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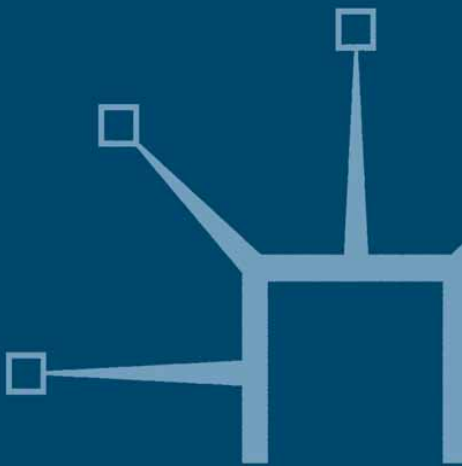
Consonant Change in English Worldwide

Synchrony meets Diachrony

Daniel Schreier



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To Karrie

without whom all is nothing

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Acknowledgements

The book at hand is a shortened and slightly revised version of my Habilitationsschrift, the post-doctoral dissertation that is still required at many German and Swiss universities (what my colleague Magnus Huber refers to as the 'moribund oddity of the German academic system'). It also reports some previously published findings, and in this context I wish to thank John Benjamins Publishing Company, Amsterdam/Philadelphia, for permitting me to reprint an article that appeared in *English World-Wide* 24, 2 (Daniel Schreier, Elizabeth Gordon, Jennifer Hay and Margaret Maclagan. 2003. 'The regional and sociolinguistic dimension of /hw-/ maintenance and loss in early 20th century New Zealand English', pp. 245–69), and Blackwell Publishing Ltd, for giving me permission to use data published in *Journal of Sociolinguistics* 7 (Daniel Schreier. 2003. 'Convergence and language shift in New Zealand: consonant cluster reduction in 19th century Maori English', pp. 378–91).

The fact that one author wrote a book does not mean that all the findings presented come from a single author – projects as extensive as this one can simply not be undertaken alone, at least not in a duly reasonable amount of time. As a consequence, I discussed and integrated work from a good number of colleagues working in fields as distinct as variationist linguistics, language change, language acquisition, phonological theory or English as a Foreign Language. The amount of research on the wonderful world of English consonants was at times overwhelming and virtually impossible to handle (for instance, a Google search with the not really everyday search item 'consonant cluster' comes up with a mere 58,000 hits); yet again, this only shows how interdisciplinary and complex the processes under discussion really are and also how much there remains to be done. I admit that the material included and discussed here is selective and that other aspects of consonant variation and change could have been discussed alternatively. Nevertheless, it is my hope that the book at hand represents a first step towards integrating insights from various linguistic subdisciplines into a coherent model of consonant change in English, and I am grateful for any feedback or comments readers may have.

This book draws on my work over the past few years at Swiss, American, New Zealand and German universities where I had the privilege of working with true experts in the field (or, from a different perspective,

where people were daring enough to offer me a job); this is the place to acknowledge the colleagues who were most helpful and the institutions that funded my research. In a chronological order, I would first like to thank Walt Wolfram of North Carolina State University for his outstanding support and valued friendship (and who somehow, *nolens volens*, started my interest in consonantal variation and change in English); Elizabeth Gordon, Jennifer Hay, Margaret Maclagan and Lyle Campbell from the University of Canterbury in Christchurch, New Zealand, where I spent a fruitful year as a post-doc and with whom I worked on /hw-/ in New Zealand English; and Edgar W. Schneider, University of Regensburg, who ensured that my transition from a British/American- to a more German-oriented academic system was not too much of a culture shock and whose constant, tireless and unconditional will to help is truly exceptional. Moreover, I would like to acknowledge the help of Sali Tagliamonte (Toronto) and Peter Patrick (Essex), who went through the trouble of reconfiguring their data on York and mesolectal Jamaican Creole English for me; Jennifer Hay, who conducted the statistical analysis of /hw-/ variation in New Zealand English; the Saints and Tristanians who allowed me to tape-record their speech when doing fieldwork in the South Atlantic Ocean; the William C. Friday Endowment of NC State University and the Royal Society of New Zealand Marsden, for funding my fieldwork on the island of St Helena and my research on New Zealand English, respectively; Peter Trudgill, who read the entire manuscript and made valuable comments; Florian Schleburg, who brushed up my knowledge of Middle English phonology; Alex Kautzsch, who introduced me good-naturedly (and with admirable patience) to the methods of historical corpus-based research; and, last but not least, a good number of colleagues who took interest in my work and shared their knowledge on various fields: Laurie Bauer, Allan Bell, Dave Britain, Janet Holmes, Paul Kerswill, John R. Rickford, Otto Santa Ana, Natalie Schilling-Estes and Jennifer Smith. Of course I alone am responsible for any oversights and shortcomings readers may spot (but thinking about this: wouldn't it be nice to blame others for my mistakes? . . . ah well, too late).

Basel, Switzerland DANIEL SCHREIER

List of Abbreviations

Language varieties

AAE	African American English
Afr	Afrikaans
AmE	American English
AppE	Appalachian English
AusE	Australian English
BrE	British English
CanE	Canadian English
ChicE	Chicano English
Da	Danish
Du	Dutch
Engl	English
EnglE	English English
Fl	Flemish
Fr	French
Frn	Frisian
G	German
Gc	Germanic
GhE	Ghanaian English
HCE	Hyde County (NC) English
IndE	Indian English
IrE	Irish English
It	Italian
JamCE	Jamaican Creole English
Lat	Latin
LG	Low German
ME	Middle English
MLG	Middle Low German
MNZE	Maori New Zealand English
ModE	Modern English
N	Norwegian
NZE	New Zealand English
OE	Old English
OHG	Old High German
OIcel	Old Icelandic

ON	Old Norse
OS	Old Saxon
PhilE	Philadelphia English
PIE	Proto-Indo-European
PNZE	Pakeha New Zealand English
Pr.Gc	Proto-Germanic
SAfE	South African English
SAtlE	South Atlantic English
ScE	Scottish English
Srn	Sranan
StHE	Saint Helenian English
Sw	Swedish
TdCE	Tristan da Cunha English
TejE	Tejano English
VietnE	Vietnamese English
YoE	York English

Other abbreviations

ASD	Anglo-Saxon Dictionary
C	Consonant
CC	Consonant cluster
CCR	Consonant cluster reduction
ESL	English as a Second Language
EFL	English as a Foreign Language
HKI	Helsinki Corpus
OCP	Obligatory Contour Principle
OED	Oxford English Dictionary
ONZE	Origins of New Zealand English
OT	Optimality Theory
RP	Received pronunciation
SSP	Sonority sequencing principle
V	Vowel

1
Introduction

English historical linguistics has been characterised by a strong focus on changes that affected the vowel system (such as the Great Vowel Shift). In contrast, the consonantal system has been considered as more stable and changes in individual consonants or groups of consonants have been neglected. This is illustrated by Finegan (1990: 78, 80), who points out that the diachronic development of English was primarily one of vowel rather than consonant change:

> 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 changed only slightly since about 1400.

In a sense, this book comes to the defence of consonantal change in English. A central argument is that there is more to the synchronic and diachronic development of English consonants than has traditionally been assumed, so that analyses of this feature certainly contribute to the understanding of how English evolved, why it took this particular developmental trajectory and, as an outlook, which developments it is likely to undergo as a result of ongoing diversification into a plethora of regional varieties. The findings presented in this book consequently (re)assess the historical dimension of English consonants. It is argued that the analysis of consonantal change is not only vital for the history of English; it is also of relevance for linguistic disciplines as distinct as contact linguistics, language variation and psycholinguistics, many of which interact in the course of this process. Whereas the main aims of

D. Schreier, *Consonant change in English worldwide*

this study are consequently to offer insights into the directionality and motivation of linguistic change that affect/affected consonants and to link the relevance of historical and contemporary change mechanisms, the intention is also to show that several disciplines are involved and interact, which adds to the complexity of this process.

With these aims, this book focuses on synchronic and diachronic aspects of English *phonotactics*. Phonotactics is the subdiscipline of phonology which deals with the language-internal factors that govern the combination of consonants into permissible, 'well-formed' sequential arrangements (what Crystal (1991: 263) also refers to as the 'tactic behaviour' of individual phonemes). Phonotactics is closely intertwined with English phonology and syllable structure, and a number of language-internal criteria (such as sonority or voicing) account for whether individual consonantal phonemes may cluster or not. Changes in English phonotactics are mentioned in the standard literature on the history of English (for example, Mossé 1952; Brunner 1963; Luick 1964; Pinsker 1969), but with the notable exception of Lutz's groundbreaking (1991) analysis of historical phonotactics in English, this branch of phonology has received comparatively little attention. Such lack of interest is regrettable, and this book was written with the aim of showing that the analysis of phonotactics (and consonantal change) contributes to a critical assessment of the historical evolution of English; moreover, insights from this area also yield crucial information on the putative outcome of English diversification around the world.

Generally speaking, the sequential arrangement of English consonants in syllable onsets and codas is conditioned by a set of phonological and morphological criteria. As a consequence, consonant clusters (CCs) are particularly suitable candidates for the study of phonotactic variation and change in English, and they have been studied in great detail in the variationist literature. However, most variationists focus on the factors that govern modification, to a large part ignoring exactly why the individual phonemes display the 'tactic behaviour' they do and what factors condition the sequencing of consonants into larger units. Most studies of phonotactic variation in (synchronic varieties of) English do not look into how consonants are combined into larger units, but rather when (and under what conditions) their realisation becomes subject to variation and how such variation can lead to permanent change. This is an oversight. Often it is precisely the criteria that determine whether consonants can be combined that also account for why clusters may be variably reduced, and which of the cluster segments is deleted (for instance, the sonority values of consonants).

The following chapters discuss both the language-internal criteria that underlie cluster arrangement and the factors that govern variation and change, frequently linking the two and pointing out the overlap between them. By means of a general introduction to the topic, this chapter discusses some salient characteristics of CCs in English.

First of all, it is instructive to identify the factors that condition phonotactic variation and change. These have been extensively researched in the form of final-cluster reduction. To take the example of final /-st/, as in *passed* or *first*, this cluster is commonly reduced through deletion of the final plosive (CC#>C(C)#>C#) due to ease of articulation and progressive assimilation. Crucially, though, this process is context-sensitive, depending on the phonetic environment into which the cluster is embedded. Variationist linguists have found that the nature of the following phonetic environment has a particularly strong effect. For instance, a cluster-final /-t/ is much more variable when followed by a plosive (e.g., *west park* [wɛs paːk]) yet more stable before a vowel (*west end* [wɛst ɛnd]). Similarly, the individual status of cluster segments exerts a strong effect as well: reduction frequency depends on whether a final /-t/ represents a cluster segment of monomorphemic /-st/ (in *past*) or a morpheme in its own right, for example, a final *-ed* suffix in *passed*. Constraints related to (following) phonetic environment and morphemic status have been asserted in a variety of studies on cluster reduction; they are so regular and pervasive that cluster reduction has been labelled the 'showcase variable for variationist sociolinguistics' (Patrick 1991: 171).

On the other hand, a question that has been neglected to date is when and under what conditions linguistic variation of CCs ([wɛs paːk ~ wɛst paːk]) may have permanent effects that lead to linguistic change. For instance, some CCs, for example, word-initial */kn-/ (in *knee*, *knight*, etc.) or */wr-/ clusters (*written*, *wrath*), are attested historically (and are still present in writing) but were lost in earlier stages of the English language. The loss of English */kn-/ represents phonotactic change since a sequential arrangement of the two consonants is no longer permissible. Consonant cluster reduction (CCR) can therefore represent both internal variation (from CC to C(C)) and phonotactic language change (when a formerly well-formed combination of phonemes is no longer permissible). Of special interest here are the conditions that favour phonotactic change, so that a cluster is no longer permissible because one of its segments has been permanently reduced (that is, when cluster segments change their tactic behaviour for good). The interplay involving variation and change is not a binary

one, neither is the one between phonological and phonotactic language change. Whereas phonological changes (such as phonemic or allophonic loss) may entail phonotactic change, the reverse is not the case. The loss of /ç/ necessarily entailed the loss of all clusters that contained this phoneme, such as */-çt/ in Middle English [ˈniçt] *night*. On the other hand, phonotactic change occurs when a formerly permissible cluster is lost as a possible phonotactic sequence only (both /k/ and /n/ are still English phonemes even though the cluster */kn-/ disappeared). This is an important point, and one to which we return repeatedly throughout the book.

An equally important criterion here is *causality*. How can we explain changes that affect English phonotactics? Under what conditions does variation give way to (or entail) change? Whereas one can account for CCR in terms of co-articulation and explain cluster loss as a function of phonological change, it is not clear at all as to why a cluster should no longer be phonotactically permissible when both phonemes are maintained individually. Even though this process takes different diachronic trajectories and manifests itself in different contexts, the point taken here is that it is possible to identify some general principles that further our theoretical understanding of consonantal change. Chapters 3 and 4 outline linguistic and extralinguistic constraints and discuss the dimension of phonotactic change, assessing the weight of language-internal constraints while at the same time evaluating and empirically testing the hypotheses with an extensive amount of data from English varieties around the world. Insights from phonotactic change in synchronic varieties will then be applied to historical processes; this approach is based on the *uniformitarian principle*, which holds that 'knowledge of processes that operated in the past can be inferred by observing ongoing processes in the present' (Christy 1983: ix; cf. the discussion of linguistic implications in Labov 1994: 21–2). The synchronic–diachronic dimension of phonotactic variation and change in English hinges on the assumption that directionalities and tendencies are in a sense 'a-historic'; we can use inferences from current developments to explore historical developments. The findings presented here are based on a complementary analysis of contemporary and historical changes, for instance, when we investigate a change in an earlier stage of English (e.g., initial */kn-/ > /n- / 'knee') and integrate evidence from contemporary varieties where a similar change operates (e.g., initial /hw-/ > /w-/ in New Zealand English); synchronic and historical data are therefore evaluated and compared in terms of their significance for phonotactic language change, and the goal is to throw light on both the general mechanisms involved and the factors that condition their manifestation.

Consequently, this book looks into some general aspects of phonotactic variation and change in English and views it as both a synchronic and a diachronic process. Evidence from several fields is combined and assessed so that the approach is strictly interdisciplinary.

1.1 Phonotactic language change: an interdisciplinary approach

Phonotactic change is not an isolated phenomenon. The complexity of this process derives from the fact that several branches of linguistics interact at various rates and in different proportions. As a result, the phonological and morphological implications of CCR are wide-reaching and of importance for a variety of linguistic disciplines (from phonological theory to contact linguistics). This was pointed out by Labov (1972b: 82), who considered cluster reduction 'an excellent candidate for a pan-linguistic [English] grammar', and is also echoed in Tagliamonte and Temple (2005 forthcoming), who state that

> The reason for the recurrent interest [in CCR] . . . is that although it is variable across varieties of English, the variability is apparently not solely attributable to universal phonetic continuous speech processes but has consistently been shown to be a function of higher levels of linguistic organisation, specifically the morphonology.

Throughout the book, I will outline the impact of various disciplines on phonotactic variation and change and discuss how they interact in different ways. The major disciplines discussed are phonological theory (in particular phonotactics and syllable structure theory), contact linguistics, language universals and typology, language acquisition and learning, genetic linguistics, historical linguistics, psycholinguistics and variationist linguistics (Figure 1.1).

I will continuously refer to these disciplines, sometimes independently, sometimes in combination. I should emphasise, though, that there exist considerable overlaps between the various fields and that much of the complexity derives from the interaction of various disciplines. For sake of simplification and clarity, the branches outlined in Figure 1.1 are subdivided into four areas:

1. Typology, universals and phonological theory
2. Language variation and change
3. Contact linguistics and genetic linguistics
4. Language acquisition, learning and psycholinguistics.

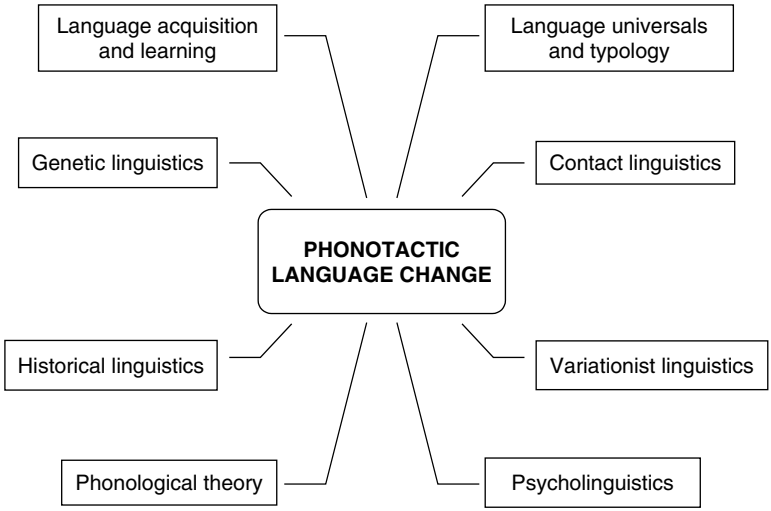


Figure 1.1 Phonotactic language change as an interdisciplinary process

Typology, universals and phonological theory

Generally and typologically speaking, CCs are uncommon linguistic structures. The phonotactic systems of most of the world's languages do *not* permit clusters, CV being the most common, and indeed universal, syllable type (Greenberg 1966). Akmajian *et al*. (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'. To weaken their typological status even further, syllables with clusters are generally less frequent than syllables consisting of a single vowel or a combination of a vowel and a consonant even in languages that permit them (Goodluck 1991: 37). CCs are thus not only found in the minority of the world's languages; they are also a minority structure in those languages that feature them. Consequently, it has been argued that CCs are less *natural* in phonological terms (Stampe 1969) and more *marked* linguistically (Lass 1984), two terms discussed in detail in Chapter 2. This accounts for the fact that clusters in syllable onsets and codas are

typologically unusual, which manifests itself in instability and language change (see below).

CCs are found in several language families, such as the Germanic branch of Indo-European (Nielsen 1989) or in West Africa (Ladefoged and Maddieson 1996). The study of these languages has indicated that CCV or VCC syllable types are under analogical pressure and often modified to match more common syllable types (most notably CV). A variety of mechanisms has been identified, not only in English but also in languages such as Spanish and Italian. Table 1.1 illustrates how CCV, CVC or CCVCV syllables are modified to yield CV patterns through segment deletion and insertion.

A particularly salient factor here is linguistic contact and interaction of distinct phonotactic systems. English is particularly suitable for an examination of phonotactic change due to its long-standing contact history. The diffusion of English around the world has led to a variety of contact scenarios, which provide excellent test sites to study the outcome of competition between a typologically unusual phonotactic system and more regular and common ones. The linguistic outcome of contact settings is influenced by a number of specific factors, such as the degree of phonotactic differentiation between varieties in contact, or the length, intensity and persistence of interaction patterns, which are discussed at length in Chapter 4.

Another important point is the extent to which phonotactic changes depend on phonological theory in general and on the phonological specifics of a given language. Cluster reduction through deletion of the final segment is by far the most common strategy, but alternative mechanisms (such as vowel epenthesis) are found also. This raises the question as to what favours the adoption of one specific strategy rather than of others available also. There is evidence that the choice of a

Table 1.1 Cross-language trends towards typological CV syllable structure

	Adaptation mechanism	**Example**
Deletion	CCV(C) > CV	Old English *cnēow* > Modern English *knee* [niː]
	CVC > CV	Old Spanish *non* > Modern Spanish *no*
Insertion (epenthesis)	CCVCV > CVCVCV	Italian *croce* [ˈkrɔʧe] > Sicilian *kiruci* 'cross'

Source: Adapted from Murray 1996:363.

given phonotactic strategy may in fact have a phonological basis, or, put differently, that the phonological features of a language influence the strategy that is adopted. For instance, it has been suggested that epenthesis (as in Asian Englishes or Welsh English) depends on the local languages' syllable structure. Harris (1994, 1998) argues that there is an interface between phonological theory and phonotactic structure and that cluster modification depends on whether the language has empty syllable-initial nuclei or not. If native speakers of a variety that does *not* allow empty nuclei (Spanish, Japanese) learn a language that does allow them (English or Greek), then their native phonological competence requires them to fill in these empty nuclei through the insertion of an additional segment. Phonological theory is thus an important factor for phonotactic variation and change, and Chapter 2 explores this further.

Language variation and change

Another recurrent topic in this book is the interplay of variation and change. Since the late 1960s, CCR has become an indispensable tool for variationist linguists, who posit that this process is both universal and language-specific, operating both in the individual speaker and within/across wider speech communities. Following early work on variationist theory (Labov *et al*. 1968) and ethnically correlated diversity in American English (Wolfram 1969; Fasold 1972; Labov 1972b), cluster reduction has remained at the forefront of linguistic research for a variety of synchronic and diachronic issues. The interest in this variable is so far-reaching that it has been labelled 'the workhorse variable for descriptive, methodological, historical, statistical, cross-dialectal, developmental, and theoretical concerns' (Santa Ana 1996: 65). Two criteria have made this variable particularly appealing: the robustness of language-internal constraints (morphological and phonological; see above), and the quantitative differences of cluster reduction values across varieties. The constraint hierarchy has been confirmed in most varieties; on the other hand, the quantitative dimension of cluster reduction differed between varieties, and this was interpreted as a linguistic expression of socioethnic differentiation (particularly in African American and Hispanic English; see Chapter 4).

With the aim of providing a more general approach to phonotactic change in English, this book also focuses on processes in earlier developmental stages of English. This is particularly promising since Old English phonotactics admitted a variety of consonantal sequences that are no longer found in contemporary varieties. A number of clusters

were modified or lost entirely so that the phonotactic system of English was weakened in a number of ways. For instance, cluster loss occurred in some lexical items only (in which case it was lexically conditioned). Historical phonotactic change could affect the frequency with which clusters occur(red), 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).

Phonotactic change may also be a function of phonological change. This was the case when /x/ was lost in English, as a result of which all clusters that had /x/ underwent change also; systemic phonotactic change affected the final clusters */-lx/ or */-rx/ (in *wealh* 'wealth', *feorh* 'life': Quirk and Wrenn 1994: 137), or initial */hl-/ or */hr-/ (in *hlǣddre*/ *hlædre*, *hrā(w)* 'corpse', or *hlihhan* 'laugh': Quirk and Wrenn 1994: 136). A similar yet slightly different case of phonotactic modification is the permanent loss of a cluster through sporadic, unconditioned and often lexeme-specific change. This happened in the case of /-wθ/, where the cluster-initial segment was not lost from the phonemic inventory but simply dropped from a cluster, as happened when /w/ disappeared in words such as *treowÞ* (Barber 1994: 110). Both /w/ and /θ/ continued their usage as phonemes of English, albeit not as a combination in a cluster.

The last process is of particular importance here, and the historical literature on the development of English lists a number of clusters that disappeared even though there was no accompanying phonological change to account for it. Some of these changes were lexically conditioned (such as /-st/), whereas others were permanently lost (such as initial */kn-/ or */wr-/). Table 1.2 summarises these processes.

This book intends to link synchrony with diachrony by identifying which conditions are favourable towards phonotactic adaptation in contemporary forms of English, and then applying such insights to processes that occurred historically (thus applying a uniformitarian framework). The aim of this approach is threefold: (1) to identify factors that speed up or slow down phonotactic change; (2) to pinpoint when and under what conditions variation leads to permanent change; and (3) to find whether there exists a common set of principles that

Table 1.2 Historical phonotactic change in English

Cluster	Word position	Example	Process
/kn/	Initial	knee, know, knife	Permanent loss (phonotactic change)
/gn/	Initial	gnat	Permanent loss (phonotactic change)
/wr/	Initial	write	Permanent loss (phonotactic change)
/st/	Intermediate	bristle, chestnut, Christmas, listen	Lexically conditioned loss
/ft/	Intermediate	often	Lexically conditioned loss
/lx/	Final	wealh	Permanent loss (phonological change)
/çt/	Final	knight, night, bright	Permanent loss (phonological change)

underlies synchronic and historical processes (that is, to what extent the present is 'a window on the past' here). These questions are addressed in detail in Chapters 3 to 5.

Contact linguistics and genetic linguistics

Cluster reduction is an essential variable for the investigation of linguistic contact phenomena, the common view being that an analysis of phonotactic variation and change allows the reconstruction of contact histories and (substratal) transfer processes. One notes some overlap with language universals and linguistic typology, most notably in what concerns the direct contact of phonotactic systems. The most frequent and regular syllable types (that is, universal CV or CVC) usually stand a higher chance of being selected in contact scenarios that involve competition between languages with distinct phonotactic systems (even though this depends on the contact scenario and a variety of linguistic and language-external criteria; see Chapter 4). In other words, when languages with final clusters come into contact with languages that admit only single C segments in a syllable coda, then cluster reduction is the usual outcome. This process can be observed *in situ* (in many contact settings in the English-speaking world), and it has also been interpreted for historical processes (for example, for discussions on the historical evolution of African American English).

There are two main reasons why cluster reduction is an important linguistic tool for the determination of genetic relationships. First, when synchronic varieties have comparatively higher levels of cluster

reduction, then this is indicative of a contact history with other languages. Second, in an input scenario that involves contributions from several varieties, reduction levels offer information as to which of the contributing donor varieties was most influential. As cluster reduction is conditioned by language-internal factors, the positive match of overall reduction levels and internal constraints in distinct varieties is a strong indicator of genetic resemblances and common ancestry. An in-depth analysis of cluster reduction is thus of importance not only for establishing genetic relationships between related languages and/or dialects, but also for the reconstruction of how much impact the individual donor varieties had in the scenario that gave rise to a contact-derived variety. This emphasises the importance of cluster reduction in contact linguistics and is investigated here with data from South Atlantic and New Zealand English.

A crucial point in this context is exactly what causes cluster reduction to increase. Phonotactic change is typically ascribed to linguistic contact, and this has led some authors (such as Wolfram, Childs and Torbert 2000) to suggest that it is exclusively an external process. In contrast, the role of internal change has received little (if any) attention. Chapter 3 reassesses this and presents evidence in favour of internal causation; the case study of initial */kn-/ and */gn-/ loss challenges the view that cluster reduction should be an exclusively external phenomenon. The question is thus not whether and when cluster reduction is an internal *or* an external process, but when it is internal and when external, whether these two differ at all and when and under what conditions one is favoured at the expense of the other. Chapter 3 will look into these questions in detail.

Language acquisition, learning and psycholinguistics

The last major point introduced here concerns the *agency* of change. Language change has occasionally been attributed to language acquisition, and children have been considered as primary agents (discussion in McMahon 1994). The analysis of phonotactic variation therefore gains from a discussion of how phonotactic systems are acquired. CCs are linguistically marked and characterised by late appearance in acquisition. It is consequently of importance to focus on the realisation of clusters by children, to address in what order CCs are acquired, by which age they are mastered, and so on. This throws light on an interesting link with language typology. The literature on language acquisition indicates that the first syllable types produced by children are CV and V and that the most preferred syllable pattern in child language

is CV. Moreover, at a stage when clusters are first produced, children use various strategies to realise CCs as structures that are easier to articulate. Following Labov (1989), this raises the question as to whether there are any parallels between historical changes and modifications in child speech. Chapter 2 indicates that there are some parallels indeed, but that it is doubtful whether children should be the primary agents of change here.

A final discipline involved is psycholinguistics. Chapter 5 assesses the role of lexical recognition and speech processing for phonotactic change. The point taken is that word recognition and psycholinguistic processing can to some extent explain why clusters are much more likely to undergo (variable) reduction in some environments than in others. The deletion of cluster-final segments at the end of lexical items results in a lower degree of information loss than reduction in the beginning of words, and cluster reduction is more frequent when word recognition is well-advanced or completed. With this aim, the cohort model in psycholinguistics (Marslen-Wilson and Tyler 1980, 1981) is discussed with reference to phonotactic variation and change.

1.2 Scope, outline and structure

Cluster reduction is at the intersection of various disciplines of linguistics, and the point taken here is that all these fields need to be integrated for a critical investigation of phonotactic variation and change in English. This accounts for questions such as how clusters are reduced in syllable onsets and codas, why they are subject to historical change, how we can account for the interplay of constant variation and sporadic change, and also who is most likely to instigate phonotactic change. The challenge, consequently, is to identify the relevance of cluster reduction for each of the various branches, while at the same time considering its wider implications on an interdisciplinary level. Thus, the approach adopted here is both *specific*, namely in that it contextualises this feature within each of the contributing fields, and *broad*, in that it is based on the assumption that phonotactic complexity is explained as the interaction of various branches.

The book is structured as follows. Chapter 2 provides a general survey of CCs, both typologically across the world's languages and in English specifically. The interplay of universal versus language-specific principles is of particular importance, since it does not only give insights into general phonotactic processes but is also essential for individually preferred modification strategies (reduction, epenthesis, and so on). Further,

Chapter 2 outlines syllable structure effects, discussing the structure of clusters in onset and coda positions, the differences and parallels in the two environments, and how these influence the rate and trajectory of reduction. Special emphasis is given to theoretical implications that embed cluster reduction in linguistic theory, for example, natural phonology (Stampe 1969; Donegan and Stampe 1979) or markedness theory (as discussed in Lass 1984).

This leads to the next point, namely the most common change and adaptation mechanisms that operate on clusters. Manifestations of phonotactic change are discussed and illustrated with historical examples from English and other languages. This is taken up in Chapter 5, which discusses the impact of language-specific phonological properties on cluster modification processes. Chapter 2 ends with an introduction to the causes and motivations behind this process: who are the agents of change and what conditions favour it? With these objectives, it discusses and contextualises internal and external effects and assesses the roles of children and adults.

Chapter 3 looks into the reduction of word-*initial* clusters. It reports findings from two case studies, one historical and one sociolinguistic/variationist. It demonstrates the historical dimension of initial cluster loss in British English, reports on a quantitative variationist analysis of /hw-/ loss in New Zealand English and discusses modification and restructuring processes in Sranan, an English-based creole spoken in Suriname (Alber and Plag 2001). Based on an evaluation of spelling variations from several historical corpora, the historical study outlines the diachronic manifestation of cluster loss in Old and Middle English, tracing the loss of initial clusters such as */wl-/, */wr-/ or */hr-/. It looks into exactly when these clusters were lost, how long it took these changes to reach completion, and whether and how they were connected; moreover, it addresses issues related to linguistic insecurity, lexical change versus phonological change and so on. The study of /hw-/ loss is based on a comparison of apparent-time data collected in several regions of New Zealand which are discussed in a dialect contact framework; how can /hw-/ maintenance and loss be interpreted in terms of local accent formation, input interaction and founder effects in a colonial context? With this aim, it examines the role of linguistic factors (phonetic environment, word status) as well as the contribution of regional and social criteria. Finally, the last point addressed is the heavy degree of restructuring and phonotactic reduction in the context of creolisation. Section 3.3 discusses effects of phonotactic transfer in language contact conditions and, following Alber and Plag (2001), considers them in a

framework based on optimality theory. The findings are summarised and compared with the aim of identifying a common set of parallels and characteristics in initial cluster reduction in English.

Chapter 4 discusses word-final cluster reduction. Surveying previous work on this variable, it is shown that this is both a variety-specific and a language-universal process, and that its inherent variability is a prerequisite for consonantal change and phonotactic restructuring that manifested itself throughout the history of English. It presents insights from four varieties (Tristan da Cunha English, St Helenian English, Pakeha and Maori New Zealand English) that were analysed for this purpose specifically. The results of these analyses are compared with studies on cluster reduction in English throughout the world – the Caribbean, North American English, British English, Asian English and Australasian English – and the findings are contextualised with reference to the respective social histories and the individual language contact scenarios (roughly classified into native speaker varieties without recent histories of language contact, contact dialects, and language contact that involves English and other languages during language shift, bilingualism, pidginisation/creolisation and so on). Chapter 4 thus brings together new and existing material, which in combination represents the most extensive comparative analysis of cluster reduction in English. This chapter also looks into the trajectory of cluster reduction in contact scenarios and weighs evidence that this feature serves both as a quantitative and a qualitative indicator of linguistic differentiation. The relevance of the last point is assessed for the continuing spread of English around the world.

Chapter 5 compares and assesses the main findings from the analytical chapters and discusses phonotactic variation and change in English from a more general perspective. This chapter is subdivided into three sections, which discuss some of the (in my personal view) most important and promising implications from Chapters 3 and 4. It revisits implications for language change in general (reassessing the role of internal and external factors in cluster reduction) and weighs the contributions of variety-specific and universal features (discussing what features differentiate World English quantitatively and qualitatively). It ends with the suggestion that this is (at least in part) a psycholinguistically motivated process, which heavily depends on the effects of syllable structure on word recognition.

In brief, this book addresses a number of issues that have received little attention in the literature on English historical linguistics, and its aim is to stress the importance of consonantal change in historical and

contemporary English. By linking past and present, it not only represents an in-depth analysis of when and why consonants change their 'tactic behaviour', but it also addresses a number of questions that are in fact still open. Consequently, this book aims at anchoring phonotactic variation and change at the crossroads of various linguistic disciplines. It argues that the interdisciplinary nature of this process accounts for parallels and differences between individual varieties and supports this with synchronic evidence of cluster reduction from a variety of Englishes around the world. Moreover, the historic dimension of this process is studied with a corpus-based analysis. The integration of contemporary and historical data provides a broad database which allows the testing and critical assessment of current approaches and views. The findings and results of this study thus complement (and on occasion challenge) current assumptions, many of which are based on findings from a single variety only. Moreover, they make a case for the importance of studying consonantal change in English historical linguistics, and by doing so contribute toward a better understanding of phonotactic variation and change in English.

2
Consonant Clusters: General Observations

This chapter outlines some general aspects of English phonotactics. A central point is that the phonotactic system of English has witnessed historical instability with the result that a number of consonants have changed their tactic behaviour. This tendency may be explained by the fact that English is typologically unusual, belonging to the minority of the world's languages that admit clusters of consonants within a syllable structure. Clusters are rarer than the individual consonants they contain and they undergo modification because minority features adapt to majority patterns. As a result, a number of clusters (both in word-initial and -final environments) have been reduced to a single consonant with which they effectively merged, and English displays several deletion and insertion strategies to modify clusters. This chapter serves as the theoretical backbone for the analytical and empirical chapters, discussing and illustrating the most frequent techniques that are employed to 'repair' anomalous phonotactic structures. Some processes operate over lengthy periods of time (for example, representing continuations of changes that began in Proto-Germanic), whereas others are ad hoc and manifest themselves more quickly; the interplay of both accounts for the complexity of this feature.

First of all, we need to distinguish whether the processes at hand are general or specific. Do the strategies entail *permanent* effects, so that clusters are lost from the phonotactic system of English entirely, or *non-permanent* ones, so that cluster segments undergo reduction in specific environments only (due to assimilation)? The interplay of synchrony and diachrony is essential for phonotactic variation and change in English; it accounts for recurring patterns in phonotactic variation, providing a vital link between non-permanent and permanent effects on the one hand and between variation and change on the other hand.

D. Schreier, *Consonant change in English worldwide*

This chapter thus addresses synchronic and diachronic developments as well as the linguistic and sociolinguistic manifestation of clusters in English.[1] The most important questions are:

1. What CC types are found in the phonotactic system of English? Which of them have the potential to undergo reduction (and for what reasons)?
2. Exactly how are CCs modified? Is the last segment reduced to zero, or can clusters be changed alternatively (either through extension and/or resyllabification, or else through breaking up and epenthesis of vocalic segments)? How context-sensitive are these processes?
3. How can we trace the diachronic evolution of English CCs? Is reduction a language-internal process or is it catalysed by external factors, or is it both? (This is particularly relevant in view of Lass's (1984: 132) statement that marked structures tend to be less stable historically; see below.)
4. What external and language-internal effects underlie this process? How can we account for the fact that reduction occurs at different rates and in different environments, and how does it manifest itself cross-linguistically and typologically? Do different language varieties display different internal constraints or does a set of general principles hold for all varieties of English?
5. Who are the principal agents of change?

Chapter 2 provides the backbone for the detailed case studies of phonotactic variation and change in English around the world, to follow in the next two chapters. This chapter provides a brief discussion of general syllable structure theory; to investigate cluster reduction, it is crucial to identify where in a syllable clusters may feature (pre- or post-nuclear), how complex they are (that is, how many elements they may contain), how individual consonantal segments are positioned in a cluster (what features govern their alignment), whether all segments carry the same status in terms of morphology (whether they indicate additional information, encoding morphological meaning and so on), and also how many clusters there are in English phonotactics in the first place. The first section discusses all these aspects, with reference to important concepts such as markedness and natural phonology, and then goes on to outline how a combination of criteria operates on the variable reduction of clusters. It also looks into internal constraints on the sequential arrangement of consonants into clusters (sonority, voicing agreement).

Section 2.2 discusses some major change and adaptation mechanisms that operate on English clusters. Individual segments influence each other in various ways, and co-articulation processes (such as assimilation and dissimilation) may represent an important step in identifying the factors that condition the permanent modification of clusters. Alternatively, clusters may be broken up through the insertion of a vocalic segment in between the consonants, so that a CC structure is modified to a (more common and less linguistically marked) CVC. Straightforward deletion of a segment (i.e., CC > C) is more common but varieties of English (have) display(ed) preferences for individual strategies. This throws light on language-internal criteria that condition cluster modification, and all these processes (assimilation, dissimilation, epenthesis and deletion) are discussed here and illustrated with examples of English (and, on occasion, of other languages).

Finally, this chapter looks into causation: exactly *why* should clusters be modified, and exactly *who* modifies them? Is this process governed by language-internal or -external factors (so that reduction is the result of contact involving English and other phonotactic systems, most notably with languages that have CV syllable structures)? Chapter 3 provides evidence that phonotactic change in English is in fact both internally and externally motivated, and we need to identify how these processes distinguish themselves and to what extent they share characteristics (for instance, is CCR as a result of internal historical change different from CCR as a result of linguistic contact?). It is with this aim that we concentrate on substratal effects in different contact scenarios and on the agency of change, addressing whether language acquisition may have an effect on these processes. Special emphasis is given to the development of CCs in language acquisition (for example, in what order they appear in child language), as this may provide an important perspective on phonotactic language change and the diachronic evolution and synchronic manifestation of clusters in English (see Labov 1989). All these questions are discussed and illustrated with examples, and they will later be contextualised with detailed case studies from historical and contemporary forms of English.

2.1 Consonant clusters and syllable structure

Phonotactically speaking, a cluster of consonants within the same syllable structure is typologically unusual; the phonotactic systems of most of the world's languages do not permit clusters, preferring sequential alternations of vowels (V) and consonants (C), most commonly as a

single consonant followed by a single vowel, (optionally) followed by a single consonant: CV or CVC (Greenberg 1966; Croft 1990). In contrast, CCs are a salient phonotactic characteristic of the Germanic language family, found in all surviving and historically documented Germanic languages (Comrie 1981; Nielsen 1989). However, English syllables cannot exclusively consist of consonants (in contrast to phonotactic systems in languages such as Czech or Serbo-Croat; Maddieson 1997) and most English syllable types combine one vowel with one or several consonants (unless we count minimal responses *mm*, or *shh* 'be quiet' as syllables, which at the very least is debatable); syllables consisting of a single V only (e.g., *I*, *eye*, *awe*) are rare. By far the most frequent syllable type is the one where a vowel is preceded and/or followed by one (or several) consonants, as in CV (*do*) or VC (*at*), CVC (*cat*), CCVC (*stop*), CVCC (*pact*), CCVCC (*stand*), or CCCV (*screw*; see below).

In English phonotactics, the vowel always represents the *nucleus* of the syllable,[2] whereas the consonants preceding the nucleus make up the syllable *onset* (*open syllables* with an onset and an ending vocalic nucleus, e.g., CV *me*, CCV *three*, CCCV *spree*). In addition, many English syllable types also feature one or more consonants in post-nuclear position: the syllable *coda* (*closed syllables* types ending in a consonant VC *at*, VCC *act*, VCCC *ants*). Many syllables feature both an onset and a coda, namely when they represent the structures CVC, CVCC, CCVC, CCVCC, and so on. A traditional approach towards English phonology would have it that up to three consonantal segments can precede the nucleus and up to four segments may feature in post-nuclear environments (a more detailed typology of CCs in English phonotactics follows in the next section). The combination of nucleus and coda is of special relevance for stress patterns as these two syllable segments make up the rhyming property of a syllable (Blevins 1995). Figure 2.1 represents the vocalic nucleus and pre- and post-nuclear clusters in English syllable structure.

The sequential arrangement of CCs in pre- and post-nuclear position adheres to basic sonority principles of English phonology. Only the most sonorous segments can feature in the syllable centre (that is, sounds that are more prominent in terms of articulation than other sounds of similar pitch or duration: open or close vowels). The nucleus represents the syllable's sonority peak, and it is preceded and/or followed by a sequence of segments with differential/lower sonority values. It is optionally flanked by phonemes in onset and coda positions which decrease in sonority the further away they are positioned from the nucleus (Lass 1984). The overall configuration of syllable-peripheral sequences is again determined by the individual segments' sonority levels. Typically, in

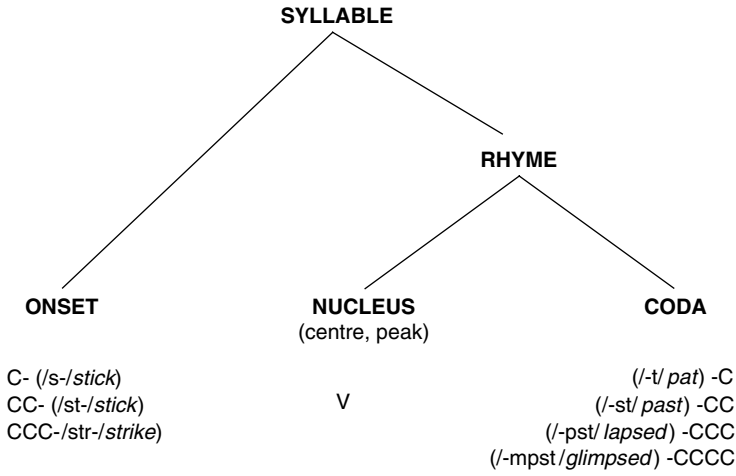


Figure 2.1 Consonant clusters and English syllable stucture

onset position, sonority levels progressively increase towards the nucleus, whereas they progressively decrease in syllable-coda position, so that it is only the least sonorous segments (plosives, fricatives, affricates) that feature in the syllable periphery (Ladefoged 1971). The sonority scale in Figure 2.2 models the differential sonority values of individual sound classes in a hierarchical ranking, with the most sonorous segments placed towards the upper end and the least sonorous segments towards the lower end.

All English syllables with onset, nucleus and coda display a sonority increase towards and a sonority decrease away from the nucleus.

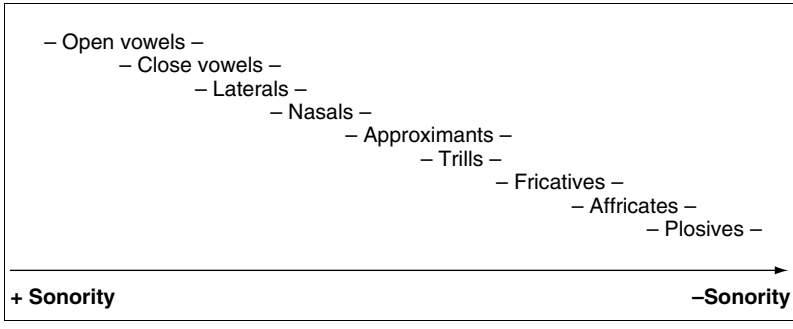
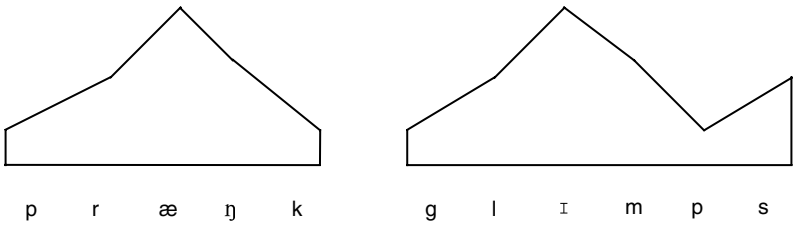
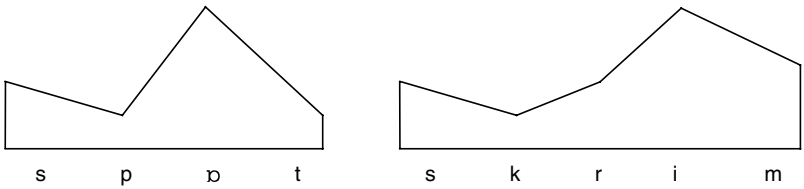


Figure 2.2 The sonority hierarchy of English phonemes
Source: Adapted from Gimson 1994: 49.

Crucially, though, not all syllable types display a perfect pyramid-shaped hierarchy, and final and initial clusters differ in this respect. Final clusters follow this hierarchy when ending in a plosive (*prank*, *punt*, *find*, *jump*, *mask*); many syllables display this pattern. On the other hand, the adherence to sonority is less rigorous in trisegmental final clusters, where the last two segments may have an equal sonority value (*sculpt*, *exempt*) or in fact violate the hierarchy principle altogether, namely in cases when the last cluster segment has a higher sonority value than the preceding one (*glimpse*). This hierarchy can be illustrated as follows (examples *prank* and *glimpse*):

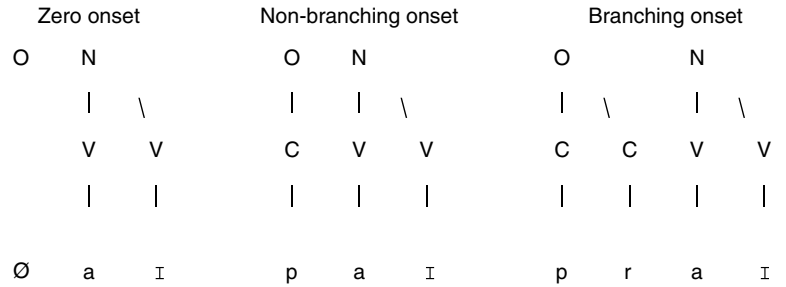


Initial clusters are more complex still. Whereas bisegmental clusters with an initial plosive (*crank*, *glad*) display a balanced hierarchy, many initial clusters beginning with /s-/ violate the sonority principle: the second CC segment is very often a voiceless plosive (*skirt*, *stand*, *spill*) and therefore less sonorous. Words like *spot* and *scream* thus display an initial decrease in sonority and show a pyramid-shaped pattern only from the second segment onwards.



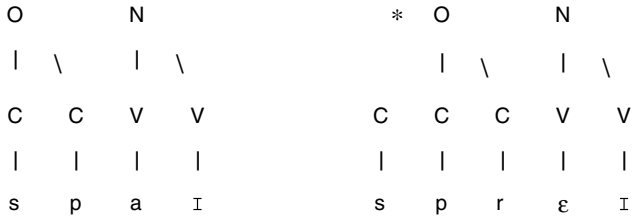
Clusters with initial /s-/ have two centres of loudness, the sibilant and the vocalic nucleus. Some phonologists (for example, Harris 1994) go as far as to claim that languages can only have bisegmental clusters and that /spr-/ is not one coherent cluster at all, but rather a combination of syllable-coda and -onset segments stuck together (words such as *sport*, *stray*, *stew* and *spleen* would therefore be bisyllabic). This view is of importance for the discussion of cluster modification in varieties of English as a Foreign Language (Chapter 4) and briefly dealt with here.

Initial clusters beginning with a sibilant are mastered without problems by native speakers of Italian, Dutch, Greek or Polish (/ˈspɔːt/ *sport*). In contrast, Spanish, Catalan, Portuguese or Welsh speakers tend to resyllabify English structures through prothesis (VCC, e.g., /ɛsˈpɒrt~ ɛsˈpɔːt/) whereas Japanese, Korean or Swahili speakers break English clusters up through epenthesis (CVC, /səˈpɔt/; see section 2.2). Harris (1998) argues that this reflects the phonological syllable structures in the respective languages. Syllable constituents (onset O, nucleus N, coda C) differentiate themselves as to whether they can branch or not (that is, whether they may contain more than one position – short vowels, for instance, always represent a non-branching nucleus). The nucleus is the only obligatory syllable constituent; onset and coda are not. English syllable onsets may therefore be zero (absent; e.g., *eye*), non-branching (*pie*) or branching (*pry*):

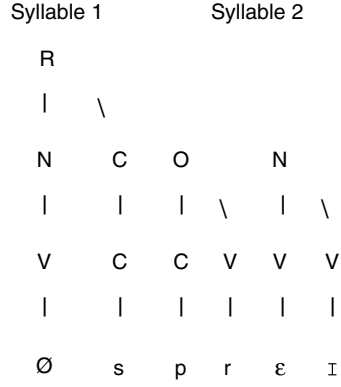


CV is a universal syllable structure (Greenberg 1966), which means that non-branching onsets are found in all languages. In the case of branching languages, the question is whether or not and, if so, when and how often, individual constituents may branch. Japanese, Swahili or Malay do not permit branching onsets, whereas onset, nucleus and coda can all branch in English. English syllables only have one nucleus and consequently one centre of loudness. The fact that a word like *spy* has not one but two peaks can therefore be interpreted to represent not one but two syllables. Phonological theory recognises that nuclei may be silent and that some languages admit empty (or silent) nuclei or not (Hockett 1955; Lass 1984). Languages such as English, Italian, Greek or German allow empty initial nuclei whereas Welsh, Spanish or Japanese do not (Harris 1998). If bi- or trisegmental onset clusters are preceded by an empty nucleus, then the initial sibilant may not be part of the cluster; rather, it represents the rhyme of a preceding silent nucleus. Following Harris (1998), /spr-/ is the combination of a coda /-s/ and an onset /pr-/. Accordingly, traditional approaches (as shown in Figure 2.1)

that regard initial /s-/ clusters as two- or three-way branches of syllable onsets are incorrect.



Consequently, a word like *spray* would consist of two syllables. The sibilant is the only element (in fact, the coda) of a preceding rhyme R which combines with a silent vocalic nucleus (syllable 1), whereas the plosive is the first segment of a branching onset (syllable 2). This can be illustrated as follows:



This provides an interesting interface between phonological theory and phonotactic variation and change. Korean speakers of English tend to break up English CCs through epenthesis (#CC->#CVC-), whereas speakers of English as a Foreign Language in other parts of the world strongly prefer prothesis (#CC->#VCC-). The local preferences can be explained by the syllable structures of the local or first languages, namely whether empty nuclei are permitted or not. If native speakers of a variety that does *not* allow Ø nuclei (Spanish or Japanese) learn a language that does (English, Greek), then the phonological system of their native language requires them to fill in empty nuclei through the insertion of an additional segment (which leads to prothesis). Alternatively, unfamiliar clusters are modified through epenthesis (see further discussion in section 4.4).

For the time being, it suffices to state that cluster reduction through final stop deletion is by far the most common phonotactic adaptation mechanism (CC > C). This is to a large extent a language-specific process as well. Even though sonority plays an important role for exactly which clusters may undergo reduction (Clements 1990), individual varieties differentiate themselves as to how often and in which clusters individual segments are reduced. Most varieties show no or very little initial cluster reduction whereas others have it often. In Sranan, for instance, an English-derived creole spoken in Suriname, the syllable-initial cluster /str-/ is typically reduced to /tr-/ (e.g., in *strong*, Sranan *tranga*). Here a more sonorous syllable-peripheral sibilant is deleted, whereas a less sonorous (non-peripheral) plosive is maintained, and the eventual outcome displays a pyramid-shaped sonority hierarchy. In British and American English, on the other hand, cluster segments may only be reduced on condition that they are the least sonorous of all the consonants and that they are at the extreme periphery of the onset or coda (which is what happened historically in the case of */kn-/ (in *knight*, which was /kniçt/ in Middle English and now is /naɪt/). The interplay of the positioning of a cluster in the overall syllable structure and the differential degrees of sonority of various consonantal segments is an important criterion, not only for the deletion of individual cluster segments but also for phonotactic variation in general.

Now, however, we go on to consider universal and language-specific principles that govern cluster formation and look into the structural characteristics and positional constraints that govern the formation of CCs in English, providing a list of all clusters found.

Universal versus language-specific principles

This section discusses the reduction of clusters with reference to specific and universal language features, focusing on whether formation and reduction are universally or specifically determined. Put differently, is there a general/universal trend to adapt syllable types with clusters to other types, or do individual varieties display their own 'repair mechanisms'? This is important in order to determine whether individual languages differentiate themselves in their trends towards cluster reduction and whether these processes generally hold across the languages in which they are found.

The point taken here is that the interplay between universal and specific aspects is of importance for approaching cluster reduction as a general, perhaps language-inherent, process. On the one hand, languages have their own specific rules as to how consonants are

combined into clusters; they thus differ in the language-internal criteria that determine their configuration. This implies that languages also differ in the variable modification processes they adopt, and in how often and in what contexts these are applied. Clearly, a descriptive (contrastive) approach is needed to outline the adaptation mechanisms implemented in each language. On the other hand, from a broad comparative perspective, one should identify a set of linguistic mechanisms and typological characteristics that operates on clusters generally; this is relevant for language typology and universals (in view of markedness, naturalness and iconicity). CV syllables are the most common (universal: Greenberg 1966) types and they are also regarded to be more *natural* in a phonological sense (there is 'a frequently made claim that the CV syllable is the most natural of all syllable types': Murray 1996: 362). By the same token, CV types also represent linguistically *unmarked* structures. As pointed out, this has an enhancing effect on the adaptation of strategies to 'repair' marked and/or non-natural linguistic structures. Strikingly, though, the difference between the two concepts is not clear-cut at all – they may in fact refer to the same phenomenon, with slightly distinct foci. The contributions of naturalness and markedness are discussed in detail here since they feature prominently in (and tie in with) approaches to the synchronic and diachronic development of English phonotactics.

To begin with the concept of linguistic *markedness*, the combination of factors such as total frequency of feature occurrence (in the world's languages), historical language change and language acquisition is taken into account to determine whether a given language feature is marked or not (Lass 1984; cf. discussion in Anttila 2002). Consequently, linguistic markedness is recognised as a key criterion to assign *universal* status to individual features (Crystal 1991). As Lyons (1977) points out, one of the basic tenets of markedness theory is that unmarked properties adhere to a common set of principles that are predominant in the world's languages; they are *absolute* universals (such as CV syllable types). Marked features, in contrast, are not in agreement with these general principles, referring to a characteristic in an individual language or group of languages instead (Crystal 1991: 297).

Accordingly, markedness is an important criterion to determine the typological status of clusters. There are several criteria to suggest why CCV/VCC etc. syllable types are linguistically marked, in contrast to other syllable types. Lass (1984), for instance, lists the following properties that characterise linguistically marked features; he states that a marked segment is

(i) less common cross-linguistically than its unmarked counterpart;
(ii) tends not to appear in positions of neutralization;
(iii) generally has lower text frequency;
(iv) is later in appearing during language-acquisition;
(v) tends in cases of phonemic merger (coalescence) to be absorbed into the unmarked category;
(vi) tends to be less stable historically;
(vii) tends to imply the existence of its unmarked counterpart. (Lass 1984: 132)

All of the features singled out by Lass directly apply (in various degrees of importance and prominence) to CCs. The following are among the most prominent ones: first, CCs are less common cross-linguistically (point i); even in languages that admit them, syllables containing CCs are less frequent than those with alternative (and more common) syllable types (point iii). Second, children display intra- and inter-individual variation in their acquisition of clusters. They are among the last structures to emerge in language acquisition; in earlier stages they are commonly realised as C or CV structures (point iv; in contrast with unmarked CV structures, which are produced at much earlier stages, as early as ten months: see section 2.3). Fourth, CCs are diachronically unstable and subject to change and adaptation (see section 2.2); a variety of change mechanisms operate with the effect of modifying clusters, either through the breaking up of the entire cluster (through *epenthesis*), through progressive or regressive assimilation as a result of co-articulation effects, or through simple reduction of one of the segments (point vi). Fifth, when bisegmental clusters are reduced they merge with a single consonant, usually a component of the cluster prior to merging, which means that during phonemic merging processes they are adapted to an unmarked consonant (point v). These five features are of importance for the discussion of change mechanisms and trajectories and are contextualised in more detail in Chapter 4.

A second important term here is *naturalness*, particularly the approach of *natural phonology* (Stampe 1969; Donegan and Stampe 1979). Natural phonology looks into tendencies towards regularity and simplification in language, with special focus on mechanisms found in early phases of child language acquisition and language pathology that have a cross-linguistic and diachronic manifestation also. In other words, natural phonology is interested in *universal* features as well. Natural phonology, as outlined in Stampe (1969), postulates that speech patterns are governed by an innate, universal set of phonological mechanisms. Natural phonology is based on

the existence of a set of universal, obligatory and categorical rules that underlie the phonological system of language (Dressler 1984). This set of rules is innate (Dressler 1987: this is of importance for language acquisition; see below) and motivated in terms of articulation. Natural processes are considered to be 'phonetically plausible' (Crystal 1991: 262) since they operate on sound classes that pose difficulties for speakers. Among others, they manifest themselves in the deletion of weak syllables, the reduction of clusters, reduplication, the fronting and stopping of dental fricatives, and assimilation processes (Crystal 1991).

