# Prosodic optimization: the Middle English length adjustment

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During late Old and Middle English, the distribution of short and long vowels in stressed syllables was profoundly altered. The changes involved have traditionally been understood as conspiring to optimize syllable quantity according to the position of the syllable in the word. However, Minkova's reformulation of so-called Middle English Open Syllable Lengthening (MEOSL) as a purely compensatory process appears difficult to reconcile with the traditional approach, which has recently been further compromised by suggestions that Trisyllabic Shortening was not a genuine historical sound change. In this article, Minkova's analysis is supported with new evidence of phonological conditioning behind the irregular lengthening of unapocopated disyllabic stems (e.g. *raven* vs *heaven*, *body*, *gannet*). I propose solutions to Riad's 'data problem' and 'analytical problem'. Optimality Theory allows Minkova's revised statement of MEOSL to be integrated into a broader, non-teleological account of late Old and Middle English quantitative developments, including coverage of processes of lexical change such as borrowing and diffusion.

## 1 Introduction[1]

During the late Old and Middle English periods (henceforth, lOE and ME), there occurred a series of major vowel length changes known by the traditional names of Shortening before Consonant Clusters (SHOCC), Open Syllable Lengthening (MEOSL), and Trisyllabic Shortening (TRISH). Despite having attracted a great deal of attention from philologists and linguists for well over a century, these changes remain rather imperfectly understood. This article addresses some of the long-standing problems in this area in the light of Minkova and Stockwell's reappraisal of the available evidence (Minkova, 1982; Minkova & Stockwell, 1996). Arguing against Luick's (1898, 1964) interpretation of the facts, I shall furnish new data supporting Minkova's (1982) compensatory reformulation of MEOSL, and Minkova & Stockwell's (1996) skepticism regarding TRISH. I will also show how an optimality-theoretic analysis brings out the grammatical connections between MEOSL (in Minkova's revised formulation) and the other vowel length changes, particularly SHOCC. Most importantly, Optimality Theory (OT) affords a non-teleological understanding of the whole process.

[1] An earlier version of this paper was presented at the IX International Conference on English Historical Linguistics, Poznań, 30 August 1996. I thank Donka Minkova, Robert Stockwell, Nikolaus Ritt, Richard Hogg, John Hutton, Christopher McCully, and an anonymous *ELL* reviewer, for their suggestions and criticism. I am also indebted to Manuel Lama-Grande for general help with epistemological issues, and to Thórhallur Eythórsson for assistance with Hansen (1962). Only I bear responsibility for the end-result.

The argument will proceed as follows:

Section 2 criticizes the major role accorded to random analogical levelling in Luick's description of the changes. There is hardly any independent evidence that TRISH triggered the allomorphic alternations required to explain the so-called 'exceptions' of MEOSL. Moreover, lengthening in unapocopated disyllabic stems is shown to have been phonologically conditioned, in that it could only occur in those words whose post-tonic rhyme contained a sonorant consonant. I suggest how this new piece of evidence fits with the compensatory statement of MEOSL.

In section 3, I expose the logical deficiencies of conspiratorial approaches to the ME length adjustment. It is shown that MEOSL did not cause massive neutralization of vowel length distinctions, nor did it contribute to standardizing the quantity of stressed syllables according to their position in the foot. An optimality-theoretic analysis, in contrast, establishes a nonteleological connection between SHOCC and MEOSL: a hierarchy of constraints regulating Final Consonant Extrasyllabicity turns out to have played a major role in both processes. The same constraint hierarchy also determined the default input specification of vowel length in the environment of a stressed monosyllable closed by a single consonant. From this default pattern it is possible to derive correct predictions concerning the assignment of vowel length to loans from Old French (henceforth, OF) and the course of diffusing change in -VC monosyllables (e.g. *hwǣl* > *whāl* 'whale').

Section 4 provides a brief summary of results.

## 2 Empirical issues

### *2.1 Luick vs Minkova & Stockwell*

Luick's (1964) classic account of the evolution of vowel length in lOE and ME is replicated with remarkable uniformity in most other twentieth-century handbooks (e.g. Brunner, 1948; Fisiak, 1968; Jordan, 1934; Mossé, 1949; Wright & Wright, 1923). According to this approach, SHOCC shortened vowels before geminates or consonant clusters not forming a branching onset (e.g. *sōfte* > *sŏfte* 'soft', *cēpte* > *cĕpte* 'kept', *wrǣþþu* > *wrăþþe* 'wrath'); TRISH shortened vowels in stressed antepenultimate syllables (e.g. *ǣrende* > *ĕrende* 'errand', *hāligdæg* > *hŏlidai* 'holiday', *sūðerne* > *sŭðerne* 'southern'); and MEOSL lengthened non-high vowels in stressed open penultimate syllables (e.g. *năma* > *nāme* 'name', *nŏsu* > *nōse* 'nose', *mĕte* > *mēte* 'meat'). Luick supplements these sound laws with certain patterns of analogical levelling, which play a crucial role in the overall analysis. First, analogy is regarded as explaining the numerous 'exceptions' of MEOSL. Secondly, it furnishes the main bulk of the evidence for TRISH. Thirdly, it provides a cause for certain sporadic lengthenings and shortenings, otherwise unaccounted for. Three main types of analogical levelling are thus postulated:

(i) MEOSL may fail in disyllabic stems on the analogy of trisyllabic inflected forms, where TRISH requires a short vowel: e.g. *hĕofon* > *hĕven* 'heaven', without

MEOSL, on the analogy of the plural *hĕofonas* > *hĕvenes*, and so *gănet* 'gannet', *bŏdi* 'body', etc. (Luick, 1964: §392.2).

(ii) Similarly, etymologically long vowels may shorten in stressed open penults by analogy with the short root-vowels created by TRISH in the trisyllabic forms of the paradigm: e.g. *hāring* > *hĕring* 'herring' through levelling from the plural *hāringas* > *hĕringes*, and so *wāpn* > *wĕpen* 'weapon', *bōsm* > *bŏsem* 'bosom' (Luick, 1964: §387).

(iii) Monosyllables with VC rhymes may be affected by lengthening on the analogy of disyllabic inflected forms, where MEOSL introduces a long root-vowel: e.g. *hwăl* > *whāl* 'whale' by analogy with the plural *hwălas* > *whāles*, and so *blăd* > *blād* 'blade' (Luick, 1964: §392.1).

In contrast, Minkova and Stockwell refuse to contemplate analyses dependent on wholesale random analogical levelling, implying that a thorough reappraisal of the available evidence is needed. For this purpose, Minkova (1982: 40–1) defends the practice of directly comparing OE forms with their Present-day English (PDE) reflexes, arguing that the role of other potential factors such as dialect mixture is opaque in any case (the 'method of long-term reflexes'; see Ritt, 1994: 8–23). The picture emerging from Minkova and Stockwell's research shows startling differences from Luick's description.

Divergence is most significant in the case of MEOSL. Minkova (1982) gathered a corpus of 326 OE words fulfilling the traditional structural description of the change, which she supplemented with a further 107 MEOSL-candidates borrowed from Anglo-Norman before 1400.[2] From this material, she obtained the following empirical results:

(i) Lengthening was regular in items affected by Schwa Apocope: e.g. *nămа* > *name*. Only sixteen such items in the corpus, constituting just 4.9 per cent of the OE material, fail to display lengthening: e.g. *drŏpa* > *drop*. Of these sixteen items, five contain potentially interfering *-sC-* clusters: e.g. *făstan* > *fast* (verb) (Minkova, 1982: n. 5).[3]

(ii) Most of the items which remain disyllabic in PDE did not undergo lengthening: e.g. *bŏdig* > *body*, *gănot* > *gannet*, *hĕofon* > *heaven*. Of 225 unapocopated words in the entire corpus, including reflexes of both OE and Anglo-Norman material, only 36 (i.e. 16 per cent) show lengthening: e.g. *hrăfn* > *raven* (Minkova, 1982: 41).

Reviving an old proposal of Sarrazin's (1898), Minkova concluded that MEOSL was contingent upon Schwa Apocope. Hayes (1989: 266–9) formalized this analysis within Mora Theory as a straightforward case of compensatory lengthening. However, both Riad (1992: 335) and Ritt (1994: 32) take Minkova to task over the 36 lengthened unapocopated forms in the corpus, for which she made no special provision; Riad dubs this the 'data problem' of Minkova's analysis. Below I will

[2] Minkova's selection of Anglo-Norman items (1982: n. 6) reproduces a list drawn up by Bliss (1952/3: §56), with four exclusions. It contains only words which have remained disyllabic in PDE.

[3] Kim (1993: 272–3) provides a somewhat larger list of exceptions. Of course, these forms are troublesome for everyone.

show that these items comply with a significant, and hitherto overlooked, phonological generalization (section 2.3).

