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#CCV- > #CV-: Corpus-based Evidence of Historical Change in English Phonotactics

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ABSTRACT

This paper examines modifications in the phonotactic system of English, as attested in changes that affected the tactic behaviour of individual consonants. This is exemplified by the loss of initial clusters in English (#CC- > #C-), which resulted in a merger of the cluster with a single consonant and effectively changed the syllable structure to CV-; this affected initial clusters such as */kn-/, */wl-/ or */hr-/. A corpus-based study traces these changes and dates them to various periods of the historical evolution of English. The findings suggest that multiple causations can be put forward to explain phonotactic change in English, including continuation of changes inherited from Germanic (and completed in Middle English), putative contact influence with Norman French, as well as local, independent innovation. Moreover, the trajectory of loss is traced also, which indicates that phonotactic change proceeds in similar fashion to other linguistic innovations (namely in an S-curve trajectory).

KEY WORDS: Phonotactic language change, consonant clusters, syllable structure, English histoncal linguistics, parallel change vs. local innovation, S-curve pattern.

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I. INTRODUCTION: PHONOTACTIC LANGUAGE CHANGE

English historical linguistics has traditionally looked into changes that affected the vowel system. The English consonant system, in contrast, has typically been considered to be more stable and received less interest. Finegan (1990: 78, 80), for instance, claims:

> **Throughout its history, English exhibits striking instability in its system of vowels, while its consonants have remained relatively fixed especially since the fourteenth century [...] As to consonants, the English system has remained relatively stable throughout its history, and the inventory of phonemes has changd only slightly since about 1400.**

This paper argues that there is more to the synchronic and diachronic development of English consonants than has traditionally been assumed. Such an analysis can indeed contribute to the understanding of how English evolved and why it took the particular developmental trajectory it did. Very few studies have discussed the role of consonantal change in English (one of the most notable being Lutz, 1991, who argues that consonant loss was to a large part a phonotactically-driven process; see below). In a similar vein, this study looks into a particular type of consonant change in English, namely into processes that affect syllable structure by modifying syllable onsets from #CCV- to #CV-. Due to processes ofweakening and subsequent loss, an initial consonant cluster (CC) is reduced to a single consonant (C), which has the effect of adapting the syllable onset (or the entire syllable structure) to CV (for further discussion, see Schreier, 2004, 2005a). This affects how Cs combine into permissible, 'well-formed' sequential arrangements (what Crystal, 1991: 263 also refers to as the 'tactic behaviour' of individual phonemes) and thus has a direct impact on thephonotuctic system of English.

From a general typological perspective, consonant clusters are rather uncommon structures. The phonotactic systems of most of the world's languages do not permit consonant clusters, CV being the most common, and indeed universal, syllable type (Greenberg, 1966). Akmajian, Demers, Farmer & Harnish (1995: 115) point out that "across the world's languages the most common type of syllable has the structure CV(C), that is, a single consonant C followed by a single vowel V, followed in turn (optionally) by a single consonant", and Crowley (1992: 44) notes that "many languages tend to have a syllable structure of consonant plus vowel (represented as *CV*), allowing no consonant clusters and having all words ending in vowels." The typological status of clusters is further weakened in that, even in languages that permit them, syllable types with CCs are less frequent than syllables consisting of a single vowel (V) or a combination of a V and a C (Goodluck, 1991: 37). Consonant clusters are thus not only found in the minority of the world's languages; they are also minority structures in the languages that feature them. Clusters of Cs in syllable onsets and codas are typologically unusual and CCV or VCC syllable types come under analogical pressure to adapt to more common (universal) structures. This is a complex issue; for the present purpose it suffices to say that multiple mechanisms operate, perhaps the most common one (and of particular interest here) being C

loss: CC > C. Alternatively, a cluster may be altered to by epenthesis: CC > CVC.

A look at the development of English phonotactics indicates that a number of once permissible syllable-onset clusters were lost frorn the phonotactic inventory. In the words of Luick (1964: 938, translation DS), "In the course of the development of the English language, there is a repeating tendency to simplify initial clusters of consonants." Old English (OE) had a richer stock of initial clusters than Modern English (ModE), as it featured a wide variety of clusters inherited from Proto-Gerrnanic (some of which have been maintained in other Germanic languages). Consequently, a nurnber of clusters were modified or lost entirely, and the phonotactic system of English was weakened in a number of ways. For instance, a cluster was weakened in that it was lost in some lexical items while being maintained in others (in which case loss was lexically conditioned). Historical phonotactic change could affect the frequency with which clusters occur(ed), as a result of which some clusters are less frequent now than they were historically. Frequency-related changes can be exemplified by initial /kw-/, which still features in Modern English quoth or *queen* but used to be more widespread, as in *cwellan* 'kill' (Luick, 1964) or conquer (Barber, 1994: 196). Similarly, the cluster /-st/ was lost in chestnut, *Christmas* or *listen* (but not in syllable onsets), and OE/ME /sw-/ was reduced to /s-/ in words such as *swā* 'thus, so' or sweoster 'sister' (Brunner. 1963: 35; cf. German Schwester, where the cluster has been maintained). Lexical conditioning may be accompanied by phonetic conditioning here, as the loss of post-consonantal /w/ occurred most prominently in clusters followed by a back V /a:- o: - u:/, as in OE *ealswā* '> ME alsō, ME *sword* /sɔ:d/ (Mosse, 1952: 41), or in OE sweoster > ME *suster*. Crucially, though, all these clusters survive in modern varieties. This manifestation of cluster loss is a *specific* process, which only operated in certain phonetic environments and individual lexical items.

Table 1: **Lexical, phonological and phonotactic manifestations of CC loss in English**

Cluster	Word position	Example	Process
/st/	Intermediate	bristle, chestnut, Christmas, listen	Non-permanent loss (*lexically* conditioned)
/ft/	Intermediate	often	
/lx/	Final	wealh	Permanent loss (*phonologically* conditioned)
/çt/	Final	knight, night, bright	
/kn/	Initial	knee, know, knife	Permanent loss (*phonotactically* conditioned)
/gn/	Initial	gnat	
/wr/	Initial	write	

Loss of clusters can also be a function of phonological changes, more precisely of changes in the phonemic inventory of English. Phonological change had a direct impact on the phonotactic system in cases when a phoneme was lost, not only as an isolated C but also in environments when it co-featured in a cluster with other Cs. This can be exemplified by the loss

of /x/; all consonant clusters that had /x/ underwent change also. This affected among others the final clusters */-lx/ or */-rx/ (in ***wealh,*** 'wealth', *feorh*, 'life'; Quirk & Wrenn, 1994: 137). Manifestations of lexically- or phonologically-conditioned changes are less important here than cases where Cs were not lost from the phonemic inventory but simply dropped from a consonant cluster, so that the cluster disappeared from the phonotactic system of English. lt is this instance of phonotactic change that is of central interest for the present study, and Table 1 exemplifies some cases of lexical, phonological and phonotactic conditioning.

