

ON THE PHONOLOGICAL STRUCTURE OF OLD ENGLISH s+C SEQUENCES¹

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1. Introduction

Traditional phonological approaches have often identified word-initial consonant combinations with syllable onsets. In other words, all initial consonant combinations up to the first vowel have been regarded as well-formed onsets. Government Phonology (as developed in the works of Kaye, Lowenstamm, and Vergnaud 1985, 1990; Harris 1990, 1994, 1997; Kaye 1990, 1993/95, and an ever-increasing number of case-studies, for example, Charette 1991; Brockhaus 1995; Yoshida 1996; Bloch-Rozmej 1998; Cyran 1997, 1998; Cyran and Gussmann 1999) claims that syllabic constituents can be maximally binary thus allowing branching onsets. However, sequences of two initial consonants do not have to necessarily form a single syllabic constituent – the precise phonological representation of a given combination has to be determined on the basis of the examination of its phonological behaviour. The goal of this paper is to analyse the structure of Old English consonant combinations composed of s + consonant. In what follows we propose to consider evidence suggesting that OE s+C combinations fall into two groups: 1) coda-onset sequences in the case of s+plosive combinations, and 2) sequences of two onsets separated by an empty nuclear position in the case of s+sonorant combinations. The paper is organised as follows: in section 2, we present the discussion of the standard Government Phonology assumption concerning the structure of s+C combinations. It will be argued that the distribution of s+C sequences in Old English suggests that the combinations in question are not a homogeneous group. This observation will allow us to present, in section 3, a novel interpretation of OE alliteration involving s+C combinations. Finally, section 4, offers some conclusions.

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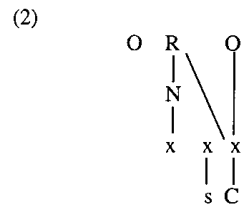
2. The phonological structure of s+C combinations

Let us start by presenting some examples of OE words with s+C combinations found word-initially. These are given in (1) below:

(1) s+C combinations

[sl]	slāw	<i>slow</i>
[sw]	sweart	<i>dark</i>
[sn]	snaca	<i>snake</i>
[sm]	smeoru	<i>fat, grease</i>
[fr]	scrinca	<i>to shrink</i>
[sp]	spell	<i>story, fable</i>
[st]	stān	<i>stone</i>
[sk] ²	scōl	<i>school</i>

The structure of s+C clusters usually assumed in Government Phonology is presented in (2) below:³



The idea that s in s+C sequences should be analysed as a rhymal complement governed by the following onset is due to Kaye (1992/96), who supports his analysis with evidence from languages like English, Italian, Ancient Greek and European Portuguese.⁴ However, as noted by Kaye himself, there is one formal problem with treating all s+C sequences as rhymal complement-onset sequences. Within interconstituent governing domains the governor occupying an onset position should be

² The cluster *sk* is always palatalised word-initially and gives *ʃ*, see Hogg (1992: §7.37). Because of this the initial *sk* in classical OE is only found in late loan-words, as in our example, which is a late borrowing from Latin, see Campbell (1959: §547). Nevertheless, even in those cases 'it is uncertain how far their pronunciation was modified to conform with the normal sound of OE' (Campbell 1959: §546).

³ In the course of our discussion it will be demonstrated that the structure in (2) is not the only possible interpretation of s+C sequences. As we shall see some cases of s+C clusters have to be regarded as projected under to separate onsets with an intervening empty nuclear position.

⁴ A number of other authors working within different approaches, for example, Kuryłowicz (1952), Selkirk (1982), Gąsiorowski (2000), have also questioned the assignment of s+C combinations to single syllabic constituents.

more complex than its governee in the rhymal complement position. This requirement is obviously satisfied for *sp*, *st*, *sk*, where *s* is followed by a plosive. However, in the case of sequences like *sl*, *sw*, *sn*, *sm*, this condition is not met. For this reason Kaye (1992/96) introduces a terminological distinction between 'natural' (*sp*, *st*, *sk*) and 'unnatural' (*sl*, *sw*, *sn*, *sm*) sequences but, nevertheless, treats them as structurally equivalent. The problem of 'natural' and 'unnatural' s+C clusters is taken up in Cyran (1997), who shows, discussing mainly Irish data, that 'unnatural' clusters are in fact sequences of two onsets separated by an empty nucleus. This is desirable since treating the 'unnatural' sequences as two onsets separated by an empty nucleus allows us to bypass the theoretical problem concerning the complexity relations in such clusters.⁵ Below we shall investigate some OE evidence suggesting that 'natural' and 'unnatural' s+C sequences are indeed structurally different.