Minkova's compensatory reformulation of MEOSL has a knock-on effect on the status of TRISH, since analogy with shortened trisyllabic forms is no longer required to explain the absence of lengthening in disyllabic stems such as *heaven* or *body*. Moreover, there is only a vanishingly small number of cases where TRISH can be claimed to have applied to uninflected forms, as Ritt (1994: 103–5) observed. Accordingly, Minkova & Stockwell (1996: 19) state categorically that 'TRISH never existed in the history of English.' Note that, in the same paper, they proved conclusively that alternations such as *sane~sanity*, which characterize the Romance wordstock in PDE, are not the result of historical TRISH application. Developing suggestions of Marchand's (1960), Minkova and Stockwell show that such words were not borrowed as derivationally related pairs; often, the allegedly derived item entered the language centuries before the alleged base (e.g. *procession* 1150 ~ *proceed* 1350, *sanity* 1432 ~*sane* 1694). Thus, proparoxytones such as *sanity* and *vanity* were directly borrowed into English with a short vowel: 'In this sense, it is certain that [sæːnɪtɪ] never existed in English (if at all) and that it is not the historical ancestor of [sænɪtɪ]' (Minkova & Stockwell, 1996: 1).

It is important to understand that, between Luick's classic description of the changes and Minkova and Stockwell's revisionary scholarship, there has intervened a major shift in the theoretical outlook of historical linguists. Luick, together with most other handbook writers, was wholeheartedly committed to the Neogrammarian principle that all sound change is lexically regular. In the light of this principle, analogical levelling was left (once interdialectal borrowing had been discarded) as the only possible explanation of irregularities such as the 'exceptions' of MEOSL, the lengthening of *whale*-type monosyllables, and the shortening of *weapon*-type disyllables. This mind-set explains why Luick shows little interest in testing the levelling hypothesis rigorously, and why he left its empirical content rather vague; there was no inducement to formulate and check the predictions of what was, after all, the only theoretically respectable explanation.

The Neogrammarian paradigm has since been overthrown by the work of the lexical diffusionists, who have shown that at least some sound changes are implemented in a lexically selective fashion. As a result, analogy is no longer the only or the preferred explanation for irregular change: lexical diffusion is now acknowledged as a significant source of 'residue' (Wang, 1969; Chen, 1972). In the current theoretical climate, therefore, the pattern of analogical levelling traditionally postulated for ME can no longer be accepted without independent corroboration. In the following sections, I will concentrate on testing Luick's analogical account of the 'exceptions' to MEOSL. Far from yielding independent support for it, this investigation will throw up important counterevidence, which is better accommodated within Minkova's compensatory analysis.

### 2.2 *The status of TRISH*

In order to avoid circularity, Luick's analogical account of the 'exceptions' to MEOSL requires independent proof that, at some point during lOE or ME, a process of sound change was triggered whereby stressed vowels were regularly shortened in proparoxytonic words (i.e. TRISH). The evidence of shortening in disyllabic stems of the *weapon* type enlarges, but does not break, the vicious circle, since it again relies on the otherwise unproven premise that lexical irregularities in the development of ME quantity arose from levelling, and not from any other plausible source such as diffusing change.

Accordingly, we require straightforward instances of TRISH in uninflected forms; but these, as I pointed out above, are extremely scarce. The examples usually cited include *ǣrende* > *errand*, *sūðerne* > *southern*, and *ǣmette* > *emmet*. Minkova & Stockwell (1996: 14) go as far as claiming that 'the number of genuine (uninflected) native forms showing TRISH in OE is zero', since any OE form with the structure σσσ would have become disyllabic under syncope. Indeed, *ǣrende* may be included under this heading, as it shows up as disyllabic <errnde> in the *Ormulum*, and therefore subject to SHOCC. Syncope did not necessarily eliminate *all* uninflected trisyllables: certain words containing a sonorant consonant in the medial rhyme retain three sonority peaks under vowel syncope (e.g. *sūðerne*; see Luick, 1964: §353 Anm. 3).[4] But this is a minor quibble: the fact remains that, in practice, there is no evidence of TRISH in uninflected forms.

The situation hardly alters if we take into account compound words. In cases such as *Hlāfmæsse* > *Lammas*, *Mōnendæg* > *Monday*, and *Þunresdæg* > *Þūresdæg* > *Thursday*, shortening is attributable to SHOCC. Only in a few compounds has the stressed syllable remained open: e.g. *hāligdæg* > *holiday*, *Mīcheles mæsse* > *Michaelmas*. Again, a few compounds do not warrant the setting up of a sound law with the critical attribute of Neogrammarian regularity. These forms, as well as those of the *weapon* type, can be handled just as adequately by a lexically diffusing process of Trochaic Shortening (Prince, 1990; Hayes, 1995); see Bermúdez-Otero (1998).

Luick's analogical account of the 'exceptions' to MEOSL makes one further assumption. Since levelling was allegedly triggered by alternations such as *hēven*~*hĕvenes*, it is implied that, after its inception, TRISH continued to apply in fully Neogrammarian, morphologically insensitive fashion alongside MEOSL well into the thirteenth century. Yet there is indirect evidence that renders this assumption unlikely. Luick (1964: §353 Anm. 4) describes TRISH as definitely active before the end of the eleventh century and, in particular, as approximately coeval with SHOCC.[5] Given this synchronicity, we may take the behaviour of SHOCC as a

[4] With regard to regularity, the evidence of *sūðerne* > *southern* is cancelled out by that of *ēasterne* > *eastern*.

[5] Luick (1964: §369 Anm. 7) regards the appearance of forms such as *hălidai* alongside *hōli* in South-umbrian dialects as evidence that TRISH preceded the raising of OE /ɑː/ to ME /ɔː/ (see also Jordan, 1934: §24).

reliable indicator of the rate at which TRISH would have become morphologized in ME. Significantly, SHOCC was already fully morphologized in the dialect of the *Ormulum* (Holt, 1878) by *circa* 1180, before MEOSL had even started (Bermúdez-Otero, in preparation).[6] Thus, SHOCC fails to create any stem-allomorphy within Orm's nominal paradigms, where it is morphologically blocked in inflected forms: e.g. the plural of <dækenn> 'deacon' (OE *dēacon*) is spelt <dæcness>, not *<deccness>; that of <tákenn> 'token' (OE *tācn*) is spelt <tacness>, not *<taccness> (cf. the spelling of <reccnenn> 'reckon' OE *rĕcenian*). To the extent that SHOCC gives us a valid insight into the morphophonology of early ME, Luick's approach to the exceptions of MEOSL is found to rely on an implausible array of allomorphic alternations.

### 2.3 *Lengthening in unapocopated disyllables*

One can test Luick's levelling hypothesis further by looking for unexpected bias in the distribution of the 'exceptions' to MEOSL. Dobson (1962: 126–7) seems one of the first to have realised that certain well-known distributional trends are anomalous in the context of an analogical account. First, MEOSL-candidates containing the ending *-ig* regularly escaped the change: e.g. *bŏdig* > *body*.[7] Secondly, unpredictability in the length of the root-vowel is particularly acute among MEOSL-candidates whose second syllable contains a nasal or liquid consonant in the rhyme: e.g. *hĕofon* > *heaven* vs *hrăfn* > *raven*. These regularities appear to be phonological in nature, to the extent that Sweet (1888: §629) spoke of 'back-shortening' before *-er*, *-el*, *-en*, *-ing* and *-i*. Dobson observes that, if the exceptions to the traditional statement of MEOSL had a purely morphological cause, one would not expect them to display any significant phonological bias; yet bias there most definitely is.

In other words, the handbooks suggest that a MEOSL-candidate is vulnerable to analogical shortening whenever it has an imparisyllabic paradigm, i.e. it has trisyllabic inflected forms subject to TRISH. Luick accounts for the regularity of lengthening in apocopated words of the *name* type through the fact that, prior to the loss of stem-final *-e*, these words were disyllabic throughout their inflection, and so lacked forms targeted by TRISH: e.g. sg. *nāme* ~ pl. *nāmen/nāmes*. The class of

[6] According to the palaeographical evidence, the *Ormulum* was completed late in the twelfth century, by about 1180 (Parkes, 1983). That MEOSL had not yet begun in Orm's dialect is now a well-established fact, thanks to the work of Fulk (1996) and Anderson & Britton (1997). Incidentally, the absence of MEOSL in the *Ormulum* is fully compatible with Minkova's compensatory formulation of the process: although final *-e* was being lost as an oblique case ending, it remained fairly stable as a stem-vowel (Fulk, 1996: 492).

