LINGUISTICS

PREVOCALIC CONSONANT CLUSTERS IN THE HISTORY OF ENGLISH

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Introduction. 0.1. English consonant clusters have so far attracted the attention of several outstanding linguists [1] who have presented them from various points of view.

Thus, Trnka [2] limited his discussion exclusively to the listing of permitted clusters in Modern English and their origin, and treated consonant clusters only as a part of a larger issue of the distribution of phonemes.

American structuralists attempted, as can best be seen in Hill's work [3], a more systematic analysis of Modern English clusters from a strictly synchronic point of view. However, one of the basic phonological assumptions of structuralists that phonemes are the smallest units which are further indivisible, prevents them from reaching really

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[1] Bloomfield, L. *Language*, New York, 1933, pp. 131—35. — Bloomfield, L. 'The Stressed Vowels of American English', *Language XI* (1935), 97—116. — Jespersen, O. 'Monosyllabism in English', *Linguistica*, Copenhagen, 1933, pp. 384—408. — Trnka, B. *A Phonological Analysis of Present-Day Standard English*, rev. ed., Tokyo, 1966 [Ist ed. 1935], pp. 43—55. — Malone, K. 'The Phonemic Structure of English Monosyllables', *American Speech XI* (1936), 205—18. — Malone, K. 'The Phonemes of Current English', *Studies for William A. Read*, ed. N. M. Caffee and T. A. Kirkby, Baton Rouge, 1940, pp. 133—65. — Whorf, B. L. 'Linguistics as an Exact Science' in *Language, Thought and Reality*, ed. J. B. Carrol, Cambridge, Mass., 1966, pp. 220—32. — Hill, A. A. *Introduction to Linguistic Structures*, New York, 1958, pp. 68—88. — Shen, Yao. *English Phonetics*, Ann Arbor, 1962, pp. 151—59. — Robinett, B. W. 'Teaching English Consonant Clusters', *Studies in Languages and Linguistics in Honor of Charles C. Fries*, ed. A. H. Marckwardt, Ann Arbor, 1964, pp. 335—42. — Hultzén, L. S. 'Consonant Clusters in English', *American Speech XL* (1965), 5—19.

[2] E.g., Trnka, B. *loc. cit.*

[3] Hill, A. A. *loc. cit.*

powerful generalizations which would give a full account of the nature of consonant clustering in English.

The most fruitful account of the clustering, although not entirely free from weaknesses, has been given by L. S. Hultzén who has analyzed consonant clusters of Modern English within the framework of distinctive features. Yet, his treatment, nontransformational as it is, does not go beyond some generalizations, to the detriment of the whole presentation. The lack of explicit consonant combination rules is its most serious shortcoming.

0.2. Of all the analyses of English consonant clusters so far produced none has given either a complete synchronic account of Old or Middle English clusters or the development of consonant clusters from the earliest stages of English to its present-day form although this is by no means a peripheral problem of historical phonology. As has been pointed out elsewhere by the present author [4], a systematic analysis of Old English clusters may throw light on some puzzling problems of historical English phonology.

0.3. The aim of this paper, which constitutes a part of a larger study, is to present the development of prevocalic consonant clusters from Old to Modern English in terms of distinctive features, with special emphasis laid on Old and Middle English.

Its ultimate purpose it to outline the development of combination rules of the permitted sequences of consonants throughout the history of English.

OLD ENGLISH

1.1. The Old English prevocalic clusters consisted of two or three consonants.

Table 1 gives the clusters in their conventional form. The clusters have been arranged so as to display relations among themselves as well as among consonants which occur in these clusters both according to the position they occupy and possibilities of combination.