In a sense, phonologically natural processes operate in reaction to diachronic changes that lead to 'unnatural' structures, as a result of which features become more unnatural in terms of articulation. We shall see below that unnatural processes very often arise due to interactions of phonology and morphology (as in affixation and compounding). Of particular relevance here is the fact that interactional patterns between the two disciplines account for cases of 'super-heavy' syllables (where codas and onsets contain several consonants) and thus for the strengthening of (word-final) CCs (Lass 1984). In natural phonology, these adaptation processes are functionally motivated (and should thus be distinguished from allomorphic and morphonological processes), since they operate on structures that are, in principle, fully pronounceable even though they are more complex in terms of articulation (Dressler 1984, 1987).

The two concepts of markedness and phonological naturalness are intricately linked. They display striking parallels indeed, most notably in their approaches towards language acquisition and typological distribution. Innate (natural) structures in first-language acquisition, for example, V or CV syllable types, are the equivalent of the most unmarked ones, and these only undergo complexification with the increase in linguistic competence of a language that admits unnatural/marked structures (dental fricatives, weak syllable deletion, clusters and so on). Even though this question is not pursued here, the two concepts overlap considerably; in fact, they may represent the same phenomenon from different angles. What is of relevance here is that the widespread manifestation of natural and/or unmarked phonotactic structures invites the implication that reduction is a universal process. This is corroborated by the fact that cluster reduction is a universal feature of spoken English and that all speakers tend to reduce them (even though no one reduces clusters categorically). This has a historical dimension also; one finds support for the existence and operation of phonological rules, for instance, in the trend towards more natural and/or less marked phonotactic

structures in English, as well as in settings of language contact and interaction between natural and non-natural structures (see below).

This leads to the next point. If unnatural/marked phonotactic structures are historically unstable and subject to change, then it is of central interest to ask how and under what circumstances clusters are reduced to (and merge with) a single C (or, rather, to a C(C) structure if there are variable rules, that is, if the reduction is not categorical and there is variability between reduced and non-reduced variants. If cluster reduction has a synchronic and diachronic dimension, then it is essential to determine how exactly these processes operate and under what conditions they thrive. Consequently, the question we have to ask in this context is whether phonotactic variation and change (in English and in other languages) is *internally* motivated, so that the fact that clusters are minority features exerts analogical pressure to make them conform to majority ones (for instance, due to competition between natural and non-natural structures). Alternatively, these changes could represent a function of linguistic contact with other phonotactic systems, which has been preeminent throughout the history of English. This is a central point of interest here.

The most promising way to approach these questions is to begin by identifying how cluster reduction works synchronically. Such information can be extrapolated to contexts for which information is missing (for instance, when (historical) data are scarce or missing). Current research indicates that phonotactic change has far-reaching implications. Since Labov's seminal studies on the stratification and socially correlated differentiation of language in New York City in the mid-1960s (Labov 1966; Labov *et al*. 1968; Labov 1972a), and Fasold's (1972) research on African American English in Washington, DC, research on CCR has focused on language-internal effects that favour or inhibit reduction (sonority, potential for resyllabification, structural constraints) and also on structural or realisational characteristics of (and constraints on) individual clusters and their individual segments. Moreover, CCR has also been traditionally studied from a sociolinguistic viewpoint, namely as a linguistic indicator of socioethnic speaker characteristics, or, perhaps more precisely, as a linguistic function of social correlates such as membership to a particular social class, ethnic group or sex/gender, or as an expression of stylistic variability and awareness to the degree of formality/informality of the interaction. These constraints display a remarkable homogeneity across varieties and are briefly introduced here, as they are placed at the crossroads of universal language features (and quite possibly language constraints) and specific phonological conditioning.

Importantly, notwithstanding its universal manifestation, CCR is a rigorously governed process. A variety of language-internal criteria influence its variable application (at least in American English, where this feature has been researched most extensively). This emphasises the relevance of CCR for general linguistic theory, as internal constraints are a recurring conditioning factor. These constraints are by nature phonetic and morphosyntactic, and they have been scrutinised in Guy (1980, 1991a, b), Neu (1980), Santa Ana (1992, 1996), Guy and Boberg (1997), Labov (1997) and many others. Some of the general questions addressed are:

- What *linguistic* (environment- and cluster-related) factors constrain the variable application of cluster reduction?
- What are the effects related to *syllable structure* (sonority, resyllabification)?
- What *contexts* and *situations* have an enhancing effect on cluster reduction?

A complicating factor for the universal–specific interface is that CCR is characterised by high variability and context-sensitivity, being conditioned by two principal parameters: (1) the phonetic environment in which the cluster is embedded and (2) the morphological status of individual cluster segments, or rather morphemes, incorporated in the cluster.

The first constraint relates to the fact that cluster deletion is subject to *phonetic* conditioning, namely that the cluster environment is an important factor. The deletion of a consonantal segment in syllable-coda or word-final CCs is context-sensitive, operating differently in distinct phonological environments. Some effects are persistent in most or all varieties studied, whereas others are more specific. Both the immediately preceding and following environments are found to affect the reduction rate of cluster-final segments. A noticeable, yet comparatively weak, language-internal constraint is exerted by the *preceding phonological segment* (Labov 1989; Guy and Boberg 1997), even though the strength of this effect varies between individual varieties and there is some indication that it is particularly strong in Hispanic varieties of English in the southern USA. The effect of the preceding environment on the reduction of a following CC manifests itself in that less sonorous environments (stops and fricatives) tend to favour deletion rates; more sonorous contexts (such as nasals and liquids), in contrast, have an inhibiting effect on the reduction of a following cluster. In other words, reduction is

more frequent in clusters where the first element is a liquid (*old*) or a nasal (*find*), and less frequent when it is an /s/ (*fast*) or a /k/ in *act*.

Whereas the preceding segment effect is comparatively weak, the following phonetic environment is reported to strongly affect the reduction of a preceding cluster (Fasold 1972; Labov 1972b; Wolfram and Fasold 1974; Guy 1980, 1991a; Patrick 1991). If a CC is followed by a consonant (as in 'past the' /past ðə/, where a final /-st/ cluster occurs before a dental fricative /ð/), then the cluster-final consonant is very likely to undergo reduction as a result of assimilation. On the other hand, a following vowel has an inhibiting effect on cluster reduction. Consequently, CCR is at least in part a phonetically conditioned process which, among others, has been attributed to syllable structure and potential for resyllabification (so that it can resyllabify onto the onset of the following syllable and result in an acceptable and phonotactically well-formed syllable across a morpheme boundary: Guy 1991a, 1994; Labov 1997):

Following C (e.g. CVCC # C)	→	*higher* reduction levels
/wɛst saɪd/ 'west side'	→	[wɛs saɪd] ~ [wɛst saɪd]
/faɪnd taɪm/ 'find time'	→	[faɪn taɪm] ~ [faɪnd taɪm]
Following V (e.g. CVCC # V)	→	*lower* reduction levels
/wɛst ɛnd/ 'west end'	→	[wɛst end]
/faɪnd aʊt/ 'find out'	→	[faɪnd aʊt]

Varieties have high reduction levels in preconsonantal environments and comparatively lower ones in prevocalic ones. The effect of these two environments on the reduction of a preceding cluster is a universal feature of English CCR. However, the picture is not so clear in other environments. A following pause ('it's half *past*') has *both* an enhancing and an impeding effect on the reduction of a cluster-final consonant, and this effect seems to be variety-specific. For instance, varieties of American English display distinct tendencies: a following pause exerts constraints similar to those of following vowels in Philadelphia (Guy 1980), promoting retention, whereas it behaves like consonants in African American English spoken in Washington (Fasold 1972) or New York (Labov 1972b) in that it favours deletion. Varieties of English thus behave differently with regard to this particular environment, and there is a variety-specific constraint on the application of CCR. The effect of this environment is particularly diagnostic and tested in more varieties in Chapter 4.

A second principal factor to affect the reduction of CCs is by nature morphological, concerning the cluster's (or rather cluster segments')

morphological status. CCR is sensitive as to whether the individual consonantal segments carry grammatical function or not so that morphological status has an effect on (variable) deletion. A general distinction is made between monomorphemic clusters and clusters that contain more than one morpheme. Monomorphemic clusters (such as *past*, *desk*) are more prone to undergo reduction than bimorphemic clusters, where the cluster-final plosive represents an *-ed* suffix (/-st/ in *pass*+*-ed* 'passed', /-kt/ in *knock*+*-ed* 'knocked'). The total number of final bimorphemic clusters increased historically as a result of the rise of the productive *-ed* tense suffix, which marks weak (regular) verbs for past tense through suffixation. In Old English (OE) and Early Middle English (ME), strong verbs that indicated past tense through root inflection or suppletion were much more common than they are now (Görlach 1991). (Note that this ties in with the discussion of natural phonology, namely that natural phonological processes operate in reaction to historical changes, so that an increase in cluster reduction may be considered as a reaction to the rising prominence and frequency of final stop addition through affixation.)

A crucial point is exactly how many sub-types should be considered in the analysis of morphological effects on CCR. This is debatable; some propose to make a general classification of two morphemic types only (present tense, without *-ed* suffixation, and past tense, with *-ed* suffixation), whereas others have argued that the nature of cluster types is more complicated and that a morphologically oriented approach towards CCR needs to integrate more information. The first view is promoted by Kiparsky (1982), who argues that the morphological conditioning of CCR is basically *functional* (namely, to avoid a homonymic clash between present and past tense forms), so that this process is governed by two principal morpheme types. In contrast, Guy (1991a) argues that the morphological structure of a cluster is more complex. He particularly refers to the case of irregular verbs like *kept*, *told* or *left*, which signal past tense reference through both suffixation and root vowel alternation; Guy (1980: 5) refers to them as 'ambiguous verbs', and Patrick (1991) calls them 'semi-weak' or 'double-marked verbs'. To illustrate the effect of morpheme type, Guy classifies clusters into (1) monomorphemes (e.g., *cost*), (2) irregular forms, where past tense is indicated through both root inflexion and affixation (*sleep – slept*, *lose – lost*), and (3) regular past forms (*tossed*). His tripartite classification is supported by the fact that the three morpheme types distinguish themselves in their reduction rates. The CCR rates of irregular forms usually pattern in between those for bi- and monomorphemic clusters,

having higher reduction rates than weak past tense forms and lower reduction rates than monomorphemic items:

Monomorphemic words (*mist*, *lift*, *act*)
> Ambiguous, semi-weak verbs (*kept*, *told*, *left*)
> Regular weak past tense verbs (*missed*, *grabbed*)

One should add here that the relationship between sonority and morphological function is not always recognised, which is an oversight. In fact, some researchers do not consider this at all and do not take into account that some bimorphemic clusters are never reduced. It is important to bear in mind that morphemic status is not the only influence on CCR, and that this effect can be overridden by internal phonological criteria, most notably *sonority*. The phonological deletion rule only affects final stops and is not operative in bisegmental clusters with final sibilants, for instance ending in a plural /-s/ suffix. The fact that a bimorphemic cluster /-st/ (in *passed*) is commonly reduced and a bimorphemic /-ts/ (in *cats*) is categorically retained emphasises the importance of sonority factors in cluster reduction. A statement such as 'CCR is more frequent in monomorphemic than in bimorphemic clusters' (Wolfram, Childs and Torbert 2000: 18) is therefore too general and factually incorrect. Any investigation of CCR needs to integrate phonological information. Cluster reduction depends on syllable structure theory and is thus at least in part a function of the sonority hierarchy of the individual cluster segments. Sonority values may even outweigh morphological criteria, a factor that is not always recognised.

To sum up, CCR operates in all varieties of English and is classified as a universal process of spoken English (Labov 1972b). It displays a set of general constraints, most notably in that both the morphemic status of cluster segments and the cluster's phonetic environment affect its variable application. The phonetic and morphological parameters condition the universal application of CCR in English, which has been confirmed in all varieties in which the reduction of cluster-final stops has been studied. Consequently, since CCR is a universal feature of English, it offers little *qualitative* information on dialectal distinctiveness; however, it is crucial to study the *quantitative* dimension of CCR, namely to compare the frequency with which this process occurs. Therefore, notwithstanding the fact that all dialects of English variably reduce syllable-coda clusters, the identification of individual and dialect-specific differences is an important analytical tool (Chapters 3 and 4).

First of all, it is essential to give an overview of how clusters are arranged in the phonotactic system of English in the first place. This allows us to assess the reduction of English clusters, to pinpoint structurally and positionally specific constraints and to weigh the contribution of individual factors in more detail.

Consonant clusters in English: structural and positional constraints

The majority of the world's languages do not permit clusters of consonants in syllable-initial or -coda position; clusters are, among others, found in Germanic, Slavic and some West African languages (for example, Idoma and Bura: Ladefoged 1971, or Yoruba: Bamgbose 1969; Laver 1994, 314–16). It is noteworthy that languages such as Czech even admit syllable structures that consist exclusively of consonants so that as many as four consonantal segments may feature in a syllable without any inter-positioned vowels (as in *smrt* 'rest', *pstros* 'trout'). This effectively means that a consonant is taking the function of a syllable nucleus.[3]

Crucially, even if languages admit clusters of consonants in syllable onsets and codas, they do not exploit the full range of potentially possible combinations of consonantal segments. The structural constraints that underlie cluster formation vary according to the phonotactic systems of individual languages; they are *language-specific*. For instance, Serbo-Croat syllable structure allows CC, CCC and even CCCC as a complement to a nuclear vowel, and in a same vein English allows clusters in word-initial, -medial and -final positions (*spring*, *cactus*, *pact*). Up to three consonants can occur word-initially, for example /str-/, /spl-/ or /skw-/, and clusters of two, three or even four elements are found in word-final position, as in *glimpsed* [-mpst] or *twelfths* [-lfθs]. The ordering of clusters in English is restricted and some consonants (particularly voiced fricatives or sibilants, such as /ð/ or /z/) may never occur cluster-initially and only in combination with other segments. The 'anatomy' of CCs in English is therefore subject to structural limitations, and sequential constraints operate differently on clusters that consist of two, three or four segments. English has a total of 47 word-initial clusters that consist of two elements (Table 2.1) but only 15 consonants can occur cluster-initially and each one of them is restricted with regard to the second element of the CC.

Some English CC combinations are of long-standing historical continuity (such as /dr-/, /kr-/, /-ft/ or /kw-/, which can be traced back to Old English, as in *drycræft* 'sorcery', or *cwæð* 'quoth'); others, yet again, are rare and exclusively represent recent borrowing processes (such as /vr-/ in *vroom*; Crystal 1991). Consequently, a basic distinction

Table 2.1 Structurally permissible two-segment CCs in English, word-initial

C_1		C_2											
Plosive	/p/	l,	r,	j									
	/t/		r,	j,	w								
	/k/	l,	r,	j,	w								
	/b/	l,	r,	j									
	/d/		r,	j,	w								
	/g/	l,	r,	j,	w								
Nasal	/m/			j,	w								
	/n/			j									
Lateral	/l/			j									
Fricative	/f/	l,	r,	j									
	/v/	l,	r,	j									
	/θ/		r,	j,	w								
	/s/	l,	r,	j,	w,	p,	t,	k,	m,	n,	f,	v	
	/ʃ/	l,	r,		w,				m,	n			
	/h/			j									

Source: Adapted from Gimson 1994: 218.

needs to be made between native clusters that take their origins in the phonotactic system of (Proto-)Germanic and have been part of the language for thousands of years, and inherited ones that entered English phonotactics through the adaptation of loanwords from other languages. Such a distinction is particularly important in view of the fact that some of the clusters listed in Table 2.1 are infrequent and only found in a restricted number of borrowings from German, Yiddish and other languages.

The different origins and statuses of English clusters raise the fundamental question as to whether it is justified to regard inherited ones as a part of the phonotactic system of English and, if so, whether they hold the same status as those with a long-standing historical continuity. The structural components of 'non-English' clusters that originated this way come from varieties with distinct phonotactic systems; as a result, several clusters listed in Table 2.1 are actually not in agreement with and have no parallel in English phonotactics. Gimson (1994: 218) finds one single instance of /mw-/ (the Swiss German loanword *muesli*);[4] similarly rare are /vl-/ and /vr-/ in *Vladivostok* and onomatopoeic *vroom*, /sr-/ and /sv-/ in *Sri Lanka*, and *svelte* or /ʃl-/, /ʃw-/, /ʃm-/ and /ʃn-/ in a handful of loanwords from German and Yiddish (e.g., *Schlesinger*, *Schweppes*, *schmaltz* and *schnapps*). The total

quantity of lexical items is therefore an important factor, since a single phonotactic structure from a single lexical borrowing has no effect on the phonotactic system of the recipient language (which makes it doubtful whether such clusters should be on a par with native ones). However, quantity is a crucial factor, since the productivity of clusters is likely to change when a large number of loanwords with an identical cluster enter the language (in a scenario similar to the one of morphemes inherited from Latin and French, which gave rise to subsequent adoption and hybridisation).

The native versus historically inherited status of clusters is of relevance for general processes of phonological adaptation of borrowings, and of course also for the structural integration of foreign elements and paradigms inherited through language contact. It is of particular importance for the general (and ongoing) debate on whether language change is lexically or phonetically conditioned (Thomason and Kaufman 1988; McMahon 1994). In this particular case, there is no doubt that the phonotactic realisation of some clusters is restricted to a handful of (loan)words only. In its most extreme case, an initial cluster may occur only once in the phonotactic system of English, and only once in the English lexicon, being lexically conditioned and not phonologically productive (this is the reverse of some traditional Germanic clusters, such as */fn-/, which featured in very few words only (as in **fnæst* 'puff, blast, breath') and disappeared when the lexical items that had them died out; cases of phonotactic loss as a function of lexical loss are discussed in Chapter 3). Notwithstanding, the overall stock of clusters in the phonotactic system of English would be considerably lower if English had not adopted a large amount of loanwords from other languages.

Turning to native clusters in English phonotactics, it is striking that their formation adheres to a number of principles. Focusing on syllable-onset clusters first, one finds both bi- and trisegmental combinations of consonants. The constraints on clusters manifest themselves in the fact that some first elements, such as /l/, /n/ or /h/, can only occur with one consonant (namely /j/), and these clusters are threatened as well, merging with the first cluster segments (as a result of *Yod dropping*: Wells 1982: 206). In contrast, other consonants may be combined with up to eleven C_2 elements (the most prominent candidate here being /s/, which can occur with subsequent plosives, nasals or laterals: *spit*, *snatch*, *sweat* or *slack*).[5] With the exception of /ʃm-/ and /ʃn-/, that is, 'loan clusters' that entered English via German and Yiddish, native English clusters thus always take a liquid or semi-vowel as second element, on condition that the first segment is not a sibilant.

/s/ has a special status in English phonotactics, being the only segment possible in initial trisegmental CCC clusters. The structural and positional constraints on CCC clusters can be summarised as follows: word-initial clusters consisting of three segments (CCCs) are comparatively rarer and follow an even more rigorous structural patterning than bisegmental ones. All English CCCs take /s/ as the first element, which is followed by a voiceless plosive (/p/, /t/ or /k/) and then by either /l/, /r/, /j/ or /w/. The limited status of trisegmental clusters manifests itself in that three out of a possible set of twelve CCC clusters are ill-formed and non-existent (English has no initial */spw-/, */stl-/ or */stw-/ clusters). Moreover, some of the nine attested combinations are restricted to very few words (/smj-/, for instance, is only found in *smew*), followed by one vowel only (/CCj-/ occurs only before /uː/ or /ʊə/, and /skl-/ only before /ə/: Gimson 1994: 218) or be in the process of change (due to Yod dropping). In other words, CCC onset clusters are rare, lexically limited and historically unstable (as a result of which they are not phonologically productive).

In contrast, syllable-coda clusters may consist of two, three or four segments and these display different structural restrictions. Two important features here are that there exists a wider variety of cluster types and that cluster-final alveolar plosives may carry morphological status on their own. As we saw above, cluster-final segments may morphologically encode information on plurality (/-s/ in *cats*), possession (*David's hobby*) and tense marking (third-person singular present tense *-s* or past tense *-ed*). As a consequence, word-final clusters are mono- or bimorphemic. A final alveolar plosive may represent either the last segment of a monomorphemic cluster (as in *soft* or *act*) or else a suffix that encodes morphological meaning, as a result of which the final segment of a bimorphemic cluster represents an independent morpheme in its own right.

In syllable-coda position, the structural set-up of English clusters has a twofold effect. A lexical item is modified grammatically (through inflexion), which means that lexical characteristics (such as membership to a word class) remain unaffected and that there is only a change in word form. Nouns do not change their status when plural /-s/ is affixed, and tense suffixation does not affect the status of verbs. At the same time, the cluster is extended and becomes more complex phonologically. In this case, an increase in form entails an increase in information, which throws an interesting light on *iconicity* and will be further discussed in Chapter 3. Crucially, this has an impact on overall reduction tendencies and the interplay of phonological complexity and grammatical meaning influences the reduction of word-final clusters.

In terms of structural constraints on syllable-coda CCs consisting of two segments, there are two main categories of permissible and phonotactically well-formed combinations (Table 2.2). First, a cluster class where the first element is a nasal, a lateral or a sibilant /s/, and the second element a voiceless plosive (e.g., *jump*, *dent*, *tank*, *belt*, *help* or *flask*). The second type consists of a consonant and one of the group of /s, z, t, d, θ/; candidates in this class mostly represent word forms as most of these clusters originate in suffixation of past tense /t, d/ (*left*, *raved*), possessive, plural, or third-person singular present /s, z/ (*dog's ~ dogs*, *cat's ~ cats*, *leads*, *hits*), or from ordinal or noun-forming attachment of /θ, t/ (*fifth*, *depth*, *product*). It is striking that there are very few monomorphemic words in this class, for example, *act*, *axe*, *adze*, *lapse*, *corpse*.

Word-final clusters consisting of three segments (CCC) can also be classified into two principal groups (Table 2.3). First, there are clusters that involve affixation and thus again represent a combination of two distinct morphemes; here the first segment is /m, n, ŋ, l, s/ plus a consonant plus the final element representing the suffix: /t, d, s, z, θ/. Most of

Table 2.2 Structurally permissible two-segment CCs in English, word-final

C_1		C_2													
Plosive	/p/		t,										θ,	s	
	/t/												θ,	s	
	/k/		t,											s	
	/b/					d,									z
	/d/														z
	/g/					d,									z
Affricate	/tʃ/		t,												
	/dʒ/					d,									
Nasal	/m/	p				d,							θ,		z
	/n/		t,			d,	tʃ	dʒ			f		θ,	s,	z
	/ŋ/			k,		d,									z
Lateral	/l/	p	t,	k,	b,	d,	tʃ	dʒ	m,	n,	f,	v,	θ,	s,	z
	/f/		t,										θ,	s	
	/v/					d,									z
	/θ/		t,											s	
	/ð/					d,									z
Fricative	/s/	p	t,	k,											
	/z/					d,									
	/ʃ/		t,												
	/ʒ/					d,									

Source: Adapted from Gimson 1994: 219.

Table 2.3 Structurally permissible three-segment CCs in English, word-final

C_1		C_2								C_3
Plosive	/p/	/s/								/t/
	/t/	/s/								
	/k/	/s/								
	/d/	/s/								
Nasal	/m/		/p/							/t/
	/n/	/s/				/tʃ/				
	/ŋ/	/s/			/k/					
Lateral	/l/	/s/	/p/		/k/	/tʃ/				/t/
Sibilant	/s/		/p/		/k/					/t/
Nasal	/n/	/z/				/dʒ/				/d/
Lateral	/l/					/dʒ/	/m/			/v/
Plosive	/p/			/t/					/θ/	
	/t/								/θ/	
	/k/			/t/						
Nasal	/m/		/p/							/f/
	/n/			/t/					/θ/	/s/
	/ŋ/				/k/					
Lateral	/l/		/p/	/t/	/k/				/θ/	/f/
Fricative	/f/			/t/					/θ/	
Sibilant	/s/		/p/	/t/	/k/					
Nasal	/n/			/d/						/z/
Lateral	/l/		/b/	/d/			/m/	/n/		/v/
Plosive	/k/	/s/								
Nasal	/n/			/t/						/θ/
	/ŋ/				/k/					
Lateral	/l/								/f/	

Source: Adapted from Gimson 1994: 219–20.

these CCC types involve marking for plurality or tense (*cradles*, *jumped*, *lisps*). The second category of word-final CCC arises due to double application of /t, d, s, z, θ/. In analogy to bisegmental final clusters, there are only very few common monomorphemic words (e.g., *text, next*); most of the clusters in this category originate in suffixation, for example, *fifths* /fɪfθs/, *products* /prɒd∧kts/, *acts* /ækts/ (although these are all commonly reduced to /fɪfs/, /prɒd∧ks/, /æks/ etc.).

These observations can be generalised as follows. Despite the grammatical implications caused by the increase in phonological

complexity (namely that final segments carry independent morphological meaning, indicating plurality or tense marking), syllable structure and the sequencing of clusters in onset and coda positions by and large adhere to the *sonority sequencing principle* (SSP). In this regard, it is quite irrelevant whether individual phonemes carry independent morphological meaning or not. The conditions that govern the formation of final English -CC(C) clusters are almost a mirror image of the principles that govern initial CC(C)-. The penultimate segment is commonly a nasal or a liquid (bearing in mind that in non-rhotic accents of English, /r/ does not fall into this category). On the other hand, there are parallels in the composition of peripheral syllable sequences: the sonority of segments in onset position moves towards the syllable peak, and in coda position sonority moves successively away from the nucleus (Roach 1992). Thus the least sonorous segments (sibilants and plosives) represent the demarcating elements of syllables and more sonorous segments link them with the syllable's nucleus.

Overall, then, the phonotactic system of English is unusual since it permits combinations of clusters, consisting of two to four segments, in word-initial (*click*, *spray*) and -final position (*grasp*, *fifths*).[6] The individual cluster types are rigorously constrained in terms of segment ordering and structural affiliation, which again are conditioned by SSP (and perhaps also by syllabification) effects. Notwithstanding, CCs, like all language structures, are not monolithic and may undergo change. Individual segments of the cluster may affect one another through processes of assimilation or dissimilation, they may change the sequential order in which they occur, they may linguistically merge with other phonemes, and they may be deleted so as to transform the CC to a simple C structure. These processes are discussed in the next section.

2.2 Change and adaptation mechanisms

The structural, phonetic or sequential properties of clusters may undergo diachronic adaptation and various change mechanisms operate on CCs. Some of these are common (for example, assimilation, dissimilation, deletion), found not only in consonantal variation and change but also elsewhere. Other processes are comparatively rare, often operating lexeme-specifically. One of these less frequent change mechanisms is *metathesis*, which does not involve the addition or reduction of a segment nor does it affect the phonetic manifestation of the consonants; rather, the sequential order is rearranged and the

cluster's individual segments are interchanged (while at the same time keeping their phonetic characteristics, that is, both in place *and* manner of articulation). This process affected /sk/ sequences in West Saxon, e.g., *āksian* /aːksian/ 'ask', *dox* 'dusk', or *flaxe* 'flask', as manifested in [aːks] for *ask* or *walrus* (rather than *'whale-horse') in contemporary varieties of English (Luick 1964; Mitchell and Robinson 1986).

Another mechanism of comparatively minor importance is *compensatory lengthening*, where the reduction of the first element of a consonant cluster goes hand in hand with the lengthening of a preceding vowel. A VCC structure, with a short vowel, undergoes reduction to VC, and the loss of a consonantal segment is accompanied by simultaneous vowel lengthening. This is exemplified in the transition phase from Proto-Germanic to English (Pr.Gc **tonθ*>OE *tōθ*>ModE *tooth* [tuːθ], Pr.Gc **gans*>OE *gōs*>ModE *goose* [guːs]; cf. Modern German cognates *Zahn* [tsaːn], *Gans* [g∧ns]: Jespersen 1909; Luick 1964). On the whole, these processes are sporadic and infrequent in phonotactic change, in contrast to others that need to be discussed in more detail: *assimilation*, *dissimilation*, *epenthesis* and *deletion*. These mechanisms are dealt with in the following, mostly using examples from English but also some from other languages whose phonotactic systems admit CCs.

Assimilation

A number of factors lead to assimilation of adjacent consonants, perhaps most importantly their degree of phonetic similarity: a 'basic generalization is that assimilation takes place first between segments which are already most similar in their feature composition' (Kiparsky 1988: 381–2). Assimilation commonly starts as a co-articulation process. A consonant often becomes more similar phonetically in that its place of articulation assimilates to that of the appositioned segment. This does not result in the complete adaptation (or reduction, which would have an identical effect; see below) of one of the two segments, and is therefore *partial*. The two cluster elements remain phonetically and perceptually distinct. The important point is that one of the two elements is more resistant, whereas the other segment undergoes the assimilation process, for reasons that need to be specified in each case. Partial assimilation can be either *regressive* or *progressive*; it is progressive when the first element is stable and the second becomes subject to assimilation.

A well-known example here is assimilation that affects the productive *-ed* suffix, which marks regular verbs for past tense. Until the Early Modern English period, this suffix used to have a categorical VC realisation

(as the spelling indicates) and was pronounced /ɛd ~ əd/ in all contexts. Then, however, the vocalic segment of the suffix disappeared as a late effect of Germanic stress shift (Görlach 1991); the ultimate loss of /ɛ ~ ə/ from the *-ed* suffix led to an increase in word-final clusters in English when verbs, to which *-ed* was attached, ended in a consonant:

Early ME /ˈnaːməd/ (word-final C + suffix *-ed*)
> /ˈnaːmd ~ ˈneːmd/ (loss of vowel)
>ModE /ˈnɛɪmd/, 'named' (word-final CC)[7]

As a direct result of vowel loss, a formerly morpheme-final plosive came to be adjacent to a preceding (and word-final) consonant and was subject to *progressive* partial assimilation. If a preceding consonant is voiceless (as in *stop* or *pick*), then a suffixed *-ed* is assimilated and realised as a voiceless [t]:

Engl *-ed* >[t]/voiceless C__#

On the other hand, there is no change in manner of articulation when the preceding element is voiced (e.g., *grab* or *nag*), in which case the *-ed* suffix remains voiced:

Engl *-ed* > [d]/voiced C__#

Notwithstanding the degree of assimilation, the two segments remain distinct (the importance of this point will become clear when we discuss deletion processes). The phonetic properties of the environment cause progressive assimilation so that the production of the *-ed* morpheme is conditioned by the phonetic characteristics of the preceding segment. In this case, assimilation leads to allomorphic variation.[8] Total assimilation here would have a counterproductive effect and may lead to ambiguity or even dissimilation.

By the same token, cluster segments may also undergo *regressive* assimilation, namely when the C_2 element influences the articulatory properties of C_1, as exemplified by the effect of the final CC segment on a preceding nasal /n/:

Engl /n/ > [ŋ]/ __ velar plosive (*punk* [p∧ŋk])

Engl /n/ > [n]/ __ alveolar plosive (*punt* [p∧nt])

We find a different scenario in cases that involve *total assimilation* of one of the two segments. Here the articulation of one of the two elements changes to the extent that the two consonants are no longer distinct on phonetic grounds. A common distinction is made between regressive and progressive directionalities of a total assimilation process as well. A process of *total regressive assimilation* involves adaptation of the first to the second element of the cluster, either through abrupt assimilation or else through a set of stages that indicate a progressively increasing degree of similarity between the two elements. This can be exemplified by the case of OE /fm/, which corresponds to ME /m/ (from Mossé 1952: 40) and can be seen as natural phonological process on a cluster that originated in compounding:

OE *lēfman*, *wīfman* > ME *lemman* 'lover', *wimman* 'woman'

Total assimilation processes may also be *progressive*, namely in cases when the first element of a cluster conditions the change. An example is the change that affected Proto-Indo-European /ln/:

PIE **kolnis* 'hill' > Pr.Gc **hulnis* > OE *hyll* > ModE *hill*

OE *myln* 'mill' > ModE *mill*

(Cf. Fr *moulin* and It *molina*, where this assimilation process has not occurred.)

Dissimilation

Dissimilation processes operate with the result of making the two consonants less similar to one another. As McMahon (1994) notes, dissimilation is rare and a more irregular and sporadic process than assimilation. A case of dissimilation in English is the [l] realisation of the second in a sequence of the two nasals /m/ and /n/, as when 'chimney' is pronounced /tʃɪmli] (Pyles and Algeo 1982: 39). Here the alveolar nasal [n] is replaced by a lateral approximant [l]; the place of articulation remains the same whereas the manner of articulation changes. Crowley (1992: 57) demonstrates dissimilation in the word-initial /sx/ cluster in Afrikaans, the Dutch-derived member of the Germanic family branch which developed in South Africa:

18th-c. Du */sxoːn/ 'clean', */sxoudər/ 'shoulder', */sxœlt/ 'debt' > Modern Afr [skoːn], [skouər], [skœlt]

In eighteenth-century Dutch, these clusters consisted of two word-initial fricatives: /s/ and /x/. Then, during the formation phase of Afrikaans, the cluster changed so that the second element dissimilated from the fricative [s] by changing its manner of articulation. The Afrikaans fricative [x] changed to the stop [k] as a result of which there no longer were two fricatives in the cluster. Consequently, the place of articulation remained identical. Afrikaans represents a rather uncommon case of non-sporadic dissimilation; in most cases, this process affects few lexical units and may give rise to variation so that both realisations continue to coexist (Lehmann 1992).

Epenthesis (insertion)

Assimilation and dissimilation of individual segments are perhaps the most common phonotactic modification mechanisms (along with reduction through final stop deletion; see below). On the other hand, we also find cases where the realisation of both elements remains unchanged and where it is the immediate phonetic environment that undergoes modification. For instance, consonant clusters may be broken up through the insertion of another phoneme; alternatively, clusters may be extended when an additional consonant is added, as a result of which the syllable set-up is modified.

One manifestation of epenthetic change in clusters is integration of an additional homorganic consonant, which usually occurs with the aim of easing articulation. Manifestations of this process are epenthesis of [p] in OE **glimsian* (which corresponds with ModE *glimpse*), [b] in OE **timr* (cf. ModE *timber*), and [d] in OE **ganra* (cf. ModE *gander*: Luick 1964; Mossé 1952). Epenthesis is typically motivated by articulatory processes; the inserted consonant functions as a link between the cluster segments. It often shares the place of articulation with the first segment (here bilabial or alveolar) and the manner of articulation with the second one (voicelessness). The cluster is thus not broken up and its surface structure becomes more complex (CC>CCC): the cluster is extended through the integration of an additional consonantal segment that serves as a link between two co-occurring segments that differ in place and manner of articulation.

On the other hand, we find vowel epenthesis as well, so that the cluster undergoes modification from a CC to a CVC structure. This manifests itself when a schwa is inserted to break up /lm/ or /θl/ clusters, as in South African English (SAfE), when *film* is pronounced ['fɪləm], or in varieties of British English, when *athlete* is pronounced ['æθəlit] (Pyles and Algeo 1982: 39). Lehmann (1992: 195) demonstrates cases of vowel epenthesis in OE and Old Icelandic (OIcel) (cf. OE *æcer* and OIcel *akr* 'acre', or OE *ofen* and OIcel *ofn*

'oven'), and a similar process is also found in nineteenth-century Maori New Zealand English, where epenthetic schwas are introduced to break up and modify the surface structure of word-final clusters in words such as settled [ˈsɛtələd] or composed [kəmˈpɒzəd] (Schreier 2003b). Asian Englishes have a prominent trend towards vowel epenthesis as well.

A final process in this category is *prothesis*, where a phoneme, most commonly a vowel (Lehmann 1992), is inserted in word-initial position. This affects an immediately following cluster through the addition of a nucleus and thus through subsequent resyllabification. This can be demonstrated in a change that occurred in Latin and continued throughout the formation of French (Campbell 1998: 33). Latin words with initial /sp/, /st/ or /sk/ clusters took on a prothetic short /ɪ/, so that the Latin words *scola* and *stabula* became *iscola* and *istabula*. The prothetic /ɪ/ later changed to /e/ and the /s/ before other consonants was lost in Modern French.

Lat *scola* [ˈskola] > *iscola* > *eskola* > Old Fr *escole* [ɛsˈkolɛ] > Modern French *école* [eˈkol]

Lat *stabula* [ˈstabula] > *istabula* > *estabula* > Old Fr *estable* [ɛsˈtablɛ] > Modern Fr *étable* [eˈtabl]

In these cases, vowel prothesis leads to the loss of a consonant and ultimately to the reduction of a consonant cluster in this particular environment (in a way not dissimilar to compensatory lengthening).

Deletion

The most common process of cluster modification in English is *deletion*, which typically entails the total loss of the second or last segment of the cluster. Grunwell (1987: 217) defines this mechanism as 'the deletion of one or more consonants from a target cluster so that only a single consonant occurs at syllable margins'. The deletion of a cluster-peripheral segment represents an ad hoc process when there is regressive assimilation to a following syllable-onset plosive. There is a diachronic dimension also; for instance, the word-final or syllable-coda /st/ and /ft/ clusters were reduced to [s] and [f] in words such as *chestnut*, *Christmas* and *often*. By the same token, the word-initial clusters /xl ~ hl/, as in *hlāf* 'loaf', /xr ~ hr/, *hring* 'ring', and /kn/, *cniht* 'knight', were reduced through loss of the cluster-initial segment as a result of which they disappeared entirely. These changes had a permanent effect on English phonotactics and are therefore highly relevant for an analysis of phonotactic variation

and change. The directionalities, duration and some possible motives and causalities of these changes are discussed in Chapters 3 to 5.

We now have looked into the major adaptation processes that affect(ed) English clusters and illustrated them with historical and contemporary examples. Though varying in frequency, a basic set of environment- and cluster-related effects appears to hold for all varieties of English. The question that has not been addressed is exactly why clusters are modified. Are there analogical pressures at work, or universal tendencies toward less marked, more natural features? Is this a language-internal or -external process? Do data from child language acquisition processes support or challenge the basic tenets of CCR variation in (adult) varieties? It is to these questions that we turn now.

2.3 Causes and motivations: a first approach

This section examines possible reasons for phonotactic change in English and addresses three possible explanations: (1) independent language-internal change; (2) adaptation caused by language contact (and integration of non-native structures); and (3) the role of children in language acquisition and of adults in second-language learning. These points are addressed in turn in order to find out whether there is a common principle that underlies cluster reduction, not only cross-typologically but also in individual languages with distinct linguistic backgrounds.

Language-internal or external (substratal) effects?

The first question is whether cluster reduction occurs diachronically in varieties of English that have no recent contact with (and influence from) other languages, or whether it exclusively represents a feature that originates in language contact and transfer of substratal phonotactic structures. Linguistic contact may have a catalysing effect on cluster reduction, particularly when one of the languages present in the contact scenario only admits CV or V syllable structures. The phonotactic systems of most of the world's languages have CV syllable structures and do not allow clusters of consonantal segments; given that this pattern is more regular and common and perhaps also more natural, it has an advantage over marked features and thus often exerts a strong impact on the phonological system of a contact-based language variety. As marked, non-natural and typologically uncommon types come into contact with less marked and more natural/frequent syllable structures, the selection of the latter one is favoured when there is competition between various

syllable types, and consonant clusters are reduced to single consonants (which is in line with Lass's principles, discussed above).

This would suggest that phonotactic change is mainly language-external. Accordingly, CCR has been described as particularly prominent in contact-derived varieties with influence from other phonotactic systems; for instance, it is particularly high in early stages of language shift (Schreier 2003b) or creolisation (Patrick 1991), and initial cluster reduction is extensive in Sranan (Alber and Plag 2001), all of which strongly suggests that phonotactic change in English is mainly a function of external language change. According to Holm (1988: 109):

> There is abundant evidence of this phonotactic rule [canonical CV syllable structure] having been carried over into a number of Atlantic creoles, particularly those whose structure is least influenced by that of their European lexical-source language . . . However, remnants of this phonotactic rule can also be found in decreolizing varieties. Since many words in the creoles' lexical-source languages were incompatible with this rule, they had to undergo phonological changes . . . These often had the effect of breaking up consonant clusters in the European words so that the corresponding creole words conformed to the CV syllabic structure rule.

In the same vein, Wolfram, Childs and Torbert (2000:20) argue that the quantitative dimension of CCR may almost reach qualitative proportions, and they consider reduction in prevocalic environments as particularly diagnostic for 'the role of CCR in terms of its potential for reflecting language contact history, in particular, phonological transfer'. They take the (strong) view that the reduction of final stops in syllable-coda CCs is an indication of contact-induced adaptation and phonotactic transfer of less marked syllable types.

On the other hand, one would object that these views are too strong, and that CCR (even in prevocalic environments) can represent internal language change indeed. Chapter 3 presents evidence that some cases of cluster reduction are most plausibly explained as internal (analogical) change, operating through long-term weakening rather than straightforward deletion. This is particularly noticeable in word-initial clusters, which have undergone gradual reduction over thousands of years and have even been regarded as 'the oldest traceable sound change' (Chambers 1998). Other clusters, such as initial */kn-/ and */gn-/, though much more abrupt in their development, are indicative of internal language

change also, all of which challenges a purely contact-based explanation. Language contact can certainly have a catalysing effect on the reduction of syllable-coda CCs, and diagnostic CCR is more likely to operate in varieties with intensive contact histories, but it can also be a function of internal language change. Consequently, among the questions to be asked are what manifestations of CCR represent internal or external change, whether these processes are different of similar, and which one of them is more frequent.

Child language acquisition or adult language learning?

The final consideration which is of importance here is the agency of change. When language contact, and hence language learning, has a catalysing effect on cluster reduction, then it is justified to consider the role of language acquisition as well. The question therefore is whether language acquisition processes are a driving force in phonotactic language change. As pointed out, it is important to distinguish between (1) *language acquisition*, that is, the mental and cognitive processes by which children acquire their native language as a first language (L1), and (2) *language learning*, the efforts of adolescents or adults to achieve competence in a second or subsequent language (L2). Which of the two processes is more important here?

Importantly, these are different processes, even though both L1 acquisition and L2 learning effectively lead to an increase in linguistic competence (Goodluck 1991; Ritchie and Bhatia 1996). First of all, acquisition is a largely subconscious process, by which an L1 develops in the first years of a pre-adolescent. This usually leads to native-speaker competence. Learning, on the other hand, occurs after the learner has already acquired a first language, and its outcome is much less certain. The success of L2 learning depends on a variety of factors, such as the degree of grammatical, phonological and phonotactic differences between the target language and the learner's L1, the age, intelligence and motivation of the individual, exposure to the target language and degree of immersion. The question of whether native-like competence may be learnt by adolescents or adults with differential L1 competence is subject to much debate, but there is strong evidence that learning does generally *not* lead to total L2 mastery once the learner has reached a certain age (Goodluck 1991; Ritchie and Bhatia 1996); a number of studies (for example, Payne 1976, 1980; Chambers 1992) have offered conclusive evidence of a so-called 'critical period' of L1 acquisition, suggesting that the linguistic competence of a native language is completely acquired and in place by the age of roughly 14 years. After

this 'critical threshold', native-like competence can only be achieved under very unusual circumstances; consequently, L1 competence as a result of L2 learning is the exception, not the rule. This, among others, is an important point for contact scenarios that involve typologically distinct varieties.

With focus on L2 learning processes, we have already seen that there are substratal effects and phonotactic transfer processes of native structures in adult learners of English. With relevance to phonotactics, it is commonly reported that the production of consonant clusters poses problems for practically all learners who do not have clusters in the phonotactic system of their native or first languages (Major 1992); Lee and Cho (2002) provide some psycholinguistic evidence for phonotactic development in the speech of Korean learners of English, and Bond (2001) and Swan and Smith (1987) illustrate cluster reduction in the speech of Brazilian and Japanese learners of English; (see Archibald 1998 for an overview). This is also evidenced in Schmied's (1991: 61) general assessment that 'consonant clusters are a major phonotactic problem' for speakers of East African English, where most native languages have CV syllable structures. Consequently, one would expect cluster reduction to be particularly high in language learning situations that involve phonotactically distinct systems (such as Vietnamese and English, or Yoruba and Swedish), and to be lower when there is contact between speakers of languages with similar phonotactics (such as English and Swedish). This claim will be tested in a variety of contact scenarios in Chapter 4.

In terms of language acquisition, however, we find a different scenario, and the question is whether phonotactic acquisition by children is a contributing factor to the change mechanisms documented above. An important field of inquiry to explain the motivation and directionality of cluster development is the emergence of a phonotactic system during L1 acquisition. On the one hand, it is tempting to assign acquisition processes a prominent role, as their production is difficult and complex in terms of articulation. Indeed, a look at the literature on early linguistic development provides ample evidence that consonant clusters are acquired later and with more difficulty than other sounds and/or sound combinations (McLeod *et al*. 2001). Clusters are absent in the first stages of child language acquisition: 'Children . . . frequently simplify consonant clusters, deleting consonants or introducing a vowel to break up the cluster' (Goodluck 1991: 24). According to Shriberg and Kwiatkowski (1980: 138), native-like cluster production represents the 'longest lasting stage' in the development of child language, and O'Grady *et al*. (1996:

469) state that 'one frequent process in children's speech involves the systematic deletion of certain sounds in order to simplify syllable structure . . . consonant clusters are reduced by deleting one or more segments'. By the same token, Lass (1984) lists late appearance during child language acquisition as one of the characteristics of linguistically marked and typologically uncommon structures.

How does the acquisition of clusters develop, and to what extent and under what conditions can this entail phonotactic language change? Phonotactic acquisition can be summarised as follows: from a very early age children display strong sensitivity towards distinct syllable types when they acquire an L1 (Goodluck 1991). Children produce the most common syllable structure types in the earliest stages of the acquisition process: V and CV. The first syllable types produced by children are therefore open ones, CV and V, which, incidentally, are the most common syllable structures in the majority of the world's languages (one notes an interesting overlap between linguistic typology, language universals, natural phonology and child language acquisition). Three-segment syllable structures, as in CVC, are rare and uncommon during the first stages of language production. Combinations of two consonants in a cluster appear very late and are not found in the earliest phases of child language acquisition (Clark and Clark 1977). Children thus typically struggle with consonant clusters when acquiring a phonological system. In the words of Goodluck (1991: 37), 'Children initially eschew clusters of consonants; they babble primarily CV and then CV and CVC syllables, and in their first words frequently delete elements from consonant clusters or break clusters with vowels to make syllables that conform to a CV pattern.'

According to de Villiers and de Villiers (1978: 43), 'Consonant clusters are one of the last phonetic aspects of speech to be mastered, some children continuing to have problems with them until their fourth year or so.' This seems to be common in all processes of phonotactic acquisition. Ingram (1979: 140) assesses that reduced clusters represent 'one of the most widespread processes observed' in child language, and provides examples drawn from acquisition of four languages (English, French, Estonian and German). Ingram also states that inter- and intra-individual variation is considerable and that children apply a wide variety of strategies. One of these options concerns the exact realisation of the target cluster, and there is ample evidence to indicate that all cluster segments may be subject to deletion (Stoel-Gannon and Dunn 1999). For instance, de Villiers and de Villiers (1978: 43) note that 'Children in the early stages of language development typically reduce

the consonant clusters that begin words (for example, *tring* for *string*, or *top* for *stop*)', and Goodluck (1991: 26) lists the child pronunciations [pe], [ten], and [dɛs] for *play*, *train* and *desk*. The earliest manifestations of phonotactic acquisition in child language therefore do not only manifest general preferences for open syllable types (the most natural and/or least marked structures) but they are also indicative of language-internal constraints. This raises interesting perspectives for a comparison with constraints on CCR in adults, such as the preceding and following environment effects discussed above. According to Ingram (1979: 140):

> The direction of the deletion is also predictable in many instances. One of the most regular patterns is the deletion of sonorants when they occur in combinations with stop consonants. The deletion of [s] is also common, although there are cases where [s] has been retained instead of the stop . . . In nasal and stop clusters, stops are usually retained, although the nasal will often be kept if the stop is voiced.

One important point is that the mastery of clusters is independent of the separate production of their individual constituting elements. Children are perfectly able to articulate phonemes (such as /p/ and /l/, or /k/ and /t/) in isolation but struggle with the articulation of a phonotactic sequence; children typically have [pe] and [le] long before they produce [ple] *play*. As Gimson (1994: 222) states, 'Children often have special problems with the acquisition of consonant clusters in syllable-initial positions, even after they have individually acquired the individual members of the clusters.' Moreover, experimental and longitudinal studies found that children display sensitivity towards the production of clusters and produce certain clusters first (Treiman 1985). In an early study of infant speech production, Templin (1957, discussed in Ingram 1989: 365–6) tested the production of a total of 176 English sounds (or combinations of sounds) in a sample of 60 children. Only one cluster was consistently produced at the age of three, namely /ŋk/.[9] Phonotactic acquisition unfolds in the fourth year as the number of clusters (both syllable-onset and -coda) produced averages to about 15 at the age of 3.5 years and about 35 at the age of four. Templin distinguished between two phases of cluster acquisition and found that the clusters acquired in a first stage were characterised by the following criteria: initial clusters beginning with an /s/ and a following stop /p, t, k/ (*spit*, *stop*, *skit*) or nasal /m, n/ (*smack*, *snack*); initial clusters of voiced or voiceless stops, followed by a liquid /l, r/ or a glide /w/; or final clusters consisting of a nasal /m, ŋ/ and a homorganic voiceless stop /p, k/. A second stage included acquisition of more complex trisegmental clusters:

initial clusters consisting of fricatives and liquids, such as /sl-/ or /fr-/; final clusters which feature liquids /l,r/ and plosives or fricatives (as in *rhubarb*[10] or *golf*); and final clusters consisting of /s/ and a stop /p, t, k/.

How does this relate with common processes in adult language and consonantal change in English? Is there a link between them so that children can be considered as principal agents of phonotactic change? Are permanent changes in clusters perhaps the result of incomplete acquisition of complex 'non-natural' language structures? It is certainly true that children display some common reduction strategies; for instance, they reduce cluster-final plosives, as in *hand* [han] (Ingram 1989: 372). On the other hand, the strategies attested in child language are more extensive, irregular and variable than those in adult speech production. For instance, children reduce clusters regardless of their position in a word, and CCs in the onsets of syllables are as readily reduced as CCs in codas. This has parallels in English-based creoles (Holm 1988) but is very uncommon in varieties that have long-lasting native-speaker traditions and no recent histories of language contact. A second consideration that speaks against the role of acquisition in phonotactic change is that CCR in early language development is a general process and not a specific one. It simply lacks the delicate context-sensitivity which is so preeminent in adult speech. Adults apply this variable rule to syllable-coda clusters and here to cluster-final plosives only. In contrast, children typically reduce all individual cluster segments in all positions, for instance C_2 liquids, such as /r/ (*bread* [but]), C_1 sibilants (*star* [daː] or *snap* [nap]) or C_1 nasals (*bent* [bat]).

Moreover, children also apply a wider variety of 'cluster avoidance strategies' in that they not only modify CC to C, but also replace both segments by another consonant that is not part of the cluster prior to reduction. One example here is *glass* [das], where C_1 and C_2, a plosive and a liquid, are replaced by an alternative stop with a different place of articulation (here an alveolar plosive). Table 2.4 lists some major modification (and substitution) processes and illustrates the complexity of phonotactic acquisition in child language. This point is referred to by Gimson (1994: 222) as well, who states that children individually develop and apply a wide variety of strategies in order to modify CCs:

> With two-term clusters consisting of fricative+C (most commonly /s/) and C+/l, r, w, j/, there is often reduction to the single C, e.g. *smoke*> [məʊk], *spin*>[pɪn], *please*>[piːz], *queen*>[kiːn]. Clusters of /s/ + /l, r, w, j/ may be reduced to either element, e.g. *slow* [səʊ] or [ləʊ]. In the case of a fricative+C type, a possible, somewhat later development

Table 2.4 Strategies of consonant cluster modification in child language

Syll. pos.	Cluster	Realised as:	Absent segment	Example
Onset	/br/	Stop	Liquid (C_2)	*bread* [but]
	/fr/	Fricative	Liquid (C_2)	*from* [f∧m]
	/st/	Stop	Sibilant (C_1)	*star* [daː]
				stop [tɒp]
	/sl/	Sibilant	Liquid (C_2)	*sleep* [siːp]
	/sn/	Nasal	Sibilant (C_1)	*snap* [nap]
	/sm/	Nasal	Sibilant (C_1)	*small* [mɒ]
	/tr/	Stop	Liquid (C_2)	*try* [taɪ]
	/kr/	(Weakened) stop	Liquid (C_2)	*crumb* [g∧m]
	/br/	Stop	Liquid (C_2)	*bring* [bɪŋ]
	/gl/	Alternative stop	Plosive and liquid (C_1 *and* C_2)	*glass* [das]
Coda	/mp/	Stop	Nasal (C_1)	*bump* [b∧p]
	/nt/	Stop	Nasal (C_1)	*bent* [bat]
				tent [det]
	/nd/	Nasal	Plosive (C_2)	*hand* [han]
	/sk/	Plosive	Sibilant (C_1)	*desk* [dɛk]

Sources: Adapted from Ingram 1989: 372; Cho and O'Grady 1996: 469.

> (which may at first glance look like a regression) involves a feature merger, whereby a single consonant replaces the two consonants of the adult cluster, the single taking at least one feature from each of the two consonants, e.g. *spin* > [fɪn], *fling* > [ɬɪŋ], *sleep* > [ɬɪːp], *smoke* > [məʊk].

Further, it is noteworthy that children display alternative strategies also, such as vowel epenthesis through which a CC surface structure is modified to CVC. Reporting results from Gilbert and Purves (1977), Gimson (1994: 222) writes that:

> When the two elements of the cluster are used, there may still be a difficulty in timing the relationship between the two elements: for example, a short intrusive, or *epenthetic*, vowel (typically /ə/) may be inserted, or one of the elements may be improperly lengthened, e.g. *sport* > [sᵊpɔt] or [sːpɔt], *slow* > [sᵊləʊ] or [sːləʊ].

Is it therefore really justified to consider and classify these modification strategies as simple reduction mechanisms? Certainly not. Such views

are erroneous, and assessments such as that 'children typically ... reduce consonant clusters' (de Villiers and de Villiers 1978: 43) consider phonotactic development from a wrong angle. It is much more plausible to argue that children do not reduce clusters through the deletion of cluster-final plosives; rather, they display a wide variety of adaptation mechanisms. These indicate that children still struggle with the production of difficult, 'unnatural' structures and that they substitute clusters with segments that, literally speaking, are easier to make (or less marked/more natural). Whereas cluster reduction presupposes that clusters are in place, and that their production is mastered but then modified due to ease of articulation, regressive assimilation and so on, children are not in a position to apply the CCR rule simply because they are not (yet) able to articulate clusters. Instead, they replace them with single segments of the cluster (and produce /sk/ as [k] and /sm/ as [m], which has no equivalent in adult speech), or replace the entire cluster with an alternative consonantal segment (/gl/ as [d]).

Children who are in the process of acquiring L1 phonotactics consequently struggle and apply a wide variety of strategies to avoid clusters. As a result, they display considerable inter- and intra-individual variability as their phonotactic competence progresses. An approach based on natural phonology (Stampe 1969; Donegan and Stampe 1979) would explain the phonotactic developments in child language as follows. Children first produce natural sounds, which, among other criteria, are easier to make (single nasals, open syllables and so on). As L1 acquisition progresses and reaches completion, children learn to correctly apply the phonological rules of their language as their cognitive and articulatory system develops. A child's innate phonological system (based on a preference towards natural, non-marked, universal structures) is continuously revised towards the target provided in the adult system. Donegan and Stampe (1979) suggest that this process contains three overlapping phases:

1. *Limitation*: The differences in the phonological and phonotactic system of a child as compared with those in the adult system become gradually limited to specific sounds or sequences (that is, the most persistent ones, those that take longest to be produced).
2. *Ordering*: Processes that appear random or unordered become ordered (which means that the variety of cluster modification mechanisms is subsequently limited until only adult-type constraints are left, such as sonority or plosive deletion).

3. *Suppression*: The (natural) realisations of choice, found in the first stages of the child's acquisition process, are eliminated (suppressed) as phonological processes available in the adult language model are learnt and applied.

This approach has the advantage that it accounts for the fact that children produce an output which is not available in the target variety spoken by adults; adult strategies and constraints are not available as a role model, and 'incomplete' clusters represent a step in the global language acquisition process. If anything, the processes found are cluster avoidance strategies, not reduction mechanisms.