[7] According to Morsbach (1896: 94), *-ig* bore secondary stress, which prevented lengthening. However, Luick (1964: §392 Anm. 1) has convincingly shown that the assumption of secondary stress in this case is groundless and *ad hoc* (see further Minkova, 1982: 30). From a phonological viewpoint, moreover, the structure σ̀σ should favour, rather than inhibit, lengthening. In contemporary American English, for example, secondary stress on the last syllable of *Arab* has been observed to trigger lengthening of the tonic vowel, clearly in order to maintain foot binarity: /ˈærəb/ ~ /ˈeɪˌræb/. This is the so-called 'Arab rule' (Fidelholtz, 1967; and see Pater, 1995: §1.1, for an OT discussion).

Table 1 *Incidence of MEOSL among unapocopated disyllabic stems*

| | | | | |
|---|---|---|---|---|
| | Total number of items: 231 | | | |
| (a) | The post-tonic rhyme contains a sonorant consonant: 166 items | | | |
| | | N | % | e.g. |
| | (i) Lengthened: | 39 | 23.5 | *raven* |
| | (ii) Unlengthened: | 127 | 76.5 | *heaven* |
| (b) | The post-tonic rhyme contains an unchecked vowel: 24 items | | | |
| | | N | % | e.g. |
| | (i) Lengthened: | 0 | 0 | – |
| | (ii) Unlengthened: | 24 | 100 | *body* |
| (c) | The post-tonic rhyme consists of vowel plus obstruent: 41 items | | | |
| | | N | % | e.g. |
| | (i) Lengthened: | 1 | 2.4 | *naked* |
| | (ii) Unlengthened: | 40 | 97.6 | *gannet* |

MEOSL-candidates vulnerable to analogical levelling thus coincides with the class of unapocopated disyllabic stems: e.g. sg. *hēven* ~ pl. *hĕvenes*. If MEOSL-failure was caused by paradigm levelling, exceptions should be randomly scattered across this vulnerable group, regardless of the segmental makeup of its individual members. How far the actual pattern of exceptions departs from this expected distribution can now be accurately assessed through Minkova's (1982) corpus.

Analysis yields striking results; see the Appendix, summarized as table 1. Variation turns out to be strictly confined to those words whose post-tonic syllable contains a rhymal sonorant consonant, i.e. to words of the *heaven* and *raven* types. If an unapocopated disyllabic stem fails to meet this segmental condition, then lengthening is predictably absent. As was already known, items whose post-tonic rhyme contains an unchecked nondeleting vowel (the *body* type) have invariably escaped lengthening. However, items whose post-tonic rhyme consists of a vowel + obstruent sequence (the *gannet* type) also display short root-vowels. In the latter case, Minkova's corpus contains just one solitary counterexample: OE *năcod* > *naked*.[8]

It is out of the question that this biased distribution should be a mere historical accident. A simple statistical test reveals that the positive correlation between lengthening and the presence of a sonorant consonant in the post-tonic rhyme attains a very high level of significance, with $\chi^2=12.646$ and $p<0.0005$:

[8] Minkova's corpus also includes the noun *process*, but this item must be discarded since it has remained bipedal in PDE: /'prəʊˌses/. According to Wells (1990: 559), 'the -ɪs, -əs forms seem to arise only as occasional weakenings of a basic -es pronunciation'. Since we therefore have a σ́σ̀ structure, the length of the tonic vowel can be put down to the 'Arab rule' (see previous note).

Table 2 *Correlation between lengthening and presence of a sonorant consonant in post-tonic rhyme*

| | | Lengthening | | | |
|---|---|---|---|---|---|
| | | YES | | NO | |
| | | observed | expected | observed | expected |
| Sonorant C | YES | 34 | 25 | 122 | 131 |
| in post-tonic σ | NO | 1 | 10 | 64 | 55 |

NB: Five etymological doublets (i.e. items with both lengthened and unlengthened reflexes) have been excluded from the running of the test.

In view of this correlation, we must conclude that Luick's analogical account of the 'exceptions' to MEOSL is either simply wrong, or else in need of phonological qualification. Luick's proposals could be salvaged by retreating into an empirically weaker position, where the alleged allomorphic alternations between disyllabic and trisyllabic inflectional forms are regarded as merely creating the *possibility* of levelling; the actual incidence of analogical shortening would then be determined by other factors.[9] However, this manoeuvre faces a serious obstacle. One would have to explain why levelling from inflected forms was particularly favoured (indeed compulsory) in two types of word which seem to have nothing in common: the *body* class and the *gannet* class. This avenue is likely to lead to a disjointed heap of *ad hoc* stipulations.

We have found, in sum, that MEOSL complies with the following generalizations:

a. Lengthening is regularly present in items affected by apocope of stem-final -ə.
b. Lengthening applies unpredictably among unapocopated disyllables containing a sonorant consonant in the post-tonic rhyme.
c. Lengthening is regularly blocked in unapocopated disyllables lacking a sonorant consonant in the post-tonic rhyme.

This summary indicates that lengthening was conditioned by the nature of the post-tonic syllable to an even greater extent than Minkova (1982) envisaged; more importantly, it suggests, as I shall argue presently, that the compensatory interpretation of MEOSL is correct in essence.

Let us assume, in accordance with the compensatory hypothesis, that ME grammar forbade lengthening through mora-insertion, but allowed lengthening through mora-transfer (i.e. through the reassociation of a mora linked to a deleted

[9] I am grateful to an anonymous *ELL* reviewer for suggesting this approach: 'An interesting issue is raised here as to whether analogical levelling could display a phonological bias. [...] One could argue that it is precisely in such conditions – i.e., where a selection has to be made between variants, and there is no rule for doing so – that all kinds of factors, including phonological ones, could become relevant, and we might expect to find local subregularities in an otherwise random set.'

segment). In optimality-theoretic terms, this implies that the faithfulness constraint DEP$^{\mu}$, which disallows mora-insertion (McCarthy & Prince, 1995: app. A), enjoyed a high position in the constraint hierarchy, dominating antagonistic constraints such as PKPROM (which requires all stressed syllables to be heavy; Prince & Smolensky, 1993: 39). Under such circumstances, lengthening in apocopated disyllables would be regular because stem-final schwas were deleted without exception (see section 3.3). In contrast, lengthening in words such as *bŏdi* and *găneт* would be prevented by the absence of a mora-donor. In these forms, deletion of the unstressed vowel is either ungrammatical (e.g. **bod*), or it yields a monosyllable closed by a SHOCC-triggering consonant cluster (e.g. OE *mŭnuc* > ME *mŭnec* > PDE *monk*).

However, when the post-tonic rhyme contains a nasal or a liquid, the situation becomes rather more complex. In PDE, such rhymes allow more or less free variation between a syllabic sonorant and nuclear schwa. Thus, *distant* may be pronounced as either [dɪstn̩t] or [dɪstənt]; the two forms are equivalent, although the presence or absence of oral plosion in the first [t] keeps them phonetically distinct. There appears to be a continuum as regards the likelihood that the sonorant will occupy the syllable nucleus: e.g. Wells (1990) describes the unstressed schwa in *bacon* as 'sometimes optionally omitted', whilst the unstressed schwa in *sudden* is 'sometimes optionally inserted'. Crucially, this state of affairs has been a persistent feature in the history of English: so-called 'parasiting' appears in the earliest OE texts (e.g. *hræfn* vs *hræfen*; Campbell, 1959: § 363) and had important repercussions on OE metre; see Fulk (1992: ch. 1). It is therefore safe to assume that unstressed syllables allowed free variation between nuclear sonorants and schwa also in ME.

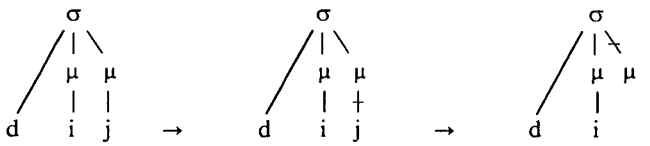
Let us now consider a ME listener in whose mental lexicon *răven* is represented as /ravən/. When such a listener is exposed to the form [ravn̩], he will find no difficulty in recognizing it as an ordinary allophonic variant of /ravən/ alongside [ravən], where underlying schwa is realized. What happens, however, if, through an accident of performance either in production or in perception (Ohala, 1989), the same listener perceives a stimulus [ra:vn̩]? His grammar may allow [ra:vn̩] to be parsed as a well-formed realization of the lexical item /ravən/: if the tonic vowel is seen to have attracted the mora delinked from the underlying schwa, the parse will satisfy DEP$^{\mu}$. In other words, 'hypocorrection' (Ohala, 1989, 1992, 1993) is likely to occur because there is a plausible mora-donor (a deletable schwa) in the environment of the lengthened vowel, and this renders lengthening grammatical.