Examples:

1. /CCC-/

/skr-/	screpan	'scrape'
/spl-/	splott	'a plot of land'
/spr-/	spring	'spring'
/str-/	strand	'shore'

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[4] Fisiak, J. 'The Old English ⟨wr-⟩ and ⟨wl-⟩', *Linguistics* 32 (1967), 12—14.

	p	t	k	f	θ	s	m	n	l	r	w
p						ps?			pl	pr	
									spl	spr	
t										tr	tw
										str	
k								kn	kl	kr	kw
										skr	
f								fn	fl	fr	
θ										θr	θw
s	sp	st	sk				sm	sn	sl		sw
š										šr	
x											xw
b									bl	br	
d										dr	dw
g								gn	gl	gr	

TABLE 1

2. /CC-/

/bl-/	blac	'bright'
/br-/	brecan	'break'
/kl-/	clepian	'cry'
/kn-/	cnapa	'boy'
/kr-/	cran	'crane'
/kw-/	cwellan	'kill'
/dr-/	draca	'dragon'
/dw-/	dwelian	'err'
/fl-/	flet	'ground'
/fn-/	fnezan	'sneeze'
/gl-/	gladian	'be glad'
/gn-/	gnorn	'sorrowful'
/gr-/	great	'great'
/xw-/	hwelp	'whelp'
/pl-/	plega	'play'
/pr-/	pricung	'pricking'
/ps/?	psealm	'psalm' (also *sealm*)
/šr-/	scrincan	'shrink'
/sk-/	scolu	'school'
/sl-/	slege	'blow'
/sm-/	smolt	'quiet'
/sn-/	snaw	'snow'
/sp-/	spadu	'spade'
/st-/	standan	'stand'

/sw-/	swa	'so'
/tr-/	tredan	'tread'
/tw-/	twelf	'twelf'
/θr-/	þringan	'press'
/θw-/	þwean	'wash'

1.2. The distinctive feature representation of the Old English consonants which occur in prevocalic clusters may have been as in Table 2 [5]

DISTINCTIVE FEATURES	p	t	k	f	θ	s	š	x	b	d	g	m	n	l	r	w
Tense	+	+	+	+	+	+	+	+	−	−	−	−	−	−	−	−
Non-vocalic	+	+	+	+	+	+	+	+	+	+	+	+	+	−	−	+
Consonantal	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	−
Nasal	−	−	−	−	−	−	−	−	−	−	−	+	+	−	−	−
Interrupted	+	+	+	−	−	−	−	−	+	+	+	+	+	−	−	−
Diffuse	+	+	−	+	+	+	−	−	+	+	−	+	+	+	+	+
Grave	+	−	+	+	−	−	−	+	+	−	+	+	−	−	−	+
Mellow	+	+	+	−	−	−	−	−	+	+	+	+	+	−	+	+

TABLE 2

Note: Halle treats /w/ as a positional variant of /u/.

For the sake of convenience we will use the conventional alphabetic notation here when speaking about consonants instead of matrices of distinctive features. However, each of the letter symbols should be understood as an abbreviation of such a matrix, e.g., /bl-/ should be understood as standing for

− tense	− tense
+ non-vocalic	− non-vocalic
+ consonantal	+ consonantal
+ interrupted	− interrupted
− nasal	− nasal
+ diffuse	+ diffuse
+ grave	− grave
+ mellow	+ mellow

[5] The selection of distinctive features made by Hultzén is quite adequate for the study of consonant clusters and has been also adopted here.

1.3. The analysis of Old English prevocalic clusters has revealed that (a) certain combinations of distinctive features were not permitted in these clusters; (b) there are a few isolated combinations of graphemes which, if representing consonant clusters, would not follow the rules of distinctive feature combinations in the morpheme-initial position and their phonemic status must thus be reinvestigated.

1.4. So far the graphemic sequences ⟨wl⟩ and ⟨wr⟩ were considered to represent the clusters /wl-/ and /wr-/, whereas ⟨hn, hl, hr⟩ were treated either as the clusters /hn- hl- hr-/ [6] or as the single consonants /n̥ l̥ r̥/ [7] respectively.