Second, and most importantly here, children *cannot* be the agents of change in phonotactic variation and change because very few of their manifold strategies are later adopted and become fossilised as permanent language change. The complete mismatch between the wide range of adaptation mechanisms in child language and the universal trend in adult language (with a restricted set of constraints) allows no other conclusion. Having said this, it is certainly possible that children's adaptation strategies may have an enhancing effect on phonotactic decomplexification when a target variety is not available (or is in the process of developing), as is typically the case in creolisation. There is definitely some truth to this claim; we will consider a case of initial cluster reduction in Sranan in Chapter 3, where we return to parallels between English-based creoles and child language.

To sum up, then, complex phonotactic systems are only mastered at a late stage of the acquisition process, and children struggle with the production of consonant clusters until the age of four or more. Other syllable structures, consisting of a single segment or CV, are much more frequent and produced first, not only in babbling, but also in first utterances and longer combinations of sequences. The fact that cluster production causes problems for children leads them to adopt a number of strategies to ease articulation. Child language data provide evidence that clusters, regardless of their position in words (initial, medial and final), are adapted in analogy with other syllable structures. Since phonotactic change in English typically adheres to constraints found in adult speech, we need to focus on adult norms and processes to further our understanding of (historical and contemporary) cluster reduction in English.

2.4 Conclusion

This chapter has provided a first introduction to a variety of aspects related to consonant clusters, both cross-typologically and in English specifically. Consonant clusters have attracted the interest of researchers

from various disciplines, such as historical linguistics, child language acquisition and phonology. One of the main points to emerge was that consonant clusters in syllable codas or onsets are uncommon, unnatural and linguistically marked structures. Based on Lass's (1984) taxonomy, they (1) are less common cross-linguistically than other structures; (2) are generally less frequent than other structures, even in languages whose phonotactic systems permit them; (3) appear later during language acquisition, and are not fully mastered until the age of about four years; (4) tend to be unstable historically, and are subject to a variety of change mechanisms that alter their surface structure to more common C or CVC; and (5) tend to be absorbed into the unmarked category in cases of phonemic merging processes.

Phonotactic modification is both a synchronic and a diachronic process, perpetuated both on an individual and on a community-wide or societal level. In other words, all speakers of English reduce CCs, typically to ease articulation and due to co-articulation, so that CCR is a true universal of spoken English. On the other hand, this process is context-sensitive, as its frequency varies with the specific linguistic environment in which the cluster is embedded; it is particularly high when followed by a consonantal segment (CC#C). Such intervarietal variation in global CCR rates is commonly explained by increase in contact settings, which again is offered as an explanation as to why it is most prominent in languages that derive from contact with varieties whose phonotactics do not allow them (English-based creoles, for instance). This chapter provides the backbone for an in-depth discussion of phonotactic variation and change in English, to which we turn now.

3
Initial Cluster Reduction in English

Initial CCR is a sub-type of word-initial segment loss. It is thus a type of *aphaeresis* (or *aphesis*) that affects all phonemes in word- or syllable-initial position (vowels and consonants alike): CVC- > VC- or VCV- > CV-. Of special interest here are cases of aphaeresis that operate on initial clusters of consonants, namely when a CC-initial segment is deleted and the cluster undergoes modification to a monosegmental C- (CC- > C-). This process is also referred to as 'glide cluster reduction' by Wells (1982: 228). Aphaeresis operating on CCs ultimately leads to a reduction of the entire cluster (namely through deletion of one of the segments) or, in other words, it entails that a CC- becomes homophonous with a single C- (usually the second segment of the cluster prior to aphaeresis), with which it effectively merges.

The phonotactic system of English has displayed tendencies towards consonant aphaeresis since OE times (Brunner 1963; Luick 1964). These manifest themselves in that a number of formerly permissible clusters of Germanic origin have disappeared from the phonotactic inventory of English (but survived in other Germanic languages, such as Dutch, Danish or German). Indeed, English seems to have a special tendency to reduce initial clusters through phonotactic change. These cases are of special interest here since they do *not* represent phonological change: consonants change their 'tactic behaviour' only; one segment is deleted from a cluster even though both are maintained in the phonemic inventory. A cluster is thus no longer phonotactically well-formed even though neither segment disappears from the language. A good example here is initial */gn-/, as in *gnat* [gnæt], which was reduced to [n] in Early ModE despite the fact that neither /g/ nor /n/ was lost from English.

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By the same token, initial cluster reduction is not only a historical process. Quite on the contrary, it is in progress in several contemporary varieties of English, and this allows us to apply synchronic information to throw light on diachronic change. The present chapter addresses these issues by looking into the historical trajectory of cluster loss in English (e.g., initial */kn-/, */gn-/, */wr-/, /hw-/) and comparing them with synchronic developments in English phonotactics. The integration of contemporary data is a particularly promising approach since it provides information that is very difficult (if not impossible) to collect in historical analyses. From a diachronic perspective, the key question is what syllable-initial clusters have historically disappeared from the phonotactic inventory of English, in which period and for what reasons. The aim here is to analyse the timing and causation of these processes, and thus to gain information as to why and when these processes occurred. From a synchronic perspective, the question is what language-internal and extralinguistic factors govern consonantal variation, change and loss. To what extent do linguistic factors such as phonetic environment or lexical status have an influence on initial cluster reduction, and to what extent is this change mechanism socially conditioned, correlating with parameters of social class, sex/gender or age? The main aim is then to combine the two approaches and to investigate how the interplay of both influences the rate of change.

To illustrate the complexity of initial cluster reduction in English phonotactics, the conclusions offered in Chapter 3 are based on three studies. The data presented and evaluated here range from a historical (corpus-based) analysis of cluster variation and loss between 900 and *c.*1700 AD (in the British Isles) to a sociolinguistically oriented case study of /hw-/ maintenance and loss in a colonial context that involves dialect contact and new-dialect formation (in New Zealand), and to an interpretation of radical CCCV->CCV/CCV->CV- restructuring of initial clusters during language contact and the formation of an English-based creole (in Suriname; based on Alber and Plag 2001). The conclusion compares and interprets the results from the three studies, applying synchronic findings to diachronic conclusions with the aim of contextualising and comparing historical and contemporary processes from a variety of settings. The analysis of initial cluster reduction is later complemented with an in-depth study of word-final CCR (Chapter 4), and Chapter 5 traces some general parallels of consonantal variation and change in English, from both a historical and synchronic perspective. I begin with analysing the historical loss of initial clusters in earlier stages of the English in the British Isles, which is followed by the study

of /hw-/ cluster reduction in several varieties of English from a sociolinguistic and dialect-contact perspective (with a detailed case study from New Zealand English), and a general look at initial cluster reduction in English-based creoles.

3.1 Historical loss of initial clusters in British English

A number of once permissible syllable-onset clusters were lost from the phonotactic inventory of English. In the words of Luick (1964: 938, my translation), 'In the course of the development of the English language, there is a repeating tendency to simplify initial clusters of consonants.' OE had a richer phonotactic system than ModE as it featured a wide variety of clusters inherited from Pr. Gc. Some of these clusters fell out of use during the evolution of English, a trend that began towards the end of the OE period and continued, at an increasing rate, throughout the entire ME period, even as late as in Early ModE. What criteria and motivations underlie this process? We know that it is not conditioned by the phonetic criteria of the consonants a cluster contains. The clusters that underwent phonotactic change and disappeared from the cluster stock of English, such as initial */kn-/ (as in *knee* /kneː/, *knight*/kniçt/) or */fn-/ (as in **fnæst* 'puff, blast, breath'), were heterogeneous in their set-ups, consisting of fricative, plosive, nasal and approximant segments, which suggests that the phonetic characteristics of the consonantal elements alone does not account for the loss of the phonotactic sequence as a whole. Rather, the trajectory of change suggests that cluster loss is related to structure (with placement in the overall syllable set-up being paramount, conditioned by the sonority of segments) and that the least sonorous and most syllable-peripheral are the most 'vulnerable' cluster segments. This point is discussed in more detail below, namely when we look into the extent to which language-internal criteria accompany (and govern) phonotactic change in English.

Likewise, it is noteworthy that initial cluster loss is more prominent in English than in other Germanic languages. This manifests itself in the fact that (a) some of the clusters that were permanently lost in English (such as /kn-/) have survived in Dutch, Swedish or German, and (b) loanwords entering the English lexicon have undergone adaptation so that the initial segment was lost (as was the case in words with initial /pn-/ clusters adopted from Greek; even though the cluster is present in writing (<pn->), the plosive is not pronounced, *pneumatic* /njuː 'mætɪk/, which again is not found in related Germanic that adopted the same

lexical items; cf. German /pnɔɪ ˈmʌtɪʃ/).[1] In other words, the loanwords were adopted but the initial cluster was reduced – even though present in spelling. Initial clusters are thus more likely to undergo reduction in English than in other Germanic languages. Why should this be so?

This section investigates *historical* loss of initial clusters from the phonotactic system of English. It outlines the phonetic and lexical properties of clusters lost and also investigates the time frame in which they disappeared, with the aim of incorporating such insights into an explanatory model of consonant change in English. The questions addressed in this section are threefold:

1. Exactly *which* initial clusters were lost from the phonotactic inventory of English?
2. *When* were these clusters lost? Was this process quick or gradual, externally caused or language-internally motivated?
3. Can we speculate on *why* these clusters were lost in English (for instance in contrast to related Germanic languages, such as Dutch or German, which have maintained some of these clusters)?

In order to find out why, when and under what conditions these clusters were lost, it is paramount not only to address the historical dimension of this process but also to reconstruct its trajectory in English (that is, to date beginnings and endings). These findings can later be complemented with related studies on similar processes (such as the analysis on /hw-/ loss in New Zealand English, which follows in section 3.2). With these aims, we begin with an inventory of clusters lost from the phonotactic system of English, and then go on to address the timing and possible causation of these processes.

Which clusters were lost?

An important point is whether cluster loss was conditioned or not, that is, whether clusters were lost in certain environments only (but not in others), or whether they disappeared completely and permanently. For instance, in the case of OE/ME /sw-/, there certainly was a historical trend towards reduction, as there was /sw-/ > /s-/ (with loss of the velar approximant) in words such as *swā* 'thus, so' or *sweoster* 'sister' (Brunner 1963: 35). On the other hand, /sw-/ > /s-/ was not categorical and operated in certain phonetic environments and individual lexical items only. The conditioning of this change manifests itself in that the loss of post-consonantal /w/ occurred most prominently when followed by back vowels /aː ~ oː ~ uː/, as in OE *ealswā* '>ME 'alsō', or ME *sword* /sɔːd/

(Mossé 1952: 41), or in a limited set of other lexical items, as in OE *sweoster* > ME *suster* (a process whose origins can be traced back to OE, where both forms are already attested: Brunner 1963: 35).[2] Notwithstanding, /sw-/ survives in modern varieties, even though it is certainly not as vital as in OE and ME. Importantly, though, /sw-/ > /w-/ is a *specific* process; this cluster was only reduced in specified phonetic environments and individual lexical items, and it still is productive in contemporary English varieties (as in *swing*, *swell* or *swan*). Variation and weakening are thus of relevance for language change; however, they do not represent categorical change in a phonotactic system and are not further elaborated here.

The first point of interest is the identification of clusters that were permanently lost from English phonotactics. Table 3.1 (based on Mossé 1952; Brunner 1963; Luick 1964; Pinsker 1969; Lutz 1991) lists an inventory of CCs that underwent permanent reduction through consonant loss. These clusters vary in their phonetic configurations. They consist of a glottal fricative plus either a lateral approximant (*/hl-/), a nasal (*/hn-/) or an alveolar trill, tap/flap or approximant (*/hr-/); a plosive and a nasal (*/kn-/, */gn-/); a labiodental fricative and a nasal (*/fn-/); or a velar approximant and another approximant (alveolar trill, tap/flap or lateral: */wr-/, */wl-/). They share the characteristic that the *first* segment is lost, so that the cluster becomes indistinguishable from, and phonologically merges with, the consonant that represents the second cluster segment (this is of importance in terms of syllable structure and sonority effects; see below).

With one exception, the initial clusters listed in Table 3.1 have disappeared from British English and are not found in transplanted colonial varieties. The notable exception here, which is still common in Scottish

Table 3.1 Initial consonant cluster loss in English

Cluster	**Examples**
*/hn-/	*nut* /xnʊtu ~ hnʊtu/, *neck* /xnɛk:a ~ hnɛk:a/
*/hl-/	*leap* /xlɛ:pən ~ hlɛ:pən/
*/hr-/	*ridge* /xrɪdʒ ~ hrɪdʒ/, *raven* /xra:vn̩ ~ hra:vn̩/
/hw-/	*whale* /xwɛɪl ~ hwɛɪl/, *which* /xwɪtʃ ~ hwɪtʃ/
*/fn-/	**fnæst* 'puff, blast, breath'
*/wl-/	*lisp* /wlispian/, **wlak* /wlak/ 'luke(-warm)', **wlate* /wla:tə/ 'be scared of', **wlite* /wlitə/ 'beauty'
*/wr-/	*write* /writə/, *wrath* /wraθ/
*/kn-/ (resp. */tn-/)	*knee* /kne:/, *knight* /kniçt/
*/gn-/ (resp. */dn-/)	*gnawan* /gnaʷən/, *gnat* /gnat/

English and varieties of American and New Zealand English, is the combination of a glottal fricative and a velar approximant, /hw-/. This cluster is related to similar clusters with initial glottal fricatives but has undergone a similar (yet much slower) development, and this may provide us with important information on the development of English phonotactics in general. Because it still features in several contemporary varieties of English, this cluster offers the opportunity to investigate the general mechanisms of phonotactic change and is thus paramount to identify how (and why) similar clusters were lost at earlier stages of the language.

When did loss occur?

Having identified the clusters lost from the phonotactic system of English, we can now go on to discuss exactly when it occurred. This section investigates the diachronic dimension of cluster loss in English, determining the time periods in which the various clusters disappeared. This is contextualised with reference to the external history of English (Lass 1987), which will allow us to speculate as to whether we are dealing with a language-internal or -external process (or with both). 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, which throws further light on the loss of some of these clusters from English phonotactics.

The traditional view

A first finding from the literature consulted (Jespersen 1909; Wright 1923; Jordan 1934; Mossé 1952; Brunner 1963; Kökeritz 1963; Luick 1964; Dobson 1968; Fisiak 1968; Pinsker 1969; Bähr 1975) is that initial cluster loss did not occur in the same period and that there was in fact a considerable diachronic gap between the periods in which individual clusters disappeared. Initial clusters were lost from the phonotactic system at successive stages. Based on direct reports on contemporary speech, literary samples (such as puns and homophones) and non-standardised spelling practices as well as on evaluations or recommendations by phoneticists and orthoepists, the picture emerges that 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).

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 twelth and thirteenth centuries and was completed by about 1300, with areas such as Kent partaking in this change later but completing it by about 1400 (Brunner 1963; Toon 1992). Innovative <n-, l-, r-> spellings are first attested in the ninth and tenth centuries and there was an abrupt increase in these spellings between approximately 1080 and 1200. Traditional spellings (with initial <h->) were sporadic from the thirteenth century onwards and disappeared in the second half of the fourteenth century (Fisiak 1968). Luick's (1964: 939) analyses of late OE and Early ME manuscripts (and the extensive additional sources he cites) reveal that <hn>, <hr> and <hl> were quasi-normative before 1000. <h> was omitted only sporadically, for instance in a manuscript of Ælfric's *Lives of Saints*, written in the early eleventh century. An important piece of evidence for an analysis of how robust initial /h/ was comes from the usage of alliterative techniques in OE poetry; they attest to the presence and strength of aspiration in these clusters, and Harris (1954: 53; quoted in Lutz 1991: 30–1) found that 'during the whole Old English period, the orthographical clusters [<hn>, <hr>, <hl>] regularly alliterate with simple initial *h-* (that is, *h-* before vowels) and not with initial *n-*, *l-*, and *r-*'.

Then, starting around 1100, the frequency of <n>, <l> and <r> spellings increases (Brunner 1963); in glosses to Ealdhelm's *De laude virginitatis*, produced in the late eleventh century, scribes predominantly used <r>, 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, and manuscripts from this period vary considerably, displaying a strong overall trend towards /h/ loss in this particular environment (Mossé 1952; Luick 1964; Bähr 1975, Scragg 1970). The usual spellings in texts written from 1150 onwards are <n>, <l> and <r>. The *Lambeth Homilies* (from around 1180) and the *Ormulum* (*c.*1200) only have remnant forms of <hn->, <hr-> and <hl->, whereas a later text, the *Ancrene Riwle*, 1230–50, has <n>, <l> and <r> variants throughout (Luick 1964).

A second process of initial cluster loss involved */wl-/, as in **wlatsom* 'disgusting' or **wlonk* 'proud, beautiful', which is dated to the early eleventh century (Pinsker 1969: 93). */wl-/ > /l-/ progressed in the twelfth century, and in the 1380s Chaucer still has <wlatsom> ('Ful wlatsom was the stynk of his careyne', *Monk's Tale*: l. 538) but he also consistently

uses <l-> for *lisp* (Dobson 1968). On the other hand, the sources indicate that */wl-/ fell 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 fifteenth 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-nineteenth 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 common in Early ModE (Pinsker 1969: 92). */wr-/, as in *write*, *wring*, *wrong* or *wreck*, was normative throughout the OE and ME periods, and there are no <r-> spellings for etymological <wr-> at all in these periods. This process is thought to have started in the mid-fifteenth century (Mossé 1952), but <wr-> spellings predominate throughout the sixteenth century. Orthoepists and phoneticists at the time (such as Bullokar 1580 and Gill 1621) exclusively use this spelling, which is a very strong indication that they pronounced /w-/ in their own speech. It is only later, for example, in Hodges (1644), that the /w-/ in this cluster is described as 'silent' (Dobson 1968) and */wr-/ disappears in the second half of the seventeenth 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. . . . Reduction of the sound is also indicated by the converse practice of writing *wr-* for *r-*, which similarly appears in the 15th cent. (in *wrath* for *rathe*), and becomes common in the 16th . . . In standard English the *w* was finally dropped in the 17th century; it has remained (though now obsolescent) in Scottish, 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 (Kökeritz 1963) and full realisations are maintained by all sixteenth- and most seventeenth-century orthoepists (Dobson 1968: 976). This would place the beginnings of */kn-/ loss in the late Early ModE period, somewhere around the 1650s. There is evidence to suggest that */gn-/ changed first,

starting perhaps as early as in the sixteenth century (Pinsker 1969: 92) and being completed at some stage in the seventeenth century. It also appears that this change underwent a different trajectory than other clusters did. Dobson (1968: 977–9) suggests that */gn-/ to /n-/ was in fact a twofold change, as there were 'two developments which affected educated speech in the sixteenth and seventeenth centuries'. On the one hand, /g/ was lost through a direct merger of */gn-/ with /n/. Orthoepists (for example, Hodges 1644) recommend an /n-/ pronunciation for <gn-> but not for <kn-> (which is evidenced by the fact that *gnash* and *Nash* are regarded as homophonous whereas *kn-* and *n-* are not). On the other hand, orthoepists such as Bullokar (1580) or Coote (1596) recommend that <gn-> be pronounced /kn-/, which they also transcribe as /kn-/. Coote expresses particularly strong value judgments by describing /kn-/ as a feature found in the 'barbarous speech of . . . country people' (quoted in Dobson 1968: 978).

The initial */kn-/ cluster remained intact until the 1650s. Then, in the later seventeenth and early eighteenth centuries, writers on pronunciation increasingly indicate the pronuniciation of <kn-> as /hn/, /tn/, /dn/ and finally as /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 the phonotactic system of English. 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. */kn-/ and /n-/ were therefore still perceived as distinct in these word pairs at the end of the seventeenth century. Again, however, there is evidence that remote areas, such as northern Scotland, were more conservative linguistically and that they retained this feature. Whereas */kn-/ disappeared in all of England and most areas of Scotland by about 1800, it survived until recent times in the extreme north, such as on the Orkneys and Shetlands (Melchers 2004).

This change underwent a more complicated trajectory than the simple loss of the initial plosive. During the seventeenth and the first half of the eighteenth centuries, */kn-/ developed a regional variant */tn-/, which was still found in Cumberland and Westmoreland in the twentieth century (Luick 1964: 1113), before changing to unvoiced [n̥], and then, as a result of progressive assimilation to a following vowel, to [n]. In the same vein, */gn-/ started to change in southern England but may have been maintained in northern 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 (as taught by Hodges 1644, quoted in Luick 1964: 1114).

Testing the claims: a corpus-based approach

The corpus-based historical study tests the general claims 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) Early ModE periods. The methodology adopted here resembles earlier ones. It is based on the assumption that spelling conventions prior to standardisation and codification of English (*c*.1500) are indicative of sound changes and thus illustrative of changes in progress. If predominant scribal practices around 1100 are <hn-> and <hl->, which in later periods (say *c*.1250) are written <n-> and <l->, then this is interpreted as an indication of changes in English phonotactics and of */hn/ cluster loss. A corpus-based approach seems most fruitful for such purposes, so that spelling variations for selected lexical items are researched in three large text corpora: the *Helsinki Corpus* (HKI: Kytö 1993), the *Oxford English Dictionary* (OED: Murray, 1878–1910) 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 detailed information for each entry, including notes on usage, archaisms and colloquialisms, as well as quotes illustrating first and last occurrences, etymologies and so on. The 1989 edition of the OED runs to twenty volumes and is also available on CD-ROM, which allows a full-text search for each of the items selected for analysis. The ASD, finally, provides a third compilation of OE words with Germanic ancestry, with text samples and information on related word forms. This source provided further specimens that could be incorporated in the analysis; moreover, the information provided in this source was particularly useful to check that the same lexeme was not included twice (which was not always a straightforward task, particularly in the case of strong OE verbs with suppletive word forms).

When classifying the historical alignment of spelling conventions and identifying periods for the chronological development of initial cluster loss, I followed the time frame adopted in the HKI, which divides the entire period into eleven sub-periods (four for OE (O1–4),

four for ME (M1–4) and three for Early ModE (E1–3): O1–850, O2 850–950, O3 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 O2, were often collapsed here since very few items were available for the earliest 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 (for example, featuring both <hn-> and <h-> spellings: <hnutu> ~ <nute>), and (c) had some historical depth in that they were found in texts from various periods. With these objectives, a set of lexical items was identified for each of the clusters investigated. Examples were searched and drawn from all three sources and then classified by spelling convention and time period. Great care was taken only to extract items that etymologically derived from words with historical <hn-, hr-, hl-> spellings. In cases when there were related forms (such as preterites or participles of strong verbs), these were checked for accuracy by consulting etymological information. In case of doubt, items were not considered.

Starting with the loss of */hl-/, */hn-/ and */hr-/, the lexical items considered for analysis were the following:

*/hn-/	*hnappen* (and related forms)	'nap'
	hnesce	'soft, tender, succulent' (now dialectal)
	hnecca	'neck'
	hnolle	'top, crown of head' (now dialectal 'noll')
	hnutu (and related forms)	'nut'
*/hl-/	*hlud* (and related forms)	'loud'
	hlaf (and related forms)	'loaf'
	hlihhan (and related forms)	'laugh v.'
	hleapan (and related forms)	'leap v.'
	hlencan	'link v.'
	hladen (and related forms)	'load'
	**hleor*	'cheek, face'
	hlest	'lest'
	hlidaford	'lid'
	**hlynn*	'torrent'
	hlin (and related forms)	'lean'
	**hlynnan*	'sound v.'
	hlæder	'ladder'
	hlædel	'ladle'

*/hr-/	hreccan	'reak v.' (< dialectal variant of 'rake v.')
	hræw (and related forms)	'raw'
	hreddan	'rid v.'
	hrefn (and related forms)	'raven'
	hreoh (and related forms)	'rough'
	hreod	'reed'
	**hreosan* (and related forms)	'go to ruin'
	**hreow*	'regret'
	hrer(e)	'rear'
	**hreðan*	'glory, triumph'
	hrycg (and related forms)	'ridge'
	hriddle	'riddle'
	hring/hryng	'ring'
	hrof	'roof'
	hrost	'roost'
	hrung	'rung'

All these words and their etymologically related spelling variants were extracted and classified by period. The historical alignment of the three clusters, as indicated by the spelling variants, was then tabularised and illustrated in figures, with the overall frequency on the *y* axis and the time frame on the *x* axis. There are some fluctuations due to the different availability of data and text sources for the respective periods; these fluctuations have little real-time value since they are only indicative of the amount of text samples for a given period. Nevertheless, this gives insights into the historical trajectory of initial cluster loss in English; it illustrates the periods in which clusters disappeared and also at what rate they were lost.

To start with */hr-/, there was coexistence of both spelling variants from the very first records available, and this coexistence continued throughout the OE period (Figure 3.1). The O1–4 periods, until roughly 1100, saw a predominant trend in <hr-> spellings. <r-> remained a minority variant until *c.*1150, after which its usage quickly increased at the expense of <hr->, which became less frequent and disappeared in the thirteenth 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 twelfth century, and that this cluster was lost by about 1300.

<hn-> and <hl-> display almost the same trajectory (Figures 3.2 and 3.3). 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

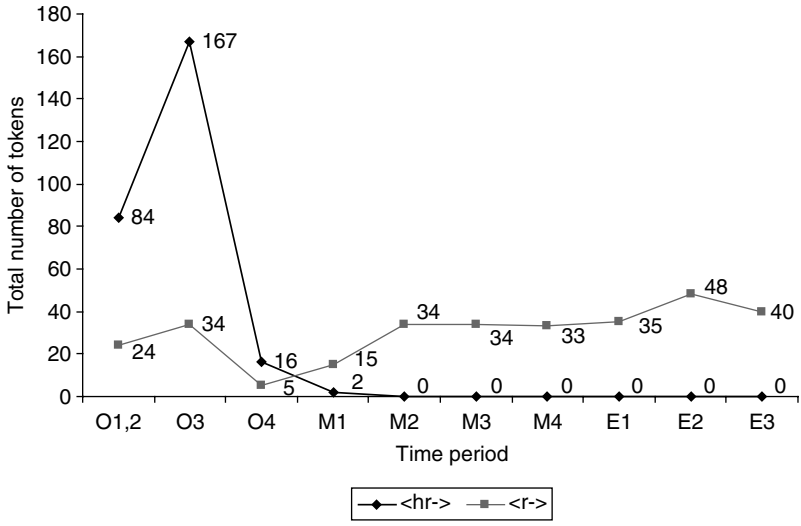


Figure 3.1 Variation in <hr- ~ r-> spelling conventions, 850–1710

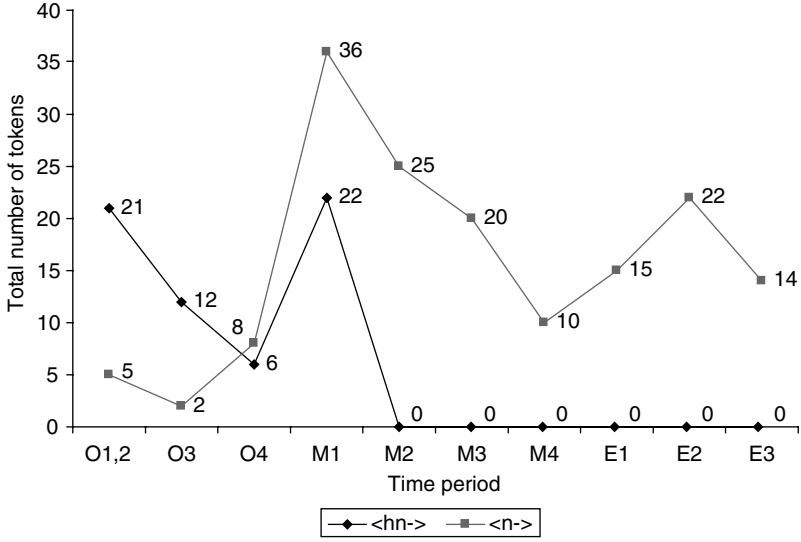


Figure 3.2 Variation in <hn- ~ n-> spelling conventions, 850–1710

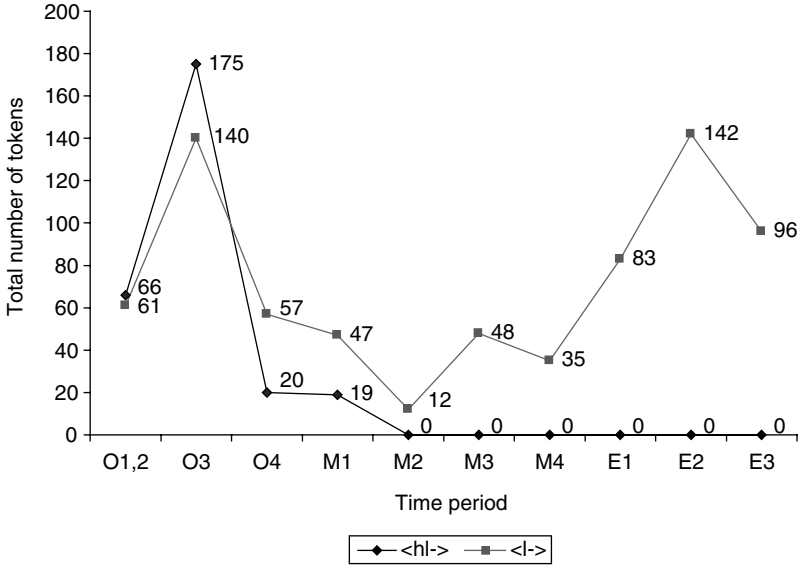


Figure 3.3 Variation in <hl- ~ l-> spelling conventions, 850–1710

by about 1300 as well. There does appear to be a general pattern behind the loss of these clusters in English. Even though <hn, hr-, hl-> were more frequent spellings (and majority variants) until about 1100 or even longer, they were in a state of competition with innovative <n-, l-, r-> spellings, which increased their usage from 1100 to 1300. This indicates that the three clusters disappeared between 1100 and 1300 and merged with /l/, /n/ and /r/ respectively; as a result, the mergers were complete by the late thirteenth or at the latest in the early fourteenth century.

The next question, then, is what diachronic developments the other initial clusters underwent. The case here is not as straightforward as with initial /h/, for one major reason: we have to take into account that there was interplay between lexical loss and phonotactic change, and this complicates the analysis somewhat. One recurrent problem for a historical study of cluster loss in English is that (once) permissible sequences occurred infrequently, some of them being limited to a handful of lexical items only.[3] The cluster disappeared from the phonotactic system when the items that had them became obsolete and died out. If this happens, it is more appropriate to consider cluster loss a direct consequence of lexical change and loss, rather than as a manifestation of phonotactic language change. No cluster illustrates this dilemma better than */fn-/, a cluster

which, according to the OED, is found in two lexical items only: in **fnast*, 'puff, blast, breath', 'breathe hard v.' (from OE **fnæstian*, cf. ON *fnasa*, *fnása* and OHG *fnâstôn*), and *fnese* 'sneeze, puff, snort v.' (from OE **fnéosan*; a cognate of Du *fniezen*, Da *fnyse*, Sw *fnysa* < ON *fnýsa* 'snort v.'), as in:

Wel necȝ hire *fnast* at-schet. (*The Owl and the Nightingale*: l. 44, *c*.1250)
He [ne] mouthe speke, ne *fnaste*, Hwere he wolde him bere or lede. (*Havelok*: l. 548, *c*.1300)
These balfull bestes were..ffull flaumond of fyre with *fnastyng* of logh. (*Destr. Troy*: l. 171, *c*.1400) (All examples from HKI)

He speketh in his nose And *fneseth* faste. (Chaucer, *Manciple's Prologue*: l.62, *c*.1386: OED)
Constantyne sayth that *fnesynge* is a vyolent meuynge of ye brayne to putte out superfluytees of fumositees therof. (Trevisa, *Barth. De P.R.* vii. xi: l. 230, *c*.1398: HKI)
And Þere-with she gan to *fnese*. (*Beryn*: l. 42, *c*.1400: OED)

Both **fnast* and **fnese* are labelled 'obsolete' in the OED, and the total of five tokens found in the HKI corpus come from the O2 and M1 periods, the last one from *Havelock* (identical with the one quoted above from the OED). Neither item occurs after 1400, so these terms must have fallen out of usage by the early fifteenth century at the latest. The case of */fn-/ illustrates that it is not easy to draw a line between lexical loss and phonotactic change, since the loss of a limited set of lexical items that feature a rare cluster necessarily entails the loss of the cluster as such. All we can say in this case is that there is a close connection between cluster frequency and lexical item in which clusters feature, so that the loss of lexical items has an impact on English phonotactics.

A similar, though not as drastic, case is the loss of initial */wl-/. Most of the OED entries that feature this cluster have died out: **wlaffe* and its derivative forms ('to stammer, to speak indistinctly', <OE **wlaffian*), **wlat* ('nausea, loathing, disgust', <OE **wlatian*; cf. MLG **wlaten*), **wlanc/wlonk* ('proud, haughty', <OE *wlanc*, *wlonc*; cf. OS *wlonc*), **wlite* ('beauty, splendour', <OE *wlite*, OS *wliti*), or **wlo* ('hem, fringe; nap on cloth', <OE *wlóh*). Some lexical items with 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 is thought to derive from OE ȝewlóh 'opulent', as in:

ȝif . . . Þou art riche mon and *wlouȝ* And of richesse hast inouh. (*Minor Poems fr. Vernon*, ms. xxxvii: l. 155, 14th cent.: OED)

Table 3.2 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

This scenario bears a certain resemblance with the one discussed above, namely that phonotactic loss is a function of lexical loss. However, since these lexical items occur with reasonable frequency in the corpora consulted (which is not the case with <fn->), the dates when they were last recorded provide at least some insights into when these words (and the clusters) were in current usage, and when they disappeared. These findings complement the study of words that remained but changed their spelling (as with initial /h/ clusters), and the results of a twofold study should give us reliable information as to when */wl-/ was lost in English.

Starting with incidences of lexical loss, Table 3.2 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 a total of six forms is listed). Then, however, the ME period marks the beginning of a gradual demise. Table 3.2 shows that the usage of these items declined throughout the thirteenth century, and it also indicates that the four items died out at different intervals. In fact, lexical loss in this case stretched until the fourteenth century, as the last chronological documentation of **wlite* (with a meaning 'pipe, chirp v.') in the OED dates from 1310:

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

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

> By comyxtioun . . . wiÞ Danes and . . . Normans, in meny Þe contray longage is apayred, and som vseÞ straunge *wlafferynge*. (Trevisa, *Higden* (Rolls) II: l. 159, c.1387).
>
> 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. 8, 1493).

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

Based on lexical loss and subsequent phonotactic loss, the implication is that */wl-/ > /l-/ in English was a gradual process, which spanned more than two centuries, starting during the thirteenth century and was completed in the early 1500s.

Can this time frame be upheld by cases where a lexical item survived and underwent spelling adaptation, just as in the other clusters discussed above? With this objective, we need to look into 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. 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). Furthermore, there is a very insightful <wlap> spelling for words that etymologically have <l-> (such as *lap*). Due to the paucity of data, one has of course to be careful in generalising findings on */wl-/ loss in English, but the combination of lost words with <wl-> and the variation of spelling variations in surviving items throws at least some light on the historical trajectory of this feature.

The first documented form of **wlak* comes from the OE period:

> Ða ful oft beoð mid wlacum watre ȝelacnode. (Ælfred, *Gregory's Past*: l. 269, 897: OED)

Although not frequent, this spelling is attested until the mid-fifteenth century, most often in the twelfth-century *Peri Didaxeon*, from which the HKI corpus draws most of its listings:

> Eft nim ladsar ðt teafur. & galpanj oðres healfes paniȝe whit. & gnid hyt to gadere mid *wlacan* ecede.

The last attestation of **wlac* I found dates from 1450:

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

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

> And opened wes his breoste. Þa blod com forð *luke*. (Layamon: l. 27,557, *c.*1205: HKI)

Table 3.3 documents the diachronic development of <wlak> and <luke> spellings. While <wlak> (and related <wlac> etc.) were predominant 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-fifteenth century.

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

> And seo tunge *awlyspaþ*, seo ðe ær hæfde ful rece ne spræce. (MS. *Junius*: l. 23, *c*.1100: OED)
> In spek *wlispyt* he sum deill. (*Barbour Bruce*: l. 393, 1375: HKI)

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

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

From this date onwards, <l-> spellings increased constantly, and this became the exclusive spelling from 1400 (even though we of course have to be careful with general assessments, since there is only a total of two attested <wl-> forms that actually survived; see Table 3.4).

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 3.4) documents that the two variants coexisted for about two centuries, <wl-> being

Table 3.3 <wlac> and <luke> spellings (and related variants)

	O1–4	**M1**	**M2**	**M3**	**M4**	**E1–3**
<wlac>	8	2	1	2	1	0
<luke->	0	1	3	12	7	10

Table 3.4 <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

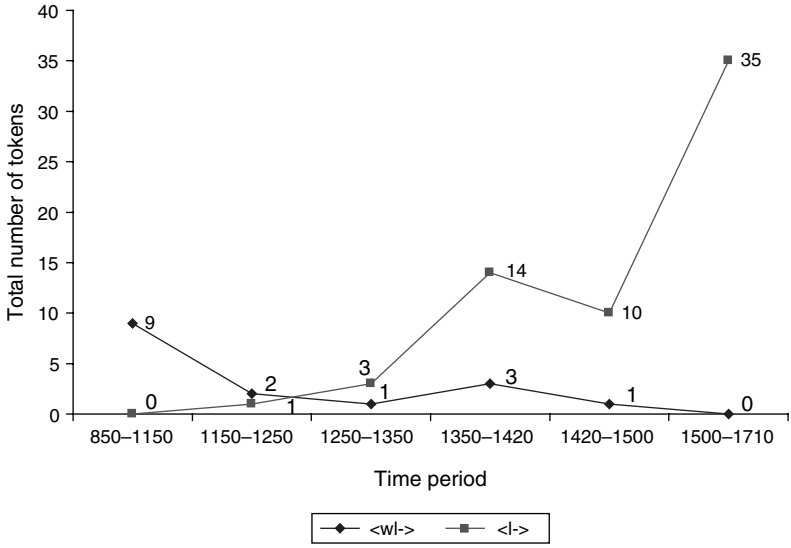


Figure 3.4 The development of <wl- ~ l-> spelling conventions, 850–1710

the original and <l-> the innovative variant. The usage of <l-> increased constantly, and the original spelling form was last documented in the early sixteenth century. This very precisely matches the time frame suggested by the analysis of lexical loss; combining these findings, we can trace the /wl/ > /l/ change in English from around 1200 to around 1500.

Further evidence as to when this change reached completion comes from three sources: (1) increasing variation of both variants in the literary work by the same author, (2) later corrections of the same manuscript, and (3) hypercorrection and insecurity as to when and for what lexical items a <wl-> spelling was used and when not. For instance, in the work of some writers we find an innovative <luke> spelling even though they still used <wl-> elsewhere. For instance, John Dunbar still wrote <wlonkes> in 1508, and it is revealing to note that he also used a modern <l-> spelling for *luke*, as in 'I am so *luik* hertit' in the very same work (*Tua mariit wemen*, l. 498: HKI).

Second, manuscripts that featured <wl-> spellings in earlier versions were subsequently changed so that original <wlache> was replaced by <luke>. The 1398 *Bodl. E. Mus. MS.* (quoted in the OED) has:

> Oyle of almondes clensyth and purgyth matere of eeres yf it be *wlache hote* droppyd therin.

In contrast, the (1495) *Trevisa* version (also quoted in the OED), produced some 100 years later, has <luke hote>, which again indicates that the process of */wl-/ loss intensified in the fifteenth century and that it finally died out in the 1500s.

A last piece of evidence comes from spelling patterns that indicate a degree of insecurity as to when a traditional and when an innovative form should be used. As a result, <wl-> spelling was generalised to include words that never had such spellings, since they derive from words that etymologically had /l-/. Towards the end of the fourteenth century, notably at a time when <wl-> spellings are declining, we find <wl-> spelling for historical <l->, for instance in *lap*, with the meaning of 'wrap v.' (not found in OE, but first recorded in the early thirteenth century, in compound forms such as *bi-lappe*, *bi-leppe*). A <wl- ~ l-> interchange was particularly noticeable in Wyclif's and Pecock's works:

> Comunly Þei ben . . . *wlappid* in pride. (Wyclif, *Works*: l. 97, *c.*1380)
> No man holdinge kny3thod to God, *wlappith* hym silf with worldli nedis. (Wyclif, *2 Tim. ii.*: l. 4, *c.*1388)
> Forwhi grete lordis han lasse nede forto *wlappe* hem silf in worldli nedis. (Pecock, *Repr. iii.* v.: l. 306, *c.*1449) (All examples drawn from OED)

The OED attributes this change in spelling conventions to interference from the verb *wrap*, but it is perhaps more likely to represent linguistic (or, better, spelling) insecurity. The co-occurrence of <wl-> and <l-> spellings at a time when these variants were in a process of variation and change indicates *hypercorrection*, that is, the extension of <wl-> to words that never had such a spelling at all (why <wlap ~ lap> later became *wrap* is another question). Writers were uncertain as to when they should use the traditional and when the innovative variant and they on occasion opted for the traditional spelling even when this led to incorrect results. Modern sociolinguistic research has shown that hypercorrection is common when communities are in the process of undergoing linguistic change (Downes 1998: 190–3). By the same token, applying the uniformitarian

principle, synchronic processes may have a historical precedent so that linguistic insecurity in scribal practices is indicative of diachronic changes also. Historical hypercorrection seems to have been more general and characteristic of the final stages of initial cluster loss, as Luick (1964: 939) notes that historical /n/ and /r/ were spelt <hn-> and <hr-> in the thirteenth century, when this change was in its last stages. Spelling insecurity manifests itself in */wr-/ loss also, to which we turn now.

*/wr-/ is the last cluster for which a historical corpus-based analysis of spelling conventions yields insightful data. However, the change from */wr-/ > /r-/ is more difficult to trace. We must bear in mind that spelling practices varied considerably when the English language was not yet standardised and codified (that is, before about 1500). With increasing standardisation, written norms became fixed and spelling conventions became fossilised, as a result of which they reflect changes in spoken English less accurately. Documents are not as insightful for changes that occurred in the sixteenth century and after, which means that whereas the beginnings of */wr-/ > /r-/ can be traced with some degree of confidence, the subsequent development is not as straightforward. We therefore have to complement our corpus-based findings with comments and recommendations of phoneticists and orthoepists, collected among others in Dobson (1968), who allow us to complete the picture of historical cluster loss in English.

The loss of initial */wr-/ (and subsequent merger with /r-/) started in the mid-fifteenth century, and one of the earliest <r-> spellings in the HKI corpus dates from *c*.1450:

and eft if it nede be *ronge* it right well (*Tretise on Horses*, *c*.1450: HKI)

Similarly, the OED lists <ringe> for *wring* and <rong> for *wrong* in the same period and states that the frequency of these spellings increased in the sixteenth century. Interestingly, from the 1560s onwards, and particularly in the first half of the seventeenth century, there is a confusion between spelling norms, and words that etymologically have /r-/ are written <wr->. This can be illustrated by <wrapt, wraps, wrap'd, wrappeth> for the verb *rap* 'to seize or snatch for oneself', as in:

I knew a Priest, who had *rapped* together foure, or fiue benefices. (Grindal, *Funeral Sermons*, 1564)

Thinges which are founde must be restored. Which thing if thou doe not, thou hast *rapt* them. (Marbeck, *Book of Notes*: l. 402, 1581) (Examples drawn from OED)

This verb is thought to be related to MLG (and G) *rappen* (Sw *rappa*), and has no historical connection at all with similar verbs with */wr-/. From the 1660s onwards, <wr-> spellings increase constantly, for instance in:

> His noble limmes in such proportion cast As would have *wrapt* a sillie womans thought. (Norton and Sackv., *Gorboduc*: l. 239, 1561)
> Al they can *wrap* and rend is little enough for Wife and Children. (Day, *Festivals*: l. 295, 1615)
> The command must needs come with much evidence when it *wrappeth* the will into such an height. (Symonds, *Serm. bef. Ho. Comm.*: 1641)
> (Examples from OED)

These misspellings are particularly frequent in the eighteenth century. As mentioned above, linguistic insecurity as to which of the two forms should be used is a strong indication that */wr-/ > /r-/ had reached its final stages in this period and that it was close to completion. It also shows that /wræp/ was still common in the seventeenth century, indicating that this was one of the last initial clusters to disappear.

All this invites the conclusion that the reduction of initial clusters in English occurred in different phases, or, put differently, that this process affected different clusters in different periods, all in all stretching over more than a millennium. The historical corpus-based study complements and supports the general estimates from the OE and ME literature well, even though there are some minor differences concerning exactly when individual clusters were lost. For instance, sources such as Jordan (1934) and Pinsker (1969) suggest that */wl-/ died out in the fourteenth century, a view which is shared by Dobson (1968: 975), who claims that 'the change from [wl] to [l] was evidently completed about 1400'. The corpus-based study documented <wl-> spellings considerably after this period, which questions whether this cluster really disappeared by 1400. Consequently, it is more likely that this change did not reach completion until the early sixteenth century and, consequently, that the time frame of /wl-/ loss in English should be revised. By the same token, estimates that the loss of this cluster began in the early eleventh century (For example, Pinsker 1969: 93) are probably too early.

Figure 3.5 illustrates the historical dimension of initial cluster loss in English, illustrating the periods in which the individual clusters thrived and disappeared. The lines indicate when the respective clusters were intact, the dotted lines when there was variation between traditional clusters and innovative merged variants, and the double vertical line indicates the completion of the change.

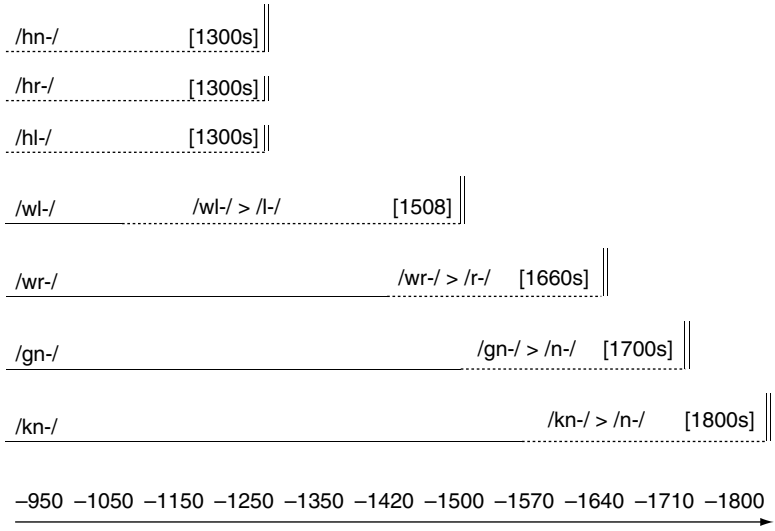


Figure 3.5 The diachronic dimension of initial cluster loss in English, 850–*c.*1800

Conclusion

What conclusions can we offer based on these findings? The most noteworthy and important findings of this study concern:

1. the similarities between the various clusters lost,
2. the initiation and total length of the individual processes, and
3. the diachronic dimension of coexistence of traditional and innovative variants, or respectively the subsequent loss of the earlier form.

These three points are briefly summarised here so they can be contextualised and discussed with reference to sociolinguistic conditioning and processes of loss in contact scenarios, the subject of the next two sections.

First of all, the beginnings of initial cluster reduction in English can be dated to different periods. Some processes of cluster loss represent a continuation of changes that were ongoing in Germanic prior to the Anglo-Saxon settlement of England. This trend is particularly strong in the case of */hn-/, */hr-/, */hl-/, and to a much lesser extent /hw-/. 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 lenition process can be modelled as follows (with /hw-/ as a reference):

PIE **kw*
> Gc, OE, Old ScE [xw ~ x^w]
> ME, Middle ScE [hw]
> ModE [w]

The modification of the cluster-initial element operated over almost three millennia. It involved both manner and place of articulation (plosive > fricative; velar > glottal) and underwent several subsequent stages in the course of this merging process:

PIE: voiceless velar plosive /k/
> Gc, OE, Old ScE: voiceless velar fricative /x/
> ME, Middle ScE: voiceless glottal fricative /h/
> ModE: null Ø

This suggests that these changes started three thousand years ago in continental Europe and that they were brought to completion in the British Isles (as well as in other Germanic languages). Loss of initial /h/ in these clusters therefore represents a continuation of changes that began in Proto-Germanic.

By the same token, English has a higher tendency to reduce initial clusters than other Germanic languages. Probably all modern members of this language family have reduced formerly permissible initial clusters, as we find general processes that operate in all (or the majority) of the Germanic languages. For instance, */hn-/, */hr-/, */hl-/ have not survived in modern varieties. Similarly, the initial cluster */wl-/, as in **wlo* 'a hem or fringe; a nap on cloth', generally died out in Germanic, whereas OE still had *wlóh* (until about 1500), OS had *wlôh*, MLG, Middle Du *vlo*, ON *ló*. All of these languages underwent an identical change and lost the cluster, so that English is on a par with Modern N, Sw and Da.

The Germanic languages thus differ in the frequencies with which initial cluster loss operates, and English may well be the most advanced of all of them in this respect. This is evidenced by the fact that some 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 Du *fniezen*, Da *fnyse*, Sw *fnysa*

(<ON *fnýsa* 'snort v.'). Another example is /wr-/, which remains unchanged in Modern Du, Fl, LG and Frn, and which is also still found, albeit with a weakened first segment (/vr-/) in Modern Da, Sw and some regional varieties of N. This trend is also noticeable in the phonetic adaptation of loanwords, which can be exemplified with words beginning with /pn-/, borrowed from Greek. The initial plosive /p/ is pronounced in virtually all languages that adopted items such as *pneumatic* (in all the Romance languages as well as in Germanic languages – German, Dutch, Danish and so on). English, on the other hand, has reduced this cluster by deleting the initial plosive: *pneumatic* /nju: 'mætɪk/.

This brings us to the next question, namely exactly why initial cluster reduction is more advanced in English than in other related languages. Are all of them continuations of originally Germanic changes? Figure 3.5 indicated that several changes occurred so late that they *cannot* represent the continuation (and successful completion) of changes that started in early Germanic. What explanations can we offer for phonotactic changes that occurred comparatively late, operating almost one millennium after Anglo-Saxon involvement in the British Isles, and that have no precedent or parallel case in related languages, some of which are limited to English? Surely there can be no external motivation here. We thus have to integrate at least some language-internal factors into an explanatory approach of phonotactic language change, and analogical change and internally motivated mergers are the most likely explanation here (Chapter 5).

A last point concerns the developmental stages of each of the loss processes. When comparing the total duration and the developmental characteristics of all the initial clusters lost, then the pattern observed brings to light the prototypical pattern of linguistic change: the alignment of linguistic innovation on an *S-curve* (Bailey 1973). If we illustrate this with the loss of */hn-/, */hr-/, */hl-/ (for which we have most data available), then we notice that around 1000, clusters were in the majority, /n-/, /r-/, /l-/ being infrequent and sporadic alternations, or what Gordon and Trudgill (1999) labelled *embryonic variants*. The overall distribution of traditional and innovative variants was stable throughout the OE period, without either variant undergoing change, for perhaps as long as two centuries. It was not until the eleventh century that there was a starting point for this change; Early ME manuscripts witness a sudden rise in <n-, l-, r->. Traditional variants were still in use and attested well into the thirteenth century, before they finally disappeared. This development is illustrated in Figure 3.6, which includes all the data for the three clusters with initial /h/ for the entire 850–1710 time frame

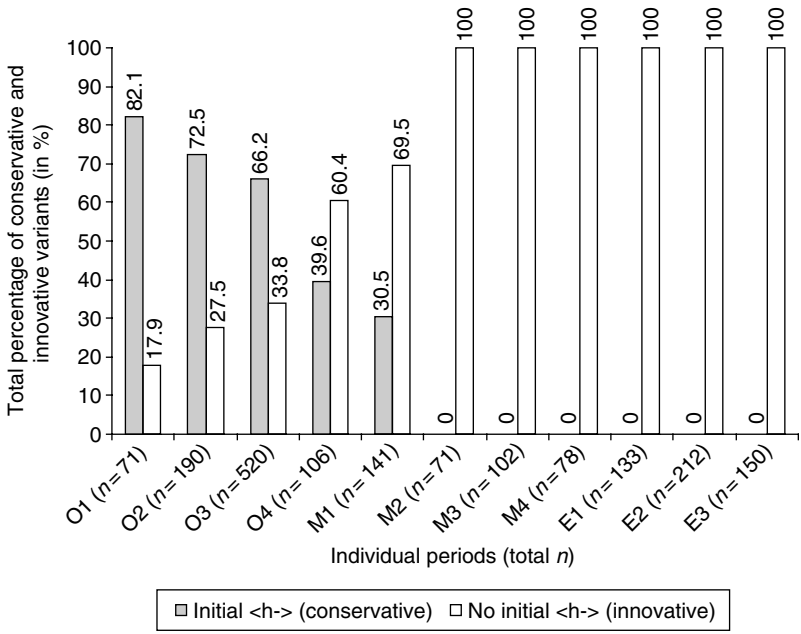


Figure 3.6 The S-curve development of h-initial cluster loss in English

(Figures 3.1–3.3). 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.[4]

The loss of */hn-/, */hr-/, */hl-/ thus displays the most common and persistent pattern of language change. It manifests itself in the appearance of an innovative variant, then a state of stability between competing majority and minority variants, followed by instability and an abrupt rise in the usage of innovations, and ultimately the dying out of the former (original) variant. This change accelerated quickly from about 1100 onwards until, in its final stages in the early thirteenth century, it reached a point of more stability again, a tailing-off period characterised by the predominant usage of innovative variants and a lingering of older, relic, forms (McMahon 1994; Chambers 2002). From the M2 period onwards, the innovative spelling variants are exclusively used. 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 (see Trudgill 1982: 52–87; Chambers and Trudgill 1998: 162–4). Historical cluster loss in English also displays this pattern.

We have therefore gained some insight into developmental and diachronic aspects of initial cluster loss in English. The traditional views were tested with a corpus-based study; the general views were by and large supported though some chronological estimates need revision. What is lacking is a synchronic perspective that may yield insights that cannot be recovered in a historical analysis. As was pointed out, one initial cluster in this category did not undergo reduction and is still found in some varieties of English: initial /hw-/. As this is 'the last of its kind', so to speak, a detailed study of this cluster may yield important information on the variation and trajectory of initial cluster loss in general (which can in turn be applied to historical processes for which such information is impossible to retrieve). It is with this aim that we now turn to an analysis of /hw-/ loss in one of the very few varieties of English round the world that have maintained it: New Zealand English.

3.2 /hw-/ > /w-/ in post-colonial English, with special reference to New Zealand

English varieties that maintain a /hw-/ and /w-/ distinction have minimal pairs like *witch* and *which* (/wɪʧ/–/hwɪʧ/), *Wales* and *whales* (/weɪlz/–/hweɪlz/), and so on (Roach 1992: 51). /hw-/ belongs to a whole group of structurally similar clusters in the English phonotactic system; they all underwent similar developments in that the C_1 witnessed consecutive weakening from velar plosive to glottal fricative (and then to null). /hw-/ is therefore related to */hl-/, */hn-/ and */hr-/, all of which disappeared through a progressive merger with /l-/, /n-/ and /r-/. In contrast to the other members in this group, however, /hw-/ is found in several varieties of English around the world. Even though this cluster is in danger of disappearing as well, it still features in Irish English (IrE), Scottish English (ScE) and some accents of American English (AmE) and New Zealand English (NZE). Since /hw-/ is in the process of being lost from most accents of English around the world, it is paramount to examine it in a variety that still makes the distinction. First of all, such an analysis provides information on current change trajectories and mechanisms; moreover, it may be instrumental in helping us to understand how and why initial clusters were lost generally, namely by yielding information that we can extrapolate to earlier language stages of English. Insights from initial cluster loss in current varieties can thus contribute towards the understanding of causes and conditions of general phonotactic change in English.

With this aim, the following case study analyses /hw-/ in New Zealand (adapted from Schreier *et al*. 2003). These findings are contextualised with reference to the country's settlement history (which is of importance for an analysis of conditioning extralinguistic factors), and complemented with studies and reports from elsewhere (particularly ScE and AmE). This analysis aims at gaining insights into the language-internal and extralinguistic conditioning of /hw-/ maintenance and loss, which is essential to address why, and under what conditions, initial clusters persist in some varieties and why, and under what conditions, they disappear in others.