Insofar as they are contingent on a particular set of circumstances arising in performance, such instances of hypocorrection will of course be sporadic. However, it is possible to predict an important property of their distribution: the frequency with which vowels are misanalysed as lengthened will increase in direct proportion to their intrinsic duration. Since low vowels are intrinsically longer than high ones (Lehiste, 1970), we predict that, within the class of ME disyllabic stems containing a sonorant in the post-tonic rhyme, /a/ will lengthen with greater frequency than either /e/ or /o/. This prediction is borne out: /a/ lengthens in 34.9 per cent of cases (30 out of 86), /o/ in 12.9 per cent of cases (4 out of 31), and /e/ in 10.2 per cent of cases (5

out of 49); see graph in Ritt (1994: 39). The positive correlation between /a/ and lengthening is very highly significant, with $\chi^2=11.598$ and $p<0.0005$.

It is important to realize that there are strict universal constraints on compensatory lengthening across syllable boundaries. In all instances, the mora-donor is a deleted nuclear vowel, and the floating mora travels from right to left: /namə/ → [na:m] is a canonical example (see Hock, 1986: §4, for further illustration). Within Mora Theory, Hayes (1989: 268) interprets these restrictions as reflecting the fact that morae cannot float across association lines; consequently, a mora can be housed under a new σ-node only when its original host is suppressed through the loss of its nuclear segment ('parasitic delinking'). In relation to ME, the 'parasitic delinking' condition implies that compensatory lengthening can only occur if the *vowel* of the post-tonic syllable is deleted. It is thus correctly predicted that the loss of the palatal glide [j] in the suffix *-ig* will not trigger lengthening of the root-vowel, even though the glide is rhymal and (presumably) mora-bearing.[10]

(1) [bodij] → [bodi]




Observe that, throughout this development, there is no parasitic delinking: the strong mora of the post-tonic syllable remains attached to its segmental anchor and to its σ-host. When the glide is deleted, the weak mora cannot be rehoused in the tonic syllable without leapfrogging over the strong mora and crossing association lines. Eventually, the weak mora is cast adrift and undergoes Stray Erasure.

### *2.4 Comparative evidence*

Lahiri (1995) puts forward an interesting argument in favour of the traditional approach to MEOSL. She suggests that Minkova's compensatory reformulation destroys the uniformity of West Germanic developments. According to Lahiri, Open Syllable Lengthening (OSL) operated in exactly the same way in ME, Middle High German and Middle Dutch. Differences in the distribution of long vowels across the West Germanic languages arose only through interference from other changes such as the *hochdeutsche Lautverschiebung* and TRISH, and were amplified by variable patterns of analogical levelling: 'Thus, although open syllable lengthening was found in all the West Germanic languages in the middle period, due to language independent interactions and levelling, cognate words can easily have different vowel quantity' (Lahiri, 1995: §47).

This argument is not persuasive. First, it is factually wrong. OSL did not occur in

[10] I am grateful to Donka Minkova for drawing my attention to this form of mora-loss in the *body* class.

all the West Germanic dialects: High Alemannic did not participate in the change (see e.g. Hotzenköcherle, 1986; Keller, 1961: ch. 2; Ritzert, 1898: §1). Secondly, Lahiri's claims imply that the quantity systems of the West Germanic languages underwent some sort of 'convergent drift' (Lass, 1987). The notion of convergent drift has strong teleological overtones, and its ontological status is dubious. To defend a particular analysis of MEOSL with evidence from convergent drift is to prove *ignotum per ignotius*.[11]

In fact, a glance at the Germanic family reveals that English is not the only language where analogical accounts of irregular vowel length developments have come under attack. In Danish, monosyllables with VC rhymes underwent sporadic lengthening, in the same way as the English *whale* class. Since Danish has genuine OSL, rather than mere compensatory lengthening, the analogical explanation of this irregularity (Boberg, 1896) would in this case appear to be cast-iron; but Hansen (1962: 389) presents counterevidence. As Riad (1992: 355) reports,

> Hansen notes that several original *CvC* forms that have lengthened their vowel could not have become that way analogically, for lack of bisyllabic forms to model on. Typical cases are nouns with zero plurals, e.g. *maat* 'food', *loof* 'permission', *taak* 'roof', *høør* 'flax', *øøl* 'beer', *hool* 'hole'. The definite article [suffix; RBO], which would render these words bisyllabic, was only in severely restricted use at this time. Hence, analogy alone could not explain the situation.

### 2.5 *Summary*

In the previous sections, I have shown that Luick's analogical account of the 'exceptions' to MEOSL suffers from serious empirical inadequacies.

First, there is no independent evidence that TRISH created the required allomorphic alternations. There are practically no instances of TRISH in uninflected forms. Moreover, the morphophonological behaviour of SHOCC, as manifested in the *Ormulum*, indicates that it is highly unlikely that TRISH would have remained morphologically insensitive until the thirteenth century. Minkova & Stockwell's (1996) scepticism regarding TRISH as a sound change is fully justified.

Secondly, Luick's paradigm-based approach fails to make sense of the phonological conditioning of lengthening in unapocopated disyllables. An investigation of Minkova's (1982) corpus of MEOSL-candidates has revealed that unapocopated disyllabic stems could undergo lengthening only if their post-tonic rhyme contained a sonorant consonant. I have shown how this fact can be incorporated into a compensatory analysis of MEOSL, where high-ranking DEP$^{\mu}$ forbids mora-insertion. Since nuclear sonorants occurred in free variation with schwa in unstressed

[11] Lahiri's argument is actually consistent with a long and venerable tradition inspired by so-called 'Prokosch's Law' (Prokosch, 1938: 140); cf. section 4 below. According to Lahiri (1995), this alleged West Germanic convergence was fuelled by the properties of the so-called 'Germanic foot' (Dresher & Lahiri, 1991); but Hutton (1996: 9–10) has convincingly argued that the Germanic foot is an unnecessary addition to universal foot inventories (cf. e.g. Hayes, 1995).

rhymes, leaving unrealized input schwas as plausible mora-donors, the grammar permitted hypocorrected lengthened forms to occur.

Finally, claims that OSL was a Pan-West-Germanic phenomenon are factually wrong and rely on the dubious assumption of convergent drift. Evidence from Danish reveals further inadequacies in levelling-based approaches to irregular quantity developments in the Germanic languages.

I conclude that the compensatory formulation of MEOSL is correct. Alternative non-analogical accounts of anomalous *whale*-type and *weapon*-type words must be sought; see Bermúdez-Otero (1998). I sketch some suggestions in the following pages, which present an optimality-theoretic analysis of lOE and ME quantitative developments.

## 3 Grammatical analysis

### *3.1 The teleological fallacy*

In their traditional handbook formulations, SHOCC, TRISH and MEOSL dovetail in a striking way; they create a powerful impression of purposeful historical momentum. We should therefore not be surprised that a linguistic tradition has emerged where SHOCC, TRISH and MEOSL are analysed together as a complex of functionally interrelated changes. In this tradition, vowel length in stressed syllables is regarded as having remained largely faithful to its etymological origins until lOE. At that point, the prosody of the language was reorganized upon new principles whereby vowel length came to depend on certain syllabic and accentual preferences (see e.g. Mossé, 1952: §§18–19). The *locus classicus* in this line of research is Luick (1898). This article, now exactly a century old, has cast a long shadow upon all subsequent approaches to lOE and ME quantity. Thus, Luick deserves the credit of having single-handedly manufactured the two most important 'objects' of English historical phonology: the Great Vowel Shift (see Lass, 1997: 32–40) and the ME Length Adjustment.

However, Minkova's (1982) compensatory reformulation of MEOSL and Minkova & Stockwell's (1996) dismissal of TRISH go against the very grain of this tradition (cf. Lahiri, 1995; Lass, 1992; Riad, 1992; Ritt, 1994). If one takes Minkova and Stockwell's proposals on board, the idea that ME quantity was heading in a particular direction loses much of its appeal. In sections 3.1.1 and 3.1.2, I show how the empirical results of section 2 put the traditional theoretical outlook in jeopardy. Afterwards, I assess how much unity there really was behind the lOE and ME vowel length changes, and suggest how this unity may be captured in an optimality-theoretic framework without resorting to conspiratorial scenarios.

#### *3.1.1 Luick's* Normalmaße

Luick (1898) classifies syllables into three quantitative grades (*Quantitätsstufen*): light or monomoric (*Stufe 1*), heavy or bimoric (*Stufe 2*), and superheavy or trimoric

Table 3 *The inverse proportion rule in Luick's* Normalmaß *system*

| | | | |
|---|---|---|---|
| No. of syllables in the word: | 1 | 2 | 3 |
| | ↕ | ↕ | ↕ |
| *Quantitätsstufe* of the head: | 3 | 2 | 1 |

(*Stufe 3*). He suggests that, in the transition from OE to ME, stressed syllables were assigned a standard or optimal measure (*Normalmaß*). SHOCC, TRISH and MEOSL were triggered in order to eliminate deviations from this optimal quantity. The standard quantitative grade assigned to a stressed syllable was inversely proportional to the number of unstressed syllables immediately following it within the word (table 3). Hence, in the absence of secondary stress (i.e. 'in phonetisch einfachen Wörtern'), monosyllables were optimally superheavy, disyllables were optimally headed by a heavy syllable, and trisyllables were optimally headed by a light syllable (Luick, 1898: 336).