2.1 The distribution of s+C combinations in Old English

Let us begin by considering certain facts noted by Cyran (1997), concerning the distribution of s+C clusters in MnE. What has been observed is that only 'natural' clusters are allowed word-finally, while the 'unnatural' sequences are found in this position only when the consonant following *s* is syllabic.⁶ The same situation seems to obtain for OE. Consider some examples in (3).

(3)

a.	<i>fæst</i>	<i>fast</i>		
	<i>crisp</i>	<i>curly</i>		
	<i>hosp</i>	<i>disgrace</i>		
	<i>tusc</i>	<i>tusk</i>		
b.	<i>bōsm</i>	<i>bosom</i>	alternative spelling	<i>bōsum</i>
	<i>hūsl</i>	<i>Eucharist</i>		<i>hūsel</i>
	<i>cnōsl</i>	<i>family, offspring</i>		<i>cnōsel</i>
	<i>æfesn</i>	<i>pasturage</i>		<i>æfesen</i>

⁵ At the same time it must be acknowledged that the proposal does not answer the question of why the 'natural' sequences *sp*, *st*, *sk* cannot form independent onsets. Of course, the problem does not arise if we adhere to the view that syllabification is government driven. In such a case *sp*, *st*, *sk* contract an interconstituent governing relation and are syllabified as coda-onset sequences. Note, however, that the existence of pairs like *sto* – *setka* 'hundred' in languages like Polish (even if the pattern they display is not very frequent), where the two consonants may be said to belong to separate onsets, indicates that the phonological structure of some combinations cannot be decided in advance even in those cases which meet the requirements of complexity. In the following sections we shall present evidence justifying the claim that OE s+C combinations do not form a homogeneous group.

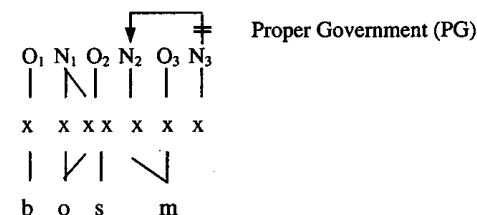
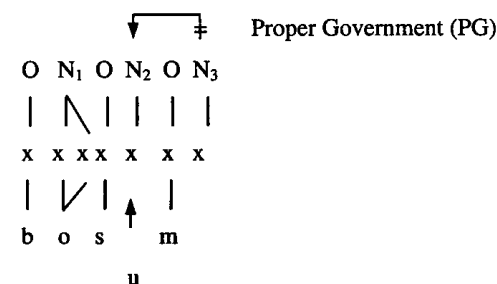
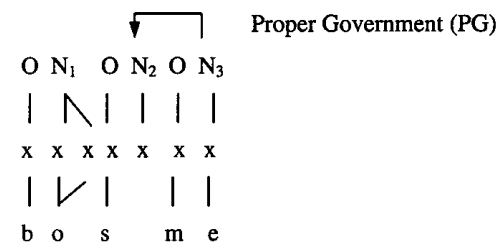
⁶ As observed by Cyran (1997: 172 fn.5), *sl*, for example, is found word-finally in MnE only when *l* is syllabic as in [wisl] *whistle*. The behaviour of *l* in such contexts is the same as in, e.g. [botl] *bottle*, where *t* and *l* are indisputably projected in two separate onsets as [tl] is not a possible branching onset or coda-onset domain.

An inspection of the data in (3) reveals an obvious difference between the two types of clusters. On the one hand, the examples in (3a) demonstrate that *sp*, *st*, *sk* can be found in the word-final position in OE. Their behaviour follows from the fact that, just like in the word-initial position, word-finally *sp*, *st*, *sk* can be said to constitute coda-onset sequences and as such are expected to appear freely in the word-final context.⁷ On the other hand, the examples given in (3b) illustrate an interesting pattern of variation (not encountered with *sp*, *st*, *sk*) whereby words with the final *sm*, *sn*, and *sl* can also appear with a vowel splitting up the final cluster. A possible way of explaining this variation is to suggest that the vowel which appears between *s* and *m*, *n*, or *l* word-finally is a phonetic realisation of an unlicensed empty nuclear position. This means that when no vowel appears between *s* and *m*, *n*, or *l* the empty nuclear position has to be licensed. It may be assumed that the source of this licensing is the syllabicity of the final sonorant, whose melody is attached to the empty nuclear position thus satisfying its licensing requirements. Note further that unless we assume that *l*, *m* and *n* are indeed syllabic in words like *bōsm*, *hūsł*, *cnōsl*, *æfesn*, the alternative spellings attested in (3b) will have to be regarded as purely accidental. Let us observe as well that with respect to the forms like those in (3b), Campbell (1959:§363) and Hogg (1992:§6.34) claim that in OE word-final resonants *l*, *r*, *m*, and *n* occurring after another consonant could either be syllabic or a vowel occurred before a resonant. The two possibilities are clearly reflected in the two variant spellings represented in (3b).⁸ Quite clearly, the conclusion which suggests itself in the light of the examples in (3b), is that *sm*, *sl*, and *sn* are best analysed as sequences of two separate onsets with an intervening empty nuclear position. Consider the representations in (4), where the two representations in (4a) depict the phonological structure of the nom.sg. *bōsm* with a syllabic *m*, and an alternative nom.sg. *bōsum*, where *m* is no longer syllabic, while (4b) presents the structure of the dat.sg. *bōsme*.