Our assumption is that both ⟨wl, wr⟩ and ⟨hn, hl, hr⟩ stood for single consonants [8]. The following factors seem to favour the monophonemic interpretation of these graphemic sequences:

(1) the Old English morphemes beginning with a cluster had the features $\begin{bmatrix} + \text{ consonantal} \\ + \text{ non-vocalic} \end{bmatrix}$ in the initial position which could be followed by $\begin{bmatrix} + \text{ consonantal} \\ + \text{ non-vocalic} \end{bmatrix}$ as in /sp-/, $\begin{bmatrix} + \text{ consonantal} \\ - \text{ non-vocalic} \end{bmatrix}$ as in /pl-/ or $\begin{bmatrix} + \text{ consonantal} \\ - \text{ non-vocalic} \end{bmatrix}$ as in /kw-/. Assuming that the graphemic sequences ⟨wr, wl, hn, hr, hl⟩ represented clusters of consonants, the morphemes containing the prevocalic /*wr *wl *hn *hr *hl/ would have had to begin with the features $\begin{bmatrix} - \text{ consonantal} \\ + \text{ non-vocalic} \end{bmatrix}$.

⟨w⟩ and ⟨h⟩ in these sequences were most probably diacritics indicating a certain value of the following consonant, e.g., velarization in the case of ⟨wl⟩ and devoicing in the case of ⟨hn, hr, hl⟩.

(2) In Middle English these sequences of graphemes were simplified to ⟨l, r, n⟩ [9], reflecting the phonetic changes /r̄-> r-; l̄-> l-; l̥-> l-, r̥-> r-, etc./ which eliminated the diacritics as no longer necessary [10] because /r l n/ had had the unambiguous graphic representation ⟨r, l, n⟩.

[6] Luick, K. *Historische Grammatik der englischen Sprache*, Oxford, 1964, p. 83.

[7] Quirk, R. and C. L. Wrenn. *An Old English Grammar*, 2nd ed., London, 1958, p. 16. — Campbell, A. *Old English Grammar*, Oxford, 1959, pp. 20—21.

[8] i. e. ⟨wl⟩=/l/, ⟨wr⟩=/r̄/ (see Fisiak, J. op. cit.) and ⟨hl, hr, hn⟩=/l̥ r̥ n̥/. As can be noticed the velarized *l* and *r* have been given the phoneme status (see Reszkiewicz, A. *Elementy gramatyki historycznej języka angielskiego*, Warszawa, 1961, pp. 76ff.).

[9] The alternate possibility of treating ⟨hn, hl, hr⟩ as representing /xn xl xr/ which would satisfy the condition of § 1.4(1) must be rejected here since no explanation could be offered for their simplification in early Middle English as against the preservation of /xw/; as to the problem of ⟨wh⟩ see Vachek, J. 'On Peripheral Phonemes of Modern English', *Brno Studies in English IV* (1964), 29ff.

[10] Fisiak, J. loc. cit.

1.5. ⟨ps⟩ is the last combination of graphemes which might be questioned as to whether it represented a cluster or a single consonant.

On the one hand the prevocalic combination of features [+mellow] [−mellow] does not appear elsewhere and the spelling ⟨ps-⟩ occurs side by side with ⟨s-⟩, as in *psealm* vs. *sealm,* which would favour the monophonemic interpretation of ⟨ps-⟩. On the other hand, however, ⟨ps-⟩ appears in loanwords, and as is often the case with borrowings we may have to do here both with the assimilated form beginning with /s-/ and the unassimilated one beginning with /ps-/, existing parallely regardless of their spelling. (The same phenomenon can be observed in Modern English, e.g., *psychology*).

1.6. The morpheme structure rules for Old English concerning the prevocalic consonant clusters may be formulated as follows:

(1) If a morpheme begins with a cluster, its first element has the features $\begin{bmatrix} + \text{ consonantal} \\ + \text{ non-vocalic} \end{bmatrix}$.

(2) If a cluster consists of two phonemes, the features $\begin{bmatrix} + \text{ consonantal} \\ + \text{ non-vocalic} \end{bmatrix}$ may be followed by

(a) $\begin{bmatrix} + \text{ consonantal} \\ + \text{ non-vocalic} \end{bmatrix}$, e.g., /sp-/;

(b) $\begin{bmatrix} + \text{ consonantal} \\ - \text{ non-vocalic} \end{bmatrix}$, e.g., /pl-/;

(c) $\begin{bmatrix} - \text{ consonantal} \\ + \text{ non-vocalic} \end{bmatrix}$, e.g., /kw-/.