Luick (1898: 337) encounters serious empirical difficulties with stressed monosyllables. SHOCC repaired those words which exceeded the requirements of a grade-3 syllable: e.g. *fȳlð* > *fȳlð* 'filth'. There was, however, no concomitant sound law raising the quantity of -VC monosyllables to their alleged *Normalmaß*; Luick argues that the final consonant was geminated in ME, but there is no evidence to suggest that this was anything other than a purely orthographic phenomenon (e.g. OE *Gōd* spelt <Godd> in the *Ormulum*). Similarly, unchecked monosyllables could only have attained grade 3 by means of a paragogic consonant or an overlong vowel; here, Luick makes a half-hearted attempt to conjure up some *ursprünglich Überdehnung* on the basis of present-day allophonic variation.

In polysyllabic words, Luick's hypothesis appears to work neatly if one adheres to the traditional formulations of MEOSL and TRISH; but these have now proved inadequate.

### *3.1.2 Lass: the Great Length Conspiracy*

Lass has addressed the lOE and ME vowel length changes in numerous publications (1974, 1980, 1985, 1987, 1992, 1997). His *leitmotif* has been the idea that these changes constitute an episode within a larger development: the Great Length Conspiracy (Lass, 1974: 326–34, 1987: 159–61, 1992: 72–6). Lass (1974) defined 'conspiracy' as a sequence of chronologically discrete and superficially unrelated changes whose cumulative effect is the enactment of a relevant synchronic generalization.[12] According to Lass, the various changes incorporated into the Great Length Conspiracy can be grouped on the basis of two common effects: 'reducing the number of environments in which vowel length was contrastive; and tending to stabilise certain syllable shapes as "preferred" or "optimal"' (Lass, 1992: 70). In

[12] The terms 'teleology', 'orthogenetic series', 'drift' and, most recently, 'chreod' (Lass, 1997: §6.3.5) all refer to the same empirical construct, although the metaphysics may differ.

Lass (1974: 315, 333), it was suggested that these effects may be captured by means of higher-order instructions or 'metarules' (see also Lakoff, 1972). Thus, at the most abstract level, the Great Length Conspiracy obeys a metarule of the type 'Maximise the predictability of vowel length' (Lass, 1974: 333); at a more concrete level, the changes tend towards the implementation of a Luickian *Normalmaß* system (see table 32 in Lass, 1992: 75–6).

Lass is aware that acknowledging conspiracies poses severe ontological problems. For a language to evolve in the direction specified by a metarule, there must exist some linguistic mechanism which selects the innovations adopted by successive generations of speakers (see Sapir, 1963: 155); but it is far from clear where this mechanism lies.[13] Nonetheless, following Vincent (1978: 427), my criticism of the Great Length Conspiracy will not focus on the ontological perplexities to which conspiracies lead; rather, I will make the point that, in view of the empirical results of section 2, Lass's teleological analysis requires violence to the facts. Intriguingly, Lass takes a sympathetic view of Minkova's reformulation of MEOSL: 'This requires more research, but there is no doubt that Minkova's solution, rather than the traditional one, is essentially right' (Lass, 1992: 74; see also Lass, 1985). Yet, as I will show presently, the compensatory approach to MEOSL is incompatible with Lass's description of the Great Length Conspiracy.

First, let us consider MEOSL from the viewpoint of the metarule 'Maximise the predictability of vowel length'. I have shown that the input to MEOSL is invariably a disyllabic word with a light stressed syllable whose post-tonic syllable contains a deletable schwa. In the vast majority of cases, where the input undergoes deletion of stem-final -ə, the output is a -VVC monosyllable: e.g. /namə/ ↔ [naːm]. Only in a few instances of hypocorrection does the output remain disyllabic: e.g. /ravən/ ↔ [raːvn̩]. Consequently, MEOSL did not neutralize vowel length distinctions anywhere at all. After MEOSL applied, there remained a plentiful stock of disyllabic words with light stressed syllables, including the *body* and *gannet* classes; these contrasted with items whose tonic syllable was heavy (e.g. words of the *token* class). Similarly, the new -VVC monosyllables (e.g. *name*) merged with an already existing phonological class, which contrasted with -VC monosyllables (e.g. *god*). Length distinctions were retained even among unapocopated disyllables whose post-tonic syllable contained a sonorant consonant: here, the irregularity of the hypocorrection mechanism prevented neutralization (e.g. *heaven* vs *raven*). Lass's (1992: 74) claim that the strong syllable of a disyllabic foot was a neutralizing environment is thus factually wrong.

Let us now turn to Lass's espousal of Luick's *Normalmaß* idea. Did MEOSL tend to 'stabilise certain syllable shapes as "preferred" or "optimal"'? In this connection, Lass (1992: 74) argues that Minkova's compensatory reformulation of MEOSL 'makes very little difference'. He contends that, 'whatever "open-syllable lengthening" was, its *effects* fit into the conspiracy' (Lass, 1987: 173; italics in the original).

[13] Ontological recommendations are given in Lass (1987) and (1997).

This is because 'the "aim" of the change is to substitute heavy for light in the strong syllable of a foot'; thus, 'the overall quantitative effect (light > heavy)' remains unaffected whether one follows the traditional version of MEOSL or its compensatory reformulation (Lass, 1992: 74).

This escape manoeuvre is obviously fallacious, since Lass resorts to a selective use of the empirical evidence. The implication is that the metarule 'Eliminate light stressed syllables', or some such, can be invoked *a posteriori* when a phonological process happens to fit the bill. The fact that the metarule is profusely violated elsewhere, as in the *body*, *gannet* and *heaven* classes, is declared irrelevant. As in Vennemann (1983), the teleological interpretation sits atop the actual sound laws, invulnerable to empirical challenge. The founders of OT have commented acidly on such practice (Prince & Smolensky, 1993: 198). It is disconcerting that Lass (1987, 1992) should use this ploy, since Lass (1980) clearly diagnoses its specious nature.

The following pages explore the connections between SHOCC and MEOSL within an optimality-theoretic framework. It will become apparent that both changes are structurally linked in a rather simple, nonteleological way, through the role of a constraint requiring Final Consonant Extrasyllabicity. This constraint exempts -VVC monosyllables from SHOCC, and forces morae cast adrift by deleted stem-final schwas to redock onto the root-vowel. We will see that MEOSL had nothing to do with PkProm.

### *3.2 SHOCC*

SHOCC has received a great deal of indirect attention from synchronic theorists because some of the allomorphic alternations it created have survived into PDE. The consensus view holds that SHOCC is a form of Closed Syllable Shortening (Myers, 1987; Prince & Smolensky, 1993; Rubach, 1996; Stampe, 1980). In OT, Closed Syllable Shortening is driven by $*\mu\mu\mu$, a prosodic maximality constraint prohibiting superheavy, or trimoric, syllables (Prince & Smolensky, 1993: 210–11). In order to be active, $*\mu\mu\mu$ must dominate $\text{Max}^{\mu}$, which is the correspondence constraint requiring that all input morae should surface (see McCarthy & Prince, 1995: app. A).

Monosyllables with VVC rhymes escape Closed Syllable Shortening because their final consonant is extrasyllabic. This is independently confirmed by the facts of stress-assignment, both in ME (Minkova, personal communication) and in PDE (Hayes, 1982). Final Consonant Extrasyllabicity is enforced by WeakC, a constraint demanding that a consonant in absolute word-final position should support the minimum possible prosodic structure; in other words, WeakC forces the final consonant to link up directly to the prosodic word node, bypassing the syllable and foot levels.[14] Extrasyllabic segments violate Strict Layering (Selkirk, 1984); there-

[14] In OT, extraprosodicity phenomena are viewed not as 'invisibility', but as 'weak edge' effects (Spaelti, 1994). According to this conception, the right edge of the prosodic word is inherently weak, in the sense that rightmost constituents are preferably dominated by the fewest possible hierarchical nodes.

| /li:f/ | *μμμ | WEAKC | PARSE$^{Seg}$ | MAX$^{\mu}$ |
|---|---|---|---|---|
| *a* [(li:f)] | *! | *! | | |
| *b* [(lif)] | | *! | | * |
| *c* [(li:)f] ☞ | | | * | |

Figure 1 *līf* → *lī<f>* 'life'

fore, WEAKC, will be active if, and only if, it dominates PARSE$^{Seg}$ (Prince & Smolensky, 1993: 85).[15]

We have thus established two crucial rankings for SHOCC: *μμμ » MAX$^{\mu}$, and WEAKC » PARSE$^{Seg}$. The harmonic evaluation of -VVC monosyllables is illustrated in figure 1.