⁷ One should note, however, the existence of words like *fīst* 'fist', or *blæst* 'blast', where the word-final cluster follows a long nucleus. In such cases (found almost exclusively with *st*) the final cluster may be argued to be a combination of two onsets with the final *t* forming an independent phonological domain. See Wójcik (2001b) for a discussion.

⁸ It has to be emphasised that, as noted by Hogg (1992: §6.4), OE displayed a sharp distinction in the treatment of syllabic liquids and syllabic nasals. For liquids the preferred pattern seems to have been with the epenthetic vowel, whereas nasals are found predominantly without the preceding vowel. Putting aside those differences, we can say that what is of primary importance is the very fact of variation in this respect and the presence of an epenthetic vowel in some forms as it clearly indicates that *s+l*, *m* or *n* combinations are structurally two onsets separated by a nuclear position.

(4)

a. *bōsm**bōsum**bōsme*

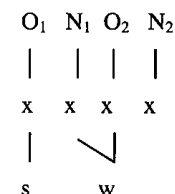
The empty nucleus N_2 separating the consonants in the 'unnatural' sequence (sm) in (4) has to be licensed in accordance with the Empty Category Principle in order to remain inaudible. In (4b), the empty nucleus N_2 is followed by a phonetically realised vowel of the ending under N_3 , which properly governs N_2 . As a result, N_2 remains inaudible. The situation is clearly different in (4a) where the empty nucleus N_2 is followed by another empty nucleus under N_3 , which is itself licensed by the domain final parameter. Crucially, however, since N_3 is empty it cannot properly govern N_2 and, consequently, N_2 must be realised phonetically. This, in turn, can be accomplished in two ways, either by providing N_2 with vocalic content, or by attaching the consonantal melody available under O_3 . If the N_2 position is filled with melody, the result is the form *bōsum*. Another possibility for N_2 to become melodically filled is through spreading the melody from the onset O_3 position into the empty N_2 position. This is the situation exemplified in (4a) by the phonological representation of *bōsm*. In such a case the consonant under O_3 is syllabic and satisfies the licensing requirements of N_2 . Quite obviously, the same analysis can be extended to the remaining cases of 'unnatural' s+C clusters enumerated in (3b), i.e. *sl* and *sn*. In each case the empty nuclear position separating two onsets can either be filled with vocalic content (*hūsel*, *æfesēn*), or the nucleus is 'taken over' by the melody spreading from the following onset, resulting in a syllabic consonant (*hūsl*, *æfesn*).⁹

The last cluster belonging to the group of 'unnatural' s+C sequences we need to look at is *sw*. As we have seen in the data in (1), it is present in the word-initial position just like *sn*, *sm*, or *sl*, but apparently differs from *sn*, *sm*, *sl* in its behaviour word-finally as it does not display the kind of variation presented in (3b). In other words, there is a total lack of words terminating in *sw* in OE. The question is whether the unavailability of *sw* word-finally inevitably means that *sw* is structurally different from other 'unnatural' sequences. We would like to argue that a different pattern of behaviour manifested by *sw* is by no means exceptional and, in actual fact, follows in a straightforward way from its structure. Being a sequence of two onsets (just like *sn*, *sm*, and *sl*), it is unavailable word-finally as a direct consequence of the lack of proper governor for the empty nucleus sandwiched between two onsets occupied by *s* and *w*. As we have indicated above, word-final *sn*, *sm*, *sl* sequences are realised as *sVn*, *sVm*, *sVl*, i.e. with a phonetically realised vowel separating the onsets if the empty position between *s* and a liquid or nasal is not properly governed. The only difference in the behaviour of *sw* is that it is never realised as *sVw*, even when no proper governor is available. For some reason the interpretation of word-final *sw* sequences always seems to involve a structure in which the melody attached to the position occupied by *w* expands to the empty nuclear position. The prediction we can make is that if the segment *w* is found in a structure parallel to the one shown in (4a) above (corresponding to the