Strikingly, English lost a number of clusters though there was no accompanying phonological change to account for it. A first methodological step is thus the identification of clusters that were permanently lost from English phonotactics, and Table 2 (based on Mossé, 1952; Brunner, 1963; Luick, 1964; Pinsker, 1969; Lutz, 1991) lists an inventory of consonant sequences that underwent reduction through initial segment loss. A total of nine initial clusters have disappeared from British English and are not found in (post-)colonial varieties. The two exceptions are /hw-/, still common in Scottish English and varieties of American and New Zealand English (Schreier, Gordon, Hay & Maclagan, 2003), and /kn-/, which survives as a remnant feature on the Shetland lslands to the present day (Melchers, 2004).

Table 2: Initial CCs lost from the phonotactic system of English

Cluster	Examples
*/hn-/	*nut* /xnʊtu ~ hnʊtu/, *neck* /xnɛk:a ~ hnɛk:a/
*/hl-/	*leap* /xlɛ:pən ~ hlɛ:pən/
*/hr-/	*ridge* /xrɪʤ ~ hrɪʤ/, *raven* /xrɑ:v n ~ hrɑ:vn/
/hw-/	*whale* /xwɛɪl ~ hwɛɪl/, *which* /xwɪʧ ~ hwɪʧ/
*/fn-/	**fnæst* 'puff, blast, breath'
*/wl-/	*lisp* /wlispian/, **wlak* /wlɑk/ 'luke(-warm)', **wlate* /wlɑ:tə/ 'be scared of, **wlite* /wlitə/ 'beauty'
*/wr-/	*write* /writə/, *wrath* /wraθ/
*/kn-/(resp. */tn-/)	*knee* /kne:/, *knight* /kniçt/
*/gn-/ (resp. */dn-/)	*gnawan* /gna^{w}an/, *gnat* /gnat/

The next point concerns ***causality.*** Three questions are of particular relevance: ***When*** were these clusters lost? ***How*** were these clusters lost, and in what trajectory did this change follow? Was it quick or gradual, externally caused or language-internally motivated? And finally, can we offer explanations as to ***why*** these clusters were lost? (in contrast to related Germanic languages, such as Dutch or German, which have maintained (some of) the very same clusters). Not all of these questions have been addressed in the literature on the historical linguistics of English. The standard reference works mention when these changes occurred and there has also been some speculation as to why these clusters were lost (inost sources leaning towards a contact-based explanation, e.g. Bähr, 1975). However, to date no study has been conducted to throw light on how this change occurred and what trajectory it took. This is an oversight, as the progress of such changes gives us vital information on the historical

development of English phonotactics also. Consequently, the present study is a first attempt to redress this imbalance. Based on a historical corpus study, it tests general claims from the standard literature and provides some evidence on how they were lost, which is interpreted with relevance for causation.

II. DOCUMENTING #CCV- > #CV- IN ENGLISH

Changes in English phonotactics are mentioned in the standard literature on the history of English (Mossé, 1952; Brunner, 1963; Luick, 1964; Pinsker, 1969), but with the notable exception of Lutz's groundbreaking (1991) analysis of historical phonotactics in English, they have received little attention as a separate phenomenon. Lutz looks into /h/-loss in English and identifies several successive stages in this development, the reduction of */hl-/, */hn-/ and */hr-/ representing step 3 (Lutz 1991: 29-37); she argues very convincingly that this particular manifestation of #CC- > #C- is part of a bigger development of phonotactically-driven consonant change, which operated throughout the history of English and is still being felt and commented on today (most notably in the form of /h/-dropping in initially-stressed lexical words). The present paper draws on Lutz' pioneering work and focuses on English cluster loss with initial /h/ in more detail. lt highlights the time periods in which the various clusters disappeared and the pattern of change cluster loss adhered to. We will first look at the general literature on initial cluster loss and then test these claims by means of a corpus-based analysis of variation in spelling variants in OE, ME and Early ModE. The findings will be summarised and contextualised in the conclusion.

II.1. Earlier assessments

Most reference works on the history of English (Jespersen, 1909; Wright, 1923; Jordan, 1934; Mossé, 1952; Brunner. 1963; Kokeritz, 1963; Luick, 1964; Fisiak, 1968; Pinsker, 1969; Dobson, 1968; Bahr, 1975) agree that initial cluster loss manifested itself in several ways, and that there was in fact a considerable diachronic gap between the periods in which individual clusters disappeared. Based on direct reports of contemporary speech, literary samples (such as puns and homophones), non-standardised spelling practices as well as of evaluations or recommendations by phoneticists and orthoepists, the picture emerges that clusters were lost from the phonotactic system at successive stages. Clusters with initial /h-/ disappeared first (with the notable exception of /hw-/), followed by */fn-/ and */wl-/, and finally by */wr-/, */kn-/ and */gn-/, which survived until the Early ModE period (which is among others evidenced by the fact that <kn-> and <gn-> are still present in present-day standard spelling).

Starting in chronological order, the first clusters to disappear were those with an initial /h-/. The loss of initial segments from the clusters */hl-/, */hn-/ and */hr-/, as in *hnutu* 'nut', *hryc3* 'ridge') began in late OE (Jordan, 1934), intensified in the 12th and 13th centuries and was completed by about 1300, with areas such as Kent partaking in this change as late as in the 14th century (Toon, 1992; Brunner, 1963). There are first attestations of innovative <n-, 1-, r->

spellings in OE texts written in the 9th and 10th centuries and these variants increase in frequency in the 11th century (Jordan, 1934; Luick, 1964: 939; Harris 1954, 53); in glosses to Ealdhelm's De *laude* virginitatis, produced in the late eleventh century, scribes predominantly used <r> (Brunner, 1963), and in two manuscripts of the same source, also produced towards the end of the eleventh century, <r> and <l> are more frequent than variants with initial /h-/ (Lutz, 1991). The twelfth century was a period of increasing variation between traditional and innovative spelling variants. Manuscripts from this period vary considerably, some more extensively than others, but they clearly display a strong overall trend toward /h/-loss in this particular environment (Bahr, 1975; Mossé, 1952; Luick, 1964). The usual spellings in texts written from 1150 onwards are <n>, <l> and <r>. The Lambeth Homifies (from around 1180) and the *Ormulum* (around 1200) only have remnant forms of <hn->, <hr-> and <hl->, whereas a later text, the Ancrene *Riwle*, 1230-1250, has <n>, <l> and <r> variants throughout (Luick, 1964).