Unrestricted Final Consonant Extrasyllabicity would have undesirable side-effects, since it would render -VC monosyllables monomoric and, hence, subminimal: e.g. *vă<t>. According to Hayes (1995), such conflicts between extraprosodicity and word minima are instances of a widespread 'Unstressable Word Syndrome'. Empirically, the resolution of this syndrome can be seen to vary from language to language (Hayes, 1995: 110–13). In Icelandic, for example, -V<C> monosyllables undergo OSL: e.g. *mă<n>* → *mā<n>* 'remember' 1 sg. pres. (Kiparsky, 1984). In ME -VC monosyllables, in contrast, Final Consonant Extrasyllabicity must be cancelled: e.g. *vă<t>* → *văt*. In the context of standard parametric theory, however, this type of extraprosodicity cancellation constitutes an anomalous procedure. Parameters are, in principle, 'all-or-nothing affairs' (Mester, 1994: 16); yet extraprosodicity cancellation involves the *ad hoc* resetting of a parameter for a particular class of items. In OT, in contrast, such 'non-uniformity' effects (Pater, 1995) follow naturally from run-of-the-mill constraint interaction: WEAKC can be violated like any other constraint, but, crucially, only under the compulsion of higher-ranked constraints (Prince & Smolensky, 1993: 43–7).

The Unstressable Word Syndrome is triggered by a strict ban on monomoric lexical words, which arises when FTBIN and Lx≈PR(Word) are undominated.[16] The

[15] Note that, since the advent of Correspondence Theory (McCarthy & Prince, 1995), PARSE (also known as LINK; Pulleyblank, 1997: 86–7) no longer functions as a faithfulness constraint, but as an output constraint requiring that every unit at level *n* should be dominated by another unit at level *n*+1 (Selkirk, 1984). The function of preventing the deletion of input material has been taken over by MAX constraints.

[16] FTBIN requires that all feet should be binary either at the moric or at the syllabic level (Prince, 1990: 360). Lx≈PR(Word) is a constraint on the morphology/phonology interface requiring that every lexical word should correspond to a prosodic word (Prince & Smolensky, 1993: 43). Since, by Proper Headedness (Itô & Mester, 1992: 12), every prosodic word must in turn contain at least one foot, Lx≈PR(Word) causes the requirements of FTBIN to percolate to content words.

| /vat/ | FtBin | Dep$^{\mu}$ | WeakC | Parse$^{Seg}$ |
|---|---|---|---|---|
| *a* [(va)t] | *! | | | * |
| *b* [(va:)t] | | *! | | * |
| *c* [(vat)] ☞ | | | * | |

Figure 2 *văt* → *văt*

resolution of the syndrome depends on the ranking of Dep$^{\mu}$, the constraint which forbids mora insertion (McCarthy & Prince, 1995: app. A). The Icelandic option is generated by the ranking WeakC » Dep$^{\mu}$; the vowel is lengthened at the expense of Dep$^{\mu}$ so that FtBin can be fulfilled under Final Consonant Extrasyllabicity: e.g. *mă<n>* → *mā<n>*. In ME, in contrast, Dep$^{\mu}$ outranks WeakC, forcing the syllabification of the final consonant: e.g. *vă<t>* → *văt*. The harmonic evaluation of this form is shown in figure 2.[17]

Figure 3 provides an example of SHOCC. Max$^{Seg}$ is the correspondence constraint which prevents segment deletion: it requires that every input segment should have an output correspondent. Its role in the analysis is to prevent the fulfilment of $*\mu\mu\mu$ through outright consonant deletion, as in candidate (c). Vowel shortening violates Max$^{\mu}$, but preserves the segmental integrity of the input (Prince & Smolensky, 1993: 210–11).

| /fy:lθ/ | $*\mu\mu\mu$ | Max$^{Seg}$ | WeakC | Parse$^{Seg}$ | Max$^{\mu}$ |
|---|---|---|---|---|---|
| *a* [(fy:lθ)] | *! | | * | | |
| *b* [(fy:l)θ] | *! | | | * | |
| *c* [(fy:)θ] | | *! | | * | |
| *d* [(fy:)lθ] | | | | **! | |
| *e* [(fyl)θ] ☞ | | | | * | * |

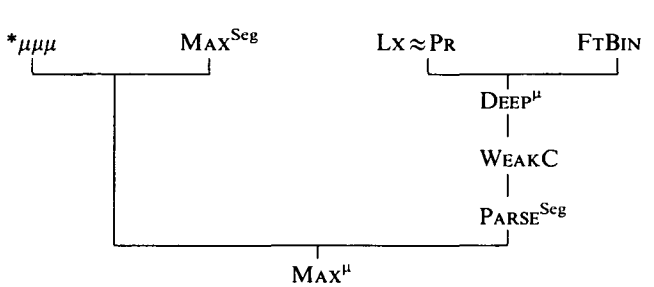
Figure 3 *fȳlþ* → *fȳl<þ>*

[17] The relative ranking of FtBin and Dep$^{\mu}$ is not crucial to the example at hand. However, FtBin must dominate Dep$^{\mu}$ if e.g. we assume that (i) alternations such as unstressed *þŭ* vs stressed *þū* 'thou' were synchronically generated in ME, and (ii) the short-vowelled form was underlying.

Candidate (c) retains the underlying long vowel; the suffix *-þ* occupies the extrasyllabic position, and bimoricity is achieved by deleting the final consonant of the stem. This incurs a fatal violation of MAX$^{Seg}$, as noted above. Candidate (d), in turn, retains the long vowel by making the two final consonants extrasyllabic, thereby incurring a double violation of PARSE$^{Seg}$. Given PARSE$^{Seg}$ » MAX$^{\mu}$, candidate (e) wins out: although it violates MAX$^{\mu}$ by shortening the vowel, it violates PARSE$^{Seg}$ just once, in order to fulfil WEAKC.

In sum, SHOCC is controlled by the following constraint hierarchy (the tree format shows only crucial rankings):

(2)




Two of the facts established in this section will prove relevant to the analysis of MEOSL and other ME vowel length developments. First, the constraint WEAKC, requiring Final Consonant Extrasyllabicity, is active in the phonology of ME (i.e. it dominates PARSE$^{Seg}$). As a result, monosyllables with VVC rhymes escape Closed Syllable Shortening and surface with an extrasyllabic consonant. Secondly, Final Consonant Extrasyllabicity is not unrestricted. Since DEP$^{\mu}$ dominates WEAKC, extrasyllabicity cannot be achieved through mora-insertion. -VC monosyllables are forced to violate WEAKC on the surface.

### *3.3 MEOSL*

MEOSL was triggered by the presence of a deletable input schwa in the post-tonic rhyme. The irregular hypocorrection mechanism involved in cases such as *hrǣfn* > *raven* was discussed in section 2.3. This section will focus on words affected by the loss of stem-final -ə (e.g. *nāma* > *name*) and will explain why lengthening was regular in this class of items.

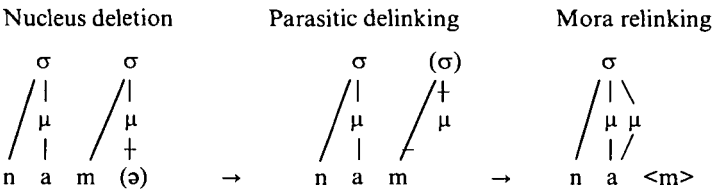
Since in lOE or early ME schwa emerged as a placeless reduction vowel, I will assume that Schwa Deletion was driven by a constraint *EMPTYV, requiring that output representations should not contain vowels lacking oral features. *EMPTYV can trigger the deletion of an underlying vowel position only if it dominates the faithfulness constraint MAX$^{Seg}$ (see section 3.2).[18] We know that deletion in stem-final position predated deletion in checked inflectional endings such as *-ed* and *-es*,

[18] *EMPTYV is intended to cover phenomena similar to those addressed by the Empty Category Principle in Government Phonology. The Empty Category Principle describes the licensing conditions under

and so we must infer that, during ME, *EMPTYV underwent crucial reranking with respect to other constraints on syllable structure; but the details are not relevant to my purposes here.

Following Hayes (1989: 266–9), diagram (3) offers a derivational representation of the mora-transfer process whereby the loss of stem-final schwa triggered lengthening of the root-vowel (for 'parasitic delinking', see section 2.3 above):

(3) *nǎme → nā<m>*




This chain of developments has a problematic weak link: after parasitic delinking, why does the floating mora skip the final consonant and dock onto the tonic vowel? Concern over this step has been independently voiced by Bickmore (1995: 148) and Riad (1992: 335–6), the latter quoting Lahiri (1991); Riad calls this 'the analytical problem' of the compensatory formulation of MEOSL. Hayes invokes Itô's (1988) proposal that prosodic structure is erected maximally, but Riad responds that default mora-to-segment association is one-to-one (as per the Association Convention; see e.g. Goldsmith, 1990: 14). It is obvious, however, that the solution cannot be a matter of universal principle, since, crosslinguistically, vowel apocope sometimes triggers compensatory lengthening, and sometimes does not. As the analysis stands, the last step in (3) must be stipulated.