Historical background of /hw-/ in English: general

As pointed out in Chapter 2, any historical analysis of phonotactic loss needs to examine the phonemic status of a cluster. As Wells (1982: 228) points out, such changes may be by nature phonological or phonotactic, depending on whether the phonetic realisation of /hw-/ is considered as a sequence of two phonemes /hw-/ or, alternatively, whether it constitutes a phoneme in its own right (/ʍ/). For Old Gothic, for instance, historical linguists traditionally used one linguistic symbol, which suggests that they considered it as a single phoneme; similarly, earlier Scottish writers used <quh->, as in *quhat* 'what', perhaps for the same motive, though this is debatable (Schleburg, personal correspondence May 2004). In varieties where /hw-/ is quasi-normative (as in ScE), the cluster could be classified as a phoneme in its own right, in which case a /ʍ/ > /w/ merger would result in phonemic loss and represent *systemic* (phonological) change. On the other hand, if /hw-/ is considered as a bisegmental cluster, consisting of two independent phonemes (/h/ and /w/), then we are dealing with reduction and *phonotactic* language change. The developmental path and subsequent loss of /hw-/ indicate that (in more recent times, at least) it represents a sequence of two consonants (and thus a cluster), rather than a single phoneme. I follow Wells's (1982) approach to view this as phonotactic change, for two reasons: first, very few varieties are normative and there is variability between the two realisations, both on an intra- and inter-individual level; and second, the first segment of this cluster is now in the process of disappearing in varieties in which /hw-/ was robust until fairly recently, and this indicates a process of cluster reduction similar to those discussed in section 3.1. (However, even though this is not pursued here, the possibility certainly exists that /hw-/ originally constituted a phoneme in its own right (/ʍ/), and that it was subsequently split into two phonemes.)

/hw-/ has a long-standing historic continuity in (varieties of) British English (Wells 1982; Aitken 1984). Samples from English and particularly

Scottish literature indicate how strong the distinction was in ME. For instance, Ben Jonson and other playwrights reported their own pronunciation of <hw-> as <huu-> (Braidwood 1964: 75). By the same token, /hw-/ was particularly prominent in Middle ScE; it was often written <quh-> or <qw->, particularly by writers of Middle and Early Modern Scottish poetry and later also by the Ulster Scots. Chambers (2002: 356) finds that individual playwrights varied between the more traditional <quh-> or <qw-> spelling and a modern <wh->. Gavin Douglas, who translated *The Aeneid* into Scottish English in the early sixteenth century, most often spelt *when* <quhen>, but on occasion he also wrote <when>, which may represent an early indication of variation between the two forms and indicate the beginnings of this reduction process in ScE.

Currently, though, most accents of EnglE no longer make a distinction between /hw-/ and /w-/ (with the exception of local varieties in the Northumberland region (Wells 1982: 228), as well as upper sociolects and RP usage; see below). It is unclear exactly where this merger started and by what time it reached completion (that is, in the areas where the contrast is no longer made). Suggestions on the putative completion of the /hw-/ and /w-/ merger vary widely, and estimates range from the eleventh century to as late as 1850. According to Quirk and Wrenn (1994: 129):

> In OE *hw* remained only initially, as in *hwā* 'who'; medially it had become *h* early, and this *h* was then lost between vowels, with consequent retraction, along with original *h*. Hence *sēon* (Go. [Gothic] *saíhwan*, Gmc [Germanic] **sehwan*, OE **sehan*) . . . with the effects of Verner's Law giving pret. pl. *sāwon*, *sǣgon*, *sēgon*, past pple *-segen*, *-sewen* . . . The 1 and 3 pret. sg. show the *h* (from **hw*) with diphthongisation before velarised consonants: *seah*.

This is also echoed in Strang (1970: 45), who notes that a /hw ~ w/ contrast 'has been largely absent from Southern English since the Norman conquest'. Others date the loss of /hw/ at a much later stage. Wells (1982: 228), for instance, claims that the merger originated in Early ME, that it was current in eighteenth-century educated speech and 'usual by 1800'. Similarly, McMahon (1998: 467) suggests that /hw-/, 'contrasting with /w/, is retained, apparently by most speakers of educated Southern English, until at least the second half of the nineteenth century; thereafter its use becomes more infrequent'. The latter view is also supported by the fact that both variants were current in London English by the end of the sixteenth century, as indicated by

some of William Shakespeare's plays, in which there are puns involving word pairs such as *wether*/*whether* or *wight*/*white* (Braidwood 1964: 75). Notwithstanding the uncertainty as to the historical development of this change, a complete merger is today reported in England and, with the exception of North America (see below), in practically all varieties of post-colonial English. /hw-/ is absent in Caribbean English ('As in England, Glide Cluster Reduction is usual in West Indian speech; thus *whine* is homophonous with *wine* [waɪn]': Wells 1982: 570), and in Southern Hemisphere Englishes, such as South Atlantic English (SAtlE) (Sudbury 2001; Schreier 2003a), SAfE or AusE (Gordon and Sudbury 2002). Only a few areas of the English-speaking world maintain /hw-/ and these are briefly discussed here to contextualise the dimension of phonotactic change in English. The aim is to further the understanding of the historical development and also to gain insights into the properties of the vernacular varieties that were transported overseas from the 1600s onwards (which affected the settlement of colonies in North America, the Caribbean and, much later, Australia and New Zealand). In this sense, such a discussion pinpoints the temporal dimension of /hw-/ exportation to English-speaking colonies and also highlights the conditions under which this feature developed (or in what colonial scenarios it was retained). This bridges the gap from the historical manifestation of /hw-/ in the British Isles to the current (post-)colonial areas where it survives and serves as a concrete background for the New Zealand data discussed below.

The consensus is that /hw-/ was first lost in the South of England and that this change diffused to West and Midland areas (Jordan 1934; Mossé 1952). In contrast, /hw-/ is strongly maintained in ScE (Murray 1873; Ellis 1889). Grant (1913: 38) claimed that 'ʍ is represented in our ordinary spelling by *wh* and is very seldom replaced by **w** in Scottish speech. Examples: -*when*, ʍɛn, *whale*, ʍel, *why*, ʍaɪ, *wheel*, ʍil.' Recent studies confirm that /hw-/ is still very strong in Mod ScE, although younger speakers of ScE appear to be in the process of replacing it with /w/. In the words of Macafee (1983: 32), 'ScE retains the phoneme /ʍ/ in contrast to /w/, e.g. where /ʍer/, wear /wer/. Younger speakers in Glasgow can occasionally be heard to merge with /w/.'[5] Similarly, Stuart-Smith (1999: 209) reports that working-class children in Glasgow have an increasing tendency to merge /hw-/ and /w/ (see also Lawson and Stuart-Smith 1999), and the same pattern emerges in Edinburgh:

> Some EdinE [Edinburgh English] speakers are consistent in maintaining /w/ and /ʍ/ as distinct phonemes, whereas other speakers are not

> predictable in their use of /w/ and /ʍ/. Rather, they regularly vary between /w/ and /ʍ/ for words that traditionally had /ʍ/. Therefore, the same speaker will pronounce *where* as [weɹ] on one occasion and as [ʍeɹ] on another. Furthermore, although the change in Glasgow was first noticed among younger speakers . . . the data collected [for the Edinburgh study] contain examples of speakers as old as 73 who use /w/ and /ʍ/ inconsistently. This suggests therefore that the change in fact has a considerable time-depth. (Chirrey 1999: 227)

On the other hand, this feature displays regional variation; Jennifer Smith (personal correspondence October 2003), informs me that '/hw/ usage is very stable in Buckie Scots', spoken in the north-east of Scotland, on the Moray Firth coast, about 60 miles north-east of Aberdeen. This suggests that speakers of ScE residing in the socio-political centres and most populous cities of Scotland are innovative, participating in an (early?) merging stage of /hw-/ with /w/, whereas speakers in less integrated communities, located away from the mainstream in the rural hinterlands, lag behind and are more conservative. This is a common pattern of feature diffusion and spread of innovative variants (Trudgill 1974, 1983: 52–87; Chambers and Trudgill 1998: 167–85), and is also found in the recent development of /hw-/ loss in Canadian English (see below).

Scotland is not the only place where /hw-/ and /w/ are kept distinct. Even though /w-/ is certainly more widespread (Wells 1982; Trudgill and Hannah 1994), a number of English varieties around the world continue to have both variants. These areas include Ireland (Hickey 2002)[6] and the English North-East (Northumberland: Wells 1982), Canada (Scargill and Warkentyne 1972; DeWolf 1992; Chambers 1998), places that have strong historical connections with the Ulster Scots, including Appalachia in the American South East (Wolfram and Christian 1976; Wells 1982) and the province of Ulster in Northern Ireland (Braidwood 1964; Chambers 2002), and colonies that had a strong and influential founding stock of Scottish settlers (such as the Southland region in New Zealand: Bauer 1986; Gordon and Sudbury 2002; Trudgill *et al*. 2003; and the south-eastern United States: Chambers 2002). Moreover, /hw-/ has survived in selected regions in the United States, such as the Atlantic states and New England (Kurath and McDavid 1961; Thomas 1971), the North-West (Reed 1971) and south-east Texas (Norman 1971).

The existence and distribution of /hw-/ in varieties of English around the world has a historical dimension. There is evidence that /hw-/ was a majority feature in the first migration waves to the American colonies, and that it subsequently came into competition with the innovative /w/

variant, transplanted by later groups of immigrants from the British Isles. Data provided in Kurath and McDavid (1961) and the *Linguistic Atlas of the Middle and South Atlantic States* (LAMSAS: Kretzschmar *et al*. 1993) indicate that /w/ is used in three major areas of the United States: the upper-mid-Atlantic area, including New York City, upstate New York (Albany) and larger cities in Maryland and Pennsylvania (Baltimore and Philadelphia); the Massachusetts/Maine area, including Boston; and the Lower South area, particularly South Carolina and Georgia. Wells (1982: 230) points out that the 'geographical distribution of this pattern suggests that glide cluster reduction, like non-rhoticity, represents an innovation imported from England via the seaports which before the advent of air travel were the places in closest contact with Europe and its influences'. The major ports on the US Atlantic coast, Boston, New York, Baltimore, Charleston and Savannah, were therefore the first cities to which subsequent settlers brought /w/. The (then) innovative variant took a foothold in the immigration centres first, being in competition with (and ultimately replacing) the more conservative form. /w/ was thus first adopted and established (at the expense of /hw/) in the major US ports, from where it was diffused to neighbouring areas and the rural hinterlands. At the same time, there is evidence that the usage of /w/ is spreading quickly and that /hw-/ is disappearing. William Labov and his associates at the University of Pennsylvania have conducted a long-time study to investigate current changes in AmE. Their extensive project is based on data collected from a sample of approximately 700 subjects residing in major urbanised areas throughout the USA (the results will be published as the *Atlas of North American English*: Labov *et al*. forthcoming). The atlas provides data on the current dimension of /hw-/ loss in AmE. Labov *et al*. found that only 71 of 587 speakers (12.1 per cent) analysed made a distinction between /hw-/ and /w/, and that they were concentrated in some major areas (eastern New England, the Lower South, south-west Texas).

One of the few quantitative studies on /hw-/ loss is Chambers (2002), who investigated the development of this feature in twentieth-century Canadian English (CanE). Chambers used data from the *Dialect Topography of Canada* survey (Chambers 1994) to analyse the recent trajectory of /hw-/ development in eastern Canada. Based on a total of almost 5,000 tokens, collected in apparent time from over 2,000 speakers (aged between 14 and over 80 years from several regions of eastern Canada: the Golden Horseshoe, the Ottawa Valley, Montreal and Quebec City), Chambers finds that, while most speakers varied, /hw-/ was a vibrant majority feature for Canadians born in the 1920s and 1930s. Then, around the time of

the Second World War, a subsequent demise began, following an S-curve development, and currently /hw-/ has become so infrequent in the speech of teenagers that it may disappear from CanE altogether, perhaps within a few generations. Moreover, Chambers observed that the speed at which this innovation proceeded was subject to variation in the four regions, even though /hw-/ loss followed a similar pattern in all of them. Whereas 'the change is not regional but national, taking place in Canadian English generally' (Chambers 2002: 362), it is the heavily urbanised and densely populated areas (the Golden Horseshoe and Montreal) that lead the change, and the more rural and less densely populated ones that are the ones to lag behind by a generation or so.

Finally, one more area in the English-speaking world where a contrast between /hw-/ and /w/ is still maintained is West Africa. In Ghanaian English (GhE), for instance, Huber (2004: 861) reports that:

> GhE pronunciation differs from RP in that orthographic *wh-* is often rendered as [hw]c, so that the question words *what*, *where*, *which*, or *why* are pronounced [hwɔt], [hwɛ], [hwitʃ], and [hwai], respectively. This is another feature that could have its historical origin in Scottish missionary activity in the Gold Coast, reinforced by spelling pronunciation. As with many other features, there is again variability, with speakers alternating between [hw-] and [w-].

/hw-/ in GhE thus most likely represents the input legacy of /hw-/ -ful speakers of BrE, and Huber suggests that this feature may have been adopted from Scottish missionaries who worked in the area (although he does not rule out spelling pronunciation as a possible contributing factor).

Apart from regional differentiation, /hw-/ also carries a strong social component in that it features prominently in certain upper-class accents. In English sociolects spoken by the upper-middle and upper classes, it serves as a prestige form (most notably in what Wells (1982: 228) refers to as adoptive received pronunciation (RP), 'where [/hw/] is widely considered correct, careful, and beautiful'). It is unclear at the moment whether this feature is subject to much variability in RP and whether it is endangered and declining, but it seems to meet the same fate as elsewhere. Trudgill and Hannah (1994: 13) note that 'Most EngEng accents have lost the original/w/:/ʍ/ contrast . . . This is for the most part also true of RP, but there are some (especially older) RP speakers who still preserve it, and one suspects this is often the result of a conscious decision and effort to do so', and Roach (1992: 51) claims

that 'most RP speakers pronounce the initial sound in such words (e.g. 'which', 'why', 'whip', 'whale') as w'. Wells (1982: 228) claims that 'Present-day RP usage could be described as schizophrenic', since /hw-/ is 'not a natural possibility' and speakers vary between the two variants. The social reputation attached to /hw-/ is also reported in colonial scenarios, even in forms of English in which it is not common, such as in SAfE; for instance, Wells (1982: 618) notes that 'South African speech is much the same as that of England. *When* and *whine* are almost universally pronounced with simple /w-/; the rare variant with /hw-/ is associated, as in England, with the careful formal style of the speech-conscious.' /hw-/ is thus stylistically marked and an indicator of high social prestige in upper-class accents. On the other hand, it is also commonly considered old-fashioned and its usage very often involves a conscientious effort (or language change from above: Labov 1972b) on the part of the speakers who believe it is desirable for them to maintain it.

In sum, /hw-/ represents a long-lasting historical change in the phonotactic system of English. The initial segment of the original Pr. Gc cluster */kw-/ underwent successive lenition (*k- > *x- > h-) and faces deletion as /hw-/ merges and becomes homophonous with /w/. /hw-/ usage has therefore continually declined over the past centuries. Remnants of this cluster, in Ireland, Scotland, North America, West Africa and New Zealand, are increasingly disappearing, so that it is certainly justified to state that the change from Pr. Gc */kw-/ to ModE /w/ has almost reached completion. At the same time, /hw-/ maintenance is also an indicator of the diachronic dimension of colonisation patterns, as it is only found in the earliest colonies (particularly in North America) and not in those settled later on (unless, as was the case in New Zealand, there was a disproportionately high contingent of settlers who made a contrast; see below). There are thus few opportunities to investigate the conditioning of this cluster; data from the last remnants of /hw-/ are crucial in that they contribute to identify the factors that govern variation and change with regard to this feature and in that they help us to understand how word-initial clusters (as exemplified by /hw-/) develop under contact conditions. With these aims, I now turn to a discussion of /hw-/ maintenance and loss in NZE.

/hw-/ in New Zealand English

The Southland/Otago region of New Zealand is one of the few regions outside North America and the British Isles (and almost certainly the only variety of English in the Southern Hemisphere) that continues to distinguish /hw-/ and /w/ (Bauer 1986). It therefore represents an ideal

test site to analyse /hw-/ maintenance and loss in English, offering not only an opportunity to investigate the linguistic and social criteria that condition the variable usage of the two competing variants, but also allowing us to study how this feature develops in a colonial scenario that involves transplantation and interaction of distinct varieties. This section investigates the regional distribution, status and linguistic conditioning of /hw-/ in NZE. A major point of analysis is the extent to which this feature represents population demographics and ancestral effects, and whether its loss and maintenance are conditioned by social criteria (total input of /hw-/ retaining donor dialects, settlement type) or by linguistic factors (preceding environment, word type), or by an interplay of social and linguistic factors.

To understand the development of /hw-/ in NZE, it is paramount to bear in mind that individual regions of New Zealand were colonised by settlers from different areas of the British Isles and Australia.[7] The proportions of immigrants who settled in the colonies varied greatly and the social configuration of individual settlements affected the formation phase of a distinctive local accent (Gordon *et al*. 2004; Trudgill 2004). NZE is one of the youngest nativised varieties of post-colonial, transplanted British English. Large-scale immigration started only when most other former colonies of the British Empire were already established (with the Falklands Islands representing a noteworthy exception: Sudbury 2001). Mainly, but not only, because of its comparatively recent colonial involvement, New Zealand has a special status among the 'New-World Englishes', and this status makes it ideal to scrutinise the kinds of social and sociolinguistic processes that operate when new colonies develop (see Schneider 2003). New-colony formation entails a complex interplay of social, sociolinguistic and linguistic processes, all of which are at work when a community is established, social networks are intensified and a new distinctive local identity emerges, and when a new dialect finally evolves and stabilises. The origination and consolidation phases of a newly founded settlement are characterised by concurring effects of contact dynamics, both on a social and on a linguistic level; questions such as why, when and under what conditions these mechanisms operate and how they shape the social and/or sociolinguistic output are of particular interest for the development and regional status of /hw-/.

Settlement history and population demographics

New Zealand was drawn into the sphere of European expansion into the Pacific in the later eighteenth century. The islands were originally

charted by Captain Cook in 1769, but by the late 1830s, European residents numbered no more than around 2,000, most of whom were residing in the North Island's Bay of Islands area (Gordon and Deverson 1998). Until it gained official status in the 1840s, New Zealand was considered an outpost of the Australian colony of New South Wales. Problems of law and order and the prospect of increasing settlement led to the British government's decision to extend its authority; in 1840, British sovereignty was proclaimed over the country after the representatives of the Crown and several chiefs of Maori tribes officially signed the Treaty of Waitangi (Belich 1996). From this date onwards, the European population of New Zealand grew at a remarkable rate; by 1872, the total of residents with European ancestry had reached 256,000, and by 1881 it was almost half a million (Belich 1996: 278). The 1886 census shows that by this date the number of native-born European New Zealanders was greater than the number of foreign-born immigrants.

Immigration was first concentrated in the North Island and many newcomers resided and settled in the Auckland and Bay of Islands areas. Auckland became the seat of government early on and it expanded very quickly to become the largest and most populous settlement of the new colony. However, the period between 1840 and 1852 was also characterised by colonising activities of bodies in Britain, which organised emigration to central and southern New Zealand. Most of the immigrants who arrived in this period came to settlements planned according to the ideals of Edward Gibbon Wakefield, whose theory of systematic colonisation was based on the principles of promoting compact settlement and preserving British ancestry and heritage. These ambitious ideals failed and became instruments of land speculation. As a result, the Free Church of Scotland and the Church of England were persuaded to set up denominational settlements in selected regions of the South Island. These settlements attracted waves of new settlers, who lived in better-organised and more structured dwellings, and this scheme proved more successful in realising the founders' original objectives. The first Presbyterians set out from Scotland for Otago in 1848, and two years later, in 1850, the Canterbury Association established the settlement of Canterbury as a High Anglican English settlement. Although the numbers of settlers who came in these early planned settlements were not great when compared with later immigration, they nevertheless set early patterns in the areas where they were established, particularly in Otago and Canterbury, with their major towns Dunedin (the capital of the Scottish parts, and, incidentally, the Celtic name for Edinburgh) and English Christchurch.

The 1871 census figures reveal that the vast majority of migrants in New Zealand came from the British Isles and that the English formed the largest ethnic group (51 per cent). The Scots, who made up 10 per cent of the population of the British Isles, constituted 27.3 per cent of the migrants in New Zealand; most of them concentrated in Otago and Southland, but they also settled in smaller numbers in other locations throughout the country. The Irish, who in 1871 made up 18.8 per cent of the UK population, constituted about 22 per cent of the New Zealand migrant population. The Welsh were often conflated with the English in official records but, even allowing for this, the percentage of Welsh immigrants was sociodemographically insignificant. Table 3.5 shows the distribution of settlers from the British Isles in the New Zealand provinces in 1871 (including the respective percentages of the New Zealand-born population). It indicates that the North Island provinces generally had more New Zealand-born people than the South Island, and that Otago and Southland had significantly more immigrants from Scotland than the other provinces. Canterbury, on the contrary, had a majority of settlers with English provenance.

Table 3.5 The New Zealand population in 1871

	Origins					
	New Zealand	**Australia**	**England**	**Scotland**	**Ireland**	**Other***
Auckland (67,451)	43.6	4.0	26.6	7.7	12.6	5.5
Wellington (29,790)	49.8	3.4	28.1	7.8	6.1	4.8
Taranaki (5,465)	53.8	2.6	28.5	4.4	7.8	2.9
Hawkes Bay (9,228)	37.2	2.6	29.3	7.4	10.6	8.7
Nelson (22,558)	43.9	4.3	25.1	7.4	10.6	8.7
Canterbury (58,775)	41.1	2.7	33.1	8.5	10.3	4.3
Westland (14,860)	27.5	10.8	19.2	8.9	19.0	14.6
Otago and Southland (85,113)	35.9	6.1	16.9	25.1	8.2	7.8

* The main countries under the birthplace category 'other' are Sweden, Norway, Germany and China.
Source: Adapted from McKinnon 1997: 53.

Another important point is that the Scots–Presbyterians dominated in rural areas, making up between 60 to 80 per cent of the total population there (of about 70,000: Olssen 1984: 71). The other large group were miners, most of whom came from England and Ireland, who represented about 24 per cent of the male workforce (Olssen 1984: 71). Settlements based on agriculture consisted mostly of Scottish settlers, whereas non-agricultural dwellings had higher proportions of settlers from other areas, and often there was no domination of a single group in such places. This pattern manifested itself in various settlement patterns of other towns throughout the two districts. The population of Arrowtown, for example, a gold-mining town in central Otago, was made up of similar percentages of people from England, Scotland, Ireland and Australia. Milton, on the other hand, a rural and mainly agricultural town, had a very high percentage of settlers born in Scotland. However, notwithstanding sociodemographic differences and some degree of local variation, the southern part of New Zealand is to the present day recognised as the area in New Zealand that was most directly influenced by Scots–Presbyterians. The area had at all times a distinctive Scottish flair that affected all aspects of everyday life (Trudgill *et al*. 2003). For instance, David Kennedy, an itinerant entertainer and singer, noted a strong Scottish influence and orientation of the settlers in the 1870s (as recounted in Olssen 1984: 76):

> Everybody spoke with a Scottish brogue; the museum displayed a lock of Robbie Burns's hair; at the Caledonian games, an annual fixture since 1862, 'Tartans waved and bagpipes blew'; and as an entertainer he discovered that Scottish numbers proved most popular.

Whereas Southland and Otago were the stronghold of the Scots–Presbyterians, Canterbury, in sharp contrast, was planned to be 'English, Anglo-Catholic [i.e., High Anglican], and Conservative' (Sinclair 1991: 92). A study of the population of nineteenth-century Canterbury (Pickens 1977, based on several limited sources of data, including the records of those who married in Canterbury between 1851 and 1887) shows that the 'English' stereotype of the Canterbury population has its basis in early settlement patterns, whereby 55 per cent were of English origin, 16 per cent from Ireland, 14 per cent from Scotland and about 1 per cent from Wales. The majority of the English settlers came from the South of England, in particular the South-East.

New Zealand's North Island, on the other hand, witnessed a different social history with distinct settlement patterns. Quite generally, the

North Island showed more sociodemographic fluctuation than many areas in the South Island so that settlements in the north tended to be less stable throughout the nineteenth century. As a result, it is more difficult to make generalisations about the North Island population as a whole. We know that some of the most influential settlements were founded early. Wellington, for instance, was established in 1840; being the earliest New Zealand Company settlement, it was one of the first places of European involvement. Throughout the nineteenth century, Wellington and Auckland were the focal points of the North Island and the population and public life concentrated mainly in these two places. In contrast, smaller and more isolated settlements were founded only in the 1870s, often for a specific purpose (Dannevirke, for instance, was set up for government-assisted immigrants from Scandinavia). In places such as Rotorua, European settlement had scarcely begun in the 1880s.

The main reason for the slow colonisation schemes in northern New Zealand was the fact that the rural hinterlands were not secure; the strong presence and increasing resistance of the Maori population hindered swifter colonisation of entire regions. European-type settlements were only established when military activities escalated and British soldiers were subsequently stationed. The population influx rose dramatically in the 1860s, after war broke out with Maori tribes who resisted the further expansion of European colonisers. By the middle of the 1860s, there were around 12,000 Imperial troops in New Zealand, together with 4,000 local soldiers. The colonial government recruited 'soldier settlers' in Great Britain and repatriated them on land confiscated from the Maori. According to a recent account (McGibbon 2000: 325), 'most of those who enlisted were young single men born in Great Britain and from the lower stratum of Victorian society, labourers and semi-skilled workers attracted by the promise of a free farm'. From a census taken of settlers with a military background at the end of 1864, in which the birthplaces of men and their wives are indicated, it appears that while the English-born were the most numerous nationality, there were relatively high numbers of Irish settlers as well, at least when compared to New Zealand's general population at the time. Upon their discharge, soldiers were allotted land and given permission to cultivate their new property, though many did not stay long enough even to obtain legal ownership. For example, of the 2,056 soldier-settlers who were granted farms in the Waikato province in the 1860s, only 214 still owned farm sections in 1880, which indicates the high degree of mobility in the North Island at the time and shows that many settlers moved on, most likely to Australia or also to New Zealand's urban centres (McGibbon 2000: 327).

Economically, the provinces of the North Island at first lagged behind Otago and Canterbury, where prosperity was founded on the wool industry. The discovery of gold in the South Island in 1861 greatly increased economic growth and vastly extended the population there. In the 1870s, a government immigration scheme was set up to boost the population in the wealthier provinces of the south, and there was a massive influx of new immigrants to Otago and Canterbury. The situation changed from the 1880s on, when the success of refrigerated shipping made the export of dairy produce possible. After 1901, more dense settlement and industrial development gave the northern provinces a socioeconomic advantage, which led to demographic restructuring and to a preeminent sociopolitical role of the North Island, which has persisted to the present day.

/hw-/ in New Zealand English: historical attestations

There are occasional comments on /hw-/ in the earliest attested forms of NZE, usually in reports made by school inspectors; for instance, McBurney (1887, in Turner 1967) claims that /hw-/ was common in the late 1880s and also makes the interesting observation that school girls use /hw-/ more often than schoolboys. Similarly, Bennett (1943: 83) reports that words spelled with <wh> were usually pronounced [hw]:

> The spelling wh-, as in 'when', 'wheat', 'which', 'while', usually represents breathed [w]. This speech habit is equally strong in all parts of the country, for both stressed and unstressed positions, in anything that approaches 'careful' pronunciation . . . All official radio announcers use it, and are encouraged to do so.

This is further substantiated by Wall (1939: 5), who writes that 'The question for us is whether it is or is not too late to save the "wh" by a concerted effort . . . All the announcers in the main stations in this country maintain, very rightly, I think, the traditional "wh." And there can be no doubt that in New Zealand generally it is better preserved than at Home.'

More evidence for the robustness of this feature in earlier forms of NZE comes from two studies in Otago. Woods (2000), in a generational study of four speakers of NZE born between 1874 and 1960, reports /hw-/ usage in the three oldest speakers but none in the youngest one, and Bayard (1991, 1995) finds that the /hw ~ w/ contrast, while not frequent, was still made by a minority of his informants and that older speakers were more likely to have it than younger ones. However, the

trajectory of /hw-/ loss in NZE is not at all clear; Bayard's (1991) sample study shows that speakers born in the 1920s actually have more merged variants than those born between 1930 and 1950 and that there was a sharp decline of /hw-/ usage in the second half of the twentieth century. These findings are mirrored by Gordon *et al.* (2004: 195ff.), who find that 'use of /hw/ was much more prevalent in Otago than in the North Island . . . it is increasing over the period we are analysing [1857–1904] . . . this increase is markedly sharper in female speakers'. In other words, overall usage of /hw-/ increased during the nineteenth century and women had higher levels than men. Woods's (2000) cross-generational case study reaches the same conclusion: an informant born in 1930 has higher levels than one born in 1874, which, 'given that this variant is declining in New Zealand English, is clearly in contrast to expectation' (Woods 2000: 105). The development of /hw-/ across time is thus not clear, and these results suggest that it was maintained until about 1950 (at least in Otago) and that it has declined since. This assessment is also shared by Bauer (1999: 297), who states that 'the distinction between *witch* and *which* was healthy in some parts of New Zealand well into the 1960s', which is also confirmed by related studies in Canterbury (Gordon and Maclagan 2000) and observations elsewhere (Wall 1939).

At the same time, there is evidence that /hw-/ usage decreased when a distinctive New Zealand accent formed. Several reports suggest that it was more widespread in earlier forms of NZE and that it is currently in the process of disappearing (Bauer 1997; Gordon *et al.* 2004). A school inspector, Mr E.A. Scott, complains in a (1908) report that 'a habit of dropping the aspirate in such words as "why", "when", "where" is . . . becoming increasingly disagreeably prevalent', and Gordon and Maclagan (2000: 4) describe the gradual demise and disappearance of /hw-/ as follows:

> In New Zealand in 1964 George Turner, lecturer in English language at the University of Canterbury, asked a large class of first-year students in Christchurch whether they thought it correct to distinguish such pairs as *where* and *wear* in pronunciation. He reported that 'on show of hands they were equally divided' (Turner 1966: 105). Today a similar question put to first year university classes by the authors receives only a very few positive responses. From our analysis . . . it is clear that this distinction is now only ever found among some older middle class speakers . . . For younger New Zealand speakers *which* and *witch* are identical.

These assessments are confirmed by findings reported in Gordon *et al*. (2004) and Trudgill (2004), who confirm that /hw-/ retention was present in nineteenth-century NZE: 'Although the Englishes of south-eastern England and, probably, Australia, had merged *whales* and *Wales*, it was the Scottish, Irish and northern England (and probably North American) form which was the one to survive in the levelling process' (Trudgill *et al*. 2000: 310).

This raises several questions, of both a specific and a general nature. First of all, since NZE originated in a context of dialect transplantation, contact and mixture ('While NZE is undoubtedly southern English in origin, it shows features which are found throughout the south of England . . . NZE really is a mixed dialect, taking input from throughout Britain': Bauer 1999: 304), the scenario that gave rise to it involved several transplanted inputs, and the distinct phonological properties of these inputs served as a pool from which an emerging focused form of NZE drew its features. Earlier forms of NZE had /hw-/ and this suggests that the first generations of native-born New Zealanders drew this feature from their parents' speech. The regional maintenance of /hw-/ raises important issues:

1. Why, 'in spite of mergers having an advantage over distinctions' (Trudgill *et al*. 2000: 306), were labiovelar fricatives adopted at the expense of a /w/ counterpart, which probably was the majority variant?
2. Why were /hw-/ clusters subject to regional variation and more robust in the South Island than in the North Island? Was it subject to gender-based stratification, as McBurney (1887) suggested?
3. Why would /hw-/ usage continue for almost a century before it presumably began to decrease? In what region(s?) did the demise of /hw-/ begin in the first place, and for what reason?

For our specific purpose, /hw-/ maintenance in New Zealand provides the opportunity to investigate the contribution of language-internal and extralinguistic factors (overt prestige, population demographics, settlement type) to the maintenance and subsequent loss of English clusters. This complements the historical findings on phonotactic variation and change. Moreover, from a historical perspective, such an analysis may yield insights into the status of this variant in the British Isles at the time when colonisation of New Zealand began in the mid-nineteenth century and may help elaborate when it disappeared in English (the main question being whether NZE /hw-/ exclusively represents the legacy of ScE and IrE, or whether it was also present in transplanted

varieties of EnglE). It is thus insightful to look into the regional distribution of this feature, and by doing so to investigate the interplay of social, regional and linguistic factors that operate during consonant variation and change.

Data: analytical procedures and findings

The data analysed for the present study come from two archives, both held in the Department of Linguistics at the University of Canterbury, Christchurch. The two data sources contain recordings of New Zealanders born between the late 1890s and the early 1980s, and were collected for oral history projects on the regions of Otago and Canterbury. The Intermediate Archive contains recordings of about 150 New Zealanders born between 1896 and the early 1930s; most recordings come from the archive of Rosemary Goodyear, who conducted interviews in the two areas between 1989 and 1994. The second archive, the Canterbury Corpus, contains recordings of some 370 speakers overall, born between 1921 and 1980. This archive was (and is being) created by the University of Canterbury New Zealand English class, which each year interviews individuals fitting into a prespecified sample, stratified by age, gender and social class. Together, the two corpora contain data collected for over 500 New Zealanders born between 1896 and 1980. In combination with the Mobile Unit, the basis of the Origins of New Zealand English (ONZE) project (Gordon *et al*. 2004), which contains recordings of some 250 New Zealanders born between 1853 and the early 1900s (Lewis 1996; Woods 1997), the database spans the entire formation and development periods of NZE.

For the present study, the speech of a total of 45 New Zealanders was analysed. These New Zealanders were born between 1896 and 1935 in various places across the country, mostly in Southland and Otago (in the southern part of the South Island), Canterbury (in the South Island's central mid-east), and several places in the North Island (such as Wellington, Dannevirke and Rotorua). Table 3.6 provides a general outline and some sociodemographic information on the speakers analysed. It indicates that a balanced stratified sample could not be analysed for practical considerations. The original intention was to obtain and analyse data for 72 speakers: a total of four speakers per cell, from three areas (North Island, Canterbury, Southland/Otago), three time periods (1890–1904, 1905–19, 1920–35), and stratified by sex/gender. Whereas the Southland/Otago areas are well-represented with four speakers in each of the six cells, fewer recordings were available for the Canterbury and North Island regions, for which there are no recordings of speakers

Table 3.6 NZE speakers analysed for /hw-/

	South Island					
	Canterbury		Southland/Otago		North Island	
	Male	**Female**	**Male**	**Female**	**Male**	**Female**
1890–1904	–	–	VS (1896) JM (1900) CN (1902) TMcC (1903)	LA (1897) VE (1900) JMcL (1901) VH (1902)	–	–
1905–19	–	HM (1914) AH (1916) JMcN (1917) RW (1917)	LB (1905) HS (1905) WO (1907) CJ (1916)	KF (1906) EB (1907) EA (1908) JJ (1915)	ET (1915) DM (1915) TR (1919)	JW (1916) JA (1919)
1920–35	PC (1924) BG (1922) JJ (1922) WG (1924)	MD (1921) PG (1921) AG (1923) ER (1928)	EG (1920) JR (1922) GG (1924) JW (1929)	VF (1921) MG (1921) CT (1926) PL (1931)	EA (1921) TK (1930) BL (1930)	MD (1935)

for the earliest 1890–1904 time frame. Moreover, there are no recordings of male speakers from the Canterbury area for the 1905–19 period and there are more men than women in the North Island sample.

Thus, whereas data are available for the twentieth century, the earliest period unfortunately eludes scrutiny for an analytical comparison of /hw-/ maintenance and distribution in the three regions. This had the consequence that, for statistical analyses that involved data from areas with (comparatively) few individuals, speakers were divided into two groups, with 1915 as the dividing year (the approximate midway point between the year of birth of the earliest-born speaker (1896) and the latest-born speaker (1935)). The direction of the effect was the same as in the statistical model that involved three age groups (the main difference was that there was no cut-off point used in the statistical model, where birth date was simply treated as a continuous variable). Moreover, the findings are presented as scatter plots and not collapsed as global numbers of speakers in the same cell. This allows the delineation of /hw-/ development across time, without running the risk of conflating and misinterpreting a limited set of data in individual cells.[8]

Extraction procedures were as follows. All words containing /hw-/ were extracted (ignored were cases where clusters are not realised even though present in written speech: that is, in cases when it is pronounced [h] rather than [w], as in *who*, *whose* or *whore*). The aim was to extract a total of 100 tokens for each of the 45 speakers in the corpus, but in some cases the length of the recording was short (20–25 minutes), which resulted in a lower total number of extracted tokens (the total of tokens analysed for the present purpose is 2,144 tokens, 48 on average per speaker). All tokens were coded and classified as merged, that is, /w/ or bisegmental (/hw/) and coded for the social variables of region, age and sex of the speaker. In addition, other coded linguistic factors included preceding environment (sonorant, plosive, vowel, fricative, affricate), whether /hw-/ was embedded within a word (e.g., *somewhere*) or not (e.g., *where*), and whether the word was a function (*why*, *when*) or a content word (*wheel*, *whistle*). All these factors had an effect in similar analyses of speakers in the ONZE corpus (Gordon *et al*. 2004).

After the coding and extraction procedures, the data-set was fitted to a stepwise binomial generalised linear model. This technique of data analysis is very much akin to that implemented in VARBRUL, but its advantage is that it enables the direct modelling of interactions. The statistical analysis retained all factors, with the exception of embeddedness, which had an insignificant effect. In addition, the analysis yielded interactions between the social factors, and also between region and

language-internal criteria (that is, status of content or function word).[9] Table 3.7 provides the summary statistics for the significant individual factors. Gender/sex, region and age are important extralinguistic effects, as /hw-/ was most frequently maintained by women, Southlanders and older speakers (that is, those born before the First World War). In terms of language-internal constraints, the likelihood of /hw-/ realisation was higher in content words than in function words, and it was also conditioned by preceding and following environments (illustrated with Wells's 1982 lexical sets).

The effect of locality is further illustrated in Figure 3.7, which shows the regional distribution of /hw-/ realisation in NZE. It also indicates that an interaction between region and gender affects the overall rate of /hw-/ production. Southlanders have higher levels than speakers from the other two regions, and Canterbury speakers again have higher ones than New Zealanders born in the North Island. Moreover, women have higher levels than men, a difference mainly found in Southland and the North Island but minimal in Canterbury.

Table 3.7 /hw-/ maintenance and loss in NZE: results

		/hw/	/w/	Per cent /hw/
Sex	Female	291	785	27.0
	Male	222	846	20.8
Region	Southland	441	666	40.0
	Canterbury	51	596	7.9
	North	21	369	5.4
Birth dates	Before 1915	275	417	39.7
	In or after 1915	238	1214	16.4
Word type	Content	70	53	56.9
	Function	443	1578	21.9
Preceding environment	Affricate	5	9	35.7
	Fricative	113	310	26.7
	Plosive	116	354	24.7
	Vowel	215	665	24.4
	Nasal	64	293	17.9
Following environment (using Wells's 1982 lexical sets)	FLEECE	15	19	44.1
	PRICE	84	116	42.0
	KIT	56	162	25.7
	SQUARE	77	243	24.1
	LOT	111	419	20.9
	DRESS	170	669	20.3

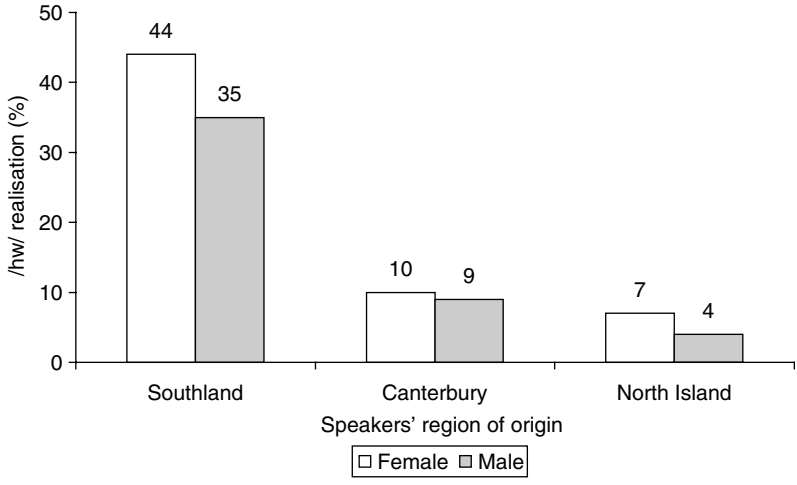


Figure 3.7 /hw-/ in New Zealand English, by region and gender

Figure 3.8 indicates the interaction between gender and birth date (subdivided into two groups, with 1915 as the dividing point). While women generally have higher levels of /hw-/ usage than men, the gender effect is more prominent for earlier-born speakers.

Women are actually changing faster than the men and catch up in the later part of our data-set. Due to the uneven distribution of speakers

Figure 3.8 /hw-/ in New Zealand English, by gender and birth date

available for the three regions (Table 3.7), one has to take care not to misinterpret the rate of /hw-/ loss from NZE. Because there are no North Island speakers available for the earliest period (1890–1904), and because North Islanders had lower overall /hw-/levels, it has to be emphasised that the apparent rate of change (as displayed in Figure 3.8) is somewhat distorted. A representation in the form of a scatter plot (Figures 3.9 and 3.10) redresses the diachronic dimension of /hw-/ maintenance by sex and region and provides additional information for the robustness of these factors. Figure 3.9 indicates the average levels of full cluster production for each speaker analysed, subdivided into

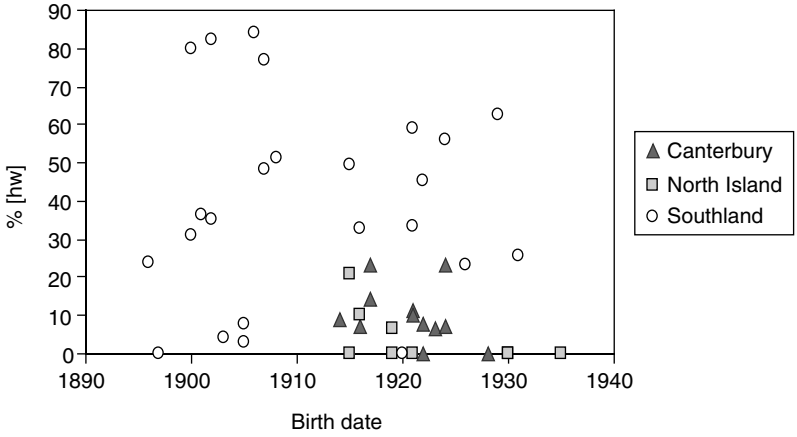


Figure 3.9 /hw-/ in New Zealand English, by region and birth date

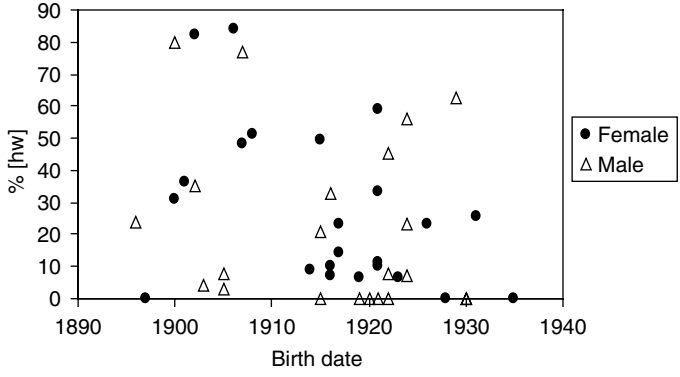


Figure 3.10 /hw-/ in New Zealand English, by sex and birth date

region of origin. Most of the Southland speakers are /hw-/-ful, varying between 2 and 86 per cent, and they also have comparatively higher levels than New Zealanders from the other two regions.

Figure 3.10 illustrates /hw-/ realisation by gender group. The result is not as straightforward as it is in the previous scatter plot, but women still have higher average levels than men and most women continue to make the distinction well into the twentieth century (only three women do not have /hw-/, two of them from the North Island).

Language-internal criteria are of relevance as well, and Figure 3.11 illustrates the effect of the preceding phonetic segment on /hw-/ maintenance.

Preceding affricates have an enhancing effect on /hw-/ realisation and this effect decreases with preceding fricatives, plosives, vowels and sonorants (in this order). Moreover, word type influences the frequency of /hw-/, with content words (such as *white* or *wheel*) having considerably higher levels of /hw-/ realisation than function words (*whereas*, *why*; see Figure 3.12), an effect that is identical in all three areas. It is possible to explain this difference as a function of *open versus closed class* status of words (Quirk *et al*. 1985; Greenbaum 1991). Quirk *et al*. distinguish between open class words (such as nouns, adjectives, main verbs and adverbs), which are more flexible in that loanwords and borrowings are constantly added to this class, and closed class words (pronouns, deter-

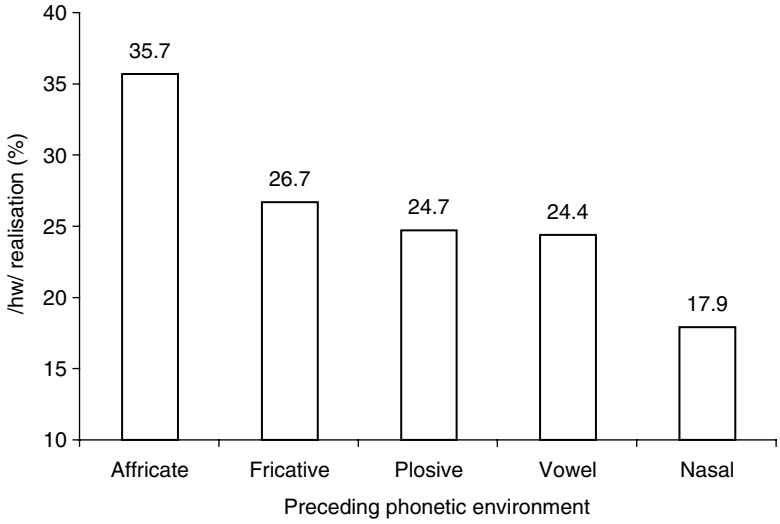


Figure 3.11 /hw-/ in New Zealand English: preceding segment effect

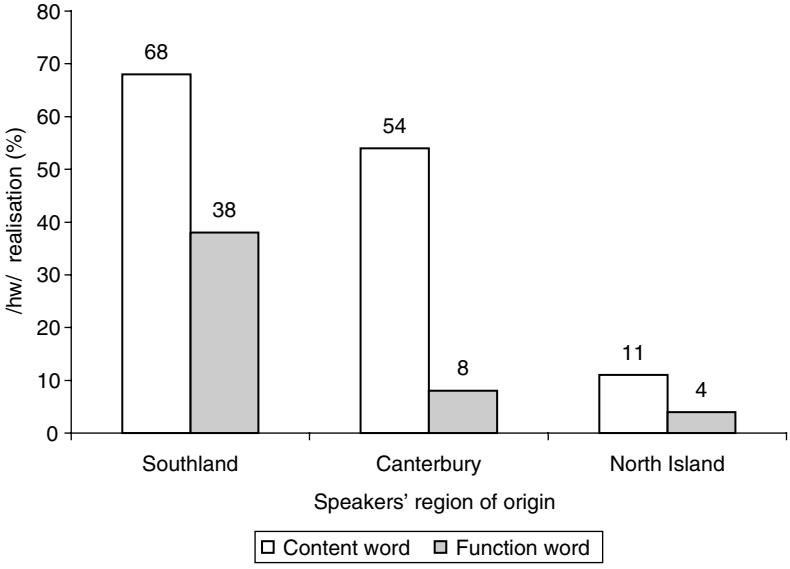


Figure 3.12 /hw-/ in New Zealand English: word type effect

miners, auxiliaries, conjunction, prepositions), which are more rigid. It is quite possible that this has an effect on /hw/, but more research and data from other varieties are necessary to investigate this in more detail.

The difference is most obvious in the Canterbury region, and less prominent, even though still strong, in speakers from Southland/Otago and the North Island. It is remarkable that the three regions display an identical trend despite the fact that they represent distinct degrees of /hw-/ maintenance and loss (which, to make this case stronger, was also reported for New Zealanders born in the nineteenth century; Gordon *et al.* 2004). Figure 3.12 therefore provides strong evidence that the demise of /hw-/ was led by function words, whereas content words were more conservative and tended to retain full initial cluster production.

Discussion

Three main points derive from the data presented. First of all, there was considerable regional variation in early twentieth-century NZE with regard to /hw-/, and residents in the Southland/Otago regions were most persistent in maintaining this feature. Second, variation and change involving /hw-/ was language-internally conditioned, both by lexical

and phonetic factors. And third, /hw-/ maintenance and loss correlated with extralinguistic factors, not only with regionality but also with age and gender. These points provide us with important information on consonant variation and change and are addressed in turn.

/hw-/ maintenance in NZE was subject to considerable *regional variation* in the first half of the twentieth century. Speakers from the North Island and Canterbury predominantly used /w/ and the /hw ~ w/ merger was very near to completion there. On the other hand, speakers from the Otago and Southland regions had much higher levels of /hw-/ throughout and continued to make the distinction. Only two speakers in the corpus used /w/ consistently, and the other 22 speakers used /hw-/ variably, ranging between 5 and 85 per cent (Figure 3.9). Whereas there was a trend for /hw-/ to decrease in the North Island and Otago areas (indeed, it may have died out in the North Island in the 1920s), this cluster was alive and well in Otago and Southland, and there was in fact little indication that it would be in danger of dying out at all.

The geolinguistic pattern is clear: the further south the dialect region, the higher the maintenance of /hw-/. This pattern was anticipated by earlier commentators, and there is historical evidence of regional variation in late nineteenth-century NZE. McBurney's reports (in Ellis 1889: 245) are in line with the data presented here, since he asserted that 'in Auckland [there is] few <wh->, general <w->; in Wellington <wh-> general for girls, <w-> general for boys; in Christchurch many <wh-> and some <w->; and in Dunedin <wh-> general for girls and many boys, with <w-> having some for boys'. McBurney's personal observations and the data presented here provide mutual support and attest to the historical stability and regional distribution of /hw-/ maintenance and differentiation in New Zealand in the early twentieth century. The observation that there existed regional varieties of NZE historically is certainly noteworthy, since contemporary NZE is commonly considered to be linguistically homogeneous (Kuiper and Bell 2000). Even though lay people claim they can tell or hear such differences, and despite the fact that many New Zealanders are convinced that there exist dialect areas (such as the South Island's West Coast or the Southland region: Bartlett 1992, 2003), there is very little, if any, linguistic evidence for regionally correlated variation in present-day NZE. In the words of Bauer (2000: 41):

> the English of New Zealand is more noted for its uniformity than for its regional dialects. For whatever reason (and this might be grounds for a great deal of speculation) the regional dialects of the immigrants

> have not obviously given rise to corresponding regional dialects in New Zealand, and certainly not in such a way that the regional dialects of New Zealand reflect directly . . . the regional dialects of Britain which might have been assumed to be the input varieties.

This may thus throw light on the development of NZE in the twentieth century.

The second point is that /hw-/ variation was language-internally conditioned, both by lexical and phonetic factors. Word type had an effect on /hw-/ realisation, in that content words have higher /hw-/ levels than function words, an effect which operates regardless of vitality of /hw-/ . This effect is very robust and all three regions strongly display an identical trend: content (open class) words > function (closed class) words. On the one hand, one can interpret this in terms of *iconicity*, which in cognitive linguistics refers to the conceived connection between form and meaning of a linguistic structure. More semantic content entails more phonological form (and vice versa), and this may provide additional support for the need to maintain such a distinction. On the other hand, the question arises as to whether this effect is primarily lexical or grammatical (namely in terms of open versus closed class membership of items containing /hw-/ clusters), or whether, alternatively, it is a reflection of stress patterns, that is, phonetic by nature. One could certainly make a case for prominence and stress as contributing factors, since content words are more likely to receive full stress and may thus be more likely to retain /hw-/ . Function words are unstressed and tend to be weaker/less prominent, and this could certainly be a contributing factor here.

Other language-internal criteria are of relevance as well, most notably the nature of the preceding and following phonetic segments. As for preceding segment effects, /hw-/ is less likely to be realised when preceded by a nasal, whereas pre-positioned fricatives and particularly affricates have an enhancing effect. The preceding segment hierarchy (affricates > fricatives > vowels > plosives > nasals) is a bit counter-intuitive, since one might expect preceding plosives with aspiration to enhance the rate of pre-aspiration in /hw-/ . Again, data from other varieties should be collected to test whether this ranking of constraints holds generally. Finally, the vowel that follows /hw-/ exerts an effect as well, in the following hierarchy (using Wells's 1982 lexical sets):

FLEECE > PRICE > KIT > SQUARE > LOT > DRESS
('wheel' > 'white, why' > 'witch, which' > 'where' > 'what' > 'when')

This ordering of following segment constraints is supported by the fact that Gordon *et al*. (2004) found an almost identical hierarchy. They examined language-internal constraints on /hw-/ production in nineteenth-century NZE, analysing a total of 59 speakers. The only difference in the two hierarchies concerns KIT and SQUARE, which are interchanged in Gordon *et al*. In other words, the hierarchy of following segment constraints shows considerable historical stability. This indicates that language-internal factors condition this feature and that there is a common hierarchy of internal constraints, not only in NZE but perhaps also elsewhere.

The third major finding concerns the extralinguistic correlate of /hw-/ maintenance and loss, namely the effects of regionality, age and gender of the speakers analysed. First, in terms of ancestral effects and regional input strength, we must bear in mind that NZE is essentially a mixed dialect; despite the fact that it bears a strong resemblance to south-eastern British English, it has its origins in processes of dialect contact and mixture (Bauer 1999). In the words of Trudgill *et al*. (2000: 302), it 'is the result . . . of a complex series of processes involving dialect contact between different British Isles varieties of English, followed by dialect mixture, new-dialect formation, and then by subsequent linguistic changes'. NZE, consequently, being a contact-derived variety rather than a transplanted form of English, bears resemblance with the donors from which it selected its features, and this allows us to attempt retracing its ancestry and reconstructing the mechanisms (and perhaps motivations) of feature selection that occurred during its formation and focusing stages. As for the /hw-/ cluster, the questions are why it was selected in the first place, why it was subject to regional variation and so much more robust in the south, and why it died out (or was in the process of dying out) in areas other than Otago and Southland.

One promising approach would be to link the maintenance and loss of /hw-/ to *levelling* processes, a prototypical by-product of new-dialect formation (Trudgill 1986; Siegel 1987; Britain 1997). Contact dialectology holds that several linguistic sub-mechanisms interact during the formation of a new contact-derived variety; levelling refers to the process through which, in an initially diffuse mixture situation, a single form stabilises and becomes normative at the expense of a majority of variants present in the original mixture situation. In other words, a candidate from the original pool of features is selected for general usage, whereas other alternatives are not adopted and disappear (see also Mufwene 2001). One of the first attempts to discuss the effects and

motivations of sociolinguistic levelling is Gambhir's (1981) analysis of new-dialect formation through contact in the East Indian speech community in Guyana. Gambhir (1981: 191) defines this mechanism as follows:

> As a result of continued contact . . . one gathers experience as to which idiosyncrasies of one's own dialect are ill-communicative, mis-communicative, or non-communicative, and accordingly, one starts to shed the hardened localisms in one's speech, allowing one's speech to conform to another's to an ever-growing extent.

The question is what factors trigger, govern, or influence such levelling processes. What linguistic, sociolinguistic and social criteria can be put forward to explain why features are adopted whereas others are abandoned? The /hw-/ data from New Zealand offer evidence that selection processes of this type are both linguistically and socially conditioned. Gambhir (1981) favours a functional approach, by suggesting that levelling is caused by factors such as ease of communication and mutual intelligibility of speakers ('ill-communicative, mis-communicative, or non-communicative' elements are most likely to disappear first). On the other hand, sheer proportions of input numbers enhance the selection chances of a given variant as well, and the surviving form is very often the one present in the majority of donor dialects (Siegel 1987; Mesthrie 1993). By the same token, regionally or socially *marked* variants are usually not maintained (Kerswill and Williams 2000; see also Trudgill 2004), unless they represent a majority variant, and those with the widest social and geographical distributions have the highest chances of surviving the selection process.

The case of /hw-/ adoption and maintenance in New Zealand offers strong evidence that under certain conditions, even strongly marked (or 'non-natural') features can survive the selection stage in early contact scenarios. As we saw above, /hw-/ is both regionally and stylistically marked in the British dialects that served as donors to NZE; *regionally*, inasmuch as it is strongly associated with Ireland, Scotland, and the English North-East (which, incidentally, did not represent a major contribution to NZE: Bauer 1999), and *stylistically*, as it features prominently in accents of English that have high social prestige (such as RP: Wells 1982). The data analysis revealed that /hw-/ was in the process of dying out in the North Island, a region which had a large contingent of settlers from south-eastern England and Australia (few of whom were likely to make such a contrast), and was characterised by ongoing population

movements. The New Zealand south, on the other hand, represents a different scenario, as it was primarily settled by Scottish and also some Irish colonisers (most of whom presumably distinguished between /w/ and /hw-/). Moreover, the Southland and Otago provinces were characterised by higher sociodemographic stability and comparatively intact settlements, particularly in the rural hinterlands.[10] What seems to be an influential criterion, then, apart from the obvious overall configuration of donor dialects and input density of speakers who maintain /hw-/, is the stability and historical continuity of settlement types. The far south was more stable than the North Island and this almost certainly had an enhancing effect on the stabilisation and maintenance of /hw-/.