A second wave of initial cluster loss involved */wl-/, as in **wlatsom* 'disgusting' or **wlonk* 'proud, fair, beautiful', which is thought to have started in the early 11th century (Pinsker, 1969: 93). */wl-/ > /l-/ progressed in the 12th century, and in the 1380s Chaucer still has <wlatsom> ("Ful wlatsom was the stynk of his careyne", Monk's *Tale*: 1. 634) but he also consistently uses <l-> for *lisp* (Dobson, 1968). On the other hand, */wl-/ seems to have fallen out of usage by the Early ModE period as it is not commented on by orthoepists at the time (Dobson, 1968). The Oxford English Dictionary (OED) lists very few examples of <wl-> after 1400, and Jordan (1934) claims that it was no longer found in the 15th century, a view which is shared by Dobson, who suggests that "the change from [wl] to [l] was evidently completed about 1400" (1968: 975). On the other hand, there are also reports that */wl-/ may have survived until the mid-19th century in more remote areas, such as in Teviotdale/Scotland (Pinsker, 1969: 93).

The changes that affected the other initial clusters, */wr-/, */kn-/ and */gn-/, occurred at a still later stage, as all three were still reported to be common in Early ModE (Pinsker, 1969: 92). */wr-/, as in write, *wring,* wrong, or wreck, was normative throughout the OE and ME periods. The origins of this merger are commonly dated to the mid-15th century (Mossé, 1952), but <wr-> spellings continue to predominate throughout the 16th century and were adopted when spelling was standardised and codified. Dobson (1968) points out that orthoepists and phonetists at the time exclusively use this spelling, which is a very strong indication that they pronounced /w-/ in their own speech. It is only later that the /w-/ in this cluster is described as "silent" (Dobson, 1968) so that */wr-/ loss can be dated to the second half of the 17th century (Luick, 1964: 1111). The OED summarises the merger of */wr-/ with /r-/ as follows:

> **Signs of the dropping of the w begin to appear about the middle of the 15th cent. in such spellings as *ringe* for *wring* v., rong for wrong adj.; these become common in the 16th cent** [...] **In standard English the w was finally dropped in the 17th century; it has remained** (though **now obsolescent**) **in Sconish, and in some south-western English dialects is represented by v, which is also regular in north-eastern Scottish.**

*/kn-/ and */gn-/ are the last clusters lost from the phonotactic inventory of English. They were stable throughout the ME period (Kokeritz, 1963) and full realisations are maintained by all 16th and most 17th century orthoepists (Dobson, 1968: 976). This would place the beginnings of */kn-/ loss somewhere around the 1650s. There is some evidence to suggest that */gn-/ changed first, starting perhaps as early as in the 16'' century (Pinsker, 1969: 92) and being completed at some stage in the 17th century. This change also underwent a different trajectory than other clusters did. Dobson (1968: 977-9) suggests that */gn-/ to /n-/ was in fact a two-fold change, as there were ''two developments which affected educated speech in the sixteenth and seventeenth centuries.'' On the one hand, */gn-/ directly merged with /n/. This becomes evident in that orthoepists recommend an /n-/ pronunciation for <gn-> but not for <kn-> (which is evidenced by the fact that *gnash*: *Nash* are given homophone pairs, but that a corresponding kn-: n- set is lacking). On the other hand, some orthoepists recommend that <gn-> be pronounced /kn-/, and it is also commonly transcribed /kn-/. Some orthoepists at the time expressed strong value judgments by describing /kn-/ as a feature of the ''barbarous speech of [...] country people'' (quoted in Dobson, 1968: 978).

As for */kn-/, in knee, *knight* etc., this cluster remained intact until the 1650s. Then, in the later 17th and early 18th centuries, writers on pronunciation increasingly indicate the pronuniciation of <kn-> as /hn/, /tn/, /dn/ and finally as simple /n/ (Luick, 1964), and a simple /n-/ pronunciation ''was prob[ably] quite established in Standard English by 1750'' (OED). As a result, */kn-/ was quite possibly the most stable of all the clusters lost from English phonotactics. This is attested by the fact that as late as 1674, Cole (quoted in Dobson, 1968) indicates that word pairs such as *Nell* and *Knell* or *nit* and *knit* are rhymes but not homophones. Again, however, there is evidence that remote areas, such as northem Scotland, are more conservative linguistically and retained this feature. Whereas */kn-/ disappeared in all of England and most areas of Scotland by about 1800, it may have survived until recent times in the extreme north, such as on the Orkneys and Shetlands (Pinsker, 1969: 92).

As for the trajectory of this particular change, it seems that it was more complicated than a simple loss of the initial plosive. During the 17th and the first half of the 18th centuries, */kn-/ developed a regional variant */tn-/, which was still found in Cumberland and Westmoreland in the 20th century (Luick, 1964: 1113), before changing to unvoiced [n̥], and then, probably as a result of assimilation to following vowel, to [n]. Similarly, */gn-/ started to change in southem England but may have been maintained in northem Scotland until recent times (Dobson 1968). Presumably in analogy to */kn-/, this cluster regionally developed into */dn-/ and then /n-/, unless of course it changed to (and effectively merged with) */kn-/ before ultimately dying out.

ln sum, we have information on when this change occurred and some speculations on causation. The question now is whether these estimates can be upheld when we conduct a corpus-based study of #CC-> #C- in English, which might also yield vital information as to how this change occurred.

11.2. Testing the claims: A corpus-based approach

The following corpus-based historical study tests the general claims made on the historical development of initial clusters in English, namely by comparing and analysing spelling variations for the individual clusters throughout the OE, ME and —with some caution— the Early ModE periods. The methodology adopted here is similar to earlier ones, based on the assumption that spelling conventions prior to the standardisation and codification of English (ca 1500) are indicative of sound changes and thus illustrative of changes in progress.