In an optimality-theoretic analysis, however, this difficulty vanishes. The floating mora must dock onto the root-vowel because, through extrasyllabification, the final consonant becomes unavailable as a landing site. But the extrasyllabicity of the final consonant is not stipulated: it is required by already existing constraint rankings, established independently in the analysis of SHOCC; see (2). Here is the demonstration:

(i) Given the ranking *EMPTYV » MAX$^{Seg}$, stem-final -ə deletes, casting its own mora adrift.

(ii) With WEAKC dominating PARSE$^{Seg}$, the preceding consonant, now word-final, occupies a preferably extrasyllabic position.

(iii) Since superordinate LX≈PR and FTBIN ban monomoric lexical items (see note 16), the floating mora is compelled to reattach to the only available intrasyllabic landing site: the root-vowel.

(iv) The lengthening of the root-vowel respects DEP$^{\mu}$ because the weak mora was already present in the input as the host of stem-final -ə.

which the 'cold vowel' is phonetically unrealized (Kaye, 1990: 313–14). In her analysis of certain aspects of the historical behaviour of German schwa, Raffelsiefen (1996) posits a constraint *SCHWA.

| /namə/ | FTBIN | *μμμ | *EMPV | DEP$^{\mu}$ | MAX$^{Seg}$ | WEAKC | PARSE$^{Sg}$ | MAX$^{\mu}$ |
|---|---|---|---|---|---|---|---|---|
| *a.* (na.mə) | | | *! | | | | | |
| *b.* (na)m | *! | | | | * | | * | * |
| *c.* (na:m) | | *! | | | * | * | | |
| *d.* (nam) | | | | | * | *! | | |
| *e.* ☛ (na:)m | | | | | * | | * | |

Figure 4 *năme* → *nā<m>*

Since MAX$^{\mu}$ penalizes mora-deletion, it could be expected to enforce the reassociation of the floating mora. However, the satisfaction of MAX$^{\mu}$ turns out to be noncrucial, as figure 4 shows. The floating mora redocks in order to fulfil Word Minimality under Final Consonant Extrasyllabicity.

As figure 4 shows, the superordinate constraints FTBIN, *$\mu\mu\mu$ and *EMPTYV narrow the pool of candidates down to two: a -VC and a -VV<C> monosyllable (*d* and *e*, respectively). Since both candidates fulfil DEP$^{\mu}$ and tie on MAX$^{Seg}$, the final decision in favour of -VV<C> is down to WEAKC.

To recapitulate, in this section I have shown how OT solves the 'analytical problem' of the compensatory formulation of MEOSL. It has become apparent, moreover, that SHOCC and MEOSL were grammatically connected, in that WEAKC played an essential role in both processes. Their connection was purely mechanical, rather than teleological. The loss of stem-final -ə, which triggered MEOSL, was driven by an unrelated constraint: *EMPTYV; it had nothing whatsoever to do with the weight of the tonic syllable. Once final schwa was deleted, the already established ranking WEAKC » PARSE$^{Seg}$ demanded the extrasyllabification of the final consonant, thereby forcing the floating mora to redock onto the root-vowel.

### *3.4 OF loans and the* whale *class*

Luick (1898) regarded his *Stufe 3* as the *Normalmaß* of ME stressed monosyllables. As we saw in section 3.1.1, this claim ran into trouble over the retention of -VC forms throughout the period: e.g. *gŏd*, *văt*, etc. My analysis of SHOCC and MEOSL

| | WEAKC | PARSE$^{Seg}$ |
|---|---|---|
| -VC | *! | |
| -VV<C> ☞ | | * |

Figure 5

shows what was wrong with Luick's idea. If we ignore input specifications altogether, the ranking WEAKC » PARSE$^{Seg}$ evaluates -VV<C> monosyllables as more harmonic than -VC forms (figure 5). But input specifications *cannot* be ignored, because the faithfulness constraint DEP$^{\mu}$ outranks WEAKC. Accordingly, -VV<C> forms are ungrammatical as phonetic realizations of short-vowelled monosyllabic inputs; see figure 2. As I showed in section 3.2, ME differs from Icelandic in that Final Consonant Extrasyllabicity cannot be achieved through mora-insertion.

In other words, it would be incorrect simply to claim that long vowels were optimal in the environment $[C_0\_C^1]_{word}$, since such a claim would ignore the role of faithfulness constraints. Nevertheless, OT offers a different way of capturing the asymmetry emerging from figure 5. Optimal or 'dominant' input specifications may be defined in optimality-theoretic terms as those which lead to the best satisfaction of the constraint hierarchy by output forms (Bermúdez-Otero, 1998).[19] According to this definition, from the ranking WEAKC » PARSE$^{Seg}$ it is possible to derive an important prediction about the ME lexicon:

(4) In the environment of a stressed monosyllable closed by a single consonant, the dominant input specification of vowel length is two morae.

This result differs pointedly from Luick's *Normalmaß* proposal: Luick's *Normalmaße* embody predictions concerning the preferred *output* of ME grammar, whereas (4) explicitly refers to *preferred input specifications*. In other words, the scope of (4) is restricted to processes of change which operate upon the lexical input in an unmediated fashion, by directly filling in or substituting input specifications; such processes bypass the control of faithfulness constraints. Two processes of input change fulfilling this description are available in ME: lexical borrowing from OF and lexical diffusion.[20]

[19] This optimality-theoretic definition of dominant input specifications is implicit in the concept of Lexicon Optimization (Prince & Smolensky, 1993: §9.3; Itô, Mester & Padgett, 1995); see also Pulleyblank (1997: 92–3). For evidence of its psycholinguistic reality, see Everett & Berent (1997). Note that, under this definition, dominant feature values are not characterized in terms of underspecification (cf. Kiparsky, 1995).

[20] Minkova (1985) adduces an interesting range of empirical evidence supporting an asymmetry between -VC and -VVC monosyllables, although she motivates it formally in a different, more traditionally Luickian way.

The assignment of length specifications to stressed vowels in OF loans followed an extremely simple pattern, although the somewhat convoluted statements of the handbooks do not make it immediately apparent (cf. Minkova & Stockwell, 1996: 18). Exceptions exist, but they are not numerous:

(i) Stressed vowels were specified as long in word-final syllables closed by a single consonant. This generalization applies both to monosyllables and to oxytonic polysyllables: e.g. OF *bas* > *base*, OF *bec* > *beak*, OF *fol* > *fool*, OF *pris* > *price*; OF *desfáit* > *defeat*, OF *despít* > *despite*, OF *devót* > *devout*.[21]

(ii) Stressed vowels were generally specified as short in nonfinal syllables, including penultimate open syllables: e.g. OF *tréble* > *treble*, OF *sóuple* > *supple*; OF *jolíf* > *jolly*, OF *paláis* > *palace*, OF *trelíz* > *trellis* (see Appendix, groups *b* and *c*); OF *qualité* > *quality*, OF *vanité* > *vanity*. However, long specifications were allowed in the environment of MEOSL. Thus, the stressed vowel is long in words subject to apocope of stem-final schwa (e.g. OF *dáme* > *dame*, OF *fáce* > *face*), although these items can also be handled by the generalization covering word-final syllables. More significantly, the length of the stressed vowel is unpredictable in disyllabic stems whose post-tonic rhyme contains a sonorant consonant: e.g. OF *táble* > *table*, OF *póudre* > *powder* (cf. *treble* and *supple* above); OF *bacín* > *basin*, OF *odúr* > *odour*, vs OF *foráin* > *foreign*, OF *galón* > *gallon* (see the Appendix, group *a*).

These generalizations make it clear that the assignment of length specifications to stressed vowels in monosyllabic OF loans complied with the default pattern stated in (4). This would suggest that the ranking WEAKC » PARSE$^{Seg}$ played a significant role in the adaptation of OF loans, since there is evidence that vowel length values could not have been fully determined by the phonology of OF:

(i) OF lacked phonemic vowel length distinctions (*pace* Bliss, 1955; see Pope, 1934: §1170).[22] Accordingly, vowel length specifications in ME loans do not reflect OF phonological contrasts.