The survival and stabilisation patterns of /hw-/ in NZE thus have a sociodemographic explanation, namely that the input of Scottish settlers in the Otago/Southland dialect region was disproportionally high and also that this area witnessed limited in- and out-migration. The Scottish legacy manifests itself in other features as well. Previous analyses based on the ONZE project (Trudgill *et al*. 2003; Gordon *et al*. 2004; Trudgill 2004) came to the conclusion that the earliest-born speakers in this region maintained a number of ScE features that were strikingly absent in regions dominated or more directly influenced by English colonisers. Historically attested forms of Scottish English in Otago include: higher levels of rhoticity (Bartlett 1992, 2003), a short front [æ] vowel in *dance*, *chance*, *plant*, etc. (Bartlett 2003; also found in AusE: Trudgill and Hannah 1994: 17), the Scottish vowel length rule (Aitken 1984), as a result of which *greed* and *agreed* do not rhyme, or an identical realisation of the vowels in FOOT and GOOSE, both realised [u] (Trudgill *et al*. 2003). None of these features was attested in the speech of New Zealanders born in Canterbury or in the North Island. It is unclear whether these features were present in the feature pool that characterised the earliest contact stage (for which there are unfortunately no records), or whether they were brought to New Zealand but not adopted by the first generations of native-born speakers. My own impression is that these (and maybe other) Scottish or Irish features were brought to New Zealand but did not survive the feature selection stage and died out, but it is of course impossible to verify this with the data available.

This strongly indicates that, at least historically, a Scottish founder effect (in terms of Mufwene 1996) was notable in Otago and Southland, and that ScE left an imprint in the earliest forms of a local accent in this area. The high overall presence of /hw-/ variants in the inputs thus had an enhancing effect on the adoption and maintenance of this feature

once the local accent stabilised and linguistic norms emerged. The usage of /hw-/ continued well into the 1920s and was in fact not in danger of disappearing at all (these data therefore confirm Bauer's assessment). On the other hand, /hw-/ disappeared in the other regions through the process of levelling, simply because it was a minority variant and the social set-up of these communities was different. More recent data from Bartlett (2003) suggest that the demise of /hw-/ in NZE has now also reached the Otago/Southland region. These recent developments legitimise speculations that /hw-/ is being lost in this region as well, presumably as a result of similar sociolinguistic and social factors as elsewhere. In combination with the obvious loss of the contrast throughout the rest of the country, population movements out of the Southland/Otago region, induced by economic decline and failing prosperity, and the recent arrival of New Zealanders from other parts of the country, some of whom moved to the region upon retirement, could have set up a new dialect contact situation where speakers who maintained the /hw ~ w/ contrast are now in a minority there. Thus, a new round of levelling was triggered off, as a result of which the contrast is currently being lost altogether.

A final point one should draw attention to concerns the role of social prestige in linguistic change, namely the effect of high social status on /hw-/ maintenance and loss. The data suggest that high social prestige is not a crucial factor in language change here (we recall that, according to Wells (1982: 228), /hw-/ 'is widely considered correct, careful, and beautiful', and that broadcasters are often advised to use it in order to convey a more authoritative voice: according to Bennett (1943: 83), 'all official radio announcers [in New Zealand] use it, and are encouraged to do so'). Notwithstanding the discrepancies in overall usage, it is striking that all three areas investigated display an identical pattern, namely that women have higher levels of /hw-/ realisation than men. The fact that women use comparatively more standard variants than men of a similar background is one of the central insights of gender-based sociolinguistics (according to Trudgill (2000: 62), this is 'the single most consistent finding to emerge from sociolinguistic studies over the last twenty years'), and /hw-/ maintenance in New Zealand makes no exception. What is striking, though, is that NZE displayed a trend of focusing on the low-prestige variant and that high-status /hw-/ was lost gradually in most parts of the country. Men consequently led the change, in that they had consistently lower levels of /hw-/, and women lagged behind in that they used more variants of a perceived high-status feature that was gradually disappearing. This is further corroborated by

differences in the speech of earlier- and later-born women (Figure 3.10). Whereas a gender-based difference was more prominent in New Zealanders born around 1900, it diminished with time and was in fact less strong for those born in the 1920s and later. The data thus indicate that women were in fact changing faster than men, and that they caught up in the later part of the period investigated. Overall, though, high status is irrelevant, as the prestigious /hw-/ usage decreases continually over the 45-year time span.

In sum, the New Zealand data indicate that contact of individual varieties plays a major role in phonotactic change. When the majority of varieties in contact have simple C, then a competing CC- cluster is levelled out (particularly in cases when the degree of distinction between two competing variants is small, when there are few minimal pairs, and so on). The role of contact is thus paramount: when analysing /hw-/ loss in contact conditions, it is crucial to take into account the sociodemographic proportions of groups of speakers who make a contrast between /hw-/ and /w-/ and those who do not. At the same time, cluster loss is accompanied by language-internal factors; we note that it is influenced by criteria related to the cluster's preceding and following phonetic segments as well as by sociolinguistic criteria, as a result of which cluster production is subject to regional, social and individual variation. In this sense, the conditioning of initial /hw-/ in New Zealand sheds important light on how the loss of related clusters (*/hl-/, */hn-/ and */hr-/) may have proceeded historically, and these insights contribute to the understanding of the general nature of phonotactic variation and change in English.

We now have discussed historical processes and data from changes that are recent (and still ongoing) and considered the interplay of linguistic, sociohistorical and sociolinguistic factors in phonotactic variation and change. The final scenario discussed in this context provides an additional perspective on consonant aphaeresis in English, namely in settings that involve extensive language contact and coexistence of linguistic systems with *distinct* phonotactic properties. Chapter 2 showed that most languages of the world have CV(C) syllable structures and that consonant clusters are typologically rare. The question, then, is simply how initial clusters are modified during extensive language contact, that is, when some of the languages have no initial clusters. Are there parallels between these scenarios and the historical and contemporary processes discussed? We will therefore end the analysis of initial CC reduction with a brief discussion of cluster reduction in Sranan, an English-based creole that developed in Suriname.

3.3 Initial cluster loss in language contact conditions

Contact involving English and languages with CV syllable structures typically entails heavy restructuring of the target language. Given the extensive contact history of English, a contact angle is of particular importance for historical changes that affected the phonotactic system and led to consonantal change. It is noteworthy that extensive initial cluster reduction is reported in contact-induced adaptation scenarios; Holm (1988: 109) notes that creole varieties, regardless of their lexifier languages, are characterised by a strong tendency to delete initial consonantal segments in CC(C)s, so that the output conforms to a CV syllable pattern, as in Sranan *tan* (CVC < English *stand*, CCVCC) and Negerhollands Creole Dutch *tomp* (CVCC < Dutch *stomp*[11] 'stamp' CCVCC).[12]

There are two main reasons why processes of intense language contact and creolisation are important for the investigation of initial cluster reduction. First, the processes at hand operate in ad hoc contact conditions and are therefore likely to occur at a faster rate than in native-speaker varieties; this is due to the fact that (1) contact has a catalysing effect on language change (Thomason and Kaufman 1988), and (2) the formation of creole varieties gives rise to dynamic innovation patterns, many of which originate due to influence of substratum features. Contact may thus speed up and demonstrate consonantal change more clearly. Second, creolisation displays phonotactic processes that are both similar and different to those discussed above, and the adaptation mechanisms that are adopted under such conditions are both more restricted and more general. This allows us to complement the findings offered so far and also to assess their relevance in distinct settings.

Of particular interest is the fact that some creole varieties display parallel strategies of initial cluster adaptation, modifying marked/unnatural syllable structures both through the deletion of existing and the insertion of additional segments (Holm 1988). The first process most likely reflects substratal influence of CV structures on the target. Phonotactic systems are thus directly transferred onto the target variety, which in turn derives and draws many of its distinctive properties from other languages present in the contact scenario. Phonotactically speaking, substrate syllable patterns are 'grafted' onto the target (as a result of incomplete mapping of structures; see below). Accordingly, a CCVCV (e.g., *story*) structure is adapted to a more common CVCV and restructured accordingly (for example, through deletion of C_1, as in Sranan /'tɔri/ 'story': Alber and Plag 2001). On the other hand, onset

clusters may also undergo adaptation when they are broken up via epenthesis (e.g., /siˈtɔn/ 'stone', in Cameroonian Pidgin English: Todd 1984). In both cases, the increase of initial cluster reduction and vowel insertion mechanisms is primarily a consequence of contact between different phonotactic systems with different syllable structure rules.

Language contact and phonotactic contact therefore provide an important additional perspective for cluster change, and the integration of such data completes the discussion of initial cluster reduction in English; consequently, after having considered evidence from historical change along with the sociolinguistic development and language-internal conditioning of cluster loss, we now turn to the discussion of phonotactic restructuring in English-derived creoles. The discussion is based on data from Sranan, which has a particularly high tendency to reduce initial clusters in initial, medial and final positions while also displaying additional phonotactic 'repair' mechanisms. This variety therefore not only allows us to investigate exactly how cluster reduction occurs, but it also throws light on the interplay and conditioning of alternative strategies. In the following, I will discuss results from initial cluster reduction in Sranan (adapted from Alber and Plag 2001) and then interpret them with reference to general phonotactic change.

The case of Sranan

Sranan is an English-based creole that developed in Suriname, on the north-eastern coast of South America, situated between French Guyana, Guyana and, to the south, Brazil. Suriname was colonised in the 1650s by British settlers, who arrived via St Kitts, Nevis and Barbados (Smith 1987) and brought with them a number of African slaves whose origins cannot be specified but who are thought to have been native speakers of Kikongo, Gbe and Twi (Adamson and Smith 1995). The English established sugar and tobacco plantations on the west bank of the Suriname River around 1650 and founded the settlement now known as Paramaribo. In 1667, however, the Dutch assumed full control of the colony as the British traded this possession off in exchange for what at the time was known as Nieuwe Amsterdam (now New York City); English influence came to a halt as few British settlers remained after the arrival of the Dutch. The Dutch took charge of the colony and subsequently imported indentured labourers from various places, mostly from the Dutch East Indies (now Indonesia), India, China, Portugal and Lebanon.

The linguistic consequences of this (bi)colonial history are (1) that Sranan, an English-based contact variety, developed within less than three decades, and (2) that the role of English as a role model was

virtually non-existent after the British colony ceased to exist in the late 1660s. Notwithstanding, more than three centuries after the withdrawal of English settlers Sranan is still widely spoken, despite the fact that Dutch is the official language and that there was extensive admixture from languages such as Dutch, Hindi, Javanese, Chinese, Djuka and Saramaccan (the latter two both English-based creoles). There are current estimates that about 60 per cent of the local population are native speakers of Sranan (Adamson and Smith 1995). The linguistic and colonial context that gave rise to Sranan is thus quite unusual and the persistent usage of the first colonising language is extraordinary. Several languages (and several phonotactic systems) came into long-standing contact, and the eventually emerging variety adopted properties from a number of structurally distinct inputs. How did this affect the development of Sranan phonotactics?

The question of importance here is the extent to which initial CV structures were transferred onto the English target and how advanced initial CCR is in Sranan. In fact, some clusters are much more resistant than others and a first impression is that Sranan has maintained a number of English #CC- and #CCC- sequences (Alber and Plag 2001), which certainly counters claims that creole varieties predominantly have CV syllable structure (for example, in Romaine 1988). A number of English onset clusters are never reduced in Sranan, most notably bisegmental ones consisting of combinations of sibilants and nasals, such as:

Engl /sm-/ (*sm*oke) > Srn /sm-/ (*sm*oko)

Engl /sn-/ (*sn*ake) > Srn /sn-/ (*sn*eki)

At the same time, other clusters are commonly modified through initial segment deletion. Crucially, though, this process is sensitive and does not apply to all clusters alike. For instance, Sranan has a strong tendency to reduce bi- or trisegmental onset clusters consisting of a #C /s-/ and a plosive through deletion of C_1 (i.e., /s-/). These deletion processes manifest themselves as follows (adapted from Alber and Plag 2001: 816):

bisegmental (#CC-):	Engl /sp-/ *sp*eak	>	Srn /p-/ *p*iki
	Engl /st-/ *st*and	>	Srn /t-/ *t*an
trisegmental (#CCC-):	Engl /str-/ *str*ong	>	Srn /tr-/ *tr*anga
	Engl /skr-/ *scr*ap	>	Srn /kr-/ *kr*asi

The generality of this process is complicated by the fact that initial cluster reduction is not categorical and that it does not apply to all lexical items that meet the requirements (that is, that have these initial clusters also); for instance, initial /sk-/ or /sp-/ are always retained in *skin* and *spit*. Phonotactic reduction in Sranan therefore appears to be at least in part lexically conditioned.

Notwithstanding, Sranan has a particularly high tendency to reduce onset clusters through deletion of the first segment. Alber and Plag (2001: 819) label this 'phonotactic optimisation' and address this process in the framework of Optimality Theory (OT), which is briefly summarised here since it is essential to their approach and a promising theoretical approach to consonantal variation and change. OT has been applied to a variety of linguistic subfields, most commonly to generative syntax and phonology. The basic tenet of OT is that linguistic units (such as sounds) are determined by the relative ranking of sets of (violable) constraints, which govern their application and positioning (Kager 1999). OT represents a framework for the transfer (or mapping) of one linguistic representation onto another, for example, transferring an underlying form into a surface form in generative syntax. The result is 'optimal' in the sense that it adheres to as many of the constraints as possible with respect to the constraints' relative weightings to each other (Prince and Smolensky 1993). The traditional approach was to construct a sequentially ordered set of rules, each of which transferred a representation into another. OT, on the other hand, posits that there are no intermediate steps during such transfer processes, but rather that there exists a set of ranked constraints that chooses the optimal output from a set of candidates. The presupposition for phonotactic adaptation in contact conditions is that English #CC- and #CCC- clusters are in competition with canonical CV syllable structures (for the very same lexical items). This discrepancy lies at the base of initial CCR in English-based creoles such as Sranan. In the words of Alber and Plag (2001: 823), 'while English allows for complex onsets consisting of a fricative and a plosive . . . Sranan has no complex onsets of this type. Instead, potential complex onsets are resolved through deletion . . . [but] It is not the case that Sranan prohibits complex onsets in general.'

One of the most important constraint rankings for co-occurring consonants is the *sonority principle* (see Chapter 2), which holds that the sonority values of segments ideally increase towards or away from the nucleus of the syllable, following a pyramid-type pattern. Some English clusters display optimal sonority hierarchies, whereas others do not. This, in an OT-based approach, is an important constraint for the

likelihood of adaptation and is essential in directing CC reduction mechanisms in English-based creoles. To illustrate this: the strongest ranking constraints that govern the set-up of a trisegmental /str-/ cluster are that the number of cluster segments and the order in which they occur are maintained. Accordingly, when mapping occurs, the sequential ordering of the various elements is ideally neither skipped (that is, there is no deletion) nor intruded (no epenthesis). If these factors are applied faithfully, then the eventual output is identical to the superstratal (base) output and the English model is successfully adopted in the creole (English *strong* = Sranan *strong*). If this happens, there is no interference or substratal influence but an accurate ('faithful') representation of the target structure. However, Alber and Plag (2001) provide ample evidence that this is not usually the case. There are considerable discrepancies in the phonotactic systems of English and Sranan. Consequently then, exactly how does 'unfaithful' mapping of phonotactic structures occur so that the constraint rankings are violated as little as possible?

In principle, there are three strategies to adapt initial clusters: (1) deletion of C_1; (2) deletion of C_2; or (3) epenthesis of a V segment: CC(C) to CVC(VC). Theoretically, the English /str-/ cluster, as in *strong*, could be modified in three ways:

1. Deletion of C_1: Engl *st*rong > Srn *t*ranga
2. Deletion of C_2: Engl *st*rong > Srn *s*ranga
3. V epenthesis: Engl *st*rong > Srn *sit*ranga

Options 2 and 3 are not selected in Sranan (**sranga*, **sitranga*), and Alber and Plag (2001: 824) suggest that option 1 is chosen as it 'copies faithfully the linear sequence of segments in the base [English]; segments that are contiguous in the base are also contiguous in the output [Sranan]'. They argue that OT criteria influence the application of strategies. The output is optimal in that it violates the lowest number of constraints; while modifying the base form, it displays a similar ranking in constraints. If we illustrate the application of deletion and epenthesis for the /str-/ cluster, then we have the following processes (✓ indicates that the requirements are met, * that they are not):

The conclusion is that both constraints are met *only* if option 1 is chosen (the remaining, 'non-deleted', segments form a contiguous sequence and there is no epenthesis to disrupt their sequential ordering). The 'damage', so to speak, is minimal if strategy 1 is adopted. In other words, even though base and output forms are not

	Option 1: Deletion of C_1	**Option 2:** Deletion of C_2	**Option 3:** V epenthesis
(English) base:	$s_1\ t_2\ r_3 \ldots$	$s_1\ t_2\ r_3 \ldots$	$s_1\ \ t_2\ r_3 \ldots$
(Sranan) output:	$Ø\ t_2\ r_3 \ldots$ (*tranga*)	$s_1\ Ø\ r_3 \ldots$ (*sranga*)	$s_1\ i\ t_2\ r_3 \ldots$ (*sitranga*)
Conditions:	no skip ✓	no skip*	no skip ✓
	no intrude ✓	no intrude ✓	no intrude*

identical in their surface forms, they adhere to the same OT constraint rankings.

Now that the application of constraint rankings is considered and that it is established that OT-based mapping processes of base and output operate independently of structural differences, the question arises as to how one can account for the remaining differences. If constraint rankings match in base and output, why should the respective forms not be identical also? Three criteria have to be taken into consideration: (1) the base norms provided by the superstrate English (a *superstratist* consideration); (2) the influence of substrate varieties present in the contact scenario (*substratist*); and (3) universal preference laws, encoded in universal syllable structure patterns (*universalist*). Quite obviously, the strength of superstratist factors is limited. English norms were not simply adopted in Sranan; even though the Sranan output forms share similarities with English base forms, substantial differences persist and there is no trend towards a perfect match or convergence of Sranan with English norms (for example, due to decreolisation). This strengthens the input of substratist and universalist criteria. Typological considerations are paramount here; CV is the most common and universally unmarked syllable structure, and this would favour a universalist motivation for the distinctive features as found in Sranan. On the other hand, a variety of substratal varieties that gave rise to Sranan (such as Gbe and Kikongo) have CV structures, but they also feature clusters formed in concordance with sonority principles. This strongly suggests that there is overlap between universalist and substratist criteria and that it is the combination of both that ultimately

accounts for the increase in initial cluster reduction and the subsequent persistence of reduced onsets in English creoles.

We conclude from this that Sranan has a strong trend to reduce initial clusters. On the other hand, this is not a categorical process and Sranan has retained a number of English clusters in intact form. Moreover, even the CCs that are reduced are subject to a set of strict conditions that govern their adaptation. How are we to interpret this with general principles of English phonotactics?

General implications for phonotactic development

The case of Sranan illustrates that creoles are particularly prone to phonotactic change. Moreover, the mechanisms attested here reveal two principal characteristics:

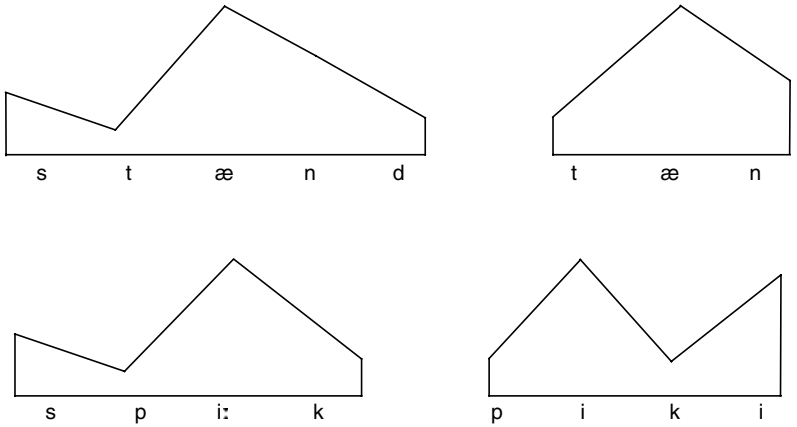
1. large-scale restructuring of target structures so that they fit into a CV pattern;
2. deletion of initial consonants so that the sonority hierarchy of the individual Cs is optimised and the SSP is maximally applied.

These points are particularly important in the light of theoretical criteria (Chapter 2) and the results of the case studies presented in sections 3.1 and 3.2.

Starting with general syllable preferences, the case of Sranan indicates that creoles display a strong tendency towards non-marked CV(C) syllable patterns. With this objective, a variety of mechanisms are at work to adapt target clusters with complex structures. Perhaps the most prominent is to graft a CV(C) syllable pattern (which has the advantage of being both substratally prominent and universal) directly onto the target and to subsequently modify the latter so that it does not violate OT principles. This reflects substratum and transfer effects (in this case, of Kikongo, Gbe, Twi and so on) and is evidence that phonotactic properties and syllable structures in substratal varieties have an advantage over the competing English forms (which is particularly interesting in view of the discussion on natural phonology and markedness in Chapter 2).

Modifications can occur in two ways: (1) initial consonants are deleted; (2) additional vowels are inserted (so that the output is not only a more regular CV but also open, ending in a vowel instead of a consonant – as a result, the output has two nuclei/loudness peaks instead of one and may in fact even become bisyllabic). These two processes can be illustrated by the modification of initial /st-/ to /t-/ in

Sranan (as in *stand*, which corresponds with Sranan *tan*) and /sp-/ to /p-/ (*speak*, Sranan *piki*).



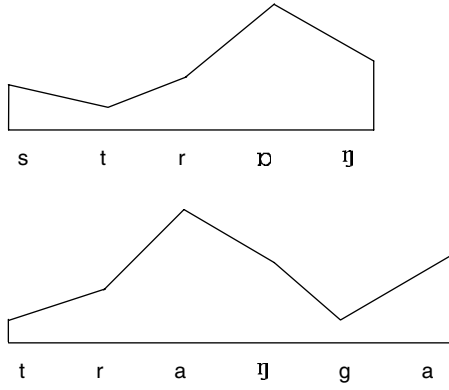
These cases represent true 'phonotactic optimisation' (in the words of Alber and Plag 2001: 812), since they reduce onset clusters and embed the English target into CVCV and CVC structures, adopted from the substrate(s). They are thus an excellent illustration of phonotactic language change in contact situations and highlight the outcome of interaction between distinct phonotactic systems.

However, and this leads to the second point, no English-based creole has a perfect CV syllable structure. Creoles adopt some of the English clusters even if, as in the case of Sranan, they have undergone heavy restructuring and have not had contact with the superstrate for centuries. Sranan heavily reduced some English clusters yet categorically retained bisegmental CCs such as /sm-/ or /sn-/ (and, in some lexical items, /sk-/ and /sp-/), which are *not* found in the substrates. Consequently, mapping procedures of substrate and superstrate structures are incomplete either way. Whereas there is (at times considerable) transfer of CV patterns and subsequent modification of target patterns, there is also partial adoption of complex, 'unnatural' superstrate structures. The question, then, is exactly which clusters are maintained, and why, and which clusters lose in complexity but are still maintained instead of undergoing reduction to a single C (which also manifests itself when trisegmental clusters are reduced to two segments). This second point is of particular relevance here.

SSP is a paramount criterion in Sranan as well; the historical analysis indicated that C_1 cluster segments were only deleted when they were less sonorous than the adjacent segment, which was closer to the

syllable nucleus: initial /k/ was lost from the */kn-/ cluster (where it is less sonorous than the following nasal) but it remained intact in clusters such as /skr-/ (where it is less sonorous than the preceding sibilant). Historical phonotactic change thus only affected the least sonorous segments (plosives and fricatives) placed at the periphery of the onset or coda. There is a striking difference in English-based creoles: cluster-onset segments can be deleted regardless of whether they meet sonority criteria or not. In other words, an onset consonant can even be deleted when it is *more* sonorous than the subsequent cluster segment. In a sense, creoles adhere to the SSP to a larger extent than British varieties do/did, so much in fact that they optimise clusters whose sonority hierarchy is violated in the superstrate target. Accordingly, it is noteworthy that Sranan prefers initial onset clusters that are well-formed in terms of sonority: 'it is only the [English] syllables violating the SSP, and not other onset clusters, that are simplified in Sranan' (Alber and Plag 2001: 830).

This is illustrated by the case of *strong*, which corresponds with Sranan *tranga*. We saw in Chapter 2 that the initial /str-/ cluster is ill-formed due to the decrease in sonority from C_1 to C_2. Sranan 'fixes' this by deleting the sibilant so that the plosive comes to be placed at the syllable periphery. The first loudness peak is therefore deleted and sonority subsequently increases toward the nucleus. In other words, creoles maintain some extent of phonotactic complexity (an initial cluster remains, after all), while at the same time optimising the cluster's sonority structure. This process can be illustrated as follows.



The initial /tr-/ cluster in Sranan adheres to the SSP perfectly, and we conclude from this that English-based creoles, as exemplified by Sranan, have generalised deletion mechanisms of initial cluster segments so

that the remaining CC displays a perfect sonority hierarchy. The prominence of this trend appears to have no parallels in English varieties without histories of contact and creolisation.

In sum, the case of Sranan illustrates that several processes operate in creolisation. First of all, it is remarkable that not even basilectal creoles with restricted contact with English have undergone complete restructuring to CV syllable types. Despite a complex language contact history and input from languages with CV structures, Sranan still permits initial clusters that were adopted from superstrate (that is, BrE) norms. It is thus virtually impossible for English-derived creoles to have canonical and universally unmarked CV syllables, notwithstanding the typological advantage of this type (that is, more common, unmarked). On the other hand, the case of Sranan also indicates substantial substrate influence, as a result of which the permissible consonant sequences in English were adapted. Some clusters remained unchanged in base and output (such as the combination of sibilants and nasals /sm-/), whereas other clusters were restructured both through consonantal deletion and vowel epenthesis. These strategies are not random; as /str-/ modification patterns show, they conform to constraint rankings (such as the maintenance of sequential orderings and no breaking up through insertion of elements) and often display more rigorous SSP principles than those found in the superstrate.

As a result, Sranan reduces /str-/ to /tr-/ not because /sr-/ clusters do not exist (as evidenced by the onset cluster in the name of this variety) but because the cluster's sonority hierarchy is optimised this way (or in OT terms, because the lowest number of constraint rankings are violated). This is another piece of evidence for substratal phonotactic influence and the preference for universal structures in contact conditions, and represents an important difference to the conditioning of similar processes in English varieties that have not undergone consonant deletion as a result of contact and creolisation.

3.4 Conclusion

This chapter has looked into initial cluster reduction from various angles. The historical analysis illustrated the temporal dimension, that is, the origins and length, of initial clusters lost through reduction and eventual mergers, the study on /hw-/ maintenance and loss in NZE identified language-internal conditioning and some sociolinguistic correlates as well as the general development of clusters in contact, and the last section showed that initial cluster reduction intensified and was more widespread in language contact, particularly when substrate CV

syllable structures are 'grafted' onto the target. What general conclusions can we make for consonantal variation and change in general?

Addressing historical cluster loss first, the two most striking characteristics relate to the total length and the direction of these processes. First of all, initial CCR in earlier British English adhered to the most common patterns of linguistic change (that is, an S-curve trajectory). The traditional variant coexisted for a lengthy period of time with the innovative competitor, which increased in frequency and finally ousted the older one. These processes were demonstrated in the case study of <wl- ~ w-> spelling alternations in ME and Early ModE. Between the first attestation of innovative forms and the final disappearance of the established traditional variant lies a period of several centuries, so that initial cluster reduction is a gradual process, operating via several stages and involving the successive weakening of the initial segment. Moreover, diachronic cluster loss adhered to sonority principles. In historical language change, initial clusters only underwent reduction through weakening and loss of the first segment, and this operated on condition that sonority increased towards the syllable peak, or in other words that the first (and ultimately deleted) cluster segment was less sonorous than the second one. The sonority principle holds for all initial clusters lost, and Figure 3.13 suggests that initial cluster reduction in earlier British English only had the effect of reducing the first (and thus less sonorous) segment of the cluster.

Cluster	C_1	C_2	Outcome
*/hn-/	Fricative/ approximant	Nasal	Deletion of *Segment 1*
*/hl-/	Fricative/ approximant	Nasal	
*/hr-/	Fricative/ approximant	Nasal	
*/fn-/	Fricative	Nasal	
*/wl-/	Approximant	Nasal	
*/wr-/	Fricative	Trill/ Approximant	
*/kn-/(*/tn-/)	Plosive	Nasal	
/gn-/ (/dn-/)	Plosive	Nasal	

Figure 3.13 Phonetic characteristics of lost clusters

Second, section 3.2 looked into the development of the /hw-/ cluster, 'the last of its kind'. The patterning of variation and change of /hw-/ in the Southland/Otago regions of New Zealand indicated that the maintenance and loss of this feature reflected levelling processes during the new-dialect formation process of a local variety. The comparative analysis of /hw-/ distribution in three areas threw light on the overall levels of this feature in the input varieties, and confirmed Bauer's (1999: 297) contention that //hw-/ maintenance was 'healthy in some parts of New Zealand well into the 1960s'. Moreover, the areas where the cluster was maintained coincided with those settlements that had a disproportionately high influx of Scottish (and by implication: /hw-/-ful) settlers. This suggested that the development of clusters is by and large conditioned by factors related to population demographics and settlement type, as well as by ancestral effects and a putative minority/majority status of the /hw-/ variant in the overall configuration of donor varieties. This indicates the necessity to investigate the feature pool from which a contact-derived variety selects its features. We also found that initial cluster loss was sociolinguistically conditioned and that it correlated with gender-based usage. New Zealand men were in the vanguard of change, as they led the general trend towards /hw-/ loss, at least in Canterbury and in the North Island during the 1896–1935 period investigated. The fact that this variant carries high social prestige obviously did not have an enhancing effect on its survival rate, and women, who were found to have higher levels of high-prestige /hw-/ throughout, subsequently increased their usage of low-prestige /w/. High social status was therefore irrelevant in this case, not only in New Zealand, but quite possibly also in other varieties of English, both synchronically and diachronically. If /hw-/ was subject to regional, social and gender-based differentiation, then the same may have applied to */hl-/, */hn-/ and */hr-/ as well.

Another important insight is that initial cluster reduction is/was conditioned by linguistic factors. Internal constraints, such as phonetic environments and lexical status (or suprasegmental factors such as stress), are found to affect and condition the frequency of initial cluster realisation. It is certainly debatable to what extent the New Zealand findings can be extrapolated to explain historical processes in England, and these findings should be complemented with similar studies on /hw-/ in ScE or AmE, but the fact that language-internal effects operated in this case strongly suggests that /hw-/ maintenance and loss in English is (and was) both a socially and linguistically conditioned process. If one agrees to apply the findings on /hw-/ development in NZE to similar

processes elsewhere, then it is certainly plausible to argue that language-external and sociolinguistic factors were crucial in the trajectory of */wr-/ to /r-/ or */kn-/ to /n-/ (via */tn-/) as well.

The last scenario investigated concerned language contact and creolisation. The case of Sranan indicated that initial CCs are more readily reduced under contact conditions that involve languages with distinct phonotactic systems, and that this process is most advanced when varieties present in the contact scenario have CV syllable structures. Initial cluster reduction is thus more frequent in English-based creoles than it is in native-speaker varieties without recent influence from other languages. Moreover, the reduction mechanisms enhance sonority principles, often optimising superstrate clusters that are ill-formed in terms of their sonority hierarchy. I interpret this as evidence that sonority-related criteria are more important in creoles. Otherwise we would be at odds to explain why creoles reduce an initial (and more sonorous) sibilant and maintain a following (less sonorous) plosive, placing it at the syllable periphery. Whereas native-speaker varieties and creoles share a resemblance in that clusters at the syllable periphery are deleted (that is, the cluster segment furthest way from the nucleus is the one to go when initial cluster loss occurs), adherence to SSP is more prominent in contact-derived varieties so that the phonotactic output is optimised. (This has parallels with the homorganic voicing constraints on the reduction of word-final clusters, which are the subject of the next chapter.)

Having investigated several facets of word-initial cluster reduction in English, I now go on to discuss the development of syllable-coda and word-final clusters, with focus on exactly what linguistic criteria condition their variable reduction, and what language-external factors enhance it. The question is whether one can extrapolate the findings from this chapter and identify a similar set of principles in other manifestations of consonantal variation and change. What is the role of contact-induced modification processes in word-final environments? Is there a similar causality and motivation for cluster reduction, and what language-internal constraints can we identify? It is to these questions that we turn now.

4
Final Cluster Reduction in English

We now turn to a discussion of consonantal variation and change in syllable-coda or word-final clusters. One of the aims of this study is the investigation of whether a set of principles underlies English CCR generally and whether it is possible to identify common phonotactic processes that operate regardless of the positioning of CCs within a syllable. With these objectives, the study of consonantal variation and change in this environment provides an additional perspective to the processes discussed in the previous chapter. At the same time, clusters display important differences in word-initial and -final contexts, which is a function of their positioning and a major influencing factor on the rate and trajectory of this process. Consequently, before we begin with quantitative analyses of final CCR in English around the world, we outline the differences and some major implications of cluster environment.

Initial and final CCs in English vary for three main reasons. First, they vary in length: final clusters may incorporate up to four consonantal segments (e.g., /-mbld/ *gambled*), whereas only a maximum of three may co-occur in initial position (/spr-/ *spray*). Second, English CCs vary in their structural set-up and functional configuration; whereas they are mostly patterned in line with sonority hierarchies and syllable structure theory (though sometimes violating the SSP: Chapter 2), initial clusters are more rigorously formed (in case of trisegmental CCC- clusters, for instance, the first element is always a sibilant). Third, and most importantly, initial and final CCs vary as to whether individual cluster segments may carry morphological meaning or not. For instance, individual segments in initial clusters, such as /h/ or /w/ in /hw-/ or /s/, /p/ and /r/ in /spr-/, do *not* encode morphological information themselves. This is different in the case of word-final

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clusters, where final /-s/ or /-t/ may represent cluster-incorporated morphemes in their own right and thus carry morphosyntactic information on plurality or tense. A variety of word-final clusters, such as /-ts/ in *cats*, or /-bd/ in *grabbed*, therefore originate in suffixation, or more precisely: in co-occurrence of one or several final consonant(s) and an affixed morpheme, consisting of a single consonant. This is a particularly important factor and the morphological status of individual CC segments strongly influences the frequency with which clusters are (variably) reduced.

Chapter 4 is subdivided into three sections, all of which address the complex nature of context-sensitivity and language-internal constraints as well as the interplay of external histories and internal developments in word-final CCR. First, we revisit the process of cluster-final stop deletion in more detail, going into typological, structural and methodological criteria and discussing environment and resyllabification effects and their relevance for data selection and evaluation. The remainder of the chapter is split into two parts. Section 4.2 analyses final CCR in four varieties that were researched for this study specifically. It highlights the criteria based on which the varieties were selected and outlines data extraction procedures and their methodological and theoretical implications, ending with an analysis and comparison of the findings. The four scenarios, two from New Zealand and two from the South Atlantic Ocean, were selected for this study as they represent two sets of varieties that are closely related. Consequently, they provide insights from dialect contact conditions and new-dialect formation as well as from language contact and subsequent creolisation. These analyses thus highlight the complex dimension of CCR evolution in distinct settings and attest to the value of this variable for historical and contact linguistics. The case studies illustrate how phonotactic transfer depends on the nature of linguistic contact and yield insights into genetic relationships between individual varieties.

A second part goes on to integrate some additional evidence of CCR in a total of 12 Englishes, spoken in diverse linguistic backgrounds on five continents, with different historical origins and time depths. In combination with the New Zealand and South Atlantic data, the material compiled and compared in section 4.3 provides the most extensive discussion of phonotactic variation and change in English around the world to date. The respective varieties are loosely ordered by the chronology of English expansion around the world (somewhat following Kachru's 1985 model of *inner*, *outer* and *expanding* circles of English and its status as a *native*, *second* or *foreign* language: Crystal

1995). This allows us to highlight how factors such as historical development, institutionalised status and current usage affect the rate of CCR as English diversifies and expands. The 12 varieties are discussed and compared in view of their social histories and sociolinguistic contexts (mono-, bi- or multilingual), with special reference as to how the historical dimension (that is, for how long English has been spoken) affects the development of CCR. The native-speaker varieties, from the United States and the British Isles, have centuries of nativisation and no notable substratal influence and/or recent contact with other languages. These data thus serve as a benchmark for a comparison of CCR development in a variety of contact settings, involving English and languages as diverse as Maori, Spanish, Vietnamese, Hindi or Korean, most of which have differing phonotactic systems and do not admit clusters in their syllable structures. Furthermore, CCR is also discussed in stable bilingual communities (Hispanic English in the United States), early stages of language contact and shift (in Vietnamese immigrants in the United States), and varieties of English as a Second (ESL) and as a Foreign Language (EFL) in India and Korea. Of special interest here is the transfer of phonotactic structures and the social conditioning of linguistic accommodation and language shift, that is, to what extent CCR is a socially diagnostic variable. Attention also focuses on how non-native speakers use other strategies to avoid (or 'repair') unfamiliar phonotactic structures in the target language, and how (and why) alternative mechanisms such as epenthesis or prothesis coexist with CCR. One question is whether CC modification strategies in EFL varieties differ from those found in native or ESL varieties; I will argue that this is an important indicator for differentiation and diversification processes as English spreads around the globe and acquires new speakers upon nativisation. The conclusion (section 4.3), finally, summarises the findings from the analytical section and discusses them in the light of the observations made in Chapter 2 and section 4.1. The three main points addressed are:

1. To what extent is this variable indicative of language contact and transfer of phonotactic structures?
2. How do global levels of word-final CCR represent (qualitative and quantitative) differences in English varieties? How is variation governed by language-internal constraints?
3. How does the status and history of English affect word-final CCR, and how (and under what circumstances) are alternative strategies used so as to avoid unfamiliar phonotactic structures?

This chapter thus approaches final CCR from various angles, complementing and at times challenging some general assumptions held. It contributes to determine the factors that foster cluster reduction and allows a comparative investigation of historical and synchronic aspects that operate in phonotactic variation and change.

4.1 A typology of consonant cluster reduction in English, revisited

Chapter 2 discussed phonotactics as a function of syllable structure theory. CCR was constrained by sonority values of the individual cluster segments, and this turned out to be an important factor in English-based creoles also. Sonority is now addressed with reference to final clusters, namely when we investigate the sequential ordering of a cluster and the sonority values of the individual segments in this environment. We begin with a brief discussion of the clusters that are and those that are not reduced, followed by a more detailed description of language-internal constraints. We then consider some typological and methodological issues that affect the evaluation and discussion of word-final CCR in English around the world. Taking up the discussion in Chapter 2, the linguistic constraints that operate on final stop deletion are examined in more detail, with focus on exactly what criteria make clusters 'reducible' (voicing constraint, cluster length, resyllabification and so on). It is also necessary to look into methodological considerations caused by the extraction and analysis of data collected for this study.

On the 'reducibility' of clusters: some taxonomic criteria

Crucially, cluster-final stop deletion is a variable process that does not apply to all clusters alike; whereas some clusters are particularly susceptible to reduction, others are more resistant and others again are never reduced, regardless of phonetic, morphosyntactic or sociopsychological considerations. This means that a CC's potential for reduction depends on a set of language-internal criteria and that a side-by-side analysis of clusters that can and clusters that cannot be reduced represents an important taxonomic step toward the identification of such parameters. Wolfram and Fasold (1974) were among the first to recognise this and suggested a basic list of clusters that may undergo final stop deletion (Table 4.1).

Wolfram and Fasold (1974) list the individual candidates by cluster type. They recognised the importance of cluster status and distinguished

Table 4.1 A first taxonomy of final clusters subject to CCR

Cluster	Monomorphemic	Bimorphemic
/st/	test, post, list	missed, messed, dressed
/sp/	wasp, clasp, grasp	
/sk/	desk, risk, mask	
/ʃt/		finished, latched, cashed
/zd/		raised, composed, amazed
/zd/		judged, charged, forged
/ft/	left, craft, cleft	laughed, stuffed, roughed
/vd/		loved, lived, moved
/nd/	mind, find, mound	rained, fanned, canned
/md/		named, foamed, rammed
/ld/	cold, wild, old	called, smelled, killed
/pt/	apt, adept, inept	mapped, stopped, clapped
/kt/	act, contact, expect	looked, cooked, cracked

Source: Adapted from Wolfram and Fasold 1974: 130.

between monomorphemic and bimorphemic types, with some clusters being represented in both categories and others in only one. This list has been adopted for a number of analyses of CCR in English varieties in North America and the Caribbean, most notably by Wolfram's associates (Childs 2000; Torbert 2001; Childs *et al*. 2003). Nevertheless, while this taxonomy is certainly helpful, one should also point out it does not give due consideration to several criteria that turned out to be of importance elsewhere. These criteria include the exhaustiveness of candidates listed, the question whether clusters ending in different stops can be compared *sensu stricto*, and also the effect of length on the overall reduction rate of clusters. These questions are of methodological and theoretical relevance and are addressed in turn.

With regard to the first point, Wolfram and Fasold (1974) only provide the final two segments of clusters and do not state whether the cluster is necessarily bisegmental, or whether it can include more consonants. Final /-ld/, for instance, may be bisegmental, *called*; on the other hand, it may be part of a trisegmental cluster, /-kld/ *buckled*, or a four-segmental one, as in /-ndld/ *fondled*. Wolfram and Fasold's list thus fails to take into account that the total length of a cluster may affect the rate of final-stop deletion. This was first noted by Guy (1980: 9), who suggested that trisegmental clusters were likely to have higher CCR rates than bisegmental ones[1] and quantitatively confirmed in Santa Ana's (1996) study of Chicano English.

Second, Wolfram and Fasold's (1974) list does not include clusters that have been reported to undergo reduction in related studies. The most notable of these missing candidates is monomorphemic /-nt/, as in *dent* [dɛnt] or *mount* [maʊnt]. Wolfram and Fasold (1974: 130) suggested that CCR is conditioned by a *voicing constraint*: 'the reduction rule only operates when the second member is a stop consonant . . . and only when both members of the cluster are either voiced or voiceless'. Accordingly, they argue that clusters consisting of voiced and unvoiced segments are never reduced. This view has been criticised, for instance in Bell (1977: 324, quoted in Holmes and Bell 1994: 57), who analysed CCR in NZE and argued that this classification is 'indefensible, since the very common cluster /-nt/ reduces in the same manner and at the same frequency as other clusters'. Other researchers have followed Bell and included /-nt/ in their analyses. This either suggests that the voicing constraint is not as strong as originally postulated (so that this particular cluster represents an exception), or, from a different perspective, that it simply does not apply to this cluster, most plausibly as a result of /t/ flapping and voicing in American English (Wells 1982: 248–9) and other varieties.

A third point of methodological and theoretical relevance concerns the nature of the cluster-final plosive. Do differences in final plosives affect the reduction rates of clusters (or, put differently, is a /-sk/ in *cask* more/less likely to be reduced than /-st/ in *cast*)? Wolfram and Fasold (1974) argue that this is not the case and include candidates with different cluster-final segments, counting all syllable-coda clusters that end in a plosive (not only final /t/ or /d/ but also clusters ending in /-p/ *wasp*, or /-k/ *desk*). Fasold (1972: 58ff.) elaborated his argument with a complex discussion of factors such as phonological structure, linguistic constraint effects and homogeneous voicing. Wolfram and Fasold argued that all these clusters could be analysed on a par, and this approach was adopted not only in early work (Wolfram 1969, 1974; Fasold 1972) but also by many of Wolfram's associates who have worked on this variable in the meantime. The following quote, taken from a recent study on Bahamian English, attests to this:

> There is virtual consensus about the observed facts: syllables that end in a stop and share voicing (i.e. both consonants are voiced or voiceless) may variably delete the final segment of the cluster. As a result, most analyses have agreed that syllable-coda consonant clusters ending in [t], [d], [k] or [p] may be reduced. (Childs *et al.* 2003: 11)

On the other hand, a number of researchers postulate that one should not compare clusters that end in plosives with distinct places of articulation. Following Labov *et al.* (1968) and Labov (1972a), researchers such as Guy (1980), Patrick (1991), Bayley (1995), Santa Ana (1992, 1996), Guy and Boberg (1997) and Tagliamonte and Temple (2005 forthcoming) only analyse clusters that end in alveolar plosives /t/ or /d/, a process commonly referred to as 'coronal stop deletion' or, most commonly, as *-t/-d deletion*. They exclude cases of cluster-final /k/ or /p/ and argue that they cannot be compared with cases of final /t/ deletion for a number of reasons. Most importantly, they point to the fact that these clusters are morphemically different as there are no bimorphemic clusters ending in the plosives /-p/ or /-k/; a CC-final /-t/ segment in a /-kt/ cluster may represent either an *-ed* tense suffix, as in *walked* [wɔkt] or a simple plosive, as in monomorphemic *act* [ækt]. The morphemic status of final plosives is one of the most important constraints on cluster reduction, and it is methodologically and theoretically significant that clusters ending in bilabial and velar plosives represent monomorphemic clusters only. This is an important issue for the nature of language-internal constraints, and it is to these that we turn now.

Language-internal constraints

It is not only important to identify exactly which English clusters may undergo CCR, but also exactly how and where this process occurs and what language-internal factors influence it. There is general consensus that CCR involves the interplay of various factors, by nature *linguistic* (environment- or status-related) and *sociolinguistic* (ethnic, social background of speakers, stylistic dimension and so on). Table 4.2 (adapted from Guy 1991a and Wolfram and Thomas 2002) generalises these findings and lists some of the most important factors that condition CCR variability in English.

The major constraints (following environment and morphological status) are not discussed here as they were already dealt with by means of an introduction in Chapter 2. There we noted that not all constraints are equally strong and that English CCR was conditioned by other factors as well. Though comparatively minor, these constraints indicate affinities and differences in related varieties while illustrating the complex development of CCR in contact conditions and the evolution of specific characteristics. These factors (though generally considered weaker) yield additional insights into phonotactic variation and change; they complement and contextualise the major constraints and are now discussed in more detail.

Table 4.2 Major constraints on final CCR in American and British English

Phonetic (environment-related)	*Preceding environment* *nasal* > *lateral* > *sibilant* > *plosive* ([wɪn] 'wind' > [waɪl] 'wild' > [wɛs] 'west' > [æk] 'act') *Following environment* *consonant* > *pause* > *vowel* ([bɛs kɪd] 'best kid' > [bɛs] 'best' > [bɛs æt] 'best at' *Stress* [– stress] > [+ stress] (['kɒntɹæk] 'contract' (noun) > [kən 'tɹæk] 'contract' (verb)
Morphosyntactic (cluster status-related)	*Status of cluster (segments)* *monomorphemic* > *redundant bimorphemic* > *bimorphemic* ([gɛs] 'guest' > [slɛp] 'slept' > [gɛs] 'guessed')
Social/psychological (speaker-related)	Lower social class > higher social class Casual style > formal style Language-contact derived > dialect-contact derived

Sources: Adapted from Guy 1991a; Wolfram and Thomas 2002: 134.

We first address the effect of *preceding segments*, that is, the conditioning influence of the phonetic segment that immediately precedes the cluster-final stop. Though minor, this effect is perhaps more diagnostic than others and there is general consensus (a) that the phonetic nature of the immediately preceding segment has an influence on the rate of CCR, and (b) that sonority is a prevalent criterion in the application of this variable rule. Sonority is an important factor here since CCR is to some extent conditioned by the sonority value of a preceding segment. The trend in AmE/BrE is that less sonorous environments (stops and fricatives) tend to inhibit deletion rates whereas more sonorous contexts (such as nasals and liquids) have a favouring effect on CCR. The frequency of reduction is thus higher in clusters whose C_1 is a liquid (*old*) or nasal (*find*) and less frequent when it is an /s/ (*fast*) or plosive (*act*; see Table 4.2). How can this effect be explained? Guy and Boberg (1997) suggest that it be approached with reference to the Obligatory Contour Principle (OCP), as outlined by McCarthy (1986) and Yip (1988). In autosegmental phonology, the OCP prohibits the adjacent positioning of identical segments and features (discussion in Nycz 2003). Guy and Boberg's OCP analysis of final -t/-d deletion in Philadelphia English rests on the assumption that the more features that are shared by the Cs in a cluster, the more likely it is that the final plosive is deleted. The relevant features are those which define the

realisation of alveolar stops (place and manner of articulation), namely [–cont(inuous)], [+cor(onal)] and [–son(orant)]. Cluster segments that share two of these features (for instance sibilants ([+cont, +cor, –son]), stops ([–cont, –cor, –son]), or /n/ ([–cont, +cor, +son]), are more likely to have a reducing effect on the following alveolar plosive than those sharing only one, or none, of these features (for example, laterals ([+cont, +cor, +son]), non-sibilant fricatives ([+cont, –cor, –son]), or /m, ŋ/ ([–cont, –cor, +son]). There may be a set of general constraints at work as an OCP-based reduction hierarchy of clusters is consistent with the general classification as outlined by Labov (1989), with the exception of the ordering of sibilant and non-sibilant fricatives.

Moreover, there is evidence that the preceding segment effect is particularly diagnostic and researchers such as Bayley (1995) and Santa Ana (1996) suggest that it is a particularly reliable indicator of linguistic distinctiveness. They find that the strength of this particular conditioning factor varies between individual varieties and that it is particularly strong in Hispanic varieties of English in the south-western USA. Bayley's (1995) study of Tejano English in Texas and Santa Ana's (1996) research on Chicano English in four Los Angeles barrios reach the identical conclusion that preceding segment constraints are as strong (and statistically significant) as those exerted by morphological status and following environment elsewhere. Furthermore, the fact that Bayley (1995) reports that the preceding segment is by far the strongest linguistic effect in the 26–44-year-old age group of Tejano speakers analysed suggests that Chicano English in the USA may be in the process of strengthening this effect (and, by implication, perhaps even that it may be in the process of diverging from other varieties).

Another factor that could influence CCR is the cluster's potential for *resyllabification*, or, put differently, whether a cluster-final plosive can resyllabify onto a following consonant or not. This constraint operates on the assumption that following environment effects are not only based on co-articulation and context-sensitive assimilation but also on whether the cluster-final stop can combine with the subsequent (consonantal) segment(s) so as to form a (well-formed) syllable onset across morpheme boundaries. Guy (1991b) looked into constraints exerted by different types of following consonants and found that a following liquid /l/ aligned with the reduction rates of plosives by favouring CCR much more than other segments. This suggests that a segment's potential for resyllabification across morpheme boundaries does influence CCR indeed and that the potential of a syllable-coda consonant to resyllabify onto the following

syllable (CVCC#CV > CVC#CCV, or CVCC#VC > CVC#CVC) is an important criterion. By means of illustration, both /tr-/ and /dr-/ are acceptable syllable onsets and formed in compliance with the phonotactic rules of English. This means that a CC-final /t/, as in *went*, has the potential to resyllabify onto the onset like /r/ in *round*, which, according to Guy (1991b), makes it less likely to undergo deletion. In contrast, a /t/ followed by an onset lateral /l/, as in *line*, is much more likely to be reduced as resyllabification is blocked by a phonotactically ill-formed and unacceptable */tl-/ onset cluster. As a result, a final /t/ in 'she *went right*' is more likely to be realised in full than one in *drift line*.

However, Labov (1997) questions the validity of this claim by demonstrating that a resyllabification approach causes methodological and analytical problems; he found that the potential for resyllabification across morpheme boundaries was not consistent with general constraint hierarchies, pointing to the fact that potentially important criteria such as the phonetic quality of individual cluster segments had an effect as well. Labov points out that, whereas the phonetic realisation of alveolar plosives as palatal [ʈ, ɖ] reflexes never occur word-initially in English, these frequently occur in other environments, most importantly in word-final position. This, he argues, affects the deletion of cluster-final plosives. When alveolar plosives were fully realised and followed by /r/, they were not phonetically similar to the [ʈɹ] combination of these two segments in other positions or in monomorphemic items, such as in *train*. Labov (1997) also found that the phonetic properties of a fully realised prevocalic /d/ (for example, as a final segment in CCs) differed from those of prevocalic /d/ in word-initial position. Whereas the potential for resyllabification is thus recognised as a possible constraint for CCR in English, its exact effects and implications are still under discussion.

To conclude, cluster-final stop deletion is extremely sensitive and conditioned by a set of general parameters which vary in strength. The strongest constraints, that is, those related to morphemic status and the nature of the following segment (vowels, pauses and consonants), are practically universals of English CCR. On the other hand, the minor criteria that govern the variability of this process, for example, the preceding segment or the potential for resyllabification, may be particularly insightful since they are more specific and set varieties apart more distinctly (for example, as found in recent developments in Chicano English). Consequently, the interplay of all these criteria accounts for the complexity of English CCR and has to be integrated

into a general comparative approach to consonantal variation and change in English around the world.

Having outlined the constraints on English CCR, the question is which of these should be integrated as research parameters here. The selection of criteria depended to a large part on those chosen in related research (see section 4.3), that is, which of them are most relevant for the present objectives and also how the parameters adopted here should be compared with additional material. It is clearly necessary to address the methodological and theoretical implications involved for an integration of all these factors. Considering all these conditioning criteria *quantitatively* requires huge amounts of data, and this heavily influences data selection and analysis. We will see below that many researchers work on small databases and restrict their analyses to few constraints only (usually the major ones: following segment and morphemic status). As a consequence, not all of the contributing factors have received equal attention in the literature. Moreover, great care has to be taken to compare studies as there exists no set of data selection and extraction criteria that is generally agreed on and applied. This concerns, for instance, the total number of tokens, the clusters to be analysed, or whether there should be broad or fine-grained classifications of preceding and following segments. This considerably complicates the analysis of CCR across varieties.

All studies I considered investigate at least the two major effects. However, some studies completely ignore preceding segment effects; by the same token, the impact of a following environment is not always clear since some studies fail to report following pause effects (focusing on vowels and consonants only). Not all studies are detailed in their phonetic subclassifications of environments.[2] To make matters worse, a conditioning factor is very often discussed in a case study of one variety only, without reference to others, and an integrative perspective which would allow for a comparative analysis of several varieties is lacking in many research reports (this particularly affects resyllabification and preceding segment effects). As a consequence, a global look at CCR in English around the world is hindered by the fact that very few constraints are analysed and presented so as to be integrated into a general framework.

It goes without saying that an in-depth analysis of CCR as a general feature of English is hampered by such inconsistencies. Consequently, I decided to work around this problem by splitting the analysis into two parts. The first one presents data from four varieties that can be compared because an identical set of extraction parameters was applied

for each. The four varieties were selected so as to provide insights into both specific and general characteristics of CCR. The methodological criteria used for this analysis are outlined in detail, with focus on data extraction criteria and their implications, and the findings from the four varieties are compared with reference to internal and external conditioning factors. Moreover, in a second part, I discuss final CCR on the basis of additional data to widen the scope of the analysis. However, and this is a very important point, these data were collected using different criteria and methodological decisions obviously have analytical and theoretical consequences. I am aware that this is to a certain degree problematic and will address the methodological and analytical implications in each variety discussed. On the other hand, this approach has the advantage that it allows the integration of more research findings and thus presents a more complete picture of phonotactic variation and change in contemporary forms of English. I begin with the comparison of data collected for this study exclusively, detailing the extraction procedures and discussing additional reports with reference to methodological, analytical and theoretical concerns.

4.2 Four case studies: final CCR in New Zealand and South Atlantic English

An identical set of criteria was applied for the extraction of data from each of the four varieties. Consequently, the analysis of CCR effects under identical conditions ensures that the four varieties and the parameters of the conditioning factors can be compared without complications. Moreover, the four varieties have the advantage that they throw light on phonotactic development in distinct types of contact scenarios, which emphasises the role of this variable for an analysis of linguistic affinities and differences. Data were collected for varieties that are related for historical reasons: two varieties of New Zealand English (Pakeha English, PNZE, spoken by New Zealanders of European descent, and Maori English, MNZE, spoken by indigenous inhabitants), and two varieties of South Atlantic English (St Helenian English, StHE, and Tristan da Cunha English, TdCE, which bear a resemblance to one another because of sociodemographic fluctuations between the two island populations in the nineteenth century). These varieties represent distinct contact settings and allow insights into phonotactic variation and change in scenarios as diverse as language contact and shift, koinéisation, creolisation and creoloidisation (a term which is used here to refer to intensive contact with an English-based

creole, without direct primary language contact). I begin with an outline of methodological criteria, continue with an individual discussion of the four varieties and then conclude this section by comparing the results and formulating some first hypotheses.