II.2.1. Methodology

Spelling variations of selected lexical items were analysed in three large text corpora: the ***Helsinki Corpus*** (HKI; Kyto, 1993), a full-text search in the ***Oxford English Dictionary*** (OED; Murray et al., 1888-1928) and the ***Anglo-Saxon Dictionary*** (ASD; Toller, 1898). The three sources provide a useful and complementary set of data for the investigation of phonotactic change in English. The computerised collection of written text samples in the HKI contains a total of 1.572.800 words, spanning the period from c. 750 to 1720, and thus covering the entire OE, ME and Early ModE periods. The OED is the most comprehensive English dictionary compiled on historical principles, providing historical information for each entry, including notes on usage, archaisms, colloquialisms, as well as quotes illustrating first and last occurrences, etymologies, etc. Moreover, the (1989) edition of the OED runs to 20 volumes and is also available on CD-ROM, which allows a full-text search for each of the selected items. The ASD, finally, provides a third compilation of OE words with Germanic ancestry, complete with text samples and information on related word forms. This source provided further specimen that were incorporated in the analysis; furthermore, the information provided was particularly useful to check that the same lexeme was not included twice in the study (which was not always a straightforward task, particularly not in the case of strong OE verbs with suppletive forms).

When classifying the historical alignment of spelling conventions and identifying periods for the chronological development of initial cluster loss, the time frame adopted in the HKI was followed, which divides the entire period into 11 sub-periods (four for OE (01-4), four for ME (M1-4) and three for Early ModE (E1-3): 0 1 -850, O2 850-950, 0 3 950-1050, O4 1050-1150, M1 1150-1250, M2 1250-1350, M3 1350-1420, M4 1420-1500, E1 1500-70, E2 1570-1640, E3 1640-1710). However, the first two categories, O1 and 0 2, were often collapsed here since very few items were available for the first period.

As for data selection, a limited set of lexical items was selected for each cluster, preferably items that a) occurred with at least moderate text frequency, b) were characterised by variation between the two spelling conventions (featuring both <hn-> and <h-> spellings, e.g. in <hnutu> ~ <nute>), and c) had some historical depth so that they featured in texts from various periods. With these objectives, a set of lexical items was identified for each of the clusters investigated (see Appendix A for a list of lexical items considered for analysis). Examples were searched and drawn from all three sources and then classified by spelling

convention and time period. The historical alignment of clusters, as indicated by the spelling variants, was then tabularised and illustrated in Figures, with overall frequency on the y axis and the time frame on the x axis. The method of data presentation adopted here gives insights into the historical trajectory of initial cluster loss in English and illustrates the periods in which clusters were lost and also at what rate they disappeared. By the same token, care has to be taken as there are some fluctuations due to the different availability of data and text sources for the respective periods (which is particularly noticeable in the 0 3 period); thus, fluctuations may be interpreted as a real-time in- or decrease whereas they are only indicative of the availability of text samples for a given period. When collecting the data, great care was taken that only words were extracted that etymologically had the cluster. In cases when there were related forms (as in preterits or participles of strong verbs), these were checked for accuracy by consulting etymological information from the OED or ASD. In case of doubt, items were not considered.

II.2.2. Results

The individual cluster groups are discussed separately; we start with */hl-/, */hn-/ and */hr-/ and then go on to discuss manifestations of */wl-/ and */wr-/ loss. All these changes occurred prior to English standardisation (or were in progress or in an advanced stage), and the varying spellings yield information on the individual changes.

*II.*2.2.a */hl-/, */hn-/, */hr-/*

To start with */hr-/, there was coexistence of both spelling variants from the very first records available, and variation continued throughout the OE period. <hr-> was used more often, however, and the early period, until roughly 1100, saw a predominant trend to use the <hr-> spelling. Figure 1 indicates that <r-> remained a minority variant until ca 1150, after which its usage increased at the expense of <hr->, which became less frequent and disappeared in the 13th century. There are no attestations of <hr-> spellings from that period onwards. This suggests that */hr-/ and /r-/ coexisted for a lengthy period of time, that the demise of /hr-/ can be dated to the 12th century, and that this cluster was ultimately lost by about 1300.

<hn-> and <hl-> display almost the same trajectory (Figures 2 and 3). Whereas */hn-/ may have been the most robust of the three clusters in question (which is indicated by the fact that there are more attestations of <hn-> in the 1250-1350 time frame), both of these spellings disappear by about 1300 as well. A general pattern underlies the loss of these clusters: Even though <hn, hr-, hl-> were majority variants until about 1100 or even longer, they were in a state of competition with innovative <n-, 1-, r->, which increased their usage from 1100-1300. This indicates that the three clusters disappeared between 1100 and 1300 before they ultimately merged with /l/, /n/ and /r/, respectively.