(3) If a cluster consists of three consonants, the first has the features $\begin{bmatrix} + \text{ consonantal} \\ + \text{ non-vocalic} \\ - \text{ mellow} \end{bmatrix}$, the second has the features $\begin{bmatrix} + \text{ consonantal} \\ + \text{ non-vocalic} \\ + \text{ mellow} \end{bmatrix}$, and the third $\begin{bmatrix} + \text{ consonantal} \\ - \text{ non-vocalic} \\ + \text{ mellow} \end{bmatrix}$.

(4) The Old English prevocalic clusters do not admit the following combinations of features:

(a) [−tense] [+tense]
(b) [−non-vocalic] [−non-vocalic]
(c) [−non-vocalic] [+non-vocalic]
(d) [−consonantal] [−consonantal]
(e) [−consonantal] [+consonantal]
(f) [+nasal] [+nasal]
(g) [+nasal] [−nasal]
(h) [−diffuse] [−diffuse]
(i) [−mellow] [−mellow]

MIDDLE ENGLISH

2.1. The Middle English prevocalic clusters were also of the type /CC-/ and /CCC-/.

In Table 3 the clusters are presented in the conventional form. The table, similarly as for Old English, displays relations among clusters as well as among consonants which occur in these clusters both according to their position and possibilities of combination.

	p	t	k	f	θ	s	m	n	l	r	w
p						ps?			pl	pr	
									spl	spr	
t										tr	tw
										str	
k							kn	kl	kr	kw
								skl	skr	skw
f							fn	fl	fr	
θ									θr	θw
s	sp	st	sk				sm	sn	sl		sw
š									šr	
x										xw
b								bl	br	
d									dr	dw
g								gn	gl	gr	gw

TABLE 3

Examples:

1. /CCC-/

/skl-/	*sclaunder*	'slander'
/skr-/	*scripture*	'writing'
/skw-/	*squirel*	'squirrel'
/spl-/	*splotti*	'spotty' (Wicl. Gen. XXX. 35)
/spr-/	*spring*	
/str-/	*strange*	

2. /CC-/

/bl-/	*blac*	'black'
/br-/	*bringe*	'bring'

/kl-/   clene   'clean'
/kn-/   knave   'boy'
/kr-/   crafty
/kw-/   questioun   'question'
/dr-/   drawe   'draw'
/dw-/   dwelle   'dwell'
/fl-/   flee
/fn-/   fnese   'sneeze'
/fr-/   from
/gl-/   glyde   'glide'
/gn-/   gnide   'rub'
/gr-/   gredy   'greedy'
/gw-/   guerdon   'reward'
/xw-/   wher   'where'
/pl-/   place
/pr-/   prince
/ps-/?   psauter   'psalter' (see § 1.5)
/sk-/   skirt
/šr-/   shrewe   'shrew'
/sl-/   slepe   'sleep'
/sm-/   smal   'small'
/sn-/   snow
/sp-/   spade
/st-/   stande   'stand'
/sw-/   swyn   'swine'
/tr-/   tree
/tw-/   twelf
/Θr-/   thrift
/Θw-/   thwert   'athwart'

2.2. The number of Middle English consonants occurring in prevocalic clusters is the same as in Old English. Their distinctive feature representation can be found in Table 2.

2.3. The evolution of prevocalic clusters from Old to Middle English resulted only in

(a) the addition of /gw-/ to the inventory of two-phoneme clusters;

(b) the addition of /skw-/ and /skl-/ to the stock of the three-phoneme clusters.

The rise of the new clusters was caused by the appearance of some Old French and Latin loanwords in Middle English.

2.4. The morpheme structure rules concerning the prevocalic consonant clusters in Middle English were the same as in Old English (see

§ 1.6). The more serious innovations have affected these rules in Modern English due both to borrowing, which is the major factor, and the internal tendencies of the development of the English language ([+interrupted][+interrupted]=/kn/ and /gn/).