Methodological issues

The methodological criteria applied here deviate from those in related studies. The main motive for the procedure adopted was that it allowed the control of a number of important factors not consistently addressed in other studies: the roles of *stress*, total *cluster length* and general *word length*. For instance, consonant clusters in polysyllabic words with stress on the first syllable are more likely to undergo reduction than consonant clusters in monosyllabic words, or in polysyllabic words with stress on the last syllable (for example, /-nt/ in a word like *applicant* is more likely and more often reduced than the same cluster in *tent* or *extent*: Guy 1980: 9). Numerous studies mention that such an effect is likely; very few actually take it into account and measure it.

Data extraction and selection criteria for the four studies were as follows. All word-final plosives that were preceded by one consonant (bisegmental CC, *last*) were extracted and classified as potential candidates for reduction (clusters consisting of more than two segments, as in *danced* or *glimpsed*, were not considered). Data extraction procedures included all CCs in monosyllabic items, for example, *rest*, *laughed*, and also CCs in polysyllabic words on condition that stress fell on the last syllable. This meant that I counted and analysed reduction levels of final CCs in *extend*, *aghast*, but did not consider those in *mutant*, *breakfast* or *different*. I tabulated words like *strict* and *land*, but ignored *district* and *Zealand*. No more than six words in a particular environment were tabulated so as to control for type–token relations. Moreover, I did not consider unstressed function words that could be subject to lexicalised reduction, particularly the unstressed adverb *just* and the verbs *want to/wanna* or contracted forms of *not* (*didn'*, *wasn'*). High-frequency items (such as *and*) were not considered either as they are more likely to undergo reduction (Neu 1980: 53).

An additional point to consider was whether the clusters were subject to reduction or not; if a cluster was never reduced in a given variety (for example, /-ŋk/ or /-lp/ in Appalachian or Pakeha New Zealand English), then it was not considered for analysis. On the other hand, if the very same cluster could be variably reduced in a variety (for instance in St Helenian English, where /-ŋk/ or /-nt/ are variably reduced to final /-ŋ/ or /-n/), then it was treated as a potential candidate, extracted and

analysed accordingly. The overall tendency to undergo reduction thus influenced the selection of a list of potential candidates.[3] Moreover, following Wolfram (1969), Fasold (1972) and Guy (1980), I did not tabulate word-final plosives when followed by homorganic stops, for example, 'The parcel was sen*t t*o my mother' or 'I've seen that kid knocke*d d*own many times', as a following alveolar plosive makes it 'impossible to perceive from the tape recordings whether the final stop [of a CC] was absent or present' (Wolfram 1969: 58). By the same token, this decision had consequences for the analyses of some of the data: CCs followed by dental fricatives could not be included (e.g., 'I *sent them* home') for some of the varieties. In nineteenth-century MNZE, for instance, /ð/ and /θ/ were practically always realised as stopped variants, which resulted in the same masking effect. Lastly, word-final CCs containing epenthetic vowels were not considered for analysis either (one of the Maori speakers had a very noticeable tendency to introduce epenthetic schwas in final clusters of *settled* ['sɛtɛləd] or *composed* [kəm'pɒsəd]), and CCR obviously does not operate when the CC is modified to a CVC surface structure. However, and this is an important point and of importance for phonotactic variation in general, the insertion of vowels in between consonantal segments (which is frequent in Korean EFL: Lee 2000) yields insights into alternate strategies of breaking up word-final CCs; although less documented, this process may be phonologically conditioned and provides vital information on phonotactic variation also.

Finally, the last criterion considered the morphological status of some verbs. A very special case in research on English CCR concerns verbs that indicate past-tense reference both through suffixation and parallel root inflection: 'semi-weak' or 'double-marked' past-tense forms, what Guy (1980: 5) simply refers to as 'ambiguous verbs', for example, monomorphemic *told*, *left* or *slept* (see Chapter 2). Verbs in this class are historically weak yet on the surface resemble strong verbs. The cluster-final dental plosive has morphemic status, which, however, is redundant since past-tense marking is also indicated through root inflection. Researchers such as Guy (1980) and Santa Ana (1996) classified and analysed these verbs as a separate category and found that their reduction tendencies typically differ from those of monomorphemic (or 'non-ambiguous') items, deletion rates falling in between those of monomorphemic and bimorphemic ones (Chapter 2).

For the present study, however, I decided not to include a separate category for (irregular) verbs that mark past tense through additional root inflection, and this for three reasons. First, this study principally

looks into whether and to what extent CCR is governed by a general set of constraints and how it develops in distinct settings around the world. Given these objectives, the 'behaviour' of ambiguous verbs is not of primary concern. Second, the overall percentage of verbs with past-tense reference by means of both root inflection and suffixation in the corpus was so low (less than 1 per cent in a total of 5,748 tokens extracted from the four varieties) that it was justified to classify them in a general category of monomorphemic items without falsifying results. The third, and perhaps most important, criterion was that several of the varieties for which data were extracted did actually not have forms like *kept* or *told* in the first place. TdCE, StHE and (though less prominently) early nineteenth-century MNZE have considerable *bare root extension*, so that the infinitive (present-tense) forms also function as preterites, as in:

They never *keep* records them days (TdCE speaker, female, b. 1906)
The men *leave* the son in peace after that (MNZE speaker, male, b. *c*.1870)[4]

Bare root extension is much more frequent in these varieties than the standard strategy of past-tense marking. Since *tell*, *keep* and *leave* can function as preterite forms without undergoing suffixation and root inflection here, it simply did not make sense to analyse ambiguous verbs as a separate category.

Based on these selection criteria, all word-final CCs with a potential for reduction were extracted and classified according to whether they were reduced or realised in full. For the reasons outlined I decided to focus on parameters related to phonetic environments and morphological status. Accordingly, in an Excel spreadsheet, I recorded the context of the word that contained the cluster (between four to six words), the cluster itself, the morphemic status (mono- or bimorphemic), the immediately following phonetic segment, classified as a vowel, a consonant or a pause, and the phonetic nature of the preceding segment (classified as plosive, lateral, fricative or nasal).

As for speaker selection and amount of data, the procedure was as follows. The aim was to collect a minimum of 100 CCs for each speaker analysed, 20 for NZE (4 Maori, 16 Pakeha) and 23 for South Atlantic English (SAtlE; 15 speakers of StHE and 8 of TdCE). The New Zealand data come from the archives of the ONZE project (which was also used for the analysis of /hw-/ maintenance and loss in New Zealand; see Chapter 3), and the South Atlantic data were collected by myself in two

fieldtrips in 1999 and 2003. Even though the ONZE database has given rise to almost 100 publications on dialect contact and new-dialect formation, it is little known that it also hosts the earliest known samples of MNZE. The ONZE archive contains recordings made of Maori speakers, born between the 1860s and the late 1880s, who were native speakers of Maori and also fluent and competent in English as a second language (Schreier 2003b). These recordings allow the investigation of contact and accommodation processes between Maori and Pakeha in the early stages of New Zealand's social history. Unfortunately, though, some of them were shorter and split almost evenly into Maori and English passages. All of the Maori speakers were bilingual; they regularly switched between Maori and English during the interview, usually relating stories and family genealogies in Maori and then translating them into English. This meant that in some cases the total fell short and the goal of 100 tokens could not be reached, the total of tokens extracted amounting to 66, 78 and 80. The 16 Pakeha New Zealanders, nine men and seven women, were born between 1868 and 1926, both in the North and South Islands. These recordings were generally lengthier, so that up to 130 individual tokens could be collected for certain individuals.

As for the South Atlantic English (SAtlE) data, a total of 100 tokens were extracted for each individual speaker of TdCE (8 speakers) and StHE (15 speakers). CCR was investigated in a sample of 15 native speakers of StHE residing all over the island, recorded when I was doing fieldwork on the island in July/August 2003; all of them were elderly, born before the Second World War, and some of them had spent their entire lives on the island. Similarly, the TdCE speakers were born between 1900 and the 1930s, that is, in the period of utmost isolation of the community (see below). The speaker characteristics are presented in Table 4.3.

All in all, a total of 5,748 clusters from the four varieties were extracted and analysed so as to be compared with varieties for which data were already available. We begin with a brief discussion of the social histories and the sociolinguistic implications of the four varieties before going on to present and analyse the results.

Social histories and linguistic implications

The social history of New Zealand has already been dealt with in Chapter 3. For the present purpose, it suffices to say that New Zealand provides an ideal scenario to investigate CCR in two distinct contact scenarios. First of all, New Zealand provides a pertinent example of

Table 4.3 Characteristics for 23 speakers of South Atlantic English

St Helena				Tristan da Cunha			
Initials	**Year of birth**	**Sex**	**Place of residence**	**Initials**	**Year of birth**	**Sex**	**Place of residence**
PF	1917	Male	Blue Hill	HG	1912	Male	Edinburgh
JJ	1920	Male	Thompson's Hill	NG	1918	Male	Edinburgh
GY	1921	Male	Half Tree Hollow	ER	1926	Male	Edinburgh
BB	1927	Male	Cleugh's Plain	AG	1935	Male	Edinburgh
CC	1927	Male	Sandy Bay	MS	1894	Female	Edinburgh
LG	1928	Male	Levelwood	GL	1906	Female	Edinburgh
AH	1930	Male	Levelwood	MG	1931	Female	Edinburgh
GB	1935	Male	Pounceys	JR	1938	Female	Edinburgh
EP	1919	Female	Jamestown				
GC	1924	Female	Jamestown				
TH	1925	Female	Longwood				
DF	1925	Female	Sandy Bay				
HS	1926	Female	Longwood				
JM	1926	Female	Blue Hill				
MP	1935	Female	Blue Hill				

language shift from a local, indigenous language to an exogenous transplant variety, brought by European colonisers. Until the mid-nineteenth century, the few European settlers who resided in New Zealand were massively outnumbered by the indigenous Maori population (Gordon and Deverson 1998). However, the linguistic and sociolinguistic situation of New Zealand witnessed an almost complete reversal in that the community has evolved from a Maori-speaking to a quasi-exclusively English-speaking one. Colonial expansion led to an increase in the social and sociolinguistic function of English (the superstrate) at the expense of Maori (the substrate), which within a few generations was effectively reduced to the status of a minority language. With reference to phonotactics, the transport of English to this region resulted in language shift from a language with canonical CV syllable structure (Bauer 1993) to one with a phonotactic system that admits CCs. The analysis of early MNZE is therefore of particular interest to study how syllable structure patterns are transferred onto the target language during the first stages of language shift and second language

learning, and also, by integrating more recent findings, how persistent these effects are.

Moreover, New Zealand also provides the opportunity to study the development of CCR in a dialect contact scenario. It is quite striking that CCR has received no attention at all in scenarios that involve the mixing and levelling of dialects during koinéisation (Siegel 1985, 1987). Prominent studies on linguistic contact and new-dialect formation in the UK, such as in Milton Keynes (Kerswill and Williams 2000) or in the East Midland Fens area (Britain 1992, 1997), exclusively look into variation in vowel systems and individual consonants (for example, glottal stops or rhoticity), while not even in passing mentioning phonotactic developments. Furthermore, there is no information on the development of CCR in post-colonial contact scenarios that involve British inputs (such as in Sudbury's 2001 study of new-dialect formation on the Falkland Islands, or in the ONZE project: Gordon *et al*. 2004; Trudgill 2004). If CCR is studied in contact-derived dialects, then it is only with the aim of having a benchmark for a cross-examination and comparison of this variable in a contact-derived English variety (usually spoken by the indigenous populations or other non-Anglophone colonisers) that developed in conditions of language shift, bilingualism or pidginisation/creolisation (see below).

Consequently, I present the first-ever analysis of CCR in a new dialect formation scenario, and a few words on contact dialectology illustrate the importance of such a study. New-dialect formation is the result of language change that represents long-term linguistic accommodation between speakers with mutually intelligible (regional or social) varieties. New-dialect formation (or koinéisation, two terms used interchangeably throughout here) is the product of several overlapping and co-occurring linguistic processes, the most important ones of which are *mixing*, *levelling* and *decomplexification* (also referred to as *simplification*). The first and most immediate stage, *mixing* of the various inputs, entails mechanisms of feature selection and retention. If a new dialect develops out of a dialect contact situation, then none of the input varieties 'wins out' during the new-dialect formation process; rather, contact results in an intricate and subtle selection process of features from several or all the varieties present in the contact scenario (Siegel 1985, 1987; Trudgill 1986; Kerswill 1996). Consequently, dialect mixture represents a vital first stage in new-dialect formation and the gradually crystallising contact-based variety consists of a mixture of features (phonetic, grammatical, morphological, lexical) stemming from some or all the dialects present in the original contact situation.

The stabilisation of a local variety with its own distinctive linguistic norms is accompanied by linguistic *levelling*, which sees the reduction of variability in an initially diffuse contact scenario (this process was already discussed with relevance of initial /hw-/ loss). A third process operating during new-dialect formation involves continuing regularisation and *decomplexification* (or *simplification*, a term I personally avoid since it carries negative connotations, namely that simplified variants are the result of psycholinguistic and cognitive processes, and, by implication, that speakers who simplify linguistic structures do this due to their alleged mental or intellectual 'simplicity'). Decomplexification may be considered as a process of continuing regularisation, as it leads to increasing regularity of linguistic features: it occurs when, for whatever reasons, a given property of a variant X, no matter if phonetic/phonological, lexical or grammatical, is subject to less variation than it originally was in the input varieties (Mühlhäusler 1980; Siegel 1987; cf. Britain's 1997: 141 view that it represents 'an increase in grammatical regularity and decrease in formal complexity'). It remains somewhat unclear whether decomplexification does not to some extent represent regularisation and whether it is in fact not more closely related to levelling processes than assumed, but this does not bother us here.

Whereas the interplay of all these processes gives a new contact-derived dialect its distinctive features upon nativisation (see Schneider 2003), it is not clear (a) precisely what linguistic features are adopted when new norms emerge; (b) what factors influence the motivation that underlies processes of feature retention and loss, and (c) what features are particularly prone to undergo decomplexification. What is clear, however, is that koinéisation depends on the complex interaction of social and linguistic factors, such as the proportions and degrees of differentiation of dialects in contact, majority versus minority status of the feature in question, social prestige and degree of linguistic marking. The question now is whether decomplexification in new-dialect formation may also operate on word-final clusters and whether CCR takes a different trajectory under koinéisation conditions. Since NZE is a mixed and newly formed dialect of post-colonial English (Bauer 1997), an examination of CCR in a variety with this contact history is an important step to answer whether contact between dialects and koinéisation has an enhancing effect on phonotactic language change, or whether CCs are resistant and remain stable during new-dialect formation. PNZE fills this gap and offers an ideal test site to investigate phonotactic development and restructuring in new-dialect formation.

The other two varieties investigated here highlight the development of CCR in two distinct settings, which, however, have important parallels also: the islands of St Helena and Tristan da Cunha in the South Atlantic Ocean. St Helena has witnessed extensive population mixing and language contact of European, African and Asian languages, and its social history resembles those that gave rise to creolisation elsewhere. Tristan da Cunha, on the other hand, was founded by British and American settlers but also saw considerable influx of St Helenian settlers. Consequently, the two varieties throw light on the development of CCR in two distinct settings with distinct input combinations; moreover, they illustrate the extent to which phonotactic systems are transported and how this variable is indicative of genetic relationships. This is illustrated by a brief social history of the two communities.

The island of St Helena lies in the central South Atlantic Ocean, some 2,000 kilometres west of Angola; its current population is less than 4,000 (dwindling since the islanders received full British citizenship in 2002). St Helena was uninhabited when it was discovered by the Portuguese in 1502. From that date on, it was regularly used by various European seafaring nations as a refreshment station and sick bay on journeys to and from Africa and the Indian subcontinent (Gosse 1938). However, the island was not settled until 1658, immediately after it was officially claimed by the British East India Company. A concerted settlement policy was implemented, and company employees (soldiers and servants) and British planters were recruited to St Helena, along with slaves supplied on request by ships travelling under the authority of the East India Company. Historical records suggest that most of the British settlers came from southern England, in particular from the London area, and that the first slaves and indentured labourers were imported from the Guinea Coast, the Indian subcontinent and Madagascar, and to a lesser extent from the South African Cape area, the West Indies, the Malay Peninsula and the Maldives (Janisch 1885). The importation of slaves officially ended in 1789, but Chinese indentured labourers arrived from 1810 on to provide cheap labour.

Slavery was finally abolished in 1832 and throughout the nineteenth century the population became further integrated as garrisoned soldiers married or entered into common-law relationships with free blacks. The island population saw further influx of West Africans, who were brought to St Helena in the 1850s when the island was used as a base for rehabilitating slaves from captured slave ships (Melliss (1875) notes that some of them chose to remain, while the majority was sent on to the West Indies or repatriated back on the African mainland). A last

substantial group of newcomers arrived around 1900, when several thousand Afrikaans-speaking prisoners, taken by the British in the Boer War, were exiled on the island. Their sociolinguistic impact was limited though: many died of infectious diseases in their camps, and most of the survivors returned to their South African homes as soon as possible. Only very few stayed behind upon their release.

The historical demographics and socioeconomic conditions of the island indicate that a relatively small and impoverished European population lived in a close but socially stratified relationship with the slaves. Moreover, the low fertility of the land meant that slave ownership was on a small scale (the largest slave population on a single plantation in 1815 was about 40). The population lived in small communities in relative isolation from each other, due to the volcanic topography of the island and the inaccessibility of many parts of the island (the topography is shaped by deep valleys and precipitous cliffs which in former times could only be passed on donkey paths). This may have given rise to differential contexts of language contact and creolisation on the island and may also have led to geographic differences in the local form of English (Schreier *et al*. forthcoming), which are subject to further research (Schreier 2006 forthcoming).

The linguistic implications are that StHE developed in a community that is almost without exception of mixed European, African and Asian origin. English is the only language spoken on the island, even though St Helena saw enduring language contact between English, African and Asian languages that were brought to the island at various stages. There is some evidence that slaves conversed in their native languages and some were also reported to speak pidgin varieties (Wright 2004). The exact language status of StHE is not clear; whereas Crystal (1995: 341) classifies it as an 'English-based creole . . . [that] has some use as a pidgin', Hancock (1991) claims that it represents a creole that bears resemblances with Atlantic creoles. Further research is necessary to support this view and the present analysis of CCR is a first step in that direction.

TdCE, spoken on one of the world's loneliest islands in the middle of the South Atlantic Ocean (Schreier 2002, 2003a), was settled much later than St Helena. Even though the island was discovered in 1506 it remained uninhabited for centuries. There was no indigenous population when the island was finally colonised in 1816, and the founders of the community did not come into contact with preexisting language varieties. The population quickly increased when shipwrecked sailors and castaways arrived (Earle 1966), and the late 1820s and 1830s also

saw the arrival of non-British settlers, most notably of several women from St Helena (Taylor 1856), a number of European settlers (from Denmark and Holland: Brander 1940) and American whalers who came during the renaissance of the whaling industry in the 1830s and 1840s (Gane 1932).

In the second half of the nineteenth century, the whale and seal trade declined quickly and the community became increasingly isolated; in 1882, for instance, there was an average of two ships calling at Tristan da Cunha per year. The influx of new settlers decreased and two sailors from Camogli, Italy, were the only newcomers in the second half of the century (Gane 1932). The sociocultural isolation of Tristan da Cunha peaked in the early twentieth century; Evans (1994) notes that the community received no mail for more than ten years, and a minister reported in the mid-1920s that the children had never seen a football (Rogers 1925). This changed in April 1942 when a British naval station was stationed on Tristan da Cunha. The contact with the outside world led to far-reaching social and economic changes (Munch 1945, 1971). The changes were catalysed in the early 1960s when a volcano erupted near the settlement. The entire community had to be evacuated and was forced to spend two years in exile in England. Upon their return, the community underwent quick modernisation and the Tristanians quickly adopted modern dress, dances and entertainment. A new fishing company employed the entire local workforce. The living conditions improved considerably, and the 1970s and 1980s were a period of unprecedented economic prosperity. In recent years, the community has become increasingly open and exocentric and the Tristanians now have more extensive contacts than ever with the outside world. An overseas teaching programme became available in England and on St Helena (Evans 1994), allowing teenagers to pursue secondary education off the island and adults to leave the island for further job training. The late 1990s, finally, saw extensive changes in telecommunication, as electronic mail, Internet access and a public satellite telephone and television became available.

What linguistic conclusions can be drawn from the community's social history? The contact scenario on Tristan da Cunha was multifaceted and the settlement patterns, demographics and sociohistorical development of the community suggest that there were three different types of linguistic contact in the early formation period of the colony – dialect contact, contact with L2 varieties of English, spoken by non-Anglophone sailors, and contact with StHE. The dialect contact scenario involved several varieties of BrE and AmE. The English-speaking colonists

on Tristan da Cunha were of mixed demographic background and divided into two principal groups, British and American. The British settlers represented various regions in England (Yorkshire, the London East End, Hastings/Sussex and Devon) and Scotland (Kelso/Scottish Lowlands) and the American settlers were mainly from the New Bedford/Massachusetts area.

The second group, the settlers who presumably did not have native competence in English, came from the Netherlands, Denmark, Italy and, very plausibly, from South Africa, thus natively speaking Dutch, Danish, Italian and Afrikaans (Schreier and Lavarello-Schreier 2003). Whatever the impact of the different varieties that came into extensive contact in the early formation period of the Tristan colony, there is no question that English was the primary and indeed only medium of conversation on the island; travel reports and logbook entries indicate that the non-anglophone settlers had a good command of English (as witnessed in the following report from 1852: 'The fine, healthy, and robust fellows, clad and speaking as Englishmen, gave the impression that they were from an island of Great Britain; even the Dutchman had become English', quoted in Brander 1940: 149). The third important subgroup of settlers came from St Helena, a group of women who cross-migrated from St Helena to Tristan da Cunha en bloc in 1827. These women were of mixed ethnic descent (described as 'half-castes' by a reverend who worked on Tristan da Cunha in the early 1850s), and recent research on St Helena suggests that at least some of them came from the capital, Jamestown, and its environs. I suggested in Schreier (2003a) that they had a very significant impact on the community, and that they contributed considerably to the developing local dialect (they arrived as a compact group, merely ten years after the settlement was founded, and were the last female settlers until two Irish sisters arrived in 1908) by bringing and transplanting a number of typical creole features to Tristan da Cunha.

In sum, StHE and TdCE provide the opportunity to study phonotactic processes in a language contact scenario as well as in a setting that involves several dialects of English, ESL varieties and StHE. Consequently, the Tristan da Cunha scenario is fundamentally different since it did not entail primary language contact (mutual intelligibility between the settlers was at all times given) but contact with a variety that developed in a context that fostered creolisation. Indeed, Hancock (1991) classifies StHE as a creole and some of the evidence presented in Schreier (2003a) also points in this direction. Consequently, even though English was always the medium of conversation on Tristan da Cunha (which was not the case on St Helena), there was

admixture from a putatively English-based creole, and TdCE therefore presents the opportunity to investigate CCR development during *creoloidisation*.

Creoloids represent a special case of varieties that display creole-like properties. 'Creoloid' is an important term and concept, but unfortunately its usage varies widely in the literature (one of the first linguists to use this term was Platt (1975) in his analysis of Singapore English, and the term has since been used with different meanings, cf. Baker and Corne (1982) or Trudgill and Hannah (1994), or used but not been defined at all, as in Romaine (1988)). Here the term 'creoloidisation' refers to cases where varieties have typical creole features despite the fact that they have not undergone direct language contact (that is, pidginisation and creolisation). I follow Holm's (1989: 19) approach that 'it will be used only to mean languages that superficially resemble creoles in some way (e.g. by being morphologically simpler than a possible source language) but which, on closer examination, appear never to have undergone creolisation'. More precisely, creoloid is used here with reference to varieties that witnessed extensive admixture from creoles or, put differently, to cases where creole speakers transmit typical creole features to a recipient dialect which has not undergone language contact per se. Language contact may thus entail creolisation; contact with a creole may entail creoloidisation.

In sum, the two sets of related varieties allow us to investigate phonotactic variation and change in four distinct scenarios. As such, they provide the opportunity to study the development of this variable in contexts as diverse as language shift and language learning, dialect contact, language contact, creolisation and creoloidisation.

Results

This section presents the results of the major effects on CCR (preceding and following phonetic segment, morphemic status of the cluster) for each of the four varieties. We begin with effects exerted by the preceding segment; Figure 4.1 and Table 4.4 list the total reduction values of cluster-final plosives preceded by a plosive (*act*, *stopped*), fricative (*left*, *laughed*), nasal (*wind*, *dined*) and lateral (*cold*, *called*). Results are given for all the clusters, listed by whether they are reduced or intact and providing the total reduction rate (in per cent).

The four varieties strongly differ in their overall tendencies to reduce clusters. Importantly, they are characterised by different constraint hierarchies, that is, the preceding segments have distinct effects. PNZE follows the general constraints in AmE, in that plosives are more likely to be deleted when preceded by laterals and nasals than when preceded

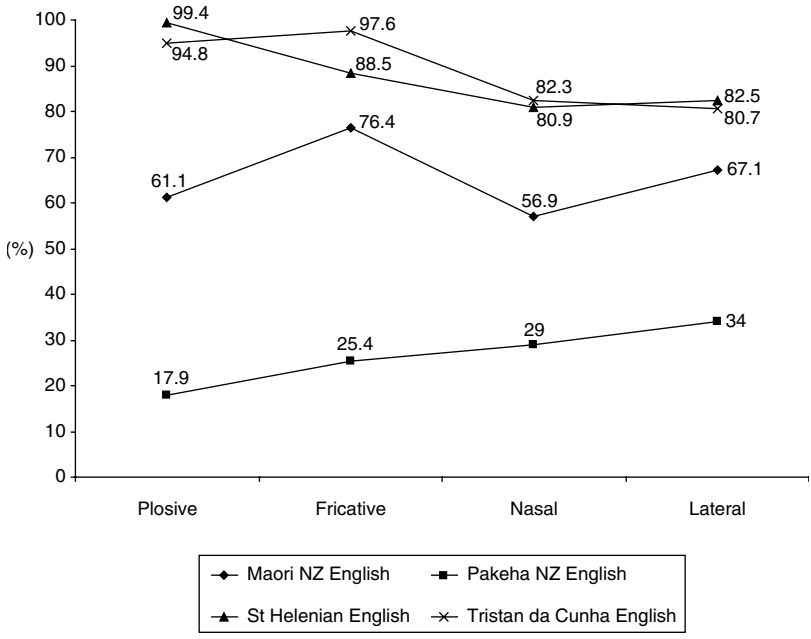

Figure 4.1 Preceding segment effects in New Zealand and South Atlantic English

Table 4.4 Preceding segment effects in New Zealand and South Atlantic English

		Plosive	**Fricative**	**Nasal**	**Lateral**
PNZE	Reduced	50	135	184	141
	Not reduced	229	397	451	273
	CCR (%)	17.9	25.4	29.0	34.0
MNZE	Reduced	11	94	66	47
	Not reduced	7	29	50	23
	CCR (%)	61.1	76.4	56.9	67.1
StHE	Reduced	155	372	559	212
	Not reduced	1	24	132	45
	CCR (%)	94.4	93.9	80.9	82.5
TdCE	Reduced	73	230	312	88
	Not reduced	4	6	67	21
	CCR (%)	94.8	97.5	82.3	80.7

by fricatives and plosives. MNZE differs from this pattern in that clusters containing a C_1 nasal are most robust, and that clusters with a preceding fricative in turn are more likely to be reduced than those with a C_1 plosive. In contrast, SAtlE turns the hierarchy on its head; here it is clusters with C_1 plosives and fricatives that are more frequently reduced than clusters beginning with a lateral or nasal.

As for the effects of the following phonetic segment and the morphemic status of the cluster, Table 4.5 and Figures 4.2–4.3 provide a breakdown by immediately following linguistic environment (C, P or V) and the morphemic status of a cluster-final stop. Figure 4.2 presents CCR in MNZE and PNZE ($n = 824$). They indicate that the two varieties of NZE display the familiar pattern; monomorphemic clusters are more readily reduced than bimorphemic ones, and the effects of the following phonetic environment follow the hierarchy following consonant > pause > vowel pattern.

On the other hand, the global CCR levels differentiate the two varieties sharply. In nineteenth-century PNZE, CCR is effectively confined to preconsonantal environments; in prevocalic contexts, however, there is sporadic CCR in monomorphemic items (9.0 per cent) and practically no CCR at all in bimorphemic items (2.8 per cent). The picture is radically different in MNZE, which has high overall CCR rates in *all* environments. Not only are the percentages higher for preconsonantal CCs

Table 4.5 Internal constraints on CCR in New Zealand and South Atlantic English

		Pre-C		**Pre-P**		**Pre-V**	
		mono	**bi**	**mono**	**bi**	**mono**	**bi**
PNZE	Reduced	336	87	25	5	46	10
	Not reduced	178	168	113	57	467	346
	CCR (%)	65.4	34.1	18.1	8.1	9.0	2.8
MNZE	Reduced	82	31	36	4	48	17
	Not reduced	8	18	14	9	36	25
	CCR (%)	91.1	63.3	72.0	30.8	57.1	40.5
StHE	Reduced	547	136	160	32	301	122
	Not reduced	43	–	29	2	114	14
	CCR (%)	92.7	100	84.7	94.1	72.5	89.7
TdCE	Reduced	273	65	86	14	188	76
	Not reduced	21	–	28	1	43	5
	CCR (%)	92.9	100.0	75.4	93.3	81.4	93.8

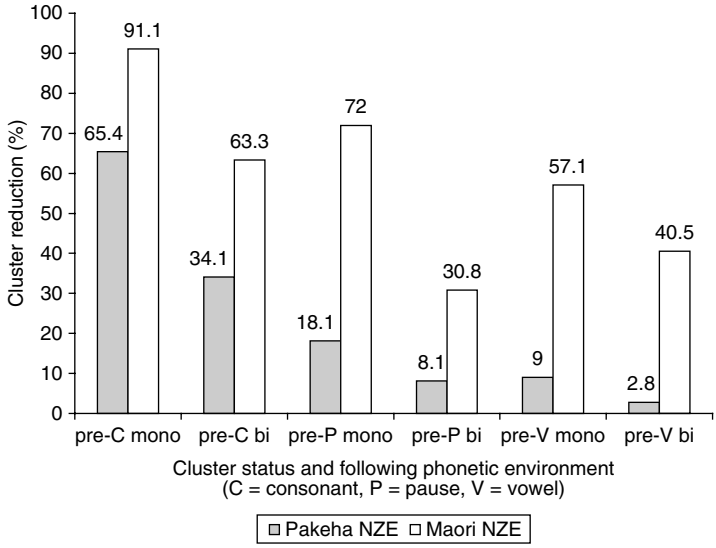

Figure 4.2 Word-final CCR in Maori and Pakeha New Zealand English

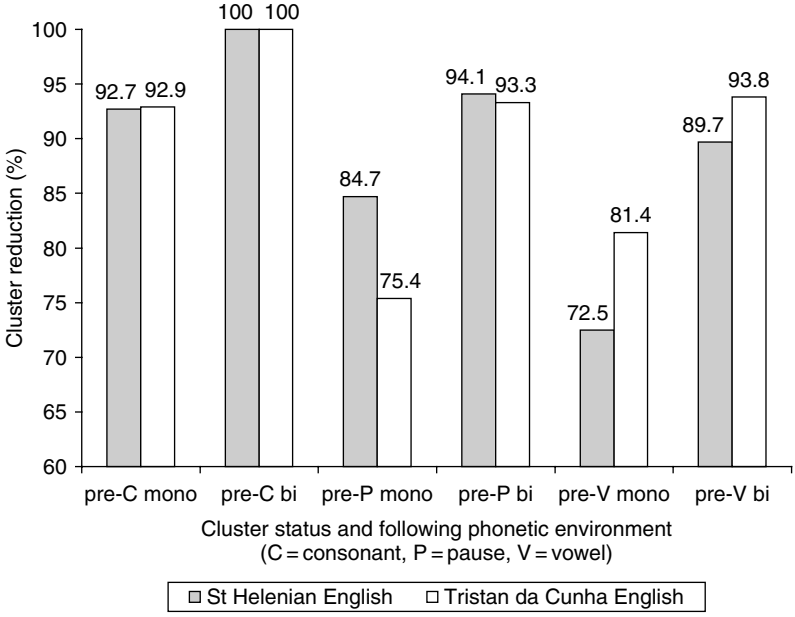

Figure 4.3 Word-final CCR in South Atlantic English

(the discrepancy is 32.0 per cent for monomorphemic and 25.5 per cent for bimorphemic clusters); there is also a considerable increase in diagnostic prevocalic contexts. The percentage of monomorphemic prevocalic CCs reduced in MNZE is 57.1 (compared to merely 9.0 per cent in PNZE) and the overall percentage of CCR in bimorphemic items amounts to 40.5 (sixteen times higher than the percentage reported for PNZE). CCR in prevocalic environments is thus low in PNZE and comparatively high in MNZE. Notwithstanding the quantitative differences, though, both follow the identical trajectory.

Turning to SAtlE, Table 4.4 and Figure 4.3 indicate that both StHE and TdCE have a high tendency to reduce CCs, amounting to 86.5 per cent (n=1,500) and 87.8 per cent respectively (n=800); see also Table 4.6. From a purely quantitative perspective, there is thus a drastic difference with the New Zealand varieties. The following segment constraint (C>P>V), however, is in line with general constraints elsewhere and thus indicative of a common set of principles. It is striking that CCR is categorical in preconsonantal environments and only slightly lower when followed by pauses or vowels (albeit the effect is weaker here, no doubt due to the high tendency to reduce final clusters in the two varieties). The morphemic status of segment clusters, in contrast, exerts a reverse effect. Bimorphemic clusters have higher reduction rates than monomorphemic clusters, and this in all three environments. The two SAtlE varieties thus diverge from the common patterns in a highly consistent way. This represents a *qualitative* distinction which needs to be discussed in more detail.

Discussion and conclusion

The four varieties are sociohistorically related even though they have distinct contact histories. As such, they offer a comparative investigation of phonotactic variation and change in two sets of varieties. Perhaps most importantly, they throw light both on contact-based effects and on the language-internal factors that govern variability. The first question, accordingly, is what features are shared by all four (or by the two sets of) varieties generally and what features are individual (and thus diagnostic). What is the significance of the four varieties' differences and parallels and how can we interpret them in view of general CCR principles?

The differences outweigh the similarities as the four varieties share one feature only: context-sensitivity or, more precisely, the following environment effects. Even though varying in strength, a following consonant favours CCR; following pauses and vowels, on the other hand, have an inhibiting effect (pauses represent a special case, and their function is discussed in more detail when additional information is available). All four varieties are consequently identical in that clusters

followed by another consonant are reduced more often than clusters followed by vowels or pauses.

By the same token, this effect is not equally strong because some varieties have a higher tendency to reduce CCs in all environments, which is illustrated by the total reduction values (Table 4.6). Counting all the clusters in the database and dividing the number of reduced clusters by the total number of clusters for each variety yields the following total reduction values (in per cent):

Table 4.6 Total CCR values in New Zealand and South Atlantic English

	PNZE	**MNZE**	**StHE**	**TdCE**
Reduced	509	218	1,298	702
Not reduced	1,329	110	202	98
CCR (%)	27.7	66.5	86.5	87.8

There exist massive quantitative differences between PNZE and the other three varieties. Whereas PNZE has a total CCR value of about 28 per cent, MNZE reduces two-thirds of all clusters and the South Atlantic Englishes have an even more prominent tendency, reducing almost 90 per cent of all final consonant clusters. The overall tendency towards CCR is thus an important indicator of linguistic diversity in English around the world, and one we have to look into in more detail.

Of equal importance is the internal conditioning that governs the variability of CCR. This highlights a major difference between the NZE varieties on the one hand and SAtlE on the other hand. As Table 4.4 indicates, MNZE and PNZE resemble one another closely in their morphemic effects (with bimorphemic clusters being more robust). On the other hand, the morphemic constraint is reversed in SAtlE: StHE and TdCE have a distinct pattern in that bimorphemic clusters have higher reduction rates than monomorphemic ones in all three environments, which was also reported in Caribbean creoles by Patrick (1991, 1999). This alternative patterning is discussed in more detail in the next section, so it suffices to say that this is most likely the result of interaction between phonotactic and grammatical processes, explained by the fact that creoles have (a) a strong (grammatical) trend towards non-marking of regular verbs for past tense, and (b) a strong tendency towards cluster-final plosive deletion as a result of phonotactic transfer. The results presented here indicate that English CCR is morphemically governed not in one but *two* ways, and that individual varieties align as to whether mono- or bimorphemic clusters are more robust. Whereas

mono>bi is much more common and widespread, *bi>mono* seems to be restricted to creolised forms of English or varieties that have undergone heavy language contact and interaction of linguistic systems with distinct phonological, phonotactic and grammatical properties.

A third major difference concerns the preceding segment effects, and again MNZE aligns more with SAtlE than with PNZE. To start with PNZE, the constraints exerted by the preceding segment conform to the general ones outlined above. Cluster-final plosives are more readily reduced when preceded by a more sonorous C_1 (lateral, nasal) and more likely to be retained when following a less sonorous fricative or plosive:

PNZE: lateral > nasal > fricative > plosive

However, this hierarchy is not found in the other three varieties. Here the preceding segments have the following effects:

MNZE: fricative > lateral > plosive > nasal
SAtlE: plosive > fricative > lateral > nasal
TdCE: fricative > plosive > lateral > nasal

All three varieties share the characteristic that preceding nasals have an inhibiting effect.

Other patterns of this hierarchy diverge and the parallels in other environments are less clear. Whereas MNZE has a criss-cross pattern (meaning that the hierarchy of preceding segment effects does not coincide with a general sonority hierarchy), the two varieties of SAtlE reverse the PNZE pattern totally: the *less* sonorous the preceding segment, the *higher* the likelihood that a C_2 stop is deleted. In other words, if both cluster segments have a similar sonority value, then the final stop is more likely to be deleted; on the other hand, if they differ in sonority then the cluster is more likely to remain intact.

We conclude that, just as in the case of morphemic conditioning, there are alternative patterns of initial segment constraints. Whereas the PNZE hierarchy resembles common patterns, MNZE, StHE and TdCE display different trajectories and sonority effects. While indicating the existence of alternative morphemic constraints, the analysis of the four varieties also supports the contention that C_1-related effects are to a certain extent variety-specific and therefore particularly diagnostic. In contrast, the following segment effect holds in all four varieties and is in agreement with general principles of English CCR (at least if we focus on consonants and vowels). We will look at the general significance of these findings in more detail in the next section, when discussing additional evidence from related studies.

This ends the discussion of the major linguistic characteristics of the four varieties studied. However, we should not limit ourselves to language-internal aspects only but also attempt to interpret their wider sociolinguistic and social significance. Accordingly, we should extend the scope of our analysis somewhat and interpret the findings from a general sociohistorical perspective. For instance, considering the relevance of these data for language shift and accommodation, we note that the two New Zealand varieties differ in their overall CCR tendencies. Notwithstanding the quantitative differences, PNZE and MNZE share a set of characteristics, most notably in that they both have a tendency to delete final stops more frequently in monomorphemic than in bimorphemic clusters and that CCR decreases when the cluster is followed by a pause or a vowel. Despite the quantitative differences, the underlying pattern is consequently identical in both varieties. How can we interpret this? First of all, these findings suggest that the earliest known forms of MNZE were characterised by features that originated as L2 learning processes in a language contact scenario involving Maori and English. Since the phonotactic system of Maori, as is the case in all Polynesian/Oceanic languages, has canonical CV syllable structure and does therefore not allow syllable-coda CCs (Bauer 1993), and since we showed that the first PNZE generations displayed very little prevocalic CCR, the most plausible explanation is that the first Maori learners of English reduced word-final clusters as a result of substratum influence or through direct phonotactic transfer of native Maori structures.[5] The phonotactic differences in nineteenth-century New Zealand English(es) attested here therefore indicate that the earliest stages of language shift from Maori to English saw diagnostic CCR levels in MNZE.

These findings can be linked to the results presented in a similar study on CCR in early twentieth-century NZE. A recent quantitative study of linguistic, social and ethnic constraints on CCR (Holmes and Bell 1994) found that age- and gender-related criteria were significant in contemporary NZE. On the other hand, CCR was not diagnostic in terms of ethnicity, the global reduction rates being identical in the two varieties (41 per cent in MNZE and 42 per cent in PNZE). The authors concluded that 'There were . . . no overall ethnic differences in the level of CCR in the New Zealand data . . . Clearly, CCR is one vernacular feature which is not ethnically significant per se in New Zealand English' (Holmes and Bell 1994: 76).[6] Consequently, ethnically marked CCR did *not* persist in MNZE; high reduction levels were lost as the Maori assimilated to the language norms of the English-speaking community. This invites the conclusion that the effects attested in

nineteenth-century varieties decreased as the Maori began to acquire English as a native L1 language, only to disappear altogether as language shift subsequently progressed and neared completion. CCR therefore offers insights into initial accommodation and subsequent mastery of L2 norms and is an important indicator of language shift phenomena.[7]

The SAtlE varieties provide sociohistorically relevant insights also. Most importantly, the CCR trajectories in these two varieties indicate the existence of alternative patterns and internal constraint hierarchies which contradict the general parameters of CCR. There is thus more phonotactic variation in English than hitherto assumed. Moreover, the two analyses suggest that CCR is an important tool in the determination of genetic affiliations and historical connections between varieties. The case of PNZE showed that neither the overall amount nor the internal conditioning of CCR changes in dialect contact situations and subsequent koinéisation. Consequently, if TdCE represented a contact dialect derived from British inputs, then it would be most likely to adhere to the constraints attested in PNZE and elsewhere. However, this is not the case; the only explanation for this unusual pattern is the influence of StHE, and the intimate connections between the two varieties are phonotactically indicated by an almost perfect match with data from both varieties. TdCE adopted this feature from StHE as it developed into a distinctive variety of SAtlE. This invites the conclusion that even though TdCE did not creolise (that is, did not originate under language contact situations) and creoles were not used as a lingua franca by the Tristan community, the gradually developing local dialect inherited a number of typically creole features from StHE, such as high CCR levels and a quasi-categorical absence of morphological tense marking.[8] The StHE data, on the other hand, are evidence that phonotactic restructuring and reduction through language contact occurred on the island of St Helena. We conclude that there was extensive substratum influence when the local variety developed; this strongly suggests that StHE bears resemblances with English-based Caribbean creole varieties, as Hancock (1991) claims. Both overall amount of CCR and internally conditioning factors evidence the heavy influence StHE had in the Tristan contact scenario and are indicative of the genetic relationships between the two varieties. We conclude that creoloids directly inherit patterns characteristic of the creoles from which they in part derive. This stresses the importance of CCR as a diagnostic variable for contact linguistics, and we can now complement this section's main insights by bringing together and comparing CCR findings in other varieties of English around the world.

4.3 Final CCR in English around the world: a comparative analysis

The New Zealand and South Atlantic varieties have the advantage that data were collected using an identical set of selection criteria. The results can be directly compared and do not differ due to methodological inconsistencies. If we now go on to extend the scope of this study by including other varieties then this has the advantage that valuable information on the development of this variable in different regions of the English-speaking world can be added and integrated. Yet again, this also means that we have to discuss data selected by other researchers who used their own methodologies. This does not mean that we cannot or should not compare results, but we have to take care in not *sensu stricto* equating data collected under different selection criteria. To take account of this, I address the most pressing implications before going on to look at CCR in a further twelve varieties of English. It is crucial to discuss whether, to what extent and why the methodological principles that underlie the handling and analysis of data collected here may differ from those used in other CCR studies and to consider how different sampling and data collection methods may affect a comparative interpretation.

A first point was exactly which varieties of English around the world should be included here. This is complicated by the fact that CCR is reported in a large number of varieties, for instance, in Belizean Creole English (Greene 1999), Torres Strait English (Shnukal 2001: 185), Australian Aboriginal English (Malcolm 2001: 215), Hawai'i Creole English (Glissmeyer 1973: 197; cf. Sakoda and Siegel 2003; Vellupilai 2003), Guyanese English (Wells 1982: 566), Tobago and Trinidad English (Wells 1982: 580; Winer 1993), Cameroonian English (Todd 1984: 102), West African Pidgin English (Huber 1999: 170–2; Simo Bobda 2003), Malaysian English (McArthur, 1993, 2002; Platt and Ho 1983; cf. Lowenberg 1991), and Hong Kong English (McArthur 2002: 360; Bolton and Nelson 2002), a list which is by no means taken to be exhaustive. The ultimate decision on which of these varieties to include depended at least in part on the detail of the discussion; when CCR was merely mentioned in passing (for example, in McArthur 2002) then crucial information on conditioning and frequency was not provided (and thus of little interest for the present purpose). Accordingly, the present analysis concentrated on in-depth research reports of CCR and varieties were selected accordingly.

An additional complication was that some conditioning factors could not be discussed simply because they were not reported in the respective

studies. This, for instance, affects the constraints of a following pause, which is not quantified in Wolfram and Christian's (1976) study on Appalachian English (AppE), or the effects of preceding segments, which is missing in Khan's (1991) report on CCR in Indian English (IndE). A comparative perspective also needs to take into account that studies differ in their selection criteria; for instance, some studies investigate factors such as stress and cluster length (and show that it has an effect on CCR: Santa Ana 1996), whereas such information is lacking in many studies. Consequently, whereas it is generally agreed that clusters in unstressed syllables are more likely to be reduced, the exclusion of this parameter in a study very likely influences the findings. Third, there is no general consensus as to whether one should include items that may be subject to lexicalised reduction. This affects the findings considerably, particularly when items with a high text frequency are included in the analysis (such as /nd/ in *and* or /st/ in *just*). These words have much higher reduction rates (Neu 1980) and not all studies detail whether they were included in the analysis or not (this almost certainly explains why the overall CCR rates in contemporary NZE, as reported by Holmes and Bell (1994), were much higher than the ones from my own study). Fourth, some researchers looked into specialised word forms and it is conceivable that this had some influence on the overall deletion pattern as well. For example, the results for bimorphemic clusters reported in Tagliamonte and Temple (2005 forthcoming) are based on an analysis of preterites only, not of past participles or other bimorphemic forms (passives and so on). A fifth complication is that some studies are written in a variationist mould and characterised by quantitative sophistication; other reports, however, are merely descriptive lists containing examples of phonotactic variation in a given variety (for instance, Lee's 2000 article on epenthesis in English as a Foreign Language in Korea). The combination of all these factors accounts for the fact that the literature on final CCR is quite 'messy'. As a result, we have to bear in mind that results are likely to vary if data are extracted under different selection criteria and have to take care when comparing and integrating additional data. Accordingly, I will compare the various studies with caution and point out possible evaluation problems for each variety discussed.

The next question is exactly how additional material should be presented so as to obtain a most integrative overview of phonotactic variation and change in English. What framework should we apply to document the quantitative development and internal conditioning of CCR in distinct varieties? The four case studies complement each other

well, as they consist of two sets of related language varieties, which allows for cross-comparisons of individual patterns. However, extending the scope and integrating additional material means that data from a number of non-related varieties (with individually distinct social histories) become available. The implications are therefore both methodological and taxonomic. For instance, the question arises as to how the additional varieties should be classified so as to ideally complement the above results. Based on the most important findings in section 4.1, I selected three research questions that were of special relevance to phonotactic variation and change in English:

1. The nature of *language-internal constraints*: are there similar (even universal) constraints on CCR variability in World English, or, in contrast, are the attested constraints variety-specific? What varieties align, and for what reasons?
2. The links and *genetic relationships* between individual varieties: to what extent is CCR an indicator of linguistic relatedness?
3. The potential causality between reduction levels and environments in terms of *contact history*: to what extent does contact between varieties, and the degree of differentiation between these varieties, have an impact on (variable) CCR?

With these aims, I selected data from a total of twelve varieties of English around the world: six from North America (African American English, Los Angeles Hispanic English, Texan Hispanic English, Appalachian English, (White) Philadelphia English, (White) Hyde County NC English), two from the Caribbean (Bahamian English, Jamaican English), one from Great Britain (York English, the only variety for which data are currently available), and three varieties of English as a Second (ESL) or Foreign Language (EFL), spoken in English environments (Vietnamese immigrants in the United States) and elsewhere (Indian and Korean English). Most of the sources used came from the general literature on English CCR; the varieties researched include English in Great Britain (Tagliamonte and Temple 2005 forthcoming), North America (both Anglo-American and African American varieties: Wolfram and Christian 1976; Guy 1980; Bayley 1995; Santa Ana 1996; Wolfram and Thomas 2002), English-derived Caribbean Creoles (Patrick 1991, 1999; Childs *et al*. 2003) and South-east Asian English (Indian English: Khan 1991). Data from learner varieties of English (for example, native speakers of Korean or Vietnamese who learn English as a Second or Foreign Language: Wolfram *et al*. 1986) and

Korean EFL (Lee 2000) are also discussed with the aim of investigating the short-term development of CCR in face-to-face accommodation and obtaining a more integrative perspective on the coexistence of various 'repair strategies' of unfamiliar phonotactic properties in ESL/EFL varieties. First-language acquisition by children, on the other hand, is not addressed here since Chapter 2 showed that this was not a major vehicle of CCR.

In an early stage of the analysis I intended to arrange these varieties along the parameter of contact intensity. It appeared most promising to classify them in this way, taking into consideration whether they had long-standing historical continuity and native-speaker traditions, whether they arose in contexts that entailed dialect contact and koinéisation, or whether they formed in settings that involved some sort of language contact. Table 4.7 lists the contact background of the twelve varieties (and for reference also includes the varieties already studied in section 4.2).

There is no doubt that some varieties fit well into this framework (particularly in cases of creolisation and koinéisation). However, there were also cases where a decision was not easy to take and several varieties

Table 4.7 Classification of the varieties analysed according to their contact histories

British and American English (long-standing historical continuity and native-speaker traditions without a recent language contact history)	• Philadelphia English • Appalachian English • Hyde County NC English • York (UK) English
Dialects originating in dialect contact (koinéisation)	• New Zealand English
Language contact	
Early accommodation processes	• Maori New Zealand English • Vietnamese English in the USA
Language shift, long-term (fossilisation)	• African American English
Bilingualism	• Los Angeles Chicano English • Texas Tejano English
English as a Second Language (institutionalised ESL)	• Indian English
English as a Foreign Language (EFL)	• Korean English
Creoloidisation	• Tristan da Cunha English
Creolisation	• Saint Helenian English • Bahamian English • Jamaican English

could have been listed in more than one of the respective categories. This can be illustrated by the case of Chicano English (ChicE), which is listed under bilingualism here; this gives the impression that all Chicano English are bilinguals and does not take into account that for some speakers this variety represents a first and native variety (which nevertheless has substratal Spanish features); a case could therefore be made that ChicE is not indicative of bilingualism but of language shift. The same problem applies to the taxonomy of MNZE; should it be labelled under the heading 'bilingualism' (since all Maori speakers were fluent in both languages), 'early accommodation' (since these are the first forms of English as spoken by the Maori) or 'language shift' (since most members of the Maori community are now English monolinguals)? It is clear that the decisions are not always clear-cut and that we have to allow for alternative classifications. I am fully aware that overlaps exist and I address and justify the individual classifications when presenting data from the varieties. Nevertheless, the advantage of such an approach is that it provides a clear and case-specific discussion of the individual varieties and a contact-based framework gives a cohesive structure to the comparison of final cluster reduction across varieties.

Consequently, the discussion of the varieties selected is loosely structured to represent various statuses of English, distinct domains of usage and varying degrees of speaker competence. The framework in Table 4.7 was adopted to document the development of English CCR in view of contact histories and mechanisms of linguistic adaptation, and thus to trace phonotactic processes in creolisation, bilingualism foreign language learning and so on. The discussion begins with American and British varieties that have a long history of native speakers and no notable substratal influence through language contact. We then continue with data from a variety of scenarios that involve(d) contact between English and other languages (including stable bilingualism, early and late stages of language shift, the development of English as a Second (ESL) or Foreign Language (EFL), and creolisation. Section 4.4, finally, brings together the findings from this chapter and discusses them from a comparative perspective, pointing out qualitative and quantitative aspects of CCR in contemporary varieties of English.

American and British English

Most of what is known about CCR in English comes from analyses of native-speaker varieties of English, and Philadelphian English (PhilE) has played a particularly prominent role here. Following Labov's early findings of how variable phonological rules account for systematic

variation (Labov 1972b), the reduction of consonant clusters in PhilE was researched by several of Labov's associates, with objectives as distinct as the investigation of individual versus social variation (Guy 1980), the development of variable rules during language acquisition (Roberts 1995) and long-term accommodation (Payne 1980), phonological theory and lexical phonology (Guy 1991a), language change in progress (Guy and Boyd 1990), or the importance of statistical techniques to analyse constraint orders on variable processes (Neu 1980). The breadth of research on CCR in PhilE has considerably contributed to the understanding of the complexity of this feature and several of the principles and constraints discussed above come from analyses of this variety.

In addition, CCR has been studied in other native-speaker varieties of English, three of which are discussed here. This section looks into CCR in the following three varieties, all of which are characterised by historical continuity and long-standing native-speaker traditions: Hyde County English (HCE), spoken in North Carolina, USA, Appalachian English (AppE), as spoken in West Virginia, USA, and York English (YoE), spoken in north-eastern England, England. The main characteristics of CCR in the three varieties are summarised and presented in turn, so that they can subsequently be compared with data from varieties elsewhere. We begin with a brief summary of the social histories and then present and compare the results.

Social histories and linguistic implications

Hyde County, situated along the eastern shoreline of North Carolina, saw first settlements as early as the 1660s (Wolfram and Thomas 2002) and was 'well settled by 1710' (Kretzschmar *et al*. 1993: 349). Even though some areas, particularly in the swampy and less accessible eastern parts, were not colonised until the eighteenth century, permanent settlements were well-established (and squatters resided in the area as well). The exact geographical origins of most of the early colonisers are not known, but available records (discussed in Wolfram, Thomas and Green 2000) suggest that they came from two main areas: North Carolina (Albemarle County) and Virginia (Norfolk County and the Eastern Shore region). The early population thus consisted of settlers who were already acclimatised, and there was no (or very little) direct influx of British settlers. Even though the varieties of English transplanted to Hyde County came into contact with preexisting Native American languages (most notably Algonquian and Iroquoian) and also with African slaves, they did not witness large-scale language contact and subsequent restructuring. The time depth of almost three centuries

ensures that this variety is well-established and has long-standing native-speaker status.

The second English variety in this category is AppE, a variety of American English spoken in the mountain range that stretches along the East Coast from Maine to Alabama. The region of Appalachia is one of the most distinctive dialect regions in North America and one of the few regions where traditional dialects may have survived outside the British Isles (Trudgill 1990). The core areas of the Appalachians (the states of Kentucky, Virginia, North Carolina, Tennessee and West Virginia) have strong historical affiliations with the Ulster Scots, who were instrumental in settling the region from the 1640s onwards. There was also input from English and Irish dialects (Montgomery 1989), as well as some limited contact with German and Dutch settlers (Wolfram and Christian 1976). There were comparatively few contacts with indigenous Indian American population groups, nor were there substantial slave populations or groups of settlers with other linguistic backgrounds. AppE represents a variety with more than three centuries of native-speaker tradition, a distinctive form of American English that has not undergone extensive contact with other varieties and their speakers. AppE has been subject to linguistic scrutiny for various reasons. First of all, its status as a distinctive dialect region has attracted the interest of traditional dialectologists, who conducted research in this area with the aim of producing a dialect map of the United States (Kurath 1949; Kurath and McDavid 1961; Carver 1989). Second, following Montgomery (1989), linguists studied AppE to uncover ancestral effects and to trace the transplantation and subsequent retention of language features from the British Isles to the (then) American colonies. And third, there has been a recent strand of work on dialect diversity within the region, most notably on the degree of distinctiveness between ethnic varieties such as African American, Anglo-American and Native American English (Mallinson and Wolfram 2002).