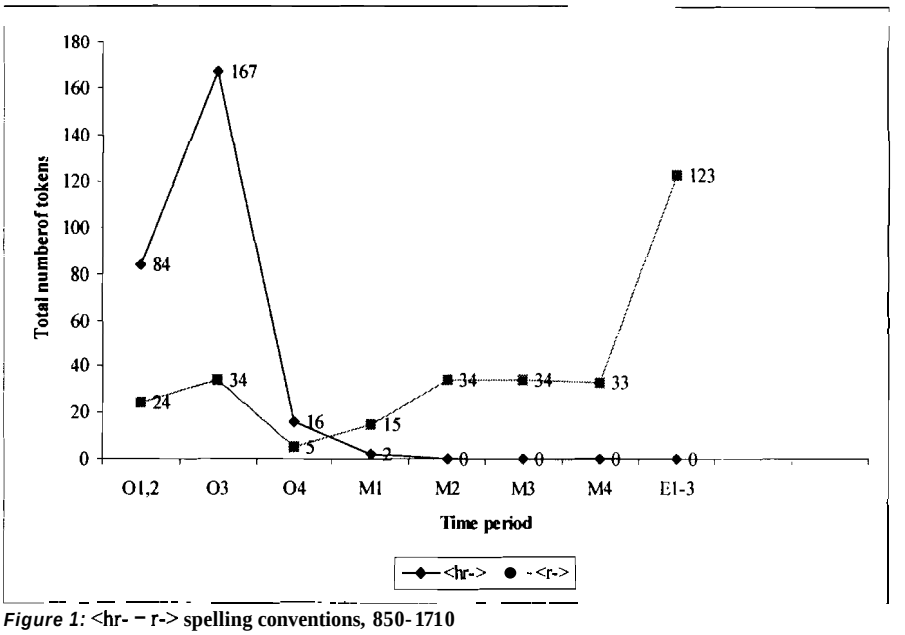

Figure 1: <hr- – r-> spelling conventions, 850-1710

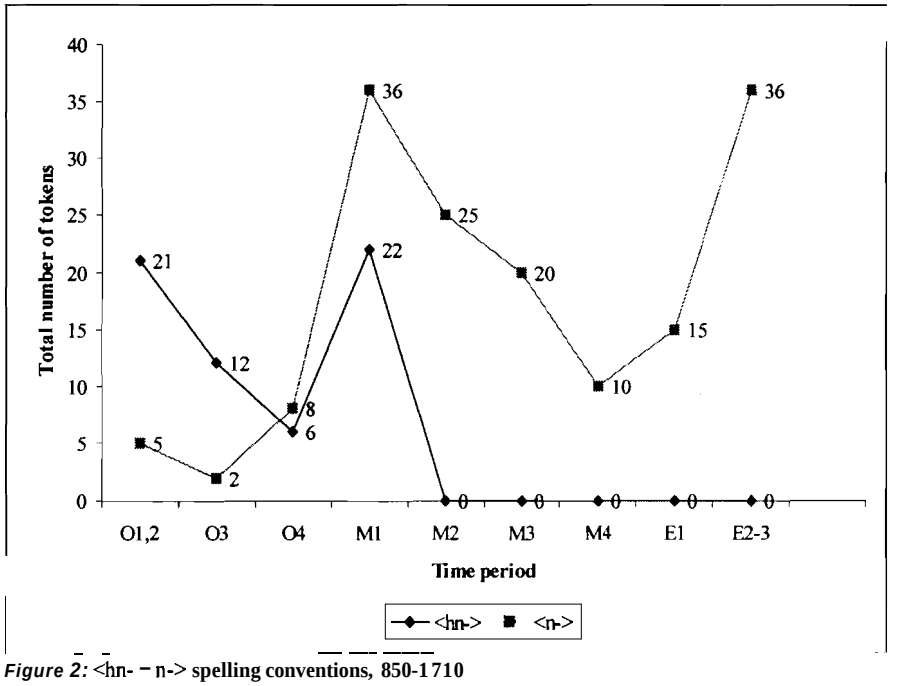

Figure 2: <hn- – n-> spelling conventions, 850-1710

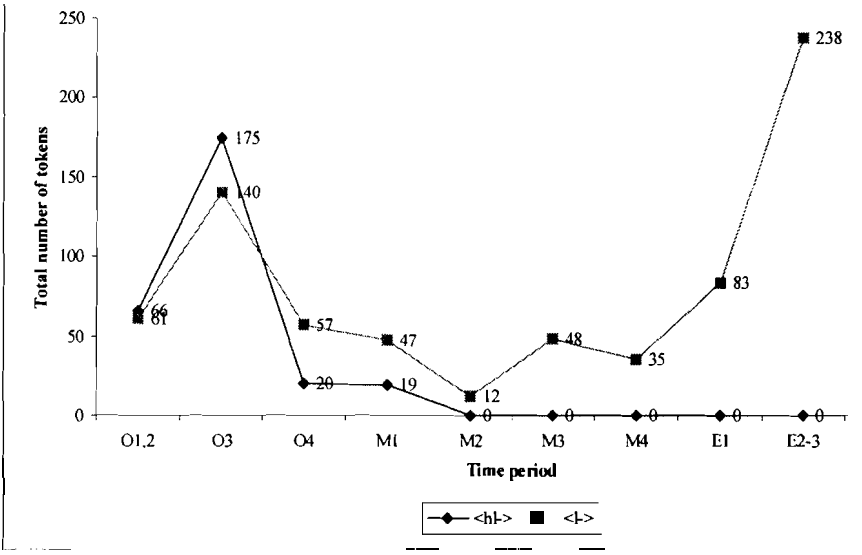

Figure 3. <hl- ~ l-> spelling conventions, 850-1710

*II.2.2.*b **/wl-/*

There are two sources for studying */wl-/ loss in English: 1) the analysis of items that had the initial */wl-/ cluster and then died out; and 2) items that, in analogy to the clusters discussed in II.2.2.a, were maintained but where the spelling conventions changed. One striking characteristic here is that most of the OED entries that featured */wl-/ have fallen out of use: **wlaffe* and its derivative forms ('to stammer, to speak indistinctly', < OE **wlaffian*), **wlat* ('nausea, loathing, disgust', < OE **wlatian*; cf. Middle Low German **wlaten*), **wlanc/wlonk* ('proud, haughty', < OE *wlanc*, wlonc; cf. Old Saxon (OS) wlonc), **wlite* ('beauty, splendour', < OE wlite, OS *wliti*), or **wlo* ('hem, fringe; nap on cloth', < OE wlóh). Other lexical items that had initial /wl-/ occur so infrequently that their etymologies and meanings are unclear. This is the case with **wlouȝ*, of which there are only two listings in the OED and which may derive from OE *ȝewlóh* 'opulent', as in:

(1) 3if ... þou art riche mon and *wlouȝ* And of richesse hast inouh. (*Minor* Poems fr. *Vernon*, ms. xxxvii: l. 155, 14th century; OED)

We thus note that phonotactic change may be a function of lexical loss (which was particularly noticeable in the case of */fn-/; discussion in Schreier, 2004, 2005a), which is certainly an important point here. Notwithstanding, the dates when lexical items with initial */wr-/ were last recorded provide at least some insights until when these words (and the clusters) were in current

usage and when they disappeared. These findings may thus complement the study of words that remained but changed their spelling (as we did above in the case of <hn- – n-> alternations), so that the results of a two-fold study should give us reliable information as to when */wl-/ was lost in English.

Starting with incidences of lexical loss, Table 3 traces the development of four of the most frequent lexical items with initial */wl-/: **wlite*, **wlat*, **wlaffe* and **wlanc/wlonk*. These items were common throughout the OE periods, with the exception of **wlaffe*, for which only six forms were retrieved (note that O1/2 and O3/4 are collapsed into two categories, since there are few data for these periods). Then, however, the ME period marks the beginning of a gradual demise. The usage of these items declined throughout the 13th century, and it also indicates that the four individual items died out at different intervals. In fact, lexical loss here first affected **wlite* (meaning 'pipe, chirp v.'), which was last recorded in 1310:

(2) This foules singeth ferly fele, Ant *wlyteth* on huere wynter wele. (Wright: Lyric P. xiii. 43: 1310; OED).

Table 3: **The lexical conditioning of */wl-/ in English**

	O1, 2	O3, 4	M1	M2	M3	M4	E1	E2
<wlite>	21	26	21	3 †	0	0	0	0
<wlaffe>	0	1	0	4	1 †	0	0	0
<wlat>	7	15	4	10	7	6 †	0	0
<wlanc ~ wlonk>	6	18	10	2	9	3	2 †	0

On the other hand, the last recorded usages of **wlaffe*, **wlat(e)* and **wlonk* (as listed in the OED) date from the late 14th century and around 1500:

(3) By comyxtioun ... wiþ Danes and ... Normans, in meny þe contray longage is apayred, and som vseþ straunge *wlafferynge*. (Trevisa: *Higden* (Rolls) II.: 1. 159, ca 1387).