It is also worthy of note that /j/ which according to all sources was a semivowel in Middle English, did not appear after consonants and before vowels. This would support the treatment of /j/ and /w/ as positional variants of /i/ and /u/ which in fact makes the description of Middle English simpler and more economic [11]

MODERN ENGLISH

3.1. The prevocalic clusters in Modern English consist of two and three consonants.

	p	t	k	f	θ	s	m	n	l	j	r	w	v
p						ps			pl	pj	pr	pw	
									spl	spj	spr		
t						tm				tj	tr	tw	
										stj	str		
k									kł	kj	kr	kw	
									skł	skj	skr	skw	
f									fl	fj	fr		
											sfr		
θ										θj	θr	θw	
s	sp	st	sk	sf	sθ		sm	sn	sl	sj		sw	sv
š								šm	šn	šl		šr	šw	
h										hj		hw	
b									ɓl	bj	br	bw	
d										dj	dr	dw	
g									gl	gj	gr	gw	
v										vj	vr		
z										zj		zw	
m										mj		mw	
										smj			
n										nj			
ł										lj			

TABLE 4

[11] Halle, M. 'On the Bases of Phonology' in J. A. Fodor and J. J. Katz, *The Structure of Language*, Englewood Cliffs, N. J., 1964, pp. 331—32.

Their inventory, arranged similarly as those of Old and Middle English clusters, has been presented in Table 4 [12].

E x a m p l e s :

1. /CCC-/

cluster	word	cluster	word
/smj-/	smew	/hw-/	where
/sfr-/	sphragistics	/zj-/	Zurich
/skl-/	sclaff	/zw-/	zouave
/skw-/	square	/Θw-/	thwart
/skr-/	scrape	/Θr-/	three
/skj-/	skew	/Θj-/	thews
/stj-/	stew	/vr-/	vraic
/spr-/	spray	/vj-/	view
/spj-/	spute	/fr-/	free
/spl-/	splash	/fj-/	few
/str-/	street	/fl-/	flight

2. /CC-/

cluster	word	cluster	word
/šr-/	shrewd	/tm-/	tmesis
/šw-/	schwa	/tw-/	twelve
/šl-/	schloop	/tr-/	try
/šn-/	schnaps	/tj-/	tube
/šm-/	schmeltz	/dw-/	dwindle
/sw-/	sweat	/dr-/	dry
/sl-/	slide	/dj-/	dune
/sn-/	snake	/gw-/	guava
/sm-/	small	/gr-/	gray
/sj-/	suit	/gj-/	gules
/sΘ-/	sthenic	/gl-/	glide
/sv-/	svelte	/bw-/	bwana
/sf-/	sphere	/br-/	bring
/sk-/	school	/bj-/	bugle
/st-/	stay	/bl-/	blow
/sp-/	speak	/kw-/	queen
/lj-/	lute	/kr-/	cruel
/nj-/	new	/kj-/	cure
/mj-/	mute	/kl-/	clean
/mw-/	moire	/pw-/	pueblo
/hj-/	huge	/pj-/	pewter
		/pr-/	proud
		/pl-/	plough
		/ps-/	psychology

3.2. The distinctive feature representation of the Modern English consonants which occur in prevocalic clusters has been given in Table 5.

FEATURE	p	t	k	f	θ	s	š	h	b	d	g	v	z	m	n	l	w	j	r
1. Tense	+	+	+	+	+	+	+	+	−	−	−	−	−	−	−	−	−	−	−
2. Non-vocalic	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	−	+	+	−
3. Consonantal	+	+	+	+	+	+	+	−	+	+	+	+	+	+	+	+	−	−	+
4. Nasal	−	−	−	−	−	−	−	−	−	−	−	−	−	+	+	−	−	−	−
5. Interrupted	+	+	+	−	−	−	−	−	+	+	+	−	−	+	+	−	−	−	−
6. Diffuse	+	+	−	+	+	+	−	−	+	+	−	+	+	+	+	+	+	+	+
7. Grave	+	−	+	+	−	−	−	−	+	−	+	+	−	+	−	−	+	−	−
8. Mellow	+	+	+	−	+	−	−	+	+	+	+	+	−	+	+	+	+	+	+