The third data-set comes from British English, thus adding a welcome contribution to the wealth of data on AmE. The variety in question is YoE, spoken in north-eastern England. York is one of the oldest English towns and has had a prominent position since Old English times, having successively passed through the hands of Romans, Saxons, Vikings and Normans. The city was particularly influenced by the Scandinavian populations who settled in the area from the ninth century (placed well inside the Danelaw, the former stronghold of the Scandinavians) and William the Conqueror chose York as the base of operations in northern England. However, York has not witnessed

language contact for the past 800 years and its recent development is unusual for two reasons. First, it did not participate in rapid urbanisation and population growth since it was little affected by industrialisation. Second, most of the in-migrating populations came from the city's immediate vicinity, mostly from eastern Yorkshire and the English North-East. YoE is thus of linguistic relevance since it provides a variety that has not seen impact from other languages in recent times; moreover, a wealth of linguistic material has been recently collected and published by Sali Tagliamonte and her associates (Tagliamonte 1998, 2001; Tagliamonte and Lawrence 2000; Tagliamonte and Temple 2005 forthcoming).

In sum, the comparative discussion and analysis of the three varieties provides insights into the quantitative dimension and internal conditioning of CCR in BrE and AmE. We discuss the findings for each variety separately and then compare them in a separate section.

Results

HCE has been subject to considerable linguistic scrutiny and research has concentrated on the complex relationship between white and black varieties and on linguistic conservatism in non-mainstream communities. Wolfram and Thomas (2002) analysed CCR in HCE to address some of these issues, and the following section is based on the results they report. Unfortunately, the authors do not report effects of preceding segments, basing their analysis on effects of morphemic status and following phonetic environment only. Nevertheless, their findings are insightful. Table 4.8 and Figure 4.4 illustrate CCR in White HCE, the results broken down by following phonetic segment (consonant, pause, vowel) and the status of cluster segments (mono- or bimorphemic: $n = 757$).

Table 4.8 Word-final CCR in White Hyde County NC English

	Pre-C		**Pre-P**		**Pre-V**	
	mono ($n = 210$)	**bi ($n = 117$)**	**mono ($n = 70$)**	**bi ($n = 48$)**	**mono ($n = 143$)**	**bi ($n = 169$)**
Reduced	123	48	23	3	14	7
Not reduced	87	69	47	45	129	162
CCR (%)	58.6	41.0	32.9	6.3	9.8	4.1

Source: Adapted from Wolfram and Thomas 2002: 136.

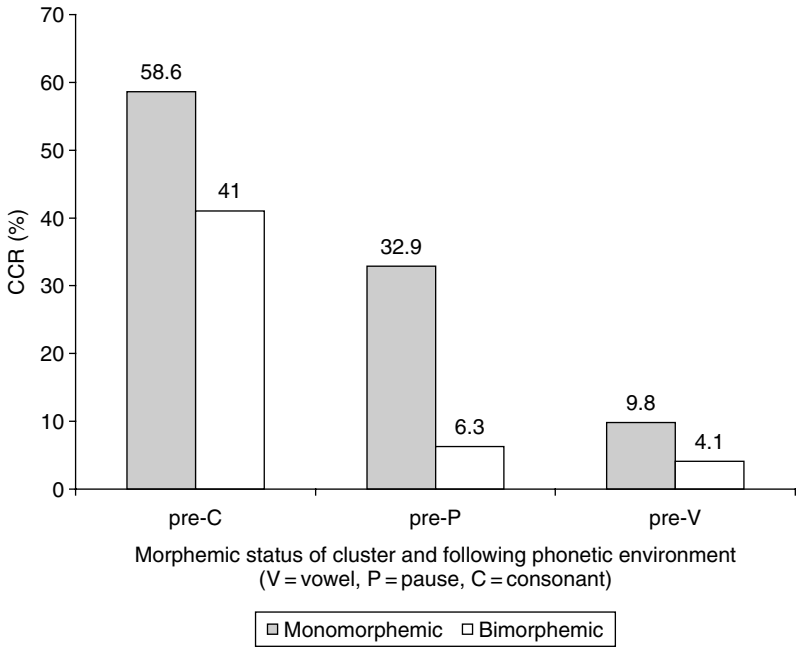

Figure 4.4 Word-final CCR in White Hyde County NC English
Source: Adapted from Wolfram and Thomas 2002: 136.

This quantitative analysis asserts the common effects and evidences general language-internal constraints. Overall, CCR is not advanced and the global reduction rate amounts to only about 29 per cent. As for its internal patterning, the following segment influences the rate of CCR considerably, with consonantal segments favouring the reduction of a preceding cluster and vowels disfavouring it. Pauses pattern in between; it is particularly noteworthy that bimorphemic pre-P clusters behave like pre-V ones, whereas the alignment is not so clear in the case of monomorphemic ones. Moreover, the data also reveal a strong morphemic effect. Clusters are more resistant when the final stop carries morphological meaning (that is, when it represents *-ed* tense marking of regular verbs).

As for AppE, Wolfram and Christian (1976) studied a variety of phonological and morphosyntactic aspects of AppE spoken in the Mercer and Monroe Counties in rural West Virginia. They found CCR to be in agreement with the general constraints elsewhere. Both cluster status (mono- or bimorphemic) and following environment had a strong

Table 4.9 Word-final CCR in West Virginian Appalachian English

	Pre-C		Pre-V	
	mono (*n* = 200)	**bi (*n* = 150)**	**mono (*n* = 84)**	**bi (*n* = 202)**
Reduced	148	26	56	11
Not reduced	52	124	28	191
CCR (%)	74.0	17.3	66.7	5.4

Source: Adapted from Wolfram and Christian 1976: 36.

effect on final CCR, which in AppE 'is largely restricted to contexts where the following word begins with a consonant. The incidence of simplification when the following word begins with a vowel is relatively small but it does occur to some extent' (Wolfram and Christian 1976: 35). Table 4.9 illustrates the constraints on CCR in AppE, illustrated in a selective sample of six speakers ($n = 636$).

Wolfram and Christian did not extract data for following pause effects and did not provide a detailed breakdown for CCR in this environment. However, they note that 'A cumulative tabulation... indicates that 24.5 percent of all potential clusters before a pause have been simplified' (p 72). Compared with the total values for CCR in pre-C (49.7 per cent) and pre-V (23.4 per cent), this indicates that pre-P clusters in AppE behave in similar fashion to pre-V clusters, thus strongly disfavouring deletion.

Finally, even though this is not reported in detail, the authors also commented on the following segment effect in AppE. They found that the clusters that were most likely to undergo final stop deletion had a lateral approximant /l/ or a nasal as C_1. A preceding sibilant or fricative, on the other hand, strongly favoured cluster retention: 'less than seven percent of all sibilant plus stop clusters are simplified before vowels... Even items like *just*, reduced to *jus*' in many casual standard English varieties, may sometime retain the *t*' (Wolfram and Christian 1976: 35). Even though Wolfram and Christian did not provide a quantitative analysis of preceding segment effects, the hierarchy they suggest is in agreement with the one generally observed: liquids > nasals > plosives > /s/. In other words, the more sonorous the C_1 segment, the more likely is the final stop to be deleted.

The final variety is particularly insightful since the quantitative analysis of CCR in BrE has been neglected to date, in sharp contrast to the attention this variable has attracted in sociolinguistic research

elsewhere. All that is known about CCR in BrE comes from Tagliamonte and Temple's (2005 forthcoming) investigation of YoE. Thus, when assessing the generality of these results, one should bear in mind that these data come from one variety only (and it is certainly possible that CCR is subject to some regional variation in the British Isles, just as it is in the USA). Nevertheless, YoE provides a valuable (and much needed) perspective on the rate of and constraints on CCR in BrE.

A first insight from Tagliamonte and Temple's study is that global reduction values in YoE were lower than those reported in AmE. CCR is thus not advanced, amounting to about 24 per cent. As for linguistic constraints, both preceding and following phonological environments had a significant effect on CCR. The effects of preceding segments yielded the following pattern: preceding sibilants had the highest reduction values, whereas nasals, stops, liquids and other fricatives did not favour cluster-final stop deletion (even though a VARBRUL analysis revealed that the individual strengths of these factor groups were quasi-identical in YoE so that the effects of preceding segments were weaker than in AmE varieties).

The following segment, on the other hand, exerted a much stronger effect in YoE. Cs favoured reduction rates whereas following Vs had an inhibiting effect on the reduction of a preceding cluster. A following pause patterned with vowels, and clusters in prepausal environments were more likely to be realised in full (Table 4.10 and Figure 4.5: n=1.018). In this respect, YoE bears a striking resemblance to White AmE. The parallels were further confirmed in a more fine-grained analysis of phonetic environments. Tagliamonte and Temple found 'a near identical pattern between British and American English' (2005 forthcoming: 15), in that the hierarchy of following segment constraints in YoE was practically the same as the one reported in Fasold (1972), Guy (1991b),

Table 4.10 Word-final CCR in York (UK) English

	Pre-C		**Pre-P**		**Pre-V**	
	mono (n=335)	**bi (n=165)**	**mono (n=68)**	**bi (n=22)**	**mono (n=252)**	**bi (n=176)**
Reduced	198	104	5	1	25	6
Not reduced	137	61	63	21	227	170
CCR (%)	59.1	63.0	7.4	4.5	9.9	3.4

Source: Adapted from Tagliamonte and Temple 2005 forthcoming.

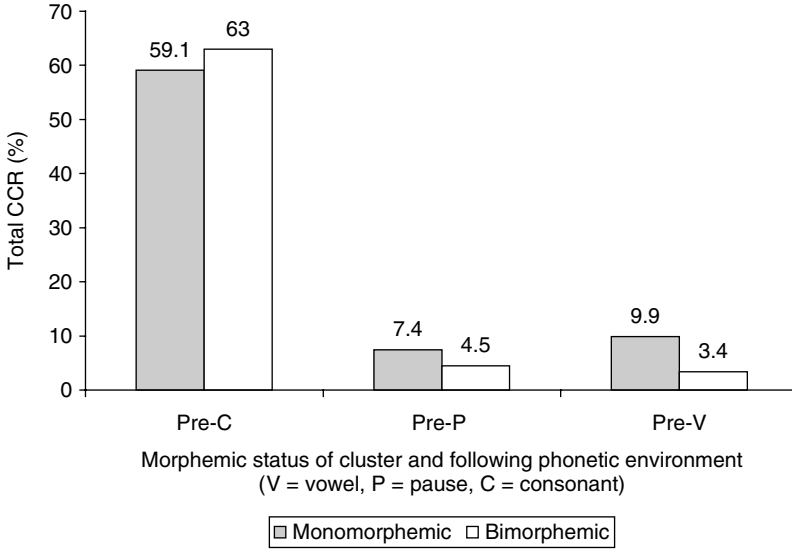

Figure 4.5 Word-final CCR in York (UK) English
Source: Adapted from Tagliamonte and Temple 2005 forthcoming.

or Labov (1997): plosive > glide > liquids > vowel > pause (the only difference was the effect exerted by following /l/ liquids, where CCR was triggered more in varieties such as PhilE).

As for the effects of *morphological status* of individual cluster elements, however, there was a notable difference, and the York data were not in agreement with the common AmE patterns. Certainly the most remarkable finding is that the morphemic status of a cluster, while following the common monomorphemic > ambiguous verb > bimorphemic trajectory, has a negligible effect in BrE and is in fact not statistically significant: 'We have an interesting dilemma: although the phonological effects are clearly not replicated in the sense that they pattern the same way across North America and British English, the morphological constraint apparently does not obtain' (Tagliamonte and Temple 2005 forthcoming). The authors attempt to account for this finding by subclassifying individual factor groups by morphological types (such as strong past, *found*, versus replacive past, *sent*), which, however, did not change the result); they also tested it with reference to individual variation (which turned out to be insignificant) and a possible age effect, studying whether this pattern could be explained by the fact that age groups differed in

their mental interpretations of clusters (elderly speakers analysing them as bimorphemic items and younger ones as monomorphemic ones: cf. Guy and Boyd's (1990) study on ongoing language change in PhilE). This did not change the overall pattern either, and Tagliamonte and Temple conclude that the morphological status of a cluster does not enhance CCR rates as strongly as it does in AmE without as yet being able to provide an explanation as to why this should be so.

Summary and conclusion

This section discussed CCR in three varieties of AmE and BrE, none of which had recent language contact. The comparison of the three varieties indicated some major parallels (most notably the total frequency of reduction, the robustness and patterning of internal constraints, and the nature of clusters that may be variably reduced); on the other hand, there are also some minor differences regarding the individual strengths of conditioning factors.

To start with the resemblances, we note that the overall CCR values were 24 (YoE), 29 (HCE) and 38 per cent (AppE), which matches findings in other varieties (33 per cent in White PhilE: Neu 1980). This may be interpreted as evidence that CCR is more advanced in AmE than in BrE (alternatively, this may also have a methodological basis, for instance, the context of the interview (casual or self-conscious speech) or the in-/exclusion of lexical items favourable to CCR processes, such as *and* or *just*: Neu 1980). Generally, however, HCE, AppE and YoE provide evidence that native-speaker varieties with no or little influence from other languages have little CCR (varying between 24 and 38 per cent). Another shared feature relates to the phonetic properties of the cluster types that may undergo CCR. The voicing constraint applies to both AmE and BrE alike, and clusters with hetero-voicing are never reduced. The third, and perhaps most important, similarity relates to the constraints exerted by the segments preceding and following the cluster-final stop. Environment-related effects display remarkable homogeneity in all three varieties.

The differences between CCR in BrE and AmE concern the constraints of cluster status and morphemic meaning of individual cluster segments. BrE and AmE behave differently in that the effect of cluster status is not as strong in YoE as in trans-Atlantic varieties. In fact, YoE reverses the well-established American pattern in that bimorphemic clusters in preconsonantal environments have slightly higher reduction levels. Whereas YoE displays a similar set of phonetic environment effects, there is a discrepancy in terms of morphological status. One of

the strongest effects on CCR in AmE is thus considerably weaker in this variety.[9] A second difference concerns the effect of a preceding sibilant, which is found to have an accelerating effect on the deletion of a following stop in YoE and PhilE but is reported to favour cluster retention in AppE.

We conclude that the three varieties share a good number of similarities. In fact, the differences are comparatively slight and there is striking homogeneity in the three varieties. With the exception of morphemic status, the YoE findings matched the AmE ones so consistently that this may be interpreted as an indication that language-internal criteria exert a set of general (perhaps even universal) constraints on CCR in native-speaker varieties of English. The BrE and AmE data therefore provide a reliable baseline with which we can compare CCR patterns in English varieties with different backgrounds and contact histories, and it is to these that we turn now.

Language contact

The CCR studies in English spoken in New Zealand, the South Atlantic, the British Isles and the USA are now complemented with data from varieties that developed in different linguistic settings. The present section looks into CCR in a variety of language contact scenarios; some of the main questions addressed are whether (and to what extent) CCR changes quantitatively and typologically in contact conditions, how quickly clusters are mastered in L2 learning processes and how indicative alternative constraint patterns are.

The spread and diversification of English yields insights into changes that affect English phonotactics in general and final clusters in particular. One central point is the degree of phonotactic differentiation between the two languages, that is, the learners' native language and the target language they are in the process of learning. Among other factors, the outcome depends on whether the phonotactic systems of the varieties in contact allow consonant clusters or not. If they do, then the realisation of CCs is likely to be different than when the native L1 language has CV or V syllable structures (see Chapter 2). Most of the (relatively few) available studies that investigate CCR development in language-learning contexts involve languages that typically do not allow syllable-coda CCs, and thus provide insights into phonotactic developments in a variety of contact conditions.

English has adopted a variety of roles following its spread and diversification around the world. This allows us to pinpoint the development of CCR in a number of environments that may be labelled 'non-native',

such as in former colonies of the British Empire (exemplified by India) or in immigrant communities, where a group of immigrants settle in a country where English is the first (and for many speakers the native) language (this is illustrated by the development of English as spoken by Vietnamese immigrants in the USA). The initial accommodation processes may disappear or decrease when English is adopted as the first language of the community (as happened in the case of MNZE) or else be retained and fossilised, on occasion surviving as a linguistic expression of ethnic differentiation (African American English). Consequently, then, how do phonotactic variation and change depend on the nature of contact? When and under what conditions does diagnostic CCR disappear as accommodation reaches completion, and when does it persist due to fossilisation?

It is also common for both languages in contact to be maintained, leading to bilingualism and functional specialisation of the two varieties (which is the case for many speakers of ChicE). In many parts of the world, English has the status of a lingua franca, particularly in former British colonies that developed in multilingual regions. English functions as a Second Language (ESL) and is very often characterised by carry-over effects of substratal properties from local languages. Moreover, perhaps the most numerous group of speakers of English consists of adults who use English as a Foreign Language (EFL). For them English represents a learner variety, that is, it is learnt by adults with different L1 backgrounds in the 'expanding circle' of English as a world language (Kachru 1985). EFL varieties are therefore *not* used in an environment where English is the sole or main medium of communication. They are very often learnt for socioeconomic purposes, such as to enhance career opportunities and to open up job opportunities in an increasingly international market. EFLs are spoken in

> those regions which recognize the importance of English as an international language, though they do not have a history of colonization by members of the inner circle, nor have they given English any special status in their language policy. It includes China, Japan, Israel, Greece, Poland and . . . a steadily increasing number of other states. In these areas, English is taught as a foreign language. (Crystal 1995: 107)

Accordingly, to gain a perspective of CCR in such contexts, we discuss the development of English phonotactics in the EFL variety spoken in Korea.

Following the framework outlined above, this section discusses CCR development in contexts of initial contact and early accommodation, language shift and fossilisation, bilingualism, second language learning and interlanguage development, English as a Foreign Language and creolisation. The data presented and discussed in this section draw on a wide variety of English(es) around the world and give insights into the nature of linguistic contact on CCR development. These findings are contextualised with reference to the individual varieties' contact histories and contact-derived linguistic processes (as outlined above). I begin by discussing and exemplifying the individual contact scenarios in turn and then conclude with a comparison and contextualisation of the general findings.

Early accommodation processes

The first context discussed is *early accommodation*, as exemplified by Vietnamese English (VietnE), spoken by Vietnamese immigrants to the USA.[10] The Vietnamese community in the United States saw a rapid influx in the mid- and late 1970s so that most VietnE speakers have a relatively short history of contact with (and accommodation to) the local American population (Wolfram and Hatfield 1984; Wolfram *et al*. 1986). The Vietnamese immigrants came from a variety of social backgrounds, with a range of linguistic exposure(s) to and prior competence(s) in English, ranging from poor and socially disadvantaged 'boat people' to educated upper-middle-class. Upon arrival in the USA, most Vietnamese immigrants settled in fairly stable communities, maintaining their culture, ethnic identity and language, while the majority of them were keen on integrating themselves into the surrounding English-speaking community.

VietnE represents a very early stage of contact; the outcome of this scenario (complete language shift or emergence of stable bilingualism) was not clear at the time this study was conducted, but Wolfram *et al*. (1986: 53) stated that 'because of the positive attitudes toward Vietnamese, and the other factors contributing to its maintenance, the language may be maintained longer in this community than has been the case in some other immigrant situations'. One reason why VietnE is particularly insightful is that the phonotactic system of Vietnamese, like those of Oceanic languages such as Maori, has canonical CV syllable structures and does not permit clusters. Vietnamese is an analytical language and this certainly has an impact on the development of ESL phonotactics: the concept of a cluster (or of suffixes that encode morphological information) is simply not familiar to native

speakers of this language. Consequently, then, due to the recent contact history between the two languages, VietnE offers the opportunity to investigate the development of CCR in the very early stages of a learner language (or interlanguage: Selinker 1972) and second language learning. Moreover, it represents an ideal scenario to study the development of this variable during contact between phonotactic systems and to follow its development as accommodation progresses in the second or third generation.

With these aims, Wolfram *et al*. (1986) investigated a total sample of 90 members of the Vietnamese community in Arlington County, Northern Virginia, stratified by gender and length of residency in the United States (1–3 versus 4–7 years), and subdivided into four age groups. The sample displayed a wide variety of competence and fluency in English, based on age, access to education, length of residency in the USA, individual motivation to adapt to American society and so on. This made it possible to research a variety of issues involved in language learning and accommodation. Besides adaptation processes commonly believed to be indicative of structural transfer and generalised language learning strategies (such as, among others, final stop devoicing ('food' [fu.t]), usage of alveolar stops for dental fricatives, or using verbs unmarked for tense ('I *have* biology class last year')), VietnE speakers have a tendency to reduce consonants in word-final or syllable-coda position (that is, to produce open CV syllable types). Moreover, and of particular relevance here, VietnE speakers heavily reduce consonant clusters, both in mono- and bimorphemic clusters (what Wolfram *et al*. somewhat idiosyncratically refer to as 'final *-d* singleton deletion' (1986: 56)). Table 4.11 and Figure 4.6 report CCR levels in two groups of Vietnamese residents in the USA, grouped by total length of residence (1–3 years or 4–7 years).[11]

Table 4.11 Word-final CCR in Vietnamese English (in per cent)

	Length of residence 1–3 years		**Length of residence 4–7 years**	
	mono	**bi**	**mono**	**bi**
Age 35–55	87	96	88	66
Age 20–25	90	98	83	95
Age 15–18	89	99	79	65
Age 10–12	80	91	53	30

Source: Adapted from Wolfram *et al*. 1986: 57.

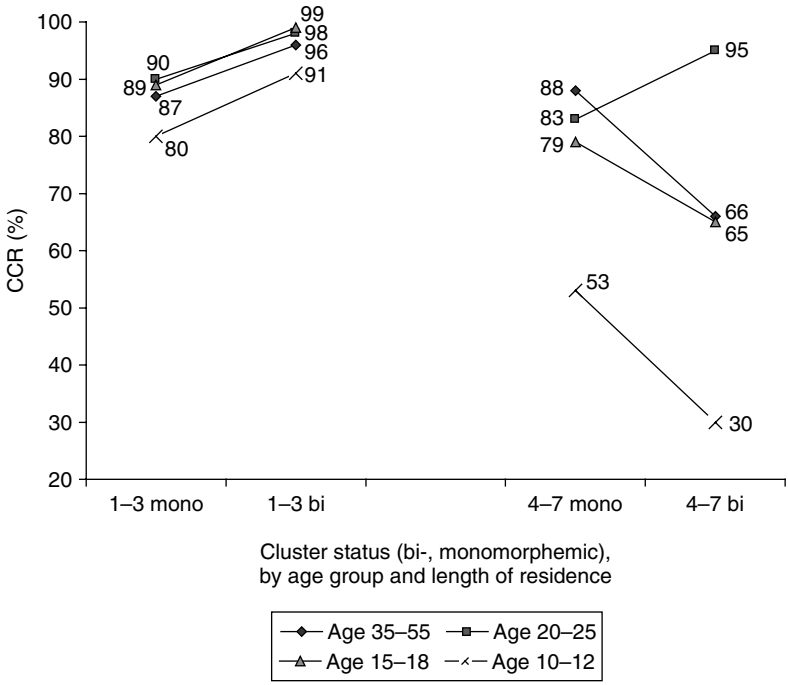

Figure 4.6 Word-final CCR in Vietnamese English
Source: Adapted from Wolfram *et al*. 1986: 57.

The effects are of two kinds. First, younger speakers of both groups tend to have lower CCR levels than the first generation of immigrants; they thus successively approach English target structures and master unfamiliar phonotactic structures more proficiently. The transfer of language properties from the native language onto the target may on occasion fossilise, even to the extent that they represent permanent substratal influence with ethnolinguistic significance. This does not seem to be the case here and we note some progress; the data indicate that CCR levels decrease with longer periods of residence in an English-speaking environment, which is indicative of the successive adoption of English norms as accommodation progresses (a frequent outcome of language shift: Gal 1979).

Second, and of particular relevance for this study, the language-internal constraints are reversed. In VietnE, the morphological status of individual cluster segments does not play the same role as in other

varieties of English; moreover, a final *-ed* suffix does not have an inhibiting effect on CCR in the earliest stages of this variety. Even though CCR tendencies are still fairly high, most VietnE speakers who had resided in the USA for 4–7 years display the common pattern (with the exception of the 20–25 age group), reducing monomorphemic clusters more frequently than bimorphemic ones. Vietnamese with a residency length of 1–3 years, on the other hand, have higher reduction levels for bimorphemic clusters throughout. This suggests that the observed process is not a phonological one but, quite on the contrary, that it has a grammatical basis (related to what was said above, namely that the concept of suffixes is unfamiliar to speakers of analytical languages). Morphological *-ed* tense marking of regular verbs is still in the process of being learnt by native speakers of Vietnamese, and this throws an entirely different light on the development of CCR in English varieties (this is an important point, to which we will return when we discuss CCR development in creolisation).

Language shift and fossilisation

The next scenario is one where language contact led to language shift, which, however, was not completed since target structures were not fully acquired. Quite on the contrary, the original contact effects persisted and the varieties remained phonotactically distinct long after the former immigrant languages ceased to be spoken. The most pertinent example here is African American English (AAE), one of the most extensively researched varieties of AmE in general (Schneider (1996: 4), for instance, states that AAE 'has been the most prominent topic on AmE . . . with more than five times as many publications devoted to it than any other group'). One of the most intensively discussed aspects of AAE is its origins and historical trajectory, and consonantal variation has played a prominent role here.

The question is whether AAE primarily derives from varieties of British English or alternatively from an English-based creole which developed as the main medium of communication in the African populations on the plantations. Traditionally, linguists working in this area were divided into two groups, propagating either a British or a creole origin (McDavid and McDavid 1951; Stewart 1967; Dillard 1972) and these views, though somewhat modified and refined, are still held by some researchers today (for example, Rickford 1999; Poplack and Tagliamonte 2001; Poplack 2000). More recently, though, the demarcation between these two approaches has been blurred and the work of Schneider (1989), Winford (1997, 1998), Kautzsch (2002), Wolfram and

Thomas (2002) and others has indicated that earlier AAE was subject to considerable social, geographical and individual variation. The social history of AAE was multifaceted and regionally distinct; this affected the total population groups in certain areas as well as the integration of slaves into the white community (house slaves, plantation slaves and so on). Thus, a number of social, psychological and regional factors conditioned the degree of accommodation. For instance, there were various access possibilities to an English target, and the ultimate linguistic outcome of contact between African slaves and the descendants of British settlers (or, for that matter, indentured labourers) was multifaceted and varied. A short social history illustrates the complexity of this issue.

The first shipment of Africans arrived in the 1620s, and until 1700 blacks constituted only a small segment of the total population (in 1671, for instance, only 5 per cent, or about 2,000, of the Virginia population were black: Winford 1997). This was to change throughout the eighteenth century, when ever-increasing numbers of slaves were imported from Africa or from the Caribbean to work on the tobacco, rice and indigo plantations; the establishment of a successful plantation economy (1720–75) led to significant sociodemographic changes in the American colonies. Local industries depended on cheap imported labour in different ways. Whereas the plantations in the South required large numbers of workers, northern colonies had different industries and little demand. This affected the overall distribution of African slaves in the Atlantic colonies and had considerable sociodemographic implications. Rickford and Rickford (2000: 134) state that by 1750, blacks constituted no more than 3 per cent of the New England population, about 7 per cent in the Mid-Atlantic region but almost 40 per cent in the South. It was likely that the low number of blacks in the North entailed an increase in contacts and interactional patterns between the two ethnic groups so that the blacks accommodated to white speech and British norms more intensely than elsewhere (and thus completed language shift more quickly). On the other hand, the large (and often linguistically heterogeneous) groups of blacks in the South were comparatively less integrated, which may have favoured the creation (or maintenance) of creoles as a medium of communication. The importance of sociodemographic criteria is evidenced by the fact that less than 10 per cent of the population in the coastal and sea island areas of South Carolina and Georgia was white, and it was in this area that Gullah (or Sea Islands Creole) developed (Rickford 1997, 1999).

During the 1776–83 War for Independence, thousands of slaves fled their plantations or joined the British forces (in hope of liberation and

emancipation). The successful development of a cotton industry, however, led to a drastic increase in local slave populations, most slaves being directly imported from West Africa. As a result, the total amount of blacks in the USA grew from an estimated 700,000 in 1790 to nearly four million in 1860 (Kautzsch 2000; Rickford and Rickford 2000). Slavery was officially abolished with the end of the Civil War, and substantial groups of blacks first dispersed to bigger cities in the South and from there to the industrial states of the North. These population movements had linguistic consequences, and 'the concentration and intense contact of African Americans of various regional backgrounds in northern and southern cities set the stage for further levelling or convergence among AAVE [African American Vernacular English] varieties, and the emergence of the relatively focussed and uniform urban vernacular' (Winford 1997: 318). The post-emancipation period, finally, between the First World War and the Great Depression, fuelled migration waves to urban centres in the North and West and saw the continuing dispersal of AAE throughout the USA.

All this suggests that earlier AAE was subject to variation and regional differentiation in various ways. Most researchers now accept that the origins of AAE have a strong British component, which among others is evidenced by the fact that language shift was completed and that none of the original African languages survived. Nevertheless, the development of AAE is also characterised by substratal influence as contact-derived features were adopted. In a thorough and detailed historical account of the genesis of AAE, Winford (1997) suggests that the present form of AAE represents the result of (relatively) successful acquisition and adaptation of British English norms while also drawing a number of structural and phonological features from substratal sources. The continuing adoption of British speech norms was accompanied by persistent substratum influence from the slaves' heterogeneous linguistic backgrounds, including a variety of West African languages and restructured (or creolised) varieties of English. The most salient characteristics of substratum influence are, among others, the high degree of *copula absence*, the usage of habitual *be* and aspect markers (e.g., completive *done* and remote perfective *been*), and, of particular relevance for the present study, the comparatively high tendency to reduce consonant clusters.

CCR was first analysed to apply a quantitative dimension to linguistic description (Labov *et al*. 1968) and to explore patterns of quantitative cross-varietal differentiation (Labov 1975). Very early on, however, it was also investigated to pinpoint and detail relations between regional,

social and ethnic varieties of English (Wolfram 1969, 1974; Fasold 1972; Labov 1972a) and it now is one of the variables most frequently used to research the relationship between (and thus throw light on the historical evolution of) Anglo- and African American English (Bailey and Thomas 1998). Research on this variable has concentrated both on the quantitative dimension of CCR and the internal factors that govern its variability. It has long been recognised that AAE distinguishes itself in having considerably higher overall levels of CCR than white varieties, both in monomorphemic and bimorphemic clusters. This difference is most noticeable in (diagnostic) prevocalic contexts, and Labov (1972a) interprets pluralisation of lexical items ending in /-st/, /-sk/ or /-sp/ as follows:

> these clusters lose the final stop much more often than any of the others . . . Simplification is obligatory for black speakers when a final *-s* is added, so that the plural of *wasp*, *test*, *desk* never show the clusters *-sps*, *-sts*, *-sks*. The major firms that are heard are *wasses*, *tesses*, *desses* [wasɪz, tɛsɪz, dɛsɪz] or *was'*, *des'*, *tes'* with occasional [waspɪz, wapsɪz] . . . the simplification of *-sp*, *-st*, *-sk* clusters may be so strong that children do not have the same underlying forms as SE [Standard English] standard forms. (Labov 1972a: 16)

Therefore, the quantitative differentiation of CCR levels in the two varieties has been recognised for a long time. This raises the question as to whether the two varieties are distinct in their language-internal constraints as well, and it is only recently that these have been subject to quantitative analysis. Several studies could be discussed in this context, and the following one, drawing on AAE data collected in rural North Carolina, serves as an exemplary reference.

The AAE data at hand were collected in the course of the Hyde County project reported above. This scenario allows for an insightful investigation of accommodation between distinct ethnic groups and regional differentiation in a comparatively isolated rural community. The peculiar status of this region has some analytical implications; as interactional patterns between the two ethnic groups were intense over a lengthy time period, it is plausible to assume that African Americans have adapted to white speech patterns more extensively than in areas where the ethnic groups were more rigorously segregated (which has been shown by Childs 2000; Wolfram, Thomas and Green 2000; Wolfram and Thomas 2002). This means that one would expect CCR levels to be higher in urban and less integrated varieties of AAE. Nevertheless, Hyde

County NC gives us a good indication of CCR in the two varieties, and Table 4.12 and Figure 4.7 report CCR in AAE as spoken in Hyde County NC, broken down by following phonetic environment and morphemic status of the cluster ($n = 1.228$).

First of all, these data confirm that CCR is more frequent in AAE (which is particularly evident when we compare these data with those from the section on American and British English). Moreover, the

Table 4.12 Word-final CCR in African American English (Hyde County NC)

	Pre-C		**Pre-P**		**Pre-V**	
	mono ($n = 410$)	**bi ($n = 177$)**	**mono ($n = 146$)**	**bi ($n = 41$)**	**mono ($n = 252$)**	**bi ($n = 202$)**
Reduced	339	146	116	32	131	61
Not reduced	71	31	30	9	121	141
CCR (%)	82.7	82.5	79.5	78.0	52.0	30.2

Source: Adapted from Wolfram and Thomas 2002: 136.

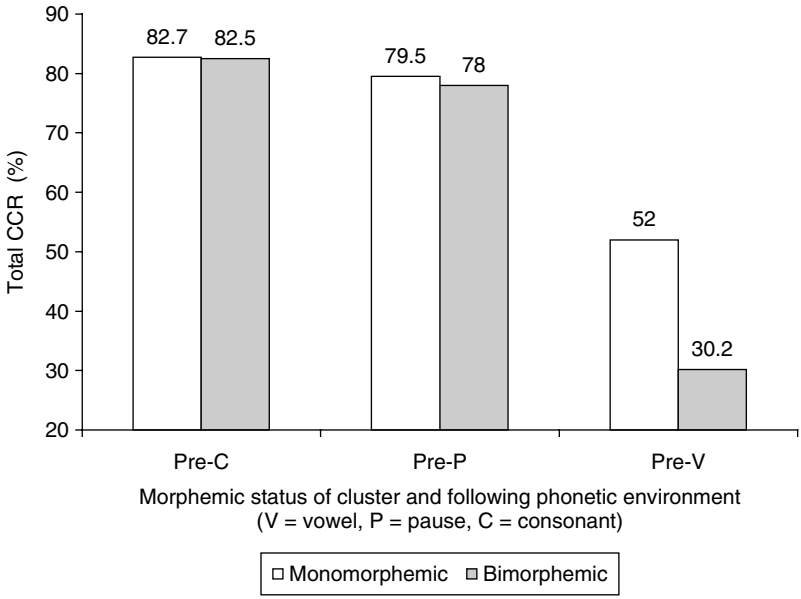

Figure 4.7 Word-final CCR in African American English (Hyde County NC)
Source: Adapted from Wolfram and Thomas 2002: 136.

phonetic and grammatical constraints are both similar and distinct. First of all, the following environment effect is particularly strong, but only in following consonants and vowels (C > V) and not with pauses: in Hyde County AAE, a following pause patterns with consonants, strongly favouring the deletion of cluster-final plosives. Another finding is that the cluster status influences the rate of CCR as well, even though the strength of this effect is weaker (being particularly slight in preconsonantal and prepausal environments). This may be indicative that this effect varies in strength, but alternatively it may also be a consequence of the high overall reduction values in AAE. Consequently, the major constraints on CCR variation are similar in white and black AmE, albeit varying in strength. Differences are by nature quantitative (CCR being much more prominent in AAE) and also related to language-internal effects, such as following pauses.

One should bear in mind that earlier AAE was subject to regional variation and that there were many facets of accommodation. Consequently, then, one would expect considerable variation with regard to CCR, so that some AAE speakers do not distinguish themselves from Anglo-AmE norms and others differ very much. However, the fact that a comparatively integrated group of AAE speakers (who did *not* reside in large plantations) has maintained different CCR patterns over several centuries is indicative of a considerable hold-over effect of substratal features and of phonotactic transfer of non-English syllable patterns. By the same token, fossilisation effects may be long-term and persist for centuries, even if individuals are immersed in a community where native-speaker norms and constraints are normative. This is witnessed by the case of an elderly African American on the island of Ocracoke NC, who has maintained a number of features that originated in putative language transfer and contact-induced adaptation even though she has spent practically her entire life in a strongly Anglo-American-oriented community and is the last surviving member of the only African American family to live on Ocracoke in the past century (Wolfram *et al*. 1997).

The present scenario resembles the one discussed above with reference to MNZE, with the difference that diagnostic CCR has been maintained in AAE. Whereas the phonotactic effects in MNZE disappeared within two or three generations, they have been maintained in the speech of many AAE speakers for centuries, long after the de facto completion of language shift. In other words, whereas phonotactic differences disappeared as MNZE speakers approached the English target, CCR fossilised in AAE, where complete accommodation did not occur.

Bilingualism

We now turn to the development of CCR in a context of language contact where shift has not (yet) occurred for many speakers. As mentioned above, the line between individual entries in a contact-based framework is occasionally difficult to draw. This dilemma is particularly noticeable in the variety discussed in this section, Chicano English (ChicE), spoken in the south-western United States. On the one hand, one could regard ChicE as indicative of ongoing language shift, and the recent immigration patterns and the increase in the Latin American and Mexican communities in the USA would certainly allow case studies of early accommodation. For the present purpose, ChicE is regarded as a case of bilingualism for three reasons. First of all, the usage of Spanish has a long-standing historical continuity in the USA. The American South-east (Florida) and South-west (Texas, New Mexico, southern California) were under Spanish rule for a long time, some regions until the nineteenth century. Spanish influence in these areas was further strengthened by the continuous influx of Spanish-speaking immigrants into the United States, from both Central America and the Caribbean. Second, Spanish is the most widespread and influential minority language in the USA; its usage is very present in areas such as the South-west and Florida and Hispanic Americans now represent the majority of the population in cities such as San Antonio in Texas. Third, many community members still use Spanish to some extent, maintaining both languages in their everyday lives; accordingly, a good number of ChicE speakers whose speech was analysed for the two studies reported here spoke both Spanish and English, sometimes in the same interview (Bayley 1995). The combination of these factors allows for a classification of this variety in the bilingualism section (but of course I admit that there is some overlap with the other categories, and it is by no means meant to imply that such a classification holds on an idiolectal level).

CCR has been subject to research in the south-western USA. Santa Ana (1992, 1996) studied this variable in the speech of Mexican Americans (Chicanos) in Los Angeles, both in non-immigrants (born in and life-long residents of Los Angeles, many of whom were Spanish–English bilinguals) and immigrants (Mexico-born speakers who moved to the United States at a later stage in their lives and spoke English as a second language). Among others, Santa Ana researched the development of ChicE with reference to regionality (comparing data from four barrios in Los Angeles) and age (analysing data from speakers across five generations, from immigrants to the great-grandchildren of immigrants), applying the importance of his findings not only to ethnolinguistics

but also to lexical phonology (Santa Ana 1992) and sonority effects that govern the variable application of CCR (Santa Ana 1996).

Based on an analysis of almost 11,000 tokens and a sample of 45 ChicE speakers in Los Angeles, Santa Ana found that ChicE displays the general constraints on CCR while at the same time having considerably higher reduction levels than white varieties of AmE. Santa Ana looked into a number of aspects of CCR which are infrequently studied elsewhere (for instance, providing quantitative evidence that trisegmental clusters have higher reduction rates than bisegmental ones, and that clusters in unstressed syllables are more likely to undergo final-stop deletion than clusters in stressed ones). Preceding segment constraints differed in ChicE, with the exception of sibilants that favoured the deletion of a following stop (hierarchy: sibilant ~ nasal > plosive > fricative > lateral). Santa Ana confirmed that the effects related to the morphological status of the plosive adhere to the well-established pattern as well (monomorphemic > semi-weak past-tense verb > regular/weak past-tense verb).

Unfortunately, Santa Ana's data presentation makes it impossible to investigate the strength of the major effects. A breakdown of CCR by cluster status and following environment is not provided, only the general effects for each category, so that a cross-analysis of the interaction of both factors is impossible. The way the data are presented indicates that monomorphemic CCs are much more likely to undergo reduction than bimorphemic ones and that a following vowel inhibits CCR in contrast to a following consonantal segment. On the other hand, the following segment effect is different in ChicE in that the strongest effect is exerted by pauses, and cluster-final stops in this environment have even lower deletion rates than when followed by vowels (Table 4.13; $n = 10{,}868$). Santa Ana also observed a number of

Table 4.13 Word-final CCR in Los Angeles Chicano English

	Morphological status		**Following phonetic environment**		
	mono ($n = 3.747$)	**bi ($n = 930$)**	**consonant ($n = 3.693$)**	**vowel ($n = 1.574$)**	**pause ($n = 1024$)**
Reduced	2,155	208	2,290	708	379
Not reduced	1,592	622	1,403	866	645
CCR (%)	57.5	25.1	62.0	45.0	37.0

Source: Adapted from Santa Ana 1996: 66.

differences (such as the effect of syllable stress or preceding /r/), which he attributes to potential substratum effects from (Mexican) Spanish.

A second study on phonotactic variation in bilingual contexts is Bayley's (1995) analysis of Tejano English (TejE), the speech of Mexican Americans in San Antonio, Texas, the only major city in the United States with a Hispanic population majority. Most of the speakers investigated by Bayley (1995) reported to speak Spanish as a first language and to use it extensively (or even exclusively) in their households (this was evidenced by the fact that some speakers frequently switched codes in the course of the sociolinguistic interviews). In terms of CCR, TejE, just like ChicE, followed the well-established patterns in terms of morphological status and following phonetic environment (Table 4.14; $n = 3{,}276$), even though it also differed in various respects (syllable stress, cluster length and voicing agreement of preceding and following segments did not significantly affect CCR rates).

The preceding segment hierarchy here is /s/ > nasal ~ plosive > lateral > fricative. Bayley concludes that CCR represents an important variable to establish linguistic and social constraints in TejE. It offers vital insights into the historical development of this variety, and provides evidence of the linguistic status of TejE *vis-à-vis* other varieties. First of all, the internal constraints led Bayley to conclude that TejE is a variety of English rather than an intermediate variety; the context-sensitivity of the constraints and the common patterns, coupled with the finding that first language usage as reported by the interviewees had no significant effect, suggest that accommodation has advanced to the stage that Spanish–English bilinguals display the same constraints as native speakers of English do. Second, Bayley stresses that CCR is of importance for cross-varietal comparisons. TejE and Los Angeles ChicE share a number of characteristics, and this may be illustrative of Hispanic English spoken in the US South-west generally. They suggest

Table 4.14 Word-final CCR in San Antonio Tejano English

	Morphological status		**Following phonetic environment**		
	mono ($n = 2.591$)	**bi ($n = 681$)**	**consonant ($n = 1.738$)**	**vowel ($n = 564$)**	**pause ($n = 974$)**
Reduced	1,404	167	1,073	257	241
Not reduced	1,187	518	665	307	733
CCR (%)	54.2	24.4	61.7	45.6	24.7

Source: Adapted from Bayley 1995: 310.

that regional varieties develop in parallel and that white AmE norms are adopted as accommodation intensifies; on the other hand, ChicE and TejE continue to differentiate themselves quantitatively. This is further evidenced in that the CCR continuously carries ethnolinguistic significance, which sets the two ethnic groups apart in their language usage. These findings allow speculations that there are general, cross-regional accommodation patterns that characterise AmE and ChicE/TejE. CCR thus offers insights into the degree of resemblance between varieties that involve similar inputs and are shaped in similar contact settings.

English as a Second Language (ESL), exemplified by Indian English

The next scenario is one where English functions as an officially recognised Second Language (L2). Though there are few monolingual speakers of English in countries where English serves as an L2 (Crystal 1995), post-colonial Englishes have often come to hold a special status as a medium of communication. First of all, ESL varieties are often incorporated into the countries' legislating and political institutions, which strengthens their role and status in public life. Second, the total number of ESL speakers increases constantly so that they have now by far surpassed the number of native speakers of English (that is, those in Kachru's 'Inner Circle' of English around the world). Crystal (1995: 109) estimates that there may be 400 million or more ESL speakers worldwide. The development of CCR in these varieties therefore provides another important insight into phonotactic variation and change in English.

One of the most important ESL varieties is Indian English (IndE), which has the status of an institutionalised L2 and is in fact one of the oldest varieties of all post-colonial Englishes. The origins of IndE date from the early seventeenth century, when the East India Company established its first trade posts in Surat, Madras, Bombay and Calcutta (McArthur 1993, 2002). Missionaries were instrumental in spreading the usage of English when founding schools and colleges for the education of the local population. By the 1830s, the local elite were English-speaking and there was a firm intent to strengthen the importance of English in public domains (which, among others, led to the education of adolescents in English colleges and later to the establishment of Western-style universities). Upon the Indian declaration of independence in 1947, English gained importance as wider population groups adopted it as an L2 or as a lingua franca.

Khan's (1991) analysis of this variable in IndE, as spoken in the state of Uttar Pradesh, is the first quantitative study of word-final CCR in this variety; previously, this feature was commented on (Bansal 1972) but not analysed in detail. Khan's database consists of a total of 40 adults, all bilingual speakers of their native language(s) (Hindi, Urdu and Pahari) and English. Unfortunately, this study lacks methodological sophistication and we need to take great care in interpreting these data (for instance, Khan does not even provide the total number of tokens analysed, reporting the global percentages instead). As for language-internal constraints, Khan reported factors of preceding/following segment and cluster status. She found that the variability of CCR in IndE was governed by the same constraints as elsewhere. Bimorphemic clusters were reduced less often than monomorphemic ones. As for the following segment, a following consonant favours reduction; a following vowel, on the other hand, inhibits it and following pauses have an intermediate effect (Figure 4.8).

Khan also studied the effect of the preceding segment, and found that CCs were most likely to undergo reduction when they were preceded by

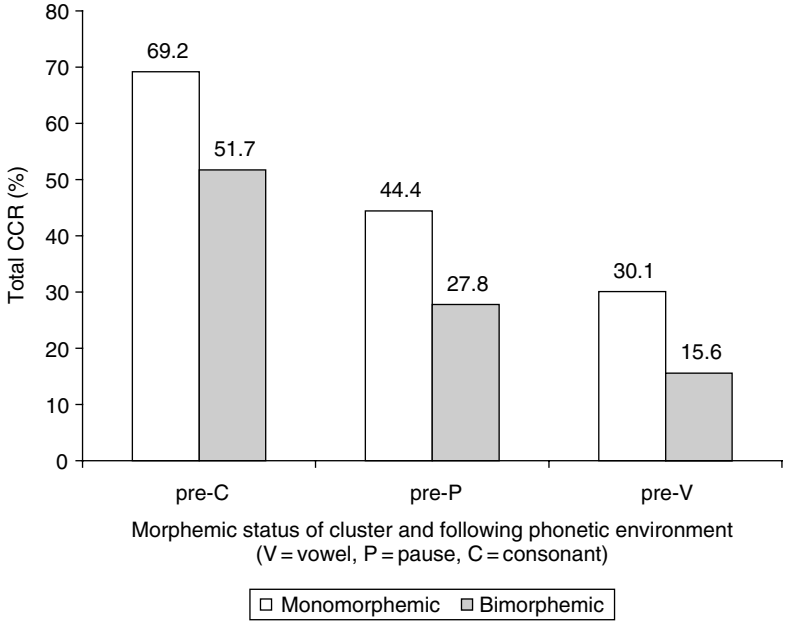

Figure 4.8 Word-final CCR in Indian English
Source: Adapted from Khan 1991: 290.[12]

a fricative (such as *fast*, *loved* or *amazed*) and less likely to be reduced after a nasal or lateral (*attend*, *rolled*). In contrast, consonants preceded by plosives (*act*, *robbed*) had the lowest overall reduction rates (hierarchy: sibilant > lateral ~ nasal > plosive). Following Guy (1980), Khan speculates that this may be explained by the grammatical function of bimorphemic clusters.

IndE thus by and large adheres to the general constraints on CCR. However, it differs in its overall trend in which CCs are reduced and in the types of clusters that are (variably) reduced. As for the high reduction rates, Khan favours substratal effects when arguing that 'Many Indian languages do not have final clusters, and most Indian speakers seem to find final clusters difficult, often tending to break them either by inserting /ɪ/ or /ə/ in the middle of the cluster or by deleting the final stop completely' (1991: 291). The insertion of vowels to break up CC structures is an important alternative phonotactic strategy, which may also be to some extent phonologically conditioned (Chapter 5). The fact that a variety has both deletion and epenthesis throws light on the complexity of phonotactic variation in ESL varieties.

The second major difference is by nature typological. Most varieties adhere to the voicing constraint, so that CCR can only operate when both cluster segments are voiced or unvoiced. Crucially, though, CCR in IndE also applies to clusters with hetero-voiced segments. This constraint is not operative (or limited) in IndE so that a larger set of clusters can undergo this process. Coda-final plosives in hetero-voiced clusters, such as /-lt/, /-lp/ or /-nt/, are as frequently reduced as homo-voiced ones, a typological difference which is in obvious contrast to the constraints reported elsewhere. This suggests that ESL varieties may have different constraints on CCR and apply this process more generally (which again explains why the overall CCR values are higher). This is an important difference, to which we return in Chapter 5.

English as a Foreign Language (EFL), as exemplified by Korean English

The next context is one where English is not natively learnt and where it does not enjoy special status (other than high prestige). Varieties of English as a Foreign Language (EFL) are non-native-speaker varieties; they are often used for specific purposes and in special (for example, work-related) domains, even though they have no official institutionalised status in the communities or countries that use them. EFL varieties are learnt once a first language is already used; they do not represent first-language acquisition and display a variety of substratal or interference phenomena involved in language learning. Generally, the number of

EFL speakers has by far exceeded the number of native speakers of English (Crystal (1995) estimates that there may be more than one billion). Consequently, there is considerable diversity within and among EFL varieties, and the development of phonotactics in such contexts is particularly insightful for the diversification of English.

CCR has not received much attention in EFL studies; various sources simply list this feature as 'typical' or 'common' (McArthur 1993; Crystal 1995) and to my knowledge there are no quantitative analyses of CCR in these varieties. There is a lack of information on CCR in EFL varieties, and this area definitely deserves more research. This is not only essential to gain further insights into the complexity of phonotactic variation and change in English but it would also yield important insights into phonological strategies and phonotactic transfer processes that operate in language-learning situations. The following discussion can be no more than a first approach.

The little known on phonotactic developments in EFLs indicates that (1) CCs pose problems for speakers whose first languages have canonical CV syllable structures (which was already the case in native speakers of Maori or Vietnamese), and that (2) a number of alternative strategies are available to break up or avoid clusters in the target language. The three most widespread of these mechanisms, reduction, epenthesis and prothesis (Chapter 2), are found in many varieties, often co-occurring. First of all, most, if not all, EFL varieties have CCR. McArthur (1993) lists a variety of Englishes where this process is found, such as Pakistani English (p. 742), Singapore English (p. 938; see also Anttila *et al*. 2003) or Uganda English (p. 1067). CCR in EFL varieties adheres to patterns found in native-speaker varieties, namely that the cluster is reduced through deletion of the final plosive whereas other plosive segments remain intact. In addition, EFL speakers also employ strategies that are not (or if so, very rarely) found in native speakers of English. These strategies often depend on the phonotactic system of the native language and reflect substratal influence.

Korean EFL is a case in point. Korean is not a CV language and permits a range of consonant clusters. However, the phonotactic system of Korean does not permit the same range of final CCs as English does; whereas clusters consisting of a lateral and a plosive (e.g., *help*, *milk*) or a nasal and a plosive (*lamp*, *ant*) are permitted, clusters consisting of laterals and nasals (*film*) or fricatives and plosives (*lisp*, *left*) are not. Korean speakers of English employ several strategies to adapt unusual clusters. CCR, perhaps surprisingly, is rare in Korean EFL; in contrast, Koreans adapt clusters by resyllabifying English syllable patterns

through epenthesis or final vowel insertion. Whereas clusters that are familiar to native speakers of Korean are kept intact (although on occasion modified through the addition of a final vowel), unfamiliar ones are broken and resyllabified through epenthesis. The strategy employed depends on various language-internal criteria, such as whether the cluster has an equivalent in the native language, the total cluster length (bi- versus trisegmental), and also what segments it incorporates. Table 4.15, adapted from Lee (2000), summarises the major strategies of phonotactic adaptation in Korean EFL.

This study reports some important findings, particularly in the light of Harris's (1994, 1998) argument that phonotactic variation is conditioned by empty nuclei. First of all, it is noteworthy that Korean EFL speakers (variably) modify *all* clusters in the target language, not only those with a plosive as second segment (final /-ks/ and /-lm/ are adapted also, as are *change* [tʃeindʒi] or *rinse* [ɾinsɯ]). English clusters may even be modified when they have an equivalent in Korean; they are neither reduced nor broken up but undergo resyllabification through the affixation of a final unstressed [ɯ], so that they become open syllable types. The pattern that emerges is that native-like clusters are more likely to be resyllabified whereas non-native ones are broken up through epenthesis. Second, both epenthesis and vowel prothesis may be employed to reduce complex CCC clusters (which have no equivalent in Korean phonotactics). The affixed final vowel is not randomly chosen but inserted in accordance with the phonetic qualities

Table 4.15 Epenthesis and final-vowel insertion in Korean EFL

Cluster set-up	Epenthesis	Final C insertion	Example
Liquid + nasal	✓		*film* [filɯm ~ filim]
Liquid + plosive		✓	*help* [help^{h}ɯ], *milk* [milk^{h}ɯ]
Nasal + plosive		✓	*lamp* [lɛmp^{h}ɯ], *rinse* [rinsɯ]
Plosive + plosive		✓	*adopt* [ədopt^{h}ɯ ~ ədapt^{h}ɯ], *act* [ɛkt^{h}ɯ]
Fricative + plosive	✓	✓	lisp [lisɯp^{h}ɯ], left [lefɯt^{h}ɯ]
Plosive + fricative		✓	*lapse* [lɛpsɯ], *fox* [fɔksɯ ~ faksɯ]
Plosive + fricative + plosive	✓	✓	*text* [t^{h}eksɯt^{h}ɯ], *midst* [midɯst^{h}ɯ]
Nasal + plosive + plosive	✓	✓	*prompt* [pɾomp^{h}ɯt^{h}ɯ], *distinct* [dist^{h}iŋkɯt^{h}ɯ]

Source: Adapted from Lee 2000.

of the cluster: [i] is suffixed to clusters that consist of affricates or post-alveolar fricatives, and [ɯ] to all other clusters.

These strategies diverge from the common processes. CCR is in competition with alternative phonotactic strategies, the variable applications of which are language-internally conditioned. By the same token, Korean EFL is primarily triggered by factors such as cluster type and length and only to a lesser extent by the phonetic properties of the individual segments. CC modification in EFL is certainly context-sensitive (as in all other varieties), but it is more tightly constrained, which may explain the concurrence of alternative strategies in this variety. As a result, there is a fairly general transfer of Korean phonotactic structures in the EFL variety; native L1 structures exert substratal effects onto the target (even, and this is an unexpected finding, when the target structure is also found in the native variety). As a consequence, EFLs provide fewer insights into CCR but illustrate the complexity of phonotactic variation and change in English more than native-speaker varieties do.

We conclude that EFL varieties (as exemplified by English in Korea), display a general trend towards phonotactic modification and feature a number of parallel mechanisms, such as epenthesis and final vowel insertion, which are uncommon in native-speaker or ESL varieties. Impressionistic evidence suggests that this is a general characteristic of Asian EFLs, but, as said above, more substantial (quantitative) studies are necessary to analyse the variation of phonotactic modification strategies in more detail.

Creolisation

Language contact and creolisation typically foster phonotactic variation and change. The case of Sranan in Chapter 3 illustrated that the emergence of contact-derived English varieties with their own linguistic systems and norms gives rise to restructuring and decomplexification on grammatical and phonological levels. Creoles thus provide an excellent venue to explore additional manifestations of consonantal change and this section ends with an analysis of CCR development in two English creoles in the Caribbean. The first of these varieties is Bahamian English (BahE). The Bahamas provide a particularly interesting case since this variable has been studied in two communities that are sociohistorically related even though they have different contact histories (thus resembling the case study of CCR in two varieties of SAtlE). The Bahamas' unusual settlement history (when compared with other Caribbean settings) accounts for the community's social heterogeneity

and allows us to contextualise the findings; a brief social history illustrates this.

The native Lucayan tribes were deported by the Spaniards and the islands remained unpopulated until the mid-seventeenth century (Holm 1989: 489). The founding stock of the present population is composed of white settlers from Bermuda and the American mainland (mostly from South Carolina) and imported slaves (Hackert 2004). Large-scale sugar or cotton plantations were not profitable due to the islands' poor soil conditions, and this had social and linguistic consequences. The demographic differences between black and white population groups were not as drastic as in other places (in 1783, whites amounted to 42 per cent of the total population), and the inhabitants worked together in close cooperation on small farms (in contrast to large-scale plantation systems elsewhere). The close ties with the United States go back to the influx of British loyalists after the American War of Independence. Most of them settled in white enclaves, some of which persist to the present day. The early nineteenth century witnessed important social changes: numerous whites left the islands after the thin soil was exhausted and the remaining cotton plantations were destroyed by insects. As a consequence, some areas of the Bahamas became almost exclusively black. The nineteenth and twentieth centuries witnessed social solidification and an increasing stability of the local population, although the demographic proportions continued to change. Some 85 per cent of the Bahamas' current population (of just under 300,000) is black.