(4) The glose ... seyth that it is amaner of spech to do *wlate* auoutre and shewynge that auoutrye is ful greuous. (H. Parker, *Dives &* Pauper (Pynson) vi. xvii. t viii, 1493).

(5) Of thir fair *wlonkes* ... Ane wes ane wedow. (John Dunbar: *Tua Mariit Wemen*: 1. 36, 1508)

This implies that */wl-/ > /l-/ in English was a gradual process. which spanned almost two centuries, started during the 13th century and was completed in the early 1500s.

Can this time frame be upheld when we consider cases where a lexical item survived and underwent spelling adaptation, just as in the other clusters? We thus have to consider evidence from words that originally had */wl-/ but were not lost, or more precisely: words that were maintained and for which we can trace a change from <wl-> to <l-> spellings (as we did with initial <h-> above). Unfortunately, only a handful of lexical items that originally had */wl-/ are still found in ModE. The few that have survived are **wlak* (= luke(-warm) < OE *wlæc, wlacu*; cf. MLG *wlak*), and **wlisp* (= lisp). Due to the paucity of data, one has ofcourse to be careful in generalising findings on */wl-/ loss in English, but the combination of lost words that contain <wl-> and the trajectory of spelling variations in surviving words throws at least some light on the historical dimension of this particular process. The first documented form of **wlak* comes from the OE period:

(6) Da ful oft beoð mid *wlacum* watre ȝelacnode (Ælfred: Gregoty*'s Past*: l. 269; OED)

Although not frequent, this spelling is attested until the the mid 15th century, most often in the 12th century Peri Didaxeon, from which the HKI corpus draws most of its listings (e.g. "Eft nim ladsar ðt teafur. & galpanj oðres healfes pani ȝe whit. & gnid hyt to gadere mid *wlacan* ecede"). The last attestation of **wlac* dates from 1450:

(7) Kepe it with *wlake* wyn unto the tyme. (Bk. Hawking: l. 304, ca 1450; HKI)

On the other hand, a <luke> spelling is not reported in the HKI and OED until the 13th century, and one of the first attestations is found in Layamon:

(8) And opened wes his breoste. þa blod com forð *luke*. (Layamon: 1.27.557, ca 1205; HKI)

Table 4 documents the diachronic development of <wlak> and <luke> spellings. It illustrates that while <wlak> (and related forms, <wlac> etc.) was exclusively used until about 1200, the 1300s saw the origination of the innovative <luke> form, which increased its usage subsequently and became the only variant by the mid-15th century.

The second lexical item in this category is lisp (< OE **wlispian*, **awlyspian*), for which two <wl-> spellings are documented, one in the 12th and one in the 14th centuries:

(9) And seo tunge *awlyspaþ*, seo ðe ær hzfde ful rece ne sprzce. (MS. *Junius*: 1.23, ca 1100; OED)

(10) In spek *wlispyt* he sum deill. (Barbour Bruce: l. 393, 1375; HKI)

Table 4: <wlac> and <luke> spellings (and related variants)

	O1-4	MI	M2	M3	M4	E1-3
<wlac>	8	2	1	2	1†	0
<luke->	0	1	3	12	7	10

ln contrast, the first <l-> spelling, with metathesis to <ps>, is found in Chaucer's ***General Prologue*** (l. 264), written in c. 1386:

(11) Somwhat he ***lipsed***, for his wantownesse To make his englissh sweete vp on his tonge.

From this date onwards, <l-> spellings increased constantly and became the exclusive spelling variant from 1400 onwards (Table 5).

Table 5: <wlisp> and <lisp> spellings (and related variants)

	O1-4	M1	M2	M3	M4	E1-3
<wlisp>	1	0	0	1†	0	0
<lisp>	0	0	0	2	3	25

Comparing these findings with those of <wlak>, it is striking that both items underwent an almost identical development. The combination of <wl- ~ l-> spellings for these two items (Figure 4) documents that the two variants coexisted for about two centuries, <wl-> being the original and <l-> the innovative variant. The usage of <l-> increased constantly, and the original spelling form was last documented in the early 16th century. This very precisely matches the time frame that emerged from the analysis of lexical loss; combining the two findings of lexical loss and an alternation in spelling conventions, we can date the /wl/ ~ /l/ change in English from around 1200 to around 1500.

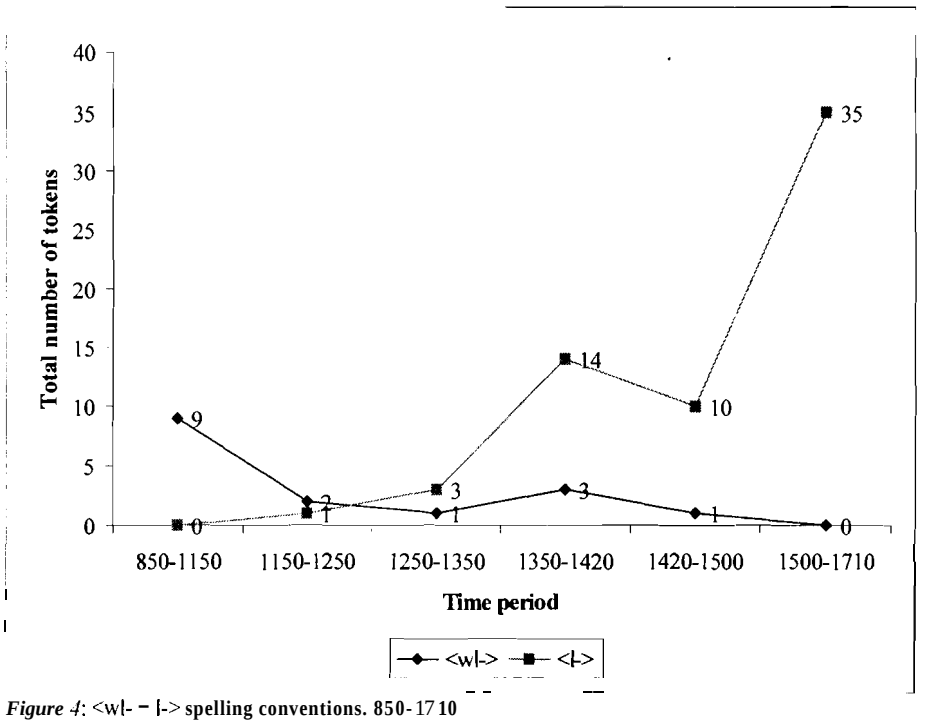

Figure 4: <wl- ~ l-> spelling conventions. 850-1710

*II.2.2.*c */wr-/*

The last cluster for which historical sources yield insightful data is */wr-/*. However, the change from */wr-/ > /r-/* is more difficult to trace here, for one chief reason. Spelling practices vary considerably in the periods in which the English language was not yet standardised and codified (i.e., before about 1500). With increasing standardisation, written norms became fixed and spelling conventions fossilised, as a result of which they reflect changes in spoken English less accurately. */wr-/* loss occurred too late and a historical study does not yield reliable data, so that indications of this change are sparse and comparatively unreliable. What our study confirms is that the loss of initial */wr-/* (and the subsequent merger with /r-/) started in the mid-15th century; one of the earliest <r-> spellings in the HKI corpus dates from ca 1450:

(12) and eft if it nede be ronge it right well (Tretise on Horses, ca 1450; HKI)

Similarly, the OED lists <ringe> for *wring* and <rong> for wrong in about the same period and states that the frequency of such spellings increases throughout the 16th century.

III. CONCLUSIONS

How are we to interpret the results for the diachronic dimension of phonotactic language change and initial cluster loss in English? First of all, the corpus-based study provides data that have not been available to date, and this allows us to look into the origins and the historical trajectory of phonotactic change in more detail. We can by and large support the generally accepted time frame, as our results match the general estimates from the OE and ME literature. There were different phases of phonotactic change that operated throughout the history of English; *CC- > *C- affected different clusters in different periods. stretching over more than a millennium. However, our study also suggests that the dates of completion of somc changes should be reconsidered and revised. This is most obviously the case in */wl-/, where the corpus-based study offered evidence that this cluster was in use for a longer time than commonly assumed. For instance, sources such as Jordan (1934) and Pinsker (1969) suggest that */wl-/ died out in the 14th century and Dobson (1968: 975) dates the eventual completion of the merger to 1400. The data offered in this paper counter these assessments as <wl-> spellings were found in manuscripts produced almost a century later, which indicates that this change is more likely to have reached completion in the early 16th century. By the same token, estimates that the loss of this cluster began in the early 11th century (e.g., Pinsker, 1969: 93) are probably too early.

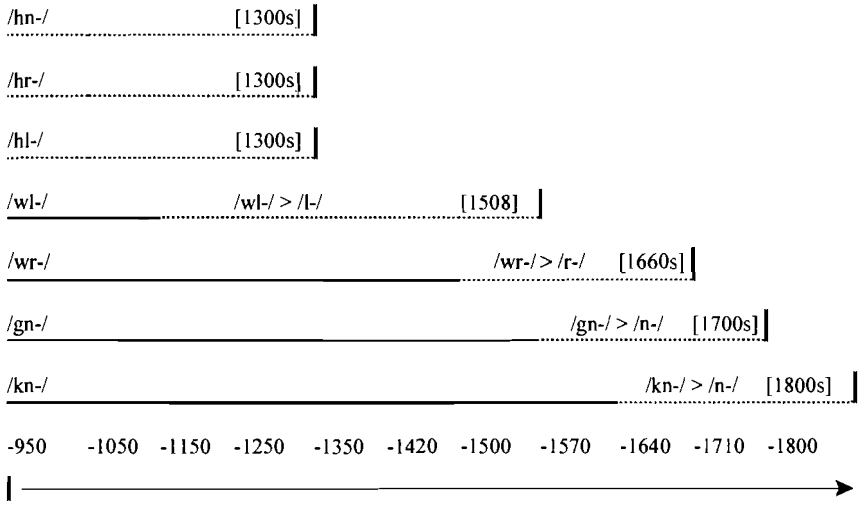

Figure 5: The diachronic dimension of initial cluster loss in English, 850 – ca 1800

Figure 5 illustrates the historical dimension of initial cluster loss in English, generalising and illustrating the periods in which the individual clusters thrived and disappeared. The lines indicated when the respective clusters were intact, the dotted lines indicate when there was variation between traditional clusters and innovative merged variants, and the double vertical

line indicates the completion of the change. The beginnings of initial cluster reduction in English can be dated to different periods, and this gives us information as to their origination. Processes such as the loss of */hn-/, */hr-/, and */hl-/ are documented in the first records available; this invites the implication that this represents a continuation of changes that were ongoing in Germanic prior to the Anglo-Saxon settlernent of England. The first stages of these changes can be traced to around three thousand years ago in continental Europe. The gradual loss of initial plosives in the Germanic proto-clusters involved several sound changes (including Grimm's Law), which ultimately resulted in the total loss of pre-aspirated voiceless velar plosives (Brunner. 1963; Luick, 1964). This change was inherited from Germanic and continued in Old English, only to reach completion in the 14th century. These developments are mirrored in other Germanic languages: we find general processes that operate in all (or the majority) of the Germanic languages. */hn-/, */hr-/, */hl-/ have not survived in modem varieties of Danish, Swedish, German, etc., and the initial cluster */wl-/ died out as well.

By the same token, the Germanic languages differ in their rates of phonotactic language change, and English rnay well be the most advanced one in this respect. This is evidenced by the fact that sorne initial clusters were lost in English but fully retained in other Germanic languages. This is the case in */fn-/, as in *fnese* (OE **fnéosan* 'sneeze, puff, snort v.'), which is last attested in English in c. 1400, but still found (albeit with few lexical items) in Dutch, Danish and Swedish (OED). Another exarnple here is /wr-/, which has been maintained in Dutch, Flemish, Low German, and Frisian, and which is also still found, albeit with a weakened first segment (/vr-/), in Danish, Swedish and regional varieties of Norwegian. This raises the question as to why #CC- > #C- should be more advanced in English than in related languages. Some have argued (e.g. Bahr, 1975) that this process is contact-induced. It is certainly noteworthy that the first traces of */wl-/ loss coincide with the 1066 Norman Invasion and can thus be directly linked to the externa1 history of English (Lass, 1987; by the same token, following Schreier, 2005b, contact with French rnay also have intensified the fate of */hn-/, */hr-/, */hl-/). Then again, other processes (most notably loss of initial */kn-/ and */gn-/) occurred so late that they can neither be explained as the continuation (and successful completion) of changes that started in Germanic nor as a contact-derived phenomenon. We must leave room for the interpretation that phonotactic change in English also operated as a local innovation that was not paralleled elsewhere. Consequently, I would argue that language-intemal factors such as analogical change and merging of iterns with a low functional load are the most likely explanation here. As a consequence, it is necessary to integrate at least some language-internal criteria into an explanatory approach of phonotactic language change in English, and that #CC->#C- in English is likely to have multiple origins.