TABLE 5

3.3. The morpheme structure rules for Modern English concerning the prevocalic consonant clusters may be formulated as follows:

(1) If the morpheme begins with a cluster, its first element has the features $\begin{bmatrix} + \text{ consonantal} \\ + \text{ non-vocalic} \end{bmatrix}$ except in three clusters which begin with $\begin{bmatrix} + \text{ consonantal} \\ - \text{ non-vocalic} \end{bmatrix}$ (/lj-/) and $\begin{bmatrix} - \text{ consonantal} \\ + \text{ non-vocalic} \end{bmatrix}$ (/hj-/ and /hw-/) [13].

(2) If a cluster consists of two phonemes, the initially permitted sets of features (see above) may be followed by $\begin{bmatrix} - \text{ consonantal} \\ + \text{ non-vocalic} \end{bmatrix}$, e.g., /sp-/; $\begin{bmatrix} + \text{ consonantal} \\ - \text{ non-vocalic} \end{bmatrix}$, e.g., /kw-/; $\begin{bmatrix} + \text{ consonantal} \\ + \text{ non-vocalic} \end{bmatrix}$, e.g., /pl-/;

(3) If a cluster consists of three phonemes, the first phoneme has the features $\begin{bmatrix} + \text{ consonantal} \\ + \text{ non-vocalic} \\ - \text{ mellow} \end{bmatrix}$, the second has the features $\begin{bmatrix} + \text{ consonantal} \\ + \text{ non-vocalic} \\ + \text{ mellow} \end{bmatrix}$ (except in /sfr-/ [14] where the second phoneme has the feature [−mellow]), and the third has the features $\begin{bmatrix} + \text{ consonantal} \\ - \text{ non-vocalic} \\ + \text{ mellow} \end{bmatrix}$ or $\begin{bmatrix} - \text{ consonantal} \\ + \text{ non-vocalic} \\ + \text{ mellow} \end{bmatrix}$

(4) The Modern English prevocalic clusters do not admit the following combinations of features:

(a) [−tense] [+tense]; (b) [non-vocalic] [+non-vocalic];

(c) [−consonantal] [+consonantal]; (d) [+nasal] [+nasal];

(e) [+interrupted] [+interrupted]; (f) [−diffuse] [−diffuse].

3.4. The development of prevocalic clusters from Middle to Modern English has resulted in
(a) the appearance of twenty-eight new two-phoneme clusters;
(b) the loss of three Middle English two-phoneme clusters, i.e. /kn-, gn-, fn-/;
(c) the rise of five new three-phoneme clusters.

The changes in the number and structure of Modern English consonant clusters have been due to the appearance of a large number of loanwords (mostly French, Latin and Greek) as well as to the native phonological and phonetic processes (e.g., the development of /j/ after consonants).

CONCLUSIONS

4.1. The analysis of prevocalic clusters in Old, Middle and Modern English has revealed that
(a) Modern English has undergone serious modifications of morpheme structure rules concerning the prevocalic section (see §§ 1.6 and 3.3) whereas no change between Old and Middle English occurred in this area;
(b) the number of consonant clusters only slightly increased in Middle English while in Modern English it has been almost doubled (Table 6 and 7) which demonstrates beyond any doubt that the structure of the phonemic component of English underwent more serious changes in the fifteenth century than has so far been expected.

Two-phoneme clusters

OE	MIDDLE ENGLISH				MODERN ENGLISH			
	Total number	From OE	New	Lost	Total number	From ME	New	Lost
30	31	30	1	—	56	28[15]	28	3

TABLE 6

Three-phoneme clusters

OE	MIDDLE ENGLISH				MODERN ENGLISH			
	Total number	From OE	New	Lost	Total number	From ME	New	Lost
4	6	4	2	—	11	6	5	—

TABLE 7

[15] Mod. E /hw-/ < ME /xw-/ has been included.