(ii) On the basis of evidence from qualitative changes, Pope claims that vowel length in OF was determined by the following allophonic rule: vowels were allophonically long in tonic open syllables and in tonic word-final syllables closed by a single consonant; elsewhere, they were allophonically short (see Pope, 1934: §§574, 575, 580).[23] If Pope is right, it is plausible that this allophonic distribution may have influenced the assignment of vowel length specifications to ME loans. According to her rule, for example, stress-shifted forms became accented on an originally short vowel: e.g. OF *jŏˈlīf* > ME *ˈjŏlĭf* 'jolly'. Nevertheless, the assumption that OF allophony determined ME length contrasts proves inadequate: ME loans display unpredictable variation both in originally tonic open syllables (e.g. *table*, *powder*, vs

[21] I use the acute accent to indicate the original position of the tonic syllable in OF.

[22] In OF there were two vowel phonemes articulated in the vicinity of [e], one derived from Late Latin tonic unchecked /a/, the other from Late Latin checked /e/; but their failure to merge need not imply a quantitative contrast (see Bliss, 1952/3: §3; Pope, 1934: §231–3).

[23] In essence, Pope postulates the continuity of a well-known early Gallo-Roman rule (Pope, 1934: §198).

*treble*, *supple*) and in originally countertonic syllables (e.g. *basin*, *odour*, vs *foreign*, *gallon*).

(iii) Finally, the length of stressed vowels in ME loans cannot have been determined by the quality of the OF vowel, since identical vowels have both short and long reflexes: e.g. OF countertonic *a* turns up as long in *basin*, but as short in *gallon*.

Empirical evidence for the role of (4) in determining the course of ME lexical change comes also from items of the *whale* type. Kiparsky (1995) makes a very persuasive case that the direction of lexical diffusion processes is grammatically controlled. Although Kiparsky's argument is cast in terms of Lexical Phonology and Underspecification Theory, his essential insight appears to be that lexically diffusing changes operate directly upon underlying representations by substituting dominant (or 'default') input specifications for recessive features in phonological environments determined by the grammar. If Kiparsky is on the right track, (4) accounts for the direction of the lexically selective change which affected items of the *whale* type: this change replaced short vowels with long ones in underlying representations in the environment $[C_0\_C^1]_{word}$.[24]

The proposals outlined in this section have clear-cut implications of general linguistic import. First, in order to determine the dominant input specification of a feature in a given environment, one has to calculate the value which leads to the best satisfaction of the constraint hierarchy by output forms. Secondly, dominance patterns in the input influence the course of lexical change, including processes of lexical borrowing and lexical diffusion. It goes without saying that the influence of input dominance cannot possibly extend to *grammatical* change, i.e. to constraint reranking, since the set of dominant input specifications of a system is itself determined by the constraint hierarchy.

## 4 Conclusion

The traditional approach to lOE and ME quantity is essentially teleological: it is fuelled by Luick's vision of a relentless pursuit of the *Normalmaß*. However, this approach takes for granted a system of empirical generalizations which has proved wholly inadequate, as I have been able to show in section 2 (see the summary in section 2.5). Attempts at neutralizing Minkova's reformulation of MEOSL have fudged the issue: Lass (1987, 1992) resorts to a selective use of the empirical evidence (see section 3.1.3); Ritt (1994) couches his analysis in vague probabilistic terms (see Bermúdez-Otero & McCully, 1997). Others, such as Lahiri (1995), reject the compensatory analysis of MEOSL altogether.

Within OT, in contrast, it is easy to incorporate the compensatory formulation of MEOSL into a broader account of lOE and ME quantity changes. Moreover, the

[24] Bermúdez-Otero (in preparation) estimates the size of the *whale* class, with results somewhat different to those of Ritt (1997).

pattern of grammatical connections which emerges from an optimality-theoretic analysis is purely nonteleological.

First, SHOCC was a form of Closed Syllable Shortening triggered by $*\mu\mu\mu$. Monosyllables with VVC rhymes escaped the change through Final Consonant Extrasyllabicity, enforced by the ranking WEAKC » PARSE$^{Seg}$. In -VC monosyllables, however, Final Consonant Extrasyllabicity was cancelled by high-ranking DEP$^{\mu}$, thereby preserving foot binarity.

Secondly, MEOSL was triggered by the presence of a deletable schwa in the post-tonic rhyme. It had nothing to do with a preference for heavy stressed syllables; the constraint PKPROM was inactive in ME, its effects neutralized by dominant DEP$^{\mu}$. The 'analytical problem' of the compensatory formulation of MEOSL (Riad, 1992: 335–6) is neatly solved by constraint rankings independently established in the analysis of SHOCC: in apocopated disyllabic stems (e.g. /namə/ → [naːm]), the floating mora was forced to dock onto the root-vowel because WEAKC required the extrasyllabification of the final consonant; since no mora-insertion took place, DEP$^{\mu}$ authorized the change.

Finally, if we set aside the role of faithfulness, the ranking WEAKC » PARSE$^{Seg}$ creates an important asymmetry between -VC and -VV<C> monosyllables. This asymmetry is reflected in dominant input specifications: in ME, the dominant vowel length specification for stressed monosyllables closed by a single consonant was two morae. This dominance pattern correctly predicts the assignment of vowel length to monosyllables and oxytones borrowed from OF. Similarly, it accounts for the direction of lexical change in the *whale* class.

My results are relevant beyond the limits of English historical phonology. First, they undermine the widely accepted notion of a Pan-Germanic quantity shift driven by Prokosch's Law.[25] Secondly, I have proposed an optimality-theoretic method for determining dominant input specifications, and I have suggested ways to apply it to the study of historical lexical change, including lexical borrowing and lexical diffusion.

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## Appendix

This appendix lists those MEOSL-candidates included in Minkova's (1982) corpus which remain disyllabic in PDE, with the sole exclusion of *process* (see note 8). Only PDE reflexes are given: for the OE and ME forms of native items, see Minkova

[25] Bermúdez-Otero (1997); cf. e.g. Árnason (1980: ch. 3), Lahiri (1995), Lass (1987: 159–62, 169; and elsewhere), Prokosch (1938: 140), Riad (1992: ch. 7; 1995), Vennemann (1988: 30).

(1982: 33–40); for Anglo-Norman items, see Bliss (1952/3: §56). The list is broken down into three groups according to the structure of the post-tonic rhyme; within each group, reflexes are classified as lengthened or unlengthened. The double bar || separates reflexes of items attested in OE from OF loans. The total number of entries (with etymological doublets receiving two entries) is 231.

a. The post-tonic rhyme contains a sonorant consonant: 166 items
(i) Lengthened: 39 items
*acorn, acre, beaver, besom* (also short), *chafer, cradle* (cf. *creddle*), *even, gable, haven, hazel, ladle, maple, navel, open, over* (cf. *uvver*), *raven, staple, taper, treadle, weasel* || *bacon, basin, blazon, capon, favour, flavour, label, labour, mason, paper, patient, savour, razor, tabor, vacant, vapour, azure* (also short), *moment, odour.*
(ii) Unlengthened: 127 items
*addle, aspen, bastard, batten, besom* (also long), *better, blather, bottom, bracken, brothel, cackle, camel, canon, castle, chaffer, clatter, cocker, cockle, copper, creddle* (cf. *cradle*), *edder, father, feather, fennel, fester, fetter, fettle, gammon, gather, gavel, gravel, hammer, hatchel, heaven, hovel, hover, kettle, Latin, latter, leather, maslin* (obs.), *nether, nettle, otter, oven, uvver* (dial.; cf. *over*), *pebble, pepper, pottle, rather, reckon, repple* (obs.), *saddle, seven, shackle, shovel, smother, sollar, swaddle, talent, tetter, throttle, throstle, water, wattle, weather, wether, whether* || *alum, azure* (also long), *baron, barren, barrel, cattle, channel, chattel, clamour, dragon, flatter, gallon, hazard, latten, mallard, manor, panel, satchel, satin, tabard, talon, tassel, travel, valour, vassal, warrant, beryl, bezant, cellar, deavour, desert, felon, herald, kennel, lecher, lesson, metal, pennon, peril, present, record, revel, second, tenant, tenor, treasure, tremor, venom, coffin, collar, common, coral, florin, foreign, honour, moral, volume; colour, covin.*

b. The post-tonic rhyme contains an unchecked vowel: 24 items
(i) Lengthened: 0 items
(ii) Unlengthened: 24 items
*barrow, belly, berry, body, callow, fallow, ferry, harry, harrow, heavy, holly, many, mellow, narrow, nephew, penny, poppy, ready, sallow, shadow, steady, tarry, yellow* || *jolly.*

c. The post-tonic rhyme consists of vowel plus obstruent: 41 items
(i) Lengthened: 1 item
*naked.*
(ii) Unlengthened: 40 items
*basked, chalice, collop, eddish, gannet, haddock, jaspis, planet, provost, radish, relic, trivet* || *anet, anise, barrat, claret, damask, faggot, habit, latchet, marish, palace, palate, statute, brevet, jealous, legate, prelate, senate, trellice, bonnet, closet, crotchet, forest, profit, rocket, rochet, socket, solace; cherish.*

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