⁹ Note that the same mechanism is involved in the variation encountered in MnE pronunciation of words like, e.g. *middle* [midl] with a syllabic *l*. According to Wells (1990: 698), it is always possible to pronounce a vowel [ə] plus an ordinary non-syllabic consonant instead of a syllabic consonant. This means that the nucleus separating the two onsets is either sounded phonetically or it is 'usurped' by the melody spreading from the following onset as in our OE examples.

option with a syllabic consonant), i.e. when its melody is attached to a nuclear position, the phonetic effect obtained should be the vowel *u*. Consider the representation in (5), which depicts the sequence *sw* word-finally.

(5)

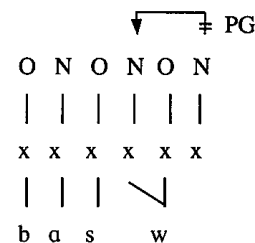


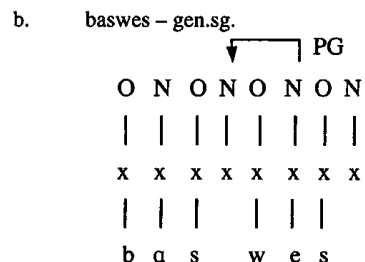
Quite obviously, in the configuration in (5) there is no proper governor for N_1 (N_2 being licensed by the domain-final parameter remains empty) and, similarly to what we encountered in (4a) in words of the *bōsm*, *hūsl* type, the nuclear position under N_1 is filled with the melody available under the following onset. As we noted above, in such a case, the expected phonetic effect is *u*. This follows from the fact that, in terms of their elemental make-up, there is no difference between *w* and *u* – both sounds are defined by the presence of the 'U' element – the observed phonetic difference between *w* and *u* depends on the syllabic position to which the melody is attached.

To test the prediction concerning the behaviour of *sw* combinations let us analyse cases of *u* – *w* alternations encountered in *wa*-stem adjectives like *basu* 'purple', or *hasu* 'grey', whose gen.sg. forms are *baswes* and *haswes* respectively. Consider the representations below.

(6)

a. basu – nom.sg.

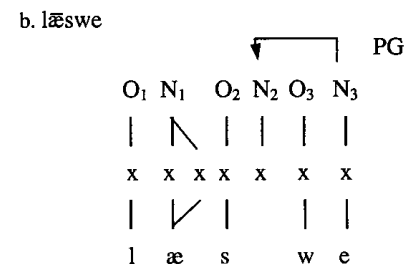
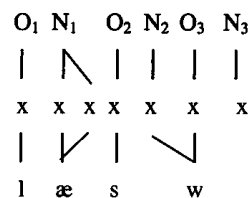




As we can see from the representations in (6), the pattern of alternations found in these forms tallies entirely with our predictions concerning the emergence of the phonetic [u] whenever the empty nuclear position between *s* and *w* cannot be properly governed by a realised nucleus to its right as in the case of nom.sg. *basu*. Note further that there is no shortage of nouns displaying the kind of alternations envisaged by our interpretation of the structure in (5), albeit with a different consonant occupying the first onset position. The nature of this consonant is not of primary importance, however, as what concerns us here is the behaviour of *w*. In this context consider alternations like *sceadu* 'shadow, nom.sg.' – *sceadwe* 'gen.sg.', *sinu* 'sinew, nom.sg.' – *sinwe* 'gen.sg.', *bealu* 'bale, nom.acc.sg.' – *beatwes* 'gen.sg.', which all display the expected *u* in the nominative, testifying to the correctness of our predictions concerning the behaviour of the word final *w* preceded by an empty nuclear position.

The predicted behaviour of *sw* sequences can also be demonstrated, although in a somewhat indirect way, by the examples involving nouns like *læs* 'pasture, nom.sg.', *læswe* 'gen.sg.':