A final point worthy of discussion concerns the developmental stages of phonotactic change, which have not been addressed in the literature. Our corpus-based study throws some light on exactly how these clusters were lost. This is best illustrated in the case of */hn-/, */hr-/, */hl-/ loss, for which we have sufficient data for all the periods investigated. When we classify

the various spelling variants by period and extrapolate their relevance for the trajectory of language change, then the pattern observed is the prototypical and recurring pattern of linguistic innovation: the developmental alignment along an *S-curve* (Bailey, 1973). The data reported here allow us to document and date this change. Around 1000, preaspirated variants were in the majority; non-aspirated variants (/n-/, /r-/, /l-/), on the other hand, were infrequent and sporadic alternations, or what Gordon & Trudgill (1999) labelled *embryonic* variants. The overall distribution of traditional and innovative variants may have been stable throughout the OE period, without either variant undergoing change, for perhaps as long as two centuries. It was not until the 11th century that this change took off; there was a sudden rise in <n-, l-, r-> in Early ME manuscripts, even though traditional variants were still in use and attested well into the 13th century, before they finally disappeared in the early 1300s. Figure 6 illustrates this development, summarising the findings reported in Figures 1-3. The innovative and traditional forms are given for each period, not as absolute values but as the respective percentage of the combined total amount of forms (which is indicated on the x axis for each period).

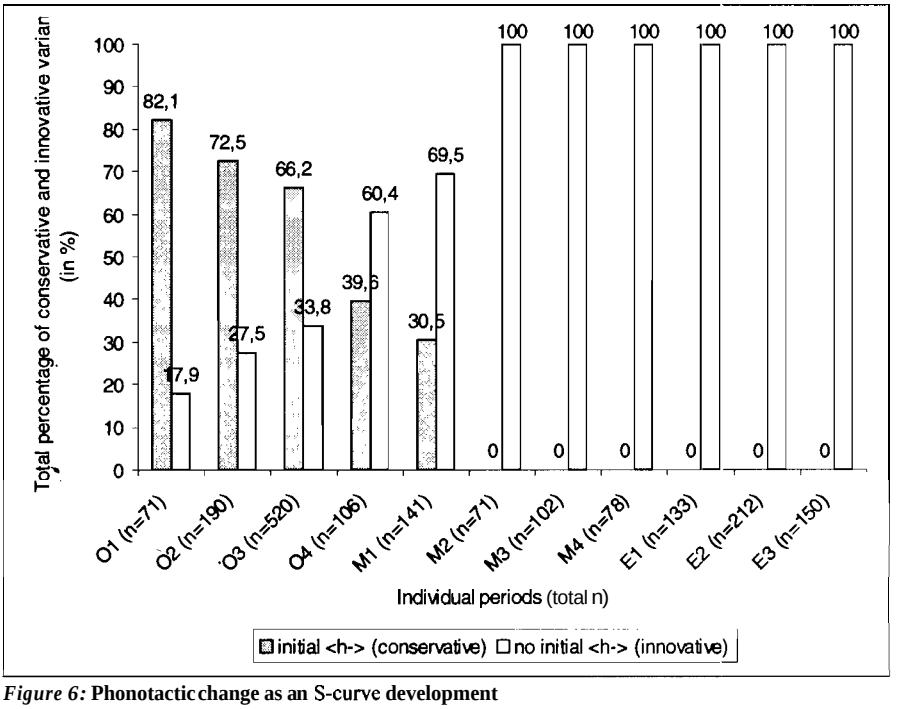

Figure 6: **Phonotactic change as an S-curve development**

Phonotactic change thus displays the most common and persistent pattern of language change. It proceeds through (1) the appearance of an innovative variant; (2) a state of stability between competing traditional variants, which are in the majority, and innovative (minority)

ones; (3) a state of instability which witnesses an abrupt rise in the usage of innovations; and (4) the dying out of the former (original) variant (discussion in McMahon, 1994; Chambers, 2002). Following Bailey (1973), the combination of these three successive stages (initial stasis, abrupt rise, and tailing off) is commonly represented as an S-curve, and the significance of this pattern of linguistic change has been demonstrated in various kinds of spread and diffusion of innovative language forms (cf. Chambers & Trudgill, 1998: 162-4; Trudgill, 1983: 52-87).

In conclusion, then, this paper has traced phonotactic language change in English, exemplified by #CC- > #C-, in the development of clusters that stretch over almost an entire millennium. The findings presented here confirm most of the general assessments in the literature on the history of English but also suggest that some of the dates need revision. Furthermore, they invite the implication that there are multiple causations for the changes attested, ranging from continuation of changes inherited from Germanic, putative contact influence with Norman French and local, independent innovation. Finally, the study showed that phonotactic change proceeded in similar fashion to other linguistic innovative pattems. These insights throw new light on the nature of phonotactic language change and suggest that the study of consonantal change can indeed contribute to our understanding of English historical linguistics.

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APPENDIX

The loss of */hl-/, */hn-/ and */hr-/ was examined through extraction and analysis of the following lexical items:

*/hn-/	hnuppen (aiid related forins)	'nap'
	hnesce	'sofi, tender, succulent' (now dialectal)
	hnecca	'neck'
	hnolle	'top, crown of head' (now dialectal 'noll')
	hmutu (and related forms)	'nut'
*/hl-/	*hlud* (aiid related forins)	'loud'
	hlaf (and related forins)	'loaf'
	hlihhaii (and related forms)	'laugh v.'
	hleapan (aiid related forms)	'leap v.'
	hlencan	'link v.'
	hladen (aiid related forins)	'load'
	*hleor	'cheek, face'
	hlest	'lest'
	hlidaford	'lid'
	*hlynn	'torrent'
	hlin (and related forms)	'lean'
	*hlynnan	'souiid v.'
	hlæder	'ladder'
	hlædel	'ladle'
*/hr-/	hreccan	'reak v.' (< dialectal variant of 'rake v.')
	hræw (aiid related forms)	'raw'
	hreddan	'rid v.'
	hrefn (and related forins)	'raven'
	hreoh (and related forins)	'rough'
	hreod	'reed'
	**hreosan* (aiid related forins)	'go to ruin'
	*hreow	'regret'
	hrer(e)	'rear'
	*hreðan	'glory, triumph'
	hrycg (aiid related forins)	'ridge'
	hriddle	'riddle'
	hring/hryng	'ring'
	hrof	'roof
	hrost	'roost'
	hrung	'rung'