(7)
a. læs



In the genitive case *læswe* in (7b), the vowel of the inflectional ending properly governs the empty position N_2 separating *s* and *w*, therefore it remains inaudible. The situation is different in the nominative, as there is no ending attached, hence no proper governor exists and the empty position N_2 has to be realised phonetically. This is accomplished through attaching the melody from the onset O_3 onto an empty N . The nominative is not interpreted as *læsu*, however, because of the application of the process traditionally referred to as High Vowel Deletion (HVD), which disallows *u* after a heavy syllable. It might be objected that our interpretation of the alternation *læs* – *læswe* is incorrect as it is essentially vacuous since we cannot present any evidence for the presence of *u* in the nominative. Hogg (a:§6.43 n.1), however, lists a form such as *læssuwe* which occurs in PsGl(I) 99.3 but regards it as exceptional. A possible interpretation of *læswe* is to claim that it only differs from an expected *læswe* in possessing a different morphological structure. If we assume that the inflectional ending *e* in *læsuwe* is analytic¹⁰ (hence the morphological structure of this word would be $[[læs\emptyset w\emptyset]e]$), the vowel of the ending will not be able to properly govern the empty nucleus between *s* and *w* and, consequently, the empty N will be filled with the melodic content of the following onset. Exceptional as it is, a form such as *læsuwe* demonstrates both the existence of a nuclear position between *s* and *w*, and indicates that the phonetic result of spreading the melody from the onset occupied by *w* into an empty nuclear position is the vowel *u*.

To summarise our discussion in this section, we have suggested that the differences in the distribution of 'natural' and 'unnatural' *s*+*C* sequences are a direct consequence of their different phonological structure. The 'natural' clusters form rhymal complement-onset interconstituent domains, while 'unnatural' sequences are best analysed as sequences of onsets separated by an empty N . Below we shall look at some facts connected with the OE alliterative practice which will further strengthen our claim concerning the different phonological status of the two types of clusters.

¹⁰ See Kaye (1993/95) for a discussion of analytic and non-analytic domains.

3. s+C clusters and Old English alliteration

A well-known peculiarity of OE alliteration is the exceptional treatment of words beginning with *st*, *sp* and *sk*. In outline, the identity requirement for OE alliteration, which specifies that two words can alliterate if they have the same initial consonant (although this condition can be suspended for velars and palatals)¹¹ is not fulfilled for *sp*, *st* and *sk* since initial *sp*, *st* and *sk* alliterate only as clusters. A word like *storm* 'storm' alliterates only with other words beginning with *st* like *stræt* 'street', not with, for example, *sōþe* 'truly', or *swēte* 'sweet'. This unexpected behaviour of initial *sp*, *st*, and *sk* is demonstrated in (8);¹² alliterating segments are given in bold.

- (8)
- a. **stræt wæs stanfah, stig wisode**
'The street was paved with stone, the path guided' *Beowulf* l.320
- b. Ne þurfe we us **spillan, gif we spedað** to þam
'We need not destroy one another, if you succeed in doing this'
The Battle of Maldon l.34
- c. **scaduhelma gesceapu scriðan cwomon**¹³
'and the shapes under concealing shadows came stalking' *Beowulf* l.650
- d. **searonet seowed smiþes orþancum**
'the mail-coat linked by the skill of a smith' *Beowulf* l.406
- e. **snellic særinc selereste gebeah**
'brave seamen lay down on beds in the hall' *Beowulf* l.690
- f. **þær swiðferhþe sittan eodon**
'there the stout-hearted ones went to sit' *Beowulf* l.493
- g. **Swylce ferhðfreccan Fin eft begeat**
sweordbealo sliðen æt his selfes ham
'Thus, a cruel death by the sword afterwards befell the bold-spirited Finn at his own home'
Beowulf l.1146-1147

The examples in (8a-c) demonstrate that *sp*, *st*, *sk* can only alliterate as clusters. At the same time, the examples in (8d-g), indicate that the same requirement is not imposed on the remaining sequences beginning with *s*, so that *sm* (example (8d)), *sn* (example

¹¹ See Wójcik (2001a) for an account of the behaviour of the voiced velar fricative *ɣ* under alliteration.

¹² All the examples in (8) together with their translation are quoted after Treharne (2000).

¹³ As we indicated earlier, words with the historical [sk] were presumably pronounced with the initial [ʃ] in classical OE. Hence, in examples like (8c) the alliterating segment is [ʃ]. At the same time, such examples clearly demonstrate that before the time of palatalisation what alliterated was the cluster [sk].

(8e)), *sw* (example (8f)) and *sl* (example (8g)) are free to alliterate with words beginning with *s* alone or *s* as a member of another cluster (but obviously not *sp*, *st* or *sk*). In the discussion of OE alliteration we follow Minkova (in prep.), who argues at length for accepting the premise of a linguistically defined identity as the basis for alliteration. She provides five principal reasons in support of her viewpoint – 1) general psycholinguistic grounds (alliteration is a pervasive phenomenon in the spoken language and early childhood language); psycholinguistically and cognitively, alliteration is a likely by-product of a human language; 2) in terms of its prosodic organisation OE is a prime candidate for a language in which phonologically defined alliteration could be developed and sustained; 3) scholars agree that the target audience of alliterative poetry was listeners and not readers; 4) the rigidity and consistency of alliteration within the OE verse corpus exceed by far the rigour with which alliteration was adhered to in the Finnish, Celtic, and Latin alliterative works; and finally 5) lack of alliteration or other metrical defects in *Beowulf* are often accompanied by incoherencies in meaning and syntax. Accepting the claim that OE alliteration was governed by linguistic (phonological) principles, we shall attempt to determine in the discussion to follow the phonological principle responsible for the unusual pattern of alliteration of the s+C clusters.

Let us observe at this point that this exceptional behaviour of *sp*, *st* and *sk*, puzzling as it is, has not as yet received a satisfactory explanation in the literature. Most researchers content themselves with the statement that the *sp*, *st*, *sk* alliteration is simply an exception (see, for example, Kuryłowicz 1970:13-16, Russom 1987:64 or Minkova 1998). A possible solution to the problem has been proposed in, e.g. Kuryłowicz (1952) or Gašiorowski (1997:15). Kuryłowicz (1952) maintains that s+C combinations alliterate only with themselves because they are complex units (onsets) but this does not account for the differences between s+plosive and s-sonorant alliteration. On the other hand, Gašiorowski (1997), noting the exceptional status of the three clusters in OE, proposes to represent the sequences in question as contour structures, where two consonantal melodies are associated with the same skeletal position. The idea that the clusters of *s* plus an obstruent should be analysed as a unit which can occupy a single slot goes back to Selkirk (1982), who proposes this kind of configuration in her analysis MnE syllable structure. Her conclusion is that 's plus obstruent may qualify as a single obstruent in English' irrespective of the position of this slot within the syllable. Espousing this point of view implies the following representation of *s* plus plosive clusters.

- (9)
- $$\begin{array}{c} x \\ \wedge \\ s \quad p \\ t \\ k \end{array}$$

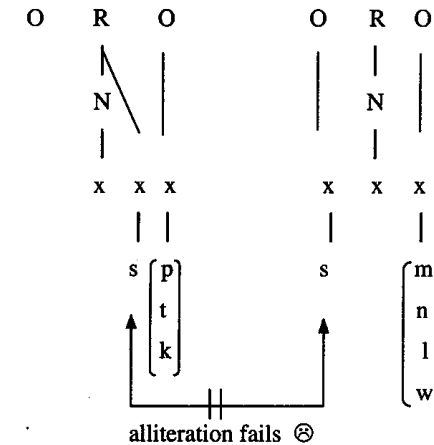
The representation in (9) has an obvious advantage since now the facts of alliteration seem easy to explain. Under this proposal, s+plosive clusters alliterate only with themselves because phonologically they are single units, not different from other single consonants.¹⁴ Working on this assumption, Gąsiorowski (1997:16) formulates the following principle of alliteration: 'syllables alliterate iff the head positions of their onsets are filled in the same way'.

The question which has to be addressed, however, is how the postulation of the contour structure for OE s+plosive sequences squares with the linguistic data. The crucial point seems to be that the contour account is contradicted by the phonological evidence provided by OE. In this respect consider a neuter noun like *nest* 'nest, nom.sg.'. If the final *st* were indeed a single segment, the syllable structure of this word would be the same as that of *scip* 'ship, nom.sg.', which unambiguously ends in a single consonant. We predict, then, that the two words should behave identically with respect to the process of HVD, which affects neuter nouns in the nominative and accusative plural deleting the final *u* after a heavy syllable (for example as in words like *word* 'word, nom.acc.sg.pl.' or *bān* 'bone, nom. acc.sg.pl.', never realised as **wordu* or **bānu* in the nom.acc.pl.) and preserving it after light syllables (in words like *scipu* 'ship, nom.acc.pl.' from *scip* 'ship, nom.acc.sg.'). Crucially for the analysis postulating contour s+C, the nom.acc.pl. of *nest* is *nest* and never **nestu*, which clearly shows that OE phonology treats s+C clusters as sequences of two segments on a par with such consonantal combinations like *rd* in *word*. Similarly, feminine nouns like *æsp* 'aspen tree, nom.sg.' or *rest* 'rest, nom.sg.' pattern in the nom.sg. with other heavy-stemmed feminine nouns like *ār* 'honour', *bād* 'pledge', or *lār* 'learning' all of which drop the final *u* in the nom.sg., as opposed to the light stem nouns which preserve the *u* ending of the nom.sg., hence *caru* 'care', *giefu* 'gift', *daru* 'injury', etc. There can be little doubt, then, that OE s+plosive sequences were phonologically equivalent to ordinary clusters of two consonants.

Note at this point that the facts of OE alliteration follow naturally if we accept the analysis which assumes the existence of a phonological difference between sequences of s+plosive and other s+C clusters established on the basis of their behaviour in the word-final context. If the two types of clusters are indeed phonologically different, their disjoint behaviour as regards alliteration is only to be expected. For example, *st* (or any other s+plosive sequence) will never alliterate with *s* alone or s+C, where C is not a plosive, because in the s+plosive configurations *s* finds itself in the coda, whereas it is always in the onset position in the remaining types of clusters or when found word-initially on its own. This suggests that, as argued by Minkova (in prep.), alliteration in OE is indeed phonologically governed and controlled not only by melodic identity (or similarity) but also the syllabic affiliation of segments. The situation is illustrated below.

¹⁴ See also the suggestion in Hogg (1992: §2.83) that *sp*, *st*, *sk* filled one slot in the onset structure.

(10)



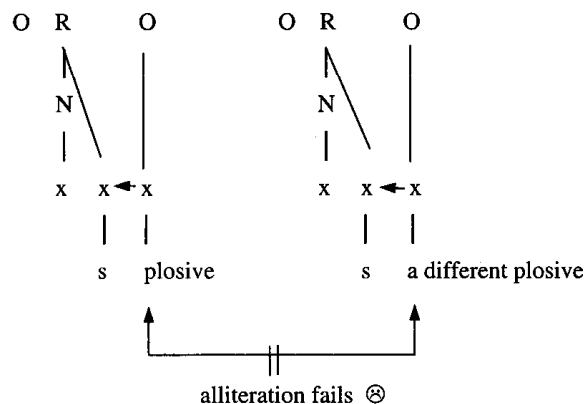
As can be seen in the representation above, alliteration fails even though 'on the surface' both types of clusters begin with the same sound, i.e. *s*. Crucially, however, *s* finds itself in two different syllabic constituents, which results in the systematic failure of alliteration between s+plosive and the remaining s+C combinations. We thus conclude that OE alliteration provides additional evidence showing that 'natural' and 'unnatural' s+C clusters should be analysed as phonologically distinct, i.e. as coda-onset sequences in the case of 'natural' clusters and as sequences of two separate onsets in the case of 'unnatural' ones.

Let us now look briefly at the mechanism of OE alliteration itself. One thing we have already observed is that alliteration is controlled by phonological factors (the syllabic affiliation of segments). In the representation in (10) alliteration fails even though both words begin with the same segment. This fact is simply ignored as apparently what matters is rather the status of *s* – a coda in one word and an onset in the other. The situation appears to be more complex, however. If the syllabic affiliation plus a phonetic identity of the first element were to be decisive, we could not correctly predict the facts connected with s+plosive alliteration. Specifically, given that s+plosive combinations all constitute coda-onset domains and the coda is invariably occupied by the same element *s*, they could be expected to alliterate freely within their own group. This means that *sp* should be found in alliteration with *st* or *sk*, just as *sl* is found alliterating with *sm* or *sn*. It looks, then, as if we encountered a basic contradiction in our interpretation of the OE facts. On the one hand, as we argued above, the most direct way of explaining the behaviour of s+plosive clusters, i.e. an analysis which regards s+plosive sequences as single segments has to be refuted.¹⁵ On the other hand, if we

¹⁵ One could say that s+plosive clusters are contour structures only initially. The phonological reasons for rejecting the contour analysis aside, note that any analysis which assumes

treat *sp*, *st*, *sk* as clusters different from other s+C combinations, we correctly predict that they should not alliterate with *sl*, *sm*, *sn*, or *sw*, but there seems to be no reason why, e.g. *sp* should not alliterate with *st* or *sk*, given their identical phonological structure (coda-onset clusters) and the fact that they all begin with the same segment. We would like to argue, however, that this contradiction can be eliminated. In order to do so we need to look at the proposed structure of s+plosive sequences once again. Consider the representation in (11), where we schematically represent two words beginning with a s+plosive sequence, assuming the plosives to be different.

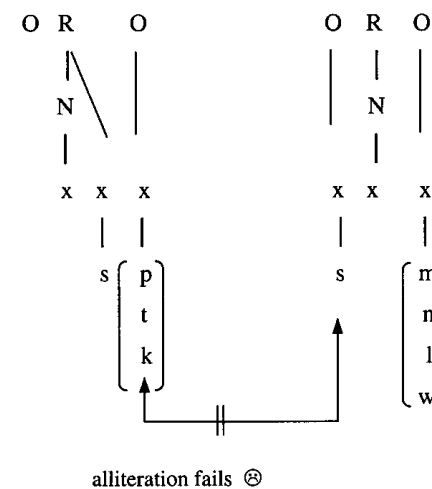
(11)



The fact that alliteration fails in (11) may receive a straightforward explanation if we assume that what really counts for the purposes of alliteration is the material found under the first, filled onset. In other words, the fact that both words begin with *s* phonetically is simply disregarded as these are found in the coda. Crucially, the first, filled onsets are occupied by a different consonant, which results in the impossibility of alliteration. The mechanism of alliteration can thus be formulated as follows: two words alliterate if their first, filled onsets are occupied by the same melodic material. If this line of reasoning is correct, we need to modify our interpretation of the representation in (10); we repeat (10) in a slightly altered version below.

contour s+C runs into serious problems if we look at these sequences from the historical perspective since the development implied would be of a very improbable type: cluster → contour structure → cluster.

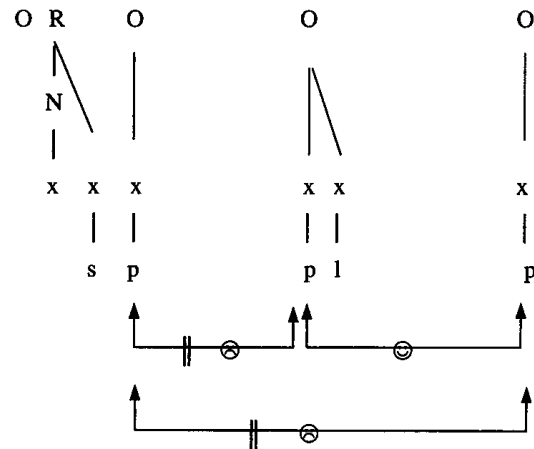
(12)



Clearly, the principle which states that two words alliterate if their initial onsets are filled in the same way can correctly predict the systematic failure of alliteration between s+plosive and the remaining s+C sequences. Under this interpretation the fact that, say, *sp* cannot alliterate with *sm* is no more surprising than the fact that there is no alliteration between *sp* and *br*, or *sm* and *kn* – in all cases the condition on the identity of onsets is not met.

Unfortunately, the proposed principle in its present shape incorrectly predicts that alliteration should be possible between s+plosive sequences and any combination starting with a given plosive or a plosive alone, that is, we should expect to find *sp* alliterating with *pl* or *p* alone, since in all these cases (i.e. *sp*, *pl*, *p*) the first onset contains identical melody. The prediction is obviously correct for *pl* and *p* as these two can alliterate, but it is downright impossible for *sp* to alliterate with *pl* or *p*. We illustrate this situation below.

(13)



What the above representation seems to suggest is that the requirement on the identity of first onsets is overridden by the ban on alliteration between a coda-onset combination and a branching or a simplex onset. If this is the case, then it may be assumed that the systematic lack of alliteration between s+plosive and other s+C combinations results directly from the fact that the two kinds of clusters are phonologically different. In other words, it is completely irrelevant what kind of melodies are encountered in s+plosive and other s+C sequences; they cannot alliterate with each other because OE disallows a coda-onset combination to alliterate with anything but another coda-onset sequence. Once this proviso is taken into account alliteration boils down to a melodic identity of the head position¹⁶ of the first onset. The principle of alliteration can now be formulated in the following way:

(14)

two words alliterate if:

the head positions of their onsets are filled by the same segment. (melodic identity)

Condition: coda-onset combinations may only alliterate with themselves.

(structural identity)

¹⁶ A governor position in the case of a branching onset.

4. Conclusion

In this paper we have provided a discussion of the phonological structure of OE s+C sequences. The analysis of the OE s+C combinations, both with respect to their behaviour in the word-initial and word-final contexts, and with respect to alliteration indicates that OE s+C combinations are not a homogenous group. As we have seen, *sp*, *st* and *sk* are best analysed along the lines proposed by Kaye (1992/96) i.e. as rhymal complement-onset sequences, whereas the remaining s+C combinations should be represented phonologically as two onsets separated by an empty nucleus. The contrasting phonological representations of the two types of s+C combinations allowed us to propose a novel interpretation of OE alliteration. The peculiarities of s+C alliteration in general, and s+plosive alliteration in particular, are in no way exceptional. Rather, OE alliteration is governed by the requirement on the melodic identity of onsets plus the requirement on the structural identity of the alliterating combinations.

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