As for phonotactics, Bahamian English (BahE) phonology, white and black varieties alike, has been noted to have a strong tendency towards CCR (Holm 1989; Hackert 2004). CCR is so frequent that Wells (1982: 566–7) suggests that basilectal varieties of BahE have virtually no final clusters ending in alveolar plosives. The high overall tendency towards CCR in BahE is further supported by Holm's (1980: 57) claims that the regular past tense suffix *-ed* is usually absent and that clusters are even reduced when followed by a suffix with initial vowel (as in *acting* ['ækən]). Related to this, Hackert (2004) finds that the tense and aspect systems of BahE have undergone extensive reorganisation, so that these categories are mostly expressed with preverbal markers.

In a detailed quantitative investigation of selected phonological features of BahE, Childs *et al*. (2003) investigated CCR in two ethnically different communities on Abaco Island, situated some 120 miles east of southern Florida. Childs *et al*. compared CCR levels in the (almost) exclusively black community of Sandy Point with those of Cherokee

Sound, an exclusively white community. The two communities, though only 35 miles distant, have different social histories as they were founded by distinct population groups: Sandy Point by emancipated slaves in the late 1830s and Cherokee Sound by British loyalists who arrived as early as in the 1780s, at a time when white settlers were in the habit of settling outer islands to minimise the risks of malaria infection and also to escape social tensions on the main islands of the Bahamas.

Childs *et al*. analysed CCR to investigate parallels and differences in the two communities' vernaculars. They found that the most significant effect governing CCR was exerted by community, and that black speakers of Sandy Point English were far more likely to reduce clusters than white Bahamians from Cherokee Sound. Moreover, BahE speakers from Sandy Point had quasi-categorical reduction rates for monomorphemic clusters in pre-C and pre-P environments, and also in bimorphemic clusters followed by a consonant (Table 4.16 and Figure 4.9; $n = 648$). On the other hand, notwithstanding the high overall reduction levels, CCR in Black BahE is a phonological and not a grammatical process. *-ed* marking is context-sensitive and displays similar constraint hierarchies in the two varieties. This is evidence that speakers of White BahE accommodated considerably to Black BahE. Even though White BahE speakers have lower levels of CCR, they nevertheless have higher rates when compared to white communities elsewhere. Interactional patterns as well as accommodation to (and adoption of) creolised features are the most plausible advance to explain why White BahE has considerably higher CCR than AmE and BrE varieties.

Table 4.16 Word-final CCR in Black and White Bahamian English

		Pre-C		**Pre-P**		**Pre-V**	
		mono	**bi**	**mono**	**bi**	**mono**	**bi**
Sandy Point	Reduced	66	11	24	4	41	10
(Black BahE)	Not reduced	1	0	0	2	10	8
	CCR (%)	98.5	100	100	66.7	80.4	55.6
		($n = 67$)	($n = 11$)	($n = 24$)	($n = 6$)	($n = 51$)	($n = 18$)
Cherokee	Reduced	93	39	37	14	23	5
Sound	Not reduced	47	32	41	1	79	60
(White BahE)	CCR (%)	66.4	54.9	47.4	6.7	22.5	7.7
		($n = 140$)	($n = 71$)	($n = 78$)	($n = 15$)	($n = 102$)	($n = 65$)

Source: Adapted from Childs *et al*. 2003: 17.

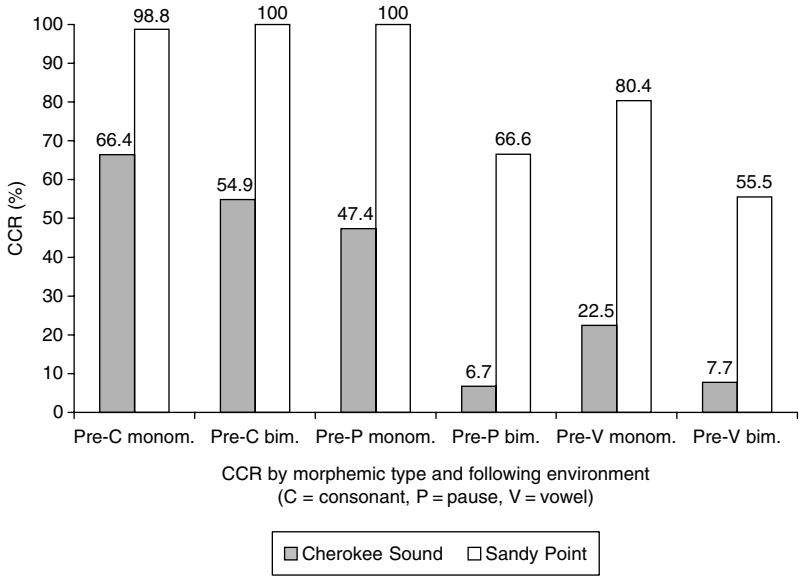

Figure 4.9 Word-final CCR in Black and White Bahamian English
Source: Adapted from Childs *et al*. 2003: 17.

Apart from the quantitative dimension of CCR in the two communities, the only notable difference concerns the effect of a following pause in the two varieties. Nevertheless, the similarities outweigh the differences. What is particularly important here is that both communities display an identical set of internal constraints, namely that variable reduction occurs at higher levels in monomorphemic clusters in each environment. This is evidence that Black BahE, while having considerably higher reduction levels due to contact-induced transfer of CV(C) syllable structures from languages other than English, has also accommodated to white norms, namely to an extent that it now displays an identical set of language-internal constraints. Whereas it aligns with following consonants in Black BahE, favouring CCR, it behaves like a following vowel in White BahE, favouring the maintenance of a preceding stop. While the two communities differ quantitatively, which is what distinguishes them from other English varieties, both Black and White BahE thus adhere to a set of identical constraints, which aligns them with BrE and AmE varieties. This indicates that

accommodation in the Bahamas took a bilateral path and that the two ethnic groups accommodated to each other alike as the local variety evolved.

The second variety discussed in this category is English in Jamaica, which, with about 2.5 million inhabitants, is 'the most populous Creole-English-speaking country…and cultural center of the Anglophone West Indies and beyond' (Holm 1989: 469). Jamaican Creole English (JamCE) has traditionally played an important role in pidgin and creole studies as it was first described in modern linguistic studies (Le Page and DeCamp 1960; Bailey 1966; Cassidy 1961) and is now probably the best documented of all English creoles. British involvement on the island began in 1655, when English colonists ousted the previous Spanish occupants and their slaves. Settlers arrived from Great Britain and from other islands in the Caribbean, Nevis, Barbados and Suriname, and Jamaica's population amounted to 4,500 whites and 1,400 blacks in 1658 (Holm 1989: 470). Then more slaves were imported to work on the large plantations, and the black population outnumbered the white one by the 1670s. Within fifty years, the slaves represented more than 90 per cent of the local population (Patrick 1999) and there are first reports that the slaves' creole English was also adopted by white settlers (see Holm 1989: 470). At the time of emancipation in 1833, whites numbered only about 7 per cent of the local population and the abolition of slavery led to a dispersal of the population to other and less accessible parts of the island (Alleyne 1988). Slavery was abolished in Jamaica through a system where slaves would buy their freedom by working for wages. This scheme was intended to displace slavery and to bolster the local economy, but there was simply no sufficient means to carry this plan out successfully. Consequently, it led to increasing social divisions between the upper class and the newly freed slaves, most of whom were lower-class. This situation continued throughout the twentieth century and changed very little after Jamaica gained independence from Britain in 1963. Today approximately 90 per cent of the Jamaican population are of African descent, with the other 10 percent mostly of European, East Indian and Chinese origins.

The population mixture and social history of Jamaica have given rise to one of the best-known and most widely researched English-based creoles, and the investigation of CCR in this variety gives particularly important insights into phonotactic processes that operate during language contact, pidginisation and creolisation. Patrick (1991, 1999) investigated this variable in ten speakers (differing in age, education, occupation and residence) of mesolectal JamCE. Table 4.17 and Figure 4.10

Table 4.17 Word-final CCR in mesolectal Jamaican Creole English

	Pre-C		**Pre-P**		**Pre-V**	
	mono (*n* = 681)	**bi (*n* = 168)**	**mono (*n* = 176)**	**bi (*n* = 53)**	**mono (*n* = 501)**	**bi (*n* = 210)**
Reduced	551	145	120	41	295	142
Not reduced	130	23	56	12	206	68
CCR (%)	80.9	86.3	68.0	77.4	58.9	67.6

Source: Reconfigured from Patrick 1999, ch. 5.

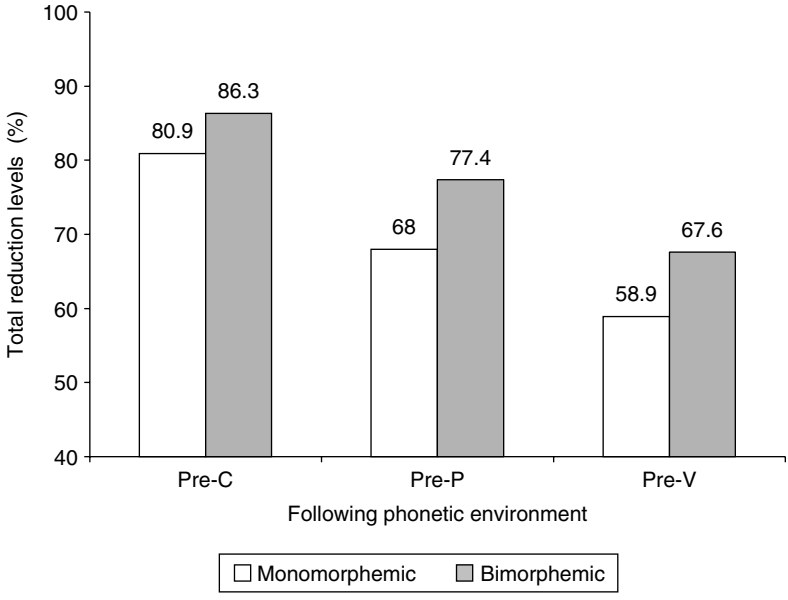

Figure 4.10 Word-final CCR in mesolectal Jamaican Creole English
Source: Dates reconfigured from Patrick 1999, ch. 5.

(*n* = 1.789) indicate that the overall reduction levels are comparatively high (72.3 per cent).

On the one hand, mesolectal JamCE displays an identical context-sensitivity, in that it features the same phonetic constraints as AmE varieties (in both preceding and following phonetic environments: Patrick 1999: 146–7). In contrast, CCR is higher throughout in bimorphemic items and lower in monomorphemic ones. The morphemic

status of cluster segments has thus a reverse effect in JamCE, and the pattern found here is exactly the same as in StHE (section 4.2), a variety with which JamCE is not historically related. This, another point of interest, is also the pattern found in the earliest developmental stages of VietnE, which is indicative of an interesting parallel between creole and learner varieties.

As for preceding segment constraints, the constraint hierarchy found in JamCE indicates that the deletion of a cluster-final stop depends on the sonority of the cluster-initial consonant. The less sonorant C_1 is, the higher is the likelihood that a following plosive is deleted. Patrick (1999: 140) reports the following hierarchy: sibilant > plosive > other fricatives > nasal > lateral.

As a conclusion, creole varieties have a higher tendency to reduce final clusters. Whereas Romaine's (1988: 63) assessment that 'Creoles . . . have no initial or final consonant clusters' cannot be maintained in view of the data discussed, it is nevertheless clear that English-based creoles have a strong tendency towards CCR. Extrapolating from the present findings, English creoles have significantly higher CCR levels than native-speaker varieties, typically ranging between about 75 and 90 per cent. By the same token, CCR is a context-sensitive process in creoles as well, displaying similar environment effects as elsewhere (most notably in the following segment: C > V). On the other hand, we also observe two competing patterns with regard to morphemic constraints and note that JamCE has effectively reversed cluster status effects; bisegmental clusters containing an *-ed* suffix are more likely to undergo reduction than monomorphemic clusters where individual segments do not carry morphological meaning. On the other hand, this is not a general phenomenon: whereas BahE displays the common morphemic constraint (mono > bi), JamCE is much more likely to reduce bimorphemic clusters. The reversal of the common constraint ranking and existence of an alternative set raises important questions for the development of phonotactics and consonant change in contact conditions. We will return to this in more detail in Chapter 5.

4.4 Word-final CCR in English: summary

This chapter has looked into final cluster reduction in a variety of Englishes. The New Zealand and South Atlantic varieties were researched for this study exclusively, whereas related studies were integrated with the aim of completing the overview of final CCR in English around the world. The four case studies reported in 4.2 revealed a number of

conditioning factors and showed the usefulness of this variable for contact and genetic linguistics. At the same time, they provided evidence of alternatively existing constraints on CCR, both phonetic and morphemic, which challenged some current assumptions. Section 4.3 elaborated on the previous discussion by presenting data from a number of distinct settings, discussing CCR in varieties without a recent history of language contact, koinés, language shift and bilingualism, ESL and EFL varieties, and creoles. Phonotactic adaptation is variety-specific and context-sensitive; the variation we find is by nature regional, social, individual and (though not investigated here) quite plausibly stylistic also. By the same token, final CCR, though by far the most common strategy, is in competition with various strategies employed to break up unfamiliar clusters and to thus modify unusual or unfamiliar phonotactic properties in the target language. The alternate usage of various strategies within a given variety offers insightful perspectives on phonotactic variation and indicates that preferences are language-specific. Combined, this chapter provides the most complete overview of word-final CCR in English around the world, highlighting the constraints and significance of this variable with an unprecedented amount of data.

5
Theoretical Implications

Consonant clusters are 'vulnerable' in a number of ways and for a number of reasons: they are less common typologically than other structures; they are unstable historically, usually merging with the more sonorous cluster segment; and their production causes problems both for children who acquire a first and for adults who learn a second language. These factors are reflected in context-sensitive variation, which under given conditions can lead to permanent phonotactic change. Chapter 2 discussed clusters in the light of markedness and naturalness, showing that cluster formation is conditioned by criteria related to sonority ranking and morphological status of the individual consonants. Chapters 3 and 4 looked into phonotactic variation and change from a variety of angles, analysing the reduction of clusters in earlier British English as well as in a plethora of contemporary varieties. We are now left with the task of comparing the results and integrating them into a general theoretical framework, interpreting the findings from Chapters 3 and 4 with reference to the most important general aspects from Chapter 2 (and, vice versa, checking whether some generally held assumptions hold in the light of the research findings presented). With these aims, the present chapter discusses some general implications for phonotactic variation and change in synchronic and diachronic varieties of English, addressing substrate influences and language-internal constraints, some general principles of consonantal change as well as the role of psycholinguistic effects and lexical processing.

5.1 Variation and differentiation

The first section deals with variation and differentiation, discussing how this feature varies individually and also how it indicates genetic

relationships and typological affinities. I first discuss the role of substratal influence, go on to look into the significance of constraints that govern these processes (to what extent they are shared, to what extent they are different) and end by discussing some typological aspects, namely why clusters are reduced in some varieties but not in others, which, I argue, is a particularly diagnostic criterion.

Substrate influence

Cluster-final stop deletion is a common and regular process. Its variable application is constrained by a variety of language-internal and extralinguistic factors, the combination of which accounts for the complexity of this feature. Moreover, word-final CCR is ubiquitous in English and found in all regional, social and idiolectal varieties. Consequently, cluster-final stop deletion is a universal feature of spoken English, which allows us to formulate a first principle:

- *Principle 1*: No speaker of English, no matter whether mono-, bi- or multilingual, native speaker or learner, regardless of psychosocial considerations and stylistic aspects, fully realises all clusters in all linguistic environments and in all social contexts or speech styles.

Individual varieties therefore do *not* vary as to whether they have this feature or not. This has implications for interpretation and analysis: since all varieties of English have some extent of CCR, this feature does not qualitatively distinguish language usage as such. This is why it is paramount to identify the overall frequency of this process in individual varieties, namely by jointly listing and comparing global CCR values across varieties (focusing on reduction percentages only, starting with the lowest ones; see Table 5.1). Strikingly, all the varieties towards the upper end are British and American varieties with no recent histories of language contact. Pakeha NZE falls in this group also, even though it is the product of dialect contact and new-dialect formation processes that occurred in the nineteenth century. This can only mean that CCR is resistant and maintained throughout the koinéisation process and that it does not undergo decomplexification once the initial co-occurrence of randomly transplanted variants decreases and new norms crystallise. Contact between varieties with similar phonotactic systems (for example, in classical dialect contact scenarios on the Falkland Islands, in the British Fens or in Milton Keynes) consequently does *not* have an accelerating effect on phonotactic change so

Table 5.1 Global CCR values in 14 varieties of English

	CCR (%)
York English (Tagliamonte and Temple 2005)	24.0
Pakeha New Zealand English	27.8
Philadelphia English (Neu 1980)	28.2
White Hyde County NC English (Wolfram and Thomas 2002)	28.8
AAE, Washington DC (Fasold 1972)	40.2*
Texas Tejano English (Bayley 1995)	48.0
Los Angeles Chicano English (Santa Ana 1996)	52.0
Maori New Zealand English	66.5
AAE, Hyde County NC (Wolfram and Thomas 2002)	67.2
Mesolectal Jamaican Creole English (Patrick 1991, 1999)	72.3
St Helenian English	86.5
Black Bahamian Creole English (Childs *et al*. 2003)	87.6
Tristan da Cunha English	87.8
Early Vietnamese English (Wolfram *et al*. 1986)	*c*.92.0

* Fasold (1972) analysed bimorphemic clusters only; the overall average would be considerably higher if monomorphemic ones had been included also.

that cluster reduction levels remain stable in new-dialect formation (principle 2).

- *Principle 2*: Contact between systems with similar or identical phonotactic systems does not lead to phonotactic simplification. CCR remains stable in dialect-contact situations and is not modified during koinéisation.[1]

Moreover, the four varieties' global reduction values are very similar, so that total CCR values in native-speaker varieties range between 25 and 30 per cent (which, however, depends on methodological and sampling criteria and may be higher if unstressed, high-frequency items are included in the analysis as well).

Moving down the list, we find that all the varieties with CCR values higher than 40 per cent were shaped in contact settings with other languages and, by implication, with other phonotactic systems: African American English, Hispanic varieties, English-based creoles in the Caribbean, ESLs, and so on. This feature is much more prominent in non-native varieties of English, in dialects that adopted substratum features as a result of language shift, underwent pidginisation and/or creolisation, and so on. The global reduction values here range between about 50 and 90 per cent. This allows one conclusion only: the chances for CCR to

increase are higher in contact situations that involve distinct languages, particularly when the substrate(s) do not have syllable-coda CCs (as was the case in creolisation, L1 Vietnamese learners of English, contact between Maori and English in New Zealand and English and Dravidian languages in northern India). Contact between distinct varieties is therefore a most important driving force; an increase in CCR reflects transfer of phonotactic structures, which has the effect of making target structures conform more to substrate structures.

High CCR values thus represent substratal effects and adoption of non-English syllable patterns. The most plausible explanation is that more natural or unmarked structures (such as CV or CVC) are directly 'grafted' onto the target variety, which in turn features syllable types that are more common, less linguistically marked or more natural. We can formulate principle 3 as follows:

- *Principle 3*: Phonotactic transfer and change is most likely to occur in contact between language varieties with distinct phonotactic systems.

This finding is important for several reasons. First of all, when researching English varieties where contact histories are unclear, global CCR values may represent a reliable indicator as to whether and, if so, to what extent the variety in question came into contact with other languages/phonotactic systems. Second, an analysis of CCR in real or apparent time allows investigating whether (and if so, why) contact-induced decomplexification processes persist. This is exemplified by the developmental trajectories of phonotactics in MNZE and AAE, whose origins and evolution have been debated intensely (Chapter 4). Whereas Poplack and Tagliamonte (2001) argue that there was considerable accommodation to White AmE norms until 1900 and that AAE's current linguistic differentiation is due to divergence of the two varieties over the past century, researchers such as Rickford (1997), Winford (1997) or Wolfram (2003) maintain that AAE and White AmE have been linguistically distinct ever since they first came into contact (even though these differences may have been subject to regional variation (Winford 1997), and notwithstanding that these may have been smaller historically: Wolfram 2003). These differences have been interpreted as evidence of prior creolisation, for instance by Rickford (1997: 331) who claims that 'there can be absolutely no doubt that *some* pidgin/creole speech – whether home-grown or imported – was an element in the formative stage of African-American Vernacular English'.

The data in Table 5.1 are highly relevant here. The CCR values of African Americans born in Hyde County NC in the late nineteenth century differed significantly from those of Anglo-Americans born in the same area and period. The fact that there existed quantitative differences even in comparatively well-integrated communities is strong evidence that the two varieties had *not* converged by 1900; quite to the contrary, phonotactic transfer effects persisted for more than two centuries after the first contacts, and this despite the fact that language shift was de facto completed. On the other hand, and this supports Poplack and Tagliamonte (2001), the same data indicate that the differences increased during the twentieth century, as a result of which the local varieties of AAE and White AmE diverged. As so often, it is not a question of 'either–or'; both sides are partially right and CCR is an important analytical tool here.

The case of MNZE provides a different scenario. MNZE arguably underwent a similar formation phase as AAE, in that it developed in a language contact setting. Chapter 4 showed that the two coexisting varieties in New Zealand, MNZE and PNZE, were distinct in the late nineteenth century, which is evidence that the earliest contact scenario was characterised by substratal effects and phonological/phonotactic transfer processes from the indigenous Maori language. These transfer effects manifest themselves in that speakers of languages with phonotactic systems that do not admit clusters 'carry over' their L1 syllable types onto the target they are in the process of learning (cf. the discussion of VietnE). However, in contrast to AAE, these effects were not persistent in New Zealand; a comparison between nineteenth-century MNZE and similar data from the twentieth century indicates that the two varieties have *converged* considerably since about 1900. Consequently, the Maori accommodated to British norms to an extent that CCR is no longer an ethnically correlated variable. In the case of MNZE, then, phonotactic transfer was short-term and disappeared as competence in the target language increased. In AAE, on the other hand, the substratal effects were long-term. They fossilised so that CCR, after centuries of contact and coexistence, still represents a linguistic demarcator of cross-varietal differentiation (principle 4).

- *Principle 4*: Phonotactic transfer may be short- or long-term, depending on factors such as the dynamism of the contact scenario, the intensification/fossilisation of accommodation patterns, the accessibility to the norms of the target variety, the degree of interaction between individual groups, and so on.

The usefulness of global CCR values as a diagnostic variable is further strengthened by the SAtlE data. The social history of the St Helenian community suggested language contact, perhaps even to an extent that the local variety underwent creolisation (Hancock 1991). The high reduction rates in StHE provide strong evidence that this was the case indeed; an analysis of CCR firmly places this variety on a par with others where contact-induced restructuring and decomplexification are not disputed (in fact, StHE has higher CCR values than mesolectal JamCE). Phonotactically speaking, StHE behaves like creolised English varieties, and this strengthens the hypothesis that this variety of SAtlE does indeed bear typological resemblances to Caribbean creoles.

Moreover, the data collected for TdCE illustrate the influence of the St Helenian input. Phonotactic systems were shown to remain stable upon koinéisation; therefore, if TdCE resembled 'new dialects' such as PNZE, then we would expect CCR values around 25–30 per cent (that is, using the methodological criteria adopted here). Section 4.2 showed that this could not be further from the truth; TdCE has almost 90 per cent CCR (in fact slightly more than StHE, which may be explained by the additional admixture of ESL varieties in this setting). CCR is thus not only a useful variable to determine whether contact occurred but is also essential to pinpoint genetic relationships between varieties, allowing the identification of the most influential inputs in a given contact scenario. Moreover, as the cases of ChicE and BahE showed, CCR is valuable to investigate relationships and degrees of differentiation in ethnic groups of one and the same speech community and to uncover the degree of linguistic affinity and differentiation in stable bilingual situations. Consequently, CCR does not only indicate transfer and contact-derived effects in specific varieties and in individual contact scenarios, it also throws light on how and to what extent varieties influence one another.

Internal constraints

Global CCR values provide only a first indicator of the degree of differentiation and relatedness between varieties. Another crucial characteristic is the factors that govern this process, its internal constraints and distinct, occasionally specific, degrees of context-sensitivity and so on. As noted above, final CCR operates in distinct linguistic environments and this is equally important for an analysis of phonotactic variation and change. The following segment effect illustrates this well: all varieties have comparatively high CCR when the final cluster is followed by a consonant (as a result of co-articulation and regressive assimilation). On the other hand, varieties differ in how often a cluster-final plosive is

deleted in prevocalic or pre-pausal environments, so that variation with regard to following segment effects is particularly diagnostic. CCR rates in individual environments are important indicators of phonotactic similarity, and reduction patterns in specific contexts may yield crucial insights into ancestral links and general transfer of phonotactic structures. This becomes clear when we compare cross-varietal patterns with reference to the three most important language-internal effects: mono- versus bimorphemic clusters, following pause and preceding segment.

All varieties of English show sensitivity towards phonetic environments and morphemic cluster status, and most follow the trajectories: monomorphemic > bimorphemic, pre-C > pre-P > pre-V. These effects are remarkably persistent in varieties with low CCR values, though individual varieties vary with regard to their strength (AmE and BrE native-speaker varieties, for instance, showed slightly different effects related to cluster status). On the other hand, we noted that varieties differ in their morphemic constraints. To illustrate this, I selected a subsample of eight varieties, namely StHE, mesolectal Jamaican Creole English (Patrick 1991, 1999), black Bahamian English (Childs *et al*. 2003), African American English (Wolfram and Thomas 2002: 136), MNZE and PNZE, White American English from Hyde County NC (Wolfram and Thomas 2002: 136) and York English (Tagliamonte and Temple 2005 forthcoming). The internal constraint effects emerge when we present the varieties' individual reduction rates for each of the six phonetic and morphological subgroups. Table 5.2 and Figure 5.1 illustrate the internal conditioning of CCR in these varieties.

Table 5.2 shows that the varieties in question are neatly divided by their overall internal conditioning of phonetic environments and morphological status. It is striking that following consonants and vowels exert a similar effect in all varieties, with the persistent hierarchy pre-C > pre-V (pauses, however, exert different effects; see below). On the other hand,

Table 5.2 Internal CCR constraints in five English varieties

	Pre-C		**Pre-P**		**Pre-V**	
	mono	**bi**	**mono**	**bi**	**mono**	**bi**
Black BahE	98.5	100	100	66.7	80.4	55.6
Mes. JamCE	80.9	86.3	68.0	77.4	58.9	67.6
AAE	82.7	82.5	79.5	78.0	52.0	30.2
White HCE	58.6	41.0	32.9	6.3	9.8	4.1
YoE	59.1	63.0	7.4	4.5	9.9	3.4

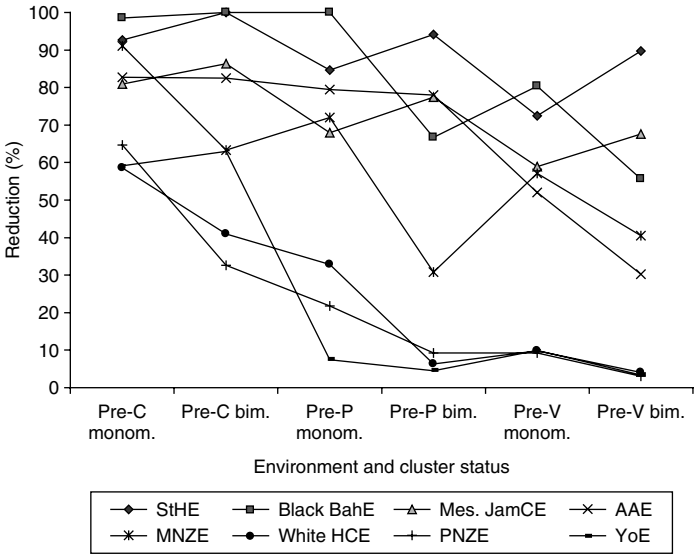

Figure 5.1 Internal CCR constraints in eight English varieties

the morphological status of individual cluster segments affects CCR also, with bimorphemic clusters generally being more robust. However, it is here that we find a striking discrepancy between varieties, and we note *two* alternative constraint rankings. The first pattern, certainly the more widespread one, is one where monomorphemic clusters have higher CCR rates than bimorphemic ones in all three environments. However, an additional (and highly) distinctive pattern includes a category of varieties where bimorphemic clusters are more likely to undergo reduction. The three varieties that have this pattern are StHE and JamCE, as well as TdCE (which provides further evidence of the genetic links between the two SAtlE varieties). Creolised varieties (and deriving creoloid varieties) may thus reverse the well-established constraint ranking (however, this must not be generalised as Black BahE adheres to the common mono>bi pattern).

How can we account for this? Following Patrick (1991), the most promising approach is to explain it through the interplay of grammatical and phonological processes. Two trends go hand in hand, one towards no overt morphological tense marking and one towards preference of CVC syllable structures. This diagnostic pattern most likely derives from the combination of *phonological* deletion of cluster-final plosives and

grammatical deletion of cluster-final *-ed* tense suffixes. Bi > mono is thus a highly diagnostic qualitative indicator of constraint differentiation, and the fact that an identical pattern was found in an unrelated South Atlantic variety (two, in fact, if we include TdCE) may be interpreted as evidence that this constraint ranking is more common than assumed and may well be found in other creoles as well. By the same token, this is a second indication that StHE resembles creole varieties. Not only are global rates here as high (or even higher) as in well-established Caribbean creoles, StHE also displays a set of internal constraints which is highly diagnostic and has no equivalent in native-speaker varieties without histories of extensive language contact.

A second constraint that merits special attention is the effect of a following pause. The individual case studies in sections 4.2 and 4.3 indicated the heterogeneous behaviour of pauses, showing that this effect varied in varieties. Following pause constraints can be classified into two major categories as well, which is illustrated by a comparison of nine varieties. For such a comparison, I added all the reduced clusters for each environment (mono- and bimorphemic CCs combined) and divided them by the total amount of clusters in the respective variety (which gave a percentage). Table 5.3 and Figure 5.2 indicate that following pauses tend to pattern either with vowels or consonants, or else that thay take an intermediate position. In YoE, PNZE and White AmE, pauses 'behave' like vowels in that they have an inhibiting effect on the deletion of a preceding stop. (One might also include ChicE in this category, but then one would ignore the fact that a following pause has the strongest effect on stop retention in this variety – which is also confirmed in Tejano English.) On the other hand, a following pause patterns with consonants in Hyde County AAE and Black BahE, thus strongly favouring

Table 5.3 Following pause effects in nine varieties of English

	Pre-C		**Pre-P**		**Pre-V**	
PNZE	55.0	(*n* = 796)	15.0	(*n* = 200)	6.4	(*n* = 869)
MNZE	81.3	(*n* = 139)	63.5	(*n* = 63)	51.6	(*n* = 126)
StHE	93.1	(*n* = 626)	86.1	(*n* = 223)	76.8	(*n* = 551)
White HCE	52.3	(*n* = 327)	22.0	(*n* = 118)	6.7	(*n* = 312)
YoE	60.4	(*n* = 500)	6.7	(*n* = 90)	7.2	(*n* = 428)
AAE	82.6	(*n* = 587)	79.1	(*n* = 187)	42.3	(*n* = 454)
ChicE	62.0	(*n* = 3,693)	37.0	(*n* = 1,024)	45.0	(*n* = 1,574)
Black BahE	98.7	(*n* = 78)	96.0	(*n* = 50)	73.9	(*n* = 69)
JamCE	82.0	(*n* = 849)	70.3	(*n* = 229)	61.5	(*n* = 711)

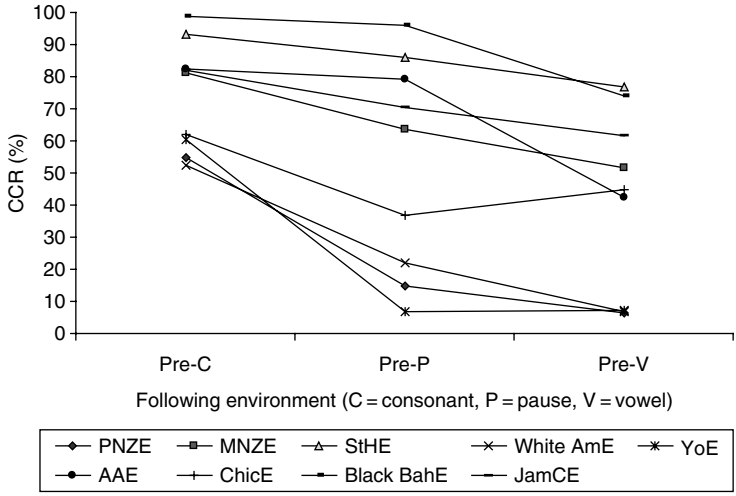

Figure 5.2 Following pause effects in nine varieties of English

deletion. In the other three varieties (MNZE, StHE and JamCE), pauses are by and large interpositioned between C and V. This finding is relevant in the light of contact histories: varieties without recent (language) contact have *foll. P=foll. V* whereas varieties that have undergone contact have *foll. P=foll. C*.

One could make a case in point that this is phonotactically motivated, namely that contact-derived varieties have a strong tendency to reduce complex final clusters with the aim of modifying the syllable structure to CVC in salient pre-P environments. This affects final clusters so that the syllable as a whole is adapted to more common types (Chapter 2); as a result, contact-derived varieties display a strong phonotactic trend towards closed syllables ending in a single C instead of a complex CC.

The third diagnostic constraint is the one exerted by the preceding segment. The common BrE and AmE effects are that less sonorous C_1 segments favour final-stop deletion whereas more sonorous ones favour retention (with the exception of sibilants, which diverge from this pattern). The case studies reported in section 4.1 showed that this hierarchy, though persistent in BrE, AmE and NZE, was reversed in SAtlE, where clusters with C_1 plosives and fricatives are more frequently reduced than those beginning with a lateral or nasal. This was a first indication that there existed different constraint sets with regard to this effect as

Table 5.4 Preceding segment effects in five varieties of English

	Plosive	**Fricative**	**Nasal**	**Lateral**
YoE	16	12	17	21
ChicE	32	65	72	39
PNZE	17.9	25.4	29.0	34
JamCE	80	75	74	58
StHE	94.4	93.9	80.9	82.5

well. Additional material from English-derived creoles confirms that alternative constraint rankings are more widespread. As Table 5.4 illustrates, the sonority hierarchy in SAtlE is also found in JamCE. Even though the hierarchy is not exactly replicated, the trend is that less sonorous C_1 segments in JamCE favour cluster-final stop deletion whereas nasals and laterals favour retention.

How are we to interpret this in terms of phonotactics? Bisegmental clusters consisting of a [+ son] nasal or lateral and a [– son] plosive are more stable in creoles; by implication, if cluster segments share the feature [– son], then they are more vulnerable and prone to reduction. (This somewhat resembles the OCP approach discussed in Chapter 4, the only difference being that sonority is the only parameter.) On the other hand, varieties with low CCR values are more likely to delete stops preceded by a [+ son] C_1. Sonority seems to be an important criterion here as well, accounting for the two alternative patterns of preceding segment effects. Moreover, the role of sonority is further strengthened by the fact that it at least in part determines which factors are 'irreducible'. It is to this constraint that we turn now.

Typological differences

The analyses reported here have thrown new light on the universal versus specific nature of CCR processes. Until now, virtually all the general principles were elaborated with data from AmE and the constraints were formulated with reference to these varieties only. Some potentially diagnostic differences have been recognised, for instance: *lexical status* effects, namely that ambiguous, root-inflected items (e.g., *slept*) tend to have different reduction tendencies; variation in *following pause* effects, with pauses sometimes behaving like a following vowel and sometimes like a following consonant, as in the Philadelphia and Washington DC data; and *preceding segment* effects, with /s/ being particularly diagnostic. Generally speaking, though, CCR in AmE is considered uniform (with the notable exception of CCR frequency, these principles also

hold for local varieties with substantial contact histories, such as African American and Hispanic Englishes). As Guy (1980: 11) puts it, CCR in American English is characterised by 'universality and uniformity . . . It applies, to a greater or lesser extent, in virtually all native speakers of English in all social settings.' Throughout Chapters 2 and 3 we discussed data that challenge some of these views; taking a broader look at phonotactic modification in varieties with different backgrounds and from other locales therefore challenges an AmE-focused view of CCR, providing a more integrative view of this process. Whereas Guy is certainly right in identifying a universal and uniform set of constraints in AmE, there are more heterogeneous patterns elsewhere; if these are not recognised, then the full complexity of phonotactic variation is not accounted for.

Chapter 4 revealed some important *qualitative* differences of CCR in English around the world; these affect phonetic and morphemic constraints, as discussed, but also the nature of the clusters that may undergo this process. Indeed, one of the most important phonetic constraints on 'reducibility' is whether the individual cluster segments are homo-voiced or not. In AmE and BrE, clusters can only be reduced if the CC segments are either voiced or non-voiced. Clusters with hetero-voicing (/-lt/, /-mp/, /-ŋk/, and so on) could under no circumstances be reduced, not even in varieties that had higher reduction rates as a result of phonotactic transfer from substrate languages. Some have gone as far as to claim that this was a universal constraint. Wolfram and Christian (1976: 34), for instance, claim that:

> Clusters such as *mp* (jump, ramp), *lt* (colt, belt), ŋk (crank, rank) and *lp* (gulp, help) are not affected by this [CCR] process…While linguists disagree as to the reason for the failure of some clusters to be affected by this process of simplification, they are in basic agreement as to those clusters that can and cannot undergo simplification.

Whereas Wolfram and Christian's claim is undoubtedly correct for well-established native-speaker varieties with no recent histories of language contact, such as NZE, it does not apply to a number of English varieties with different contact histories. Observations in the literature, along with the data discussed above, indicate typological differences, namely that hetero-voiced clusters may undergo reduction also.

The StHE data provide a pertinent case in point, as this variety (variably) reduces a number of hetero-voiced clusters. The following examples illustrate this (and one should note that CCR here occurs in the most

diagnostic pre-V environments; CCR frequency in these clusters would considerably increase in pre-C positions):

/ŋk/: Submarines sunkØ our ships (JJ, male, b. 1921)
/mp/: The dog jumpØ over the bankØ (CC, male, b. 1926)
/lk/: Yeah, we had milkØ and cows (JM, female, b. 1923)
/lp/: I had to helpØ out in the store (GY, male, b. 1934)

Speakers of StHE consequently delete final plosives in /ŋk/, /mp/, /lk/ and /lp/ clusters; these are by no means isolated and idiosyncratic phenomena. /lp/, for instance, is reduced to /l/ by five out of nine speakers for whom this cluster was extracted, and the total reduction rate for this cluster is 41.2 per cent ($n=17$). Consequently, then, not only is CCR very frequent in StHE, this process also affects a larger number of clusters, many of which consist of hetero-voiced segments (Table 5.5).

This is by no means restricted to SAtlE and the very same clusters are subject to final CCR in other varieties of English as well. For instance, IndE speakers reduce /-nt/, /-lt/ and /-lk/ (Khan (1991: 291) reports that reduction rates range from 10.2 to 67.5 per cent, depending on their phonetic environments), and Crowley (1992) mentions that /ŋk/ is reduced in Melanesian Pidgin English, an English-based pidgin spoken in Papua New Guinea which developed in a contact scenario involving indigenous languages and English as a lexifier language.

This is an important finding, particularly so since it goes against all trends attested for CCR in AmE and BrE. This indicates that English varieties do not only differ in the rates with which clusters are reduced, that is, *quantitatively*, but that they also have individual preferences with regard to the clusters that may undergo this process, that is, that

Table 5.5 The reduction of hetero-voiced clusters in St Helenian English

Consonant cluster	**Voicing status**	**AmE/BrE**	**St Helenian English**	
/kt/	–voice/–voice	/strɪk/	/strɪk/	‘district’
/st/	–voice/–voice	/pəʊs/	/poʊs/	‘post’
/nd/	+voice/+voice	/graʊn/	/graun/	‘ground’
/mp/	+voice/–voice	/dʒʌmp/	/dʒʌm/	‘jump’
/ŋk/		/tæŋk/	/tæŋ/	‘tank’
/lk/		/mɪlk/	/mɪl/	‘milk’
/lp/		/hɛlp/	/hɛl/	‘help’

they vary *qualitatively* as well. Whereas all varieties of English reduce homo-voiced clusters such as /-st/, albeit variably and predominantly in pre-consonantal environments, the integration of a wider range of data from a wider sample of varieties reveals a major typological difference. The set of clusters that may undergo reduction is greater in some varieties than in others, and the criteria that delimit clusters as 'reducible' are less rigorous.

The question, consequently, is how we can account for the fact that the voicing constraint is categorical in BrE and AmE and absent (or weakened) in IndE or StHE. CCR increases drastically in contact scenarios that involve languages with distinct phonotactic systems, being most prominent in L2 learning, pidginisation and creolisation. At the same time, not only does the overall amount of CCR increase under such conditions, it is likely that language contact has an effect on the total amount of clusters that may undergo reduction also. If native speakers of AppE reduce a total of 14 clusters, and speakers of IndE a total of, say, 20 clusters, then the latter apply the reduction rule to more clusters and hence also to more cluster segments with different properties. I would argue that native-speaker constraints are weakened due to substratal influence and phonotactic transfer of non-English structures, and that the reduction rule is applied to a larger number of clusters with different structural characteristics. This is a manifestation of *rule generalisation*; a constraint present in the target (superstrate) variety is adopted yet generalised so as to be applied to a larger number of potential candidates. As a result, the voicing constraint is not operative, or at least less rigid, in ESL or EFL varieties and in English-derived pidgins and creoles (such as Melanesian Pidgin English and St Helenian English). This leads to qualitative phonotactic differences which distinguish individual varieties of English around the world, and I would predict that these developments will become stronger as English continues to diversify.

In conclusion, then, all speakers apply the deletion rule and final CCR is a universal of spoken English. There is no English variety where clusters are always realised in full, and no variety of English where they are always reduced to a single C (through final stop deletion). Native-speaker varieties are characterised by minor differences and uniformity, both in frequency and internal constraints. At the same time, English phonotactics is characterised by variation and differentiation in other contexts. Factors such as generality and context-sensitivity are paramount and may yield crucial information on contact histories and parallels/differences between varieties of English around the world. The data presented here thus show that the quantitative dimension of final CCR is a reliable

indicator of contact and transfer processes. Moreover, they evidence qualitative differences as well in that there is variation concerning the total number of clusters that can be optionally reduced in a variety. Some clusters are never reduced in British and American varieties but are commonly undergoing CCR elsewhere. Language-internal (phonetic, morphological, cluster-typological) criteria consequently are a diagnostic indicator of phonotactic variation as well (principle 5).

- *Principle 5*: Internal constraints on CCR (phonetic, morphological and cluster-typological) are as diagnostic and genetically indicative as global CCR values.

5.2 Implications for language change

The next point concerns the implications for language change in general. How does phonotactic change proceed, and how does it depend on social and environmental criteria? One of the main questions outlined in Chapter 1 was whether cluster reduction was motivated by internal or external factors. As Chapter 4 showed, the common view is that linguistic contact accelerates final CCR and that phonotactic change is to a large part externally motivated. This has led some authors (for example, Wolfram, Childs and Torbert 2000) to take the very strong position that CCR necessarily represents a contact-induced phenomenon and that it is indicative of substratal transfer of phonotactic structures.

The data presented here provided ample evidence to strengthen this position. However, there is also reason to assume that phonotactic language change is more complex and that it may on occasion have a language-internal motivation. As the case studies in Chapter 3 showed, some cases simply cannot be explained externally. For instance, there is no indication that contact accounted for /h/-loss in Pr.Gc and cluster loss in later stages of English does not coincide with the external history of English (Lass 1987). We saw in Chapter 3 that the loss of various clusters followed individual trajectories; whereas all of them took a long time to reach completion (see below), they began in different periods. Some took much longer than others: initial */wl-/ and */wr-/ are attested until the sixteenth and seventeenth centuries and */kn-/ and */gn-/ loss only started in the 1600s. If this was a contact-induced development, then we would expect their reduction to begin in periods that witnessed language contact (with French or Scandinavian, though the latter may not have differed in phonotactic terms). This was not the case. Consequently, there must be some internal causation and it seems most promising to

consider it a manifestation of analogical language change (since clusters were phonotactically salient minority forms and thus particularly prone to merging processes with unmarked Cs; see Chapter 2). Therefore, albeit restructuring through contact and transfer of phonotactic properties is more frequent, phonotactic change is both an external and an internal process.

Moreover, it is important that phonotactic change takes different trajectories. Looking at the clusters analysed in Chapter 3 more closely, we find that the loss of initial /h/ from */hn-/, */hl-/ and */hr-/ clusters is manifest in the first OE sources (Luick 1964) and that it took this merger hundreds, maybe thousands, of years to reach completion (this is also pointed out by Chambers (2002), who considers this the 'oldest sound change' that can be observed). Initial plosive lenition in these clusters therefore started long before Anglo-Saxon involvement in England and the merger may have stretched for over a millennium, displaying an S-curve pattern. Final CCR, on the other hand, is ubiquitous and operates ad hoc in contact scenarios (evidenced by early accommodation processes in VietnE). Initial cluster loss consequently occurs at a much slower rate than a language contact-based explanation would allow for.[2] This invites the implication that cluster position (onset versus coda) plays a significant role in this process (see also section 5.3).

There is a third possibility: internal and external factors may go hand in hand and shape this process jointly. If this occurs, then phonotactic change is not a question of external or internal; rather, the two may interact and thus have a particularly strong effect. The results presented in Chapter 3 provide a case in point, indicating that internal processes may set the stage for phonotactic change, which in turn is influenced by external processes. The loss of initial /h/ picked up momentum towards the middle of the eleventh century and it was very near to completion in the early thirteenth century (with the exception of /hw-/). /n, l, r/ were embryonic (minority) variants before 1050 but then they quickly ousted bisegmental covariants from the second half of the eleventh century onwards and became normative within the next 150 years or so. Consequently, whereas the origins of /h/ lenition in English remain somewhat obscure, the exact timing of an abrupt rise in /h/ loss in these environments may not, particularly not if addressed in the light of the principles discussed in Weinreich *et al.*'s seminal (1968) article on empirical and theoretical aspects of language change. Weinreich *et al.* suggest that (successful) linguistic changes undergo several phases, each of which, though there may be overlap between them, is essential for

the development of linguistic innovations as a whole. Weinreich *et al*. distinguish between what they refer to as the *embedding problem*, namely how linguistic innovations are embedded both in the structural system of a given language and in the speech community that uses this particular language as a medium of interaction, and an *actuation problem*, namely why innovation affects a certain language feature (and not another one), why it takes place at a particular point in time (and not at another one) and why in a certain speech community or language variety (and not in another one). This distinction is echoed in Milroy's (1992) discussion of speaker-based innovation and language change in general. Milroy makes the important claim that *innovation* does not necessarily lead to change, since innovation is speaker-based (and therefore individual), whereas change affects the language system as a whole (and thus entails a wider usage of the novel language structure/feature throughout a speech community):

> We can therefore approach the *actuation problem* in the following way. We can describe *speaker-innovation as an act of the speaker which is capable of influencing linguistic structure*. The innovation may, or may not, enter the language system: thus, part of the solution to the actuation problem will be to explain the conditions in which an innovation is unsuccessful in addition to those in which it is successful. (Milroy 1992: 169; italics in original)

The motivation of initial-cluster loss in English has not been addressed in greater detail in the literature (a notable exception is Lutz (1991), who argues that deletion in this environment is phonotactically conditioned and part of successive and context-dependent stages of /h/ loss in English; see further discussion below). Fisiak (1968: 63) suggests that this process primarily had a functional motivation: 'The distribution of the phonemes, limited to the word-initial position exclusively, made their functional yield rather slight and in consequence led to the elimination of the first three [/hn-/, /hl-/ and /hr-/].' Such an approach takes into consideration that English witnessed a general tendency towards lenition of plosives and fricatives in the onset of stressed syllables (as for instance in the loss of initial */kn-/ and */gn-/), and that /h/ loss in this particular environment is embedded in a general development (see Lutz 1991).

It is thus not clear what motivated the innovation (in the sense of Milroy 1992) of the /n, l, r/ variants originally. However, the further developments of #CC- > #C- may have a language-external motivation,

which accounts for the timing and trajectory of this change. Put differently, it is likely that the final stages of this merger were the direct consequence of changes in England's social and sociolinguistic history from the eleventh century onwards and brought about by the 1066 Norman Conquest (Bailey and Maroldt 1977; Milroy 1984; Baugh and Cable 1991; Barber 1994). In other words, whereas the language-internal motivation of /h/ loss in English remains unclear, the external history of English (Lass 1987) was paramount for the development of this particular change and may account for why this particular change 'took off' at *that* particular point in time and in *that* particular place.

The impact of Norman French on Early ME has been subject to much debate (see, for instance, Lass 1992) and the most widespread view is that Norman French did not have a major influence on the course of English (in contrast to Central French and Scandinavian). The point taken here, however, is that language contact with Norman French did to some extent change the course of Early ME; not primarily through the innovation of new patterns but through the reinforcement and intensification of ongoing ones. Language contact effects were particularly strong when there was a change in progress in the local varieties. The question is of course far from straightforward and remains somewhat speculative; admittedly, following Thomason and Kaufman (1988), we have to consider factors such as the degree of integration of the Norman French into the wider English population or the degree of bilingualism and interaction between the different groups in contact. Also, it appears that this change occurred suspiciously early in the contact phase, and one could question a contact-based explanation for /h/ loss by pointing to the fact that other contact-derived innovations (perhaps most notably large-scale lexical borrowing) only manifested themselves from the 1300s onwards.

On the other hand, one can make a strong claim that the preexisting status and conditioning of this feature made it particularly susceptible to rapid change. If one agrees that (1) contact may result in the levelling out of initial clusters (which was the case in New Zealand); and that (2) the arrival of the Norman French coincided with the incipient stages of a change in progress, then it is not unreasonable to suggest that language contact provided a vital impetus for the quick acceleration (and thus to the success) of this change. In other words, the time frame of this change indicates that language contact very probably had a catalysing effect on consonant aphaeresis in Early ME as the Norman French had no pre-aspiration in this environment (having categorical /n-, l-, r-/)[3] and as the local varieties of English already were in a state of flux

between traditional and innovative variants (see Trudgill 1998 for a similar scenario on the history of third-person singular present tense zero in East Anglia).

The external history may thus at least to some extent account for the trajectory of initial English cluster loss in English. Prior to the Norman invasion, there was a language change in progress which involved #CC- >#C-. Contact between English and Norman French entailed linguistic contact between a variety in which C_1s were undergoing lenition and one in which CCs and initial Cs were not distinguished, being /n, l, r/ throughout. The local variety was unstable and therefore particularly susceptible to adopt this particular feature, which had the additional advantage of being linguistically unmarked (Lass 1984). This may explain why clusters were lost fairly quickly and why they died out in most parts of England within a century and a half (with the possible exception of Kent). Neither preexisting changes nor contact with Norman French *alone* are therefore sufficient to explain why this change took off so abruptly; it was the combination of both that ultimately led to the rapid loss of clusters in this particular environment. This is not to challenge Lutz's (1991) suggestion that /h/ loss in English underwent various stages and that it was primarily conditioned by its phonotactic position. Rather, it appears that language-internal changes such as the one at hand can be accelerated in contexts of language contact, and that a distinction between */hn-/ and /n-/ is no longer made when there is long-term and stable interaction with speakers who do not make such a contrast (principle 6).

- *Principle 6*: Cluster reduction is both an internal and an external process. Whereas internal change typically operates on initial clusters, a gradual change following an S-curve trajectory, final CCR is ubiquitous and very prone to external change.

Initial cluster loss in Early ME, consequently, presents a case where both language-internal and -external factors are involved in language change and where the trajectory and rate of a linguistic innovation are influenced by the interplay of both. Historical phonotactic change may thus at least in part have been externally conditioned. One could even go as far as to claim that initial cluster reduction is indicative of internal change, whereas final reduction reflects an external motivation, and the data presented here certainly suggest that there is some truth to such a claim. This, however, raises the next question: why should clusters behave so differently in the two environments?

5.3 A psycholinguistic explanation?

Final cluster reduction is ubiquitous and ad hoc in language contact conditions. In sharp contrast, initial reduction is typically slow and follows the well-established pattern of language change, in that an initially dominant traditional feature coexists with an innovative (at first embryonic) one for a considerable time before the usage of the newer form increases as the usage of the older form decreases (in an S-shaped curve). An important point we need to consider in closer detail is the dependence of reduction frequency on syllable position, or, put differently, the fact that syllable-coda clusters are much more readily reduced than clusters in the syllable onset. How can we account for the fact that *fast play* undergoes reduction to /fɑs pleɪ/ and not to */fast leɪ/? Why should word-final reduction be so frequent and instantaneous and word-initial reduction uncommon and slow?

I would advance two hypotheses to account for this discrepancy. A first possible explanation is the coincidence of cluster position with *overall syllable stress*, namely the effect of onset and coda stress on CCR. We saw in Chapter 4 that the rate of final cluster reduction is affected by stress in a number of ways. This is particularly evident in the case of bisyllabic words, which consist of a prefix and a stem and are often the result of morphological conversion (zero-derivation). A number of English words fall into this category (*abstract*, *conduct*, *contrast*, *object*, *perfect*, etc.), all of which are spelt identically and only differ in terms of stress placement (Roach 1992: 100ff.). Guy (1991a) points out that initial stress entails higher reduction rates of final CCR (['kɒntɹæk] 'contract n.' > [kən'tɹæk] 'contract v.'). This implies that clusters with secondary stress are more likely to be reduced. Accordingly, it is plausible to argue that the historical Germanic stress pattern with initial stress leads to clusters being more robust, whereas clusters in final (typically unstressed) environments are weakened and thus more likely to be reduced.[4]

A second explanation is connected with the nature of speech processing and recognition, that is, it is by nature *psycholinguistic*. This is loosely connected with the non-related issue of iconicity, which was mentioned in passing in previous chapters. The basic assumption is that an increase in form entails an increase in information; following this, a decrease in form necessarily leads to loss of information. In order to be efficient and non-redundant, it is crucial to determine what form (or type of form) can be omitted with the level of information transmitted being high enough so that communication does not break down. How much of a form can be lost (and where), with the loss of information

being minimal? This has consequences for psycholinguistic processing and I argue that this is an important criterion for the two differential patterns taken by initial and final clusters.

One approach that has been advanced to account for speech recognition is the *cohort model* (Marslen-Wilson and Tyler 1980, 1981), and this model is relevant for cluster reduction for various reasons. Among others, this model has the advantage that it may account for why hearers are able to recognise and correctly identify polysyllabic lexical items while a speaker is still in the process of saying them (Cutler 1995). Crucially, word recognition starts immediately and automatically when a word is produced; as such it depends on the amount of information given and it depends on the linear processing of an incoming acoustic signal. Marslen-Wilson and Tyler suggest that the selection of suitable candidates starts immediately upon input and is continually updated as word production continues. Word onsets are crucial as hearers detect candidates using the material available to them. Following this theory, a hearer, when hearing an initial cluster /str-/, will immediately access and activate all possible candidates that fit and begin with this structural sequence: *strong*, *strive*, *strict*, *straw*, *string*, *stride* and so on, a set referred to as the *word-initial cohort*. As more phonetic information becomes available, the list of candidates narrows down and unsuitable candidates are dropped. For example, when /ɪ/ follows, as in /strɪ-/, then the lexical recognition process focuses on *string*, *strict*, *strip* and so on, whereas the vast majority of items that were activated in the initial phase but that now no longer meet the criteria drop from the candidate list. Lexical recognition does not only depend on the phonetic input but also on contextual information (this accounts for the fact that words are accessed faster in context than in isolation: Nygaard and Pisoni 1995). The more information retrieved from context and phonetic input, the faster words are processed and identified. A lexical item is successfully recognised once it has passed the critical threshold, upon which it remains the only candidate available, all others having dropped out.

The cohort model has been criticised for being idealistic in numerous respects. Some major points of criticism concern the complete dependency on the correctness of the onset; most importantly, it has been pointed out that this model has difficulties in explaining (1) how a word is recognised if the beginning is missing, hidden by other noise, or simply incorrect, maybe because of a foreign accent or through a slip of the tongue; (2) how newly coined words and innovations are recognised; or (3) that it does not take into account that many monosyllabic English words are often recognised one or two words after they have been

produced (discussion in Grosjean 1985; Aitchison 1987; Cutler 1995). Still, this model offers us some insight into the effects of syllable position on cluster reduction. The crucial point is that clusters in a syllable coda or at the end of a word are less essential for word recognition than onset clusters. A cluster may be readily reduced when the cohort of potential candidates has already been narrowed down to one candidate. In this case, a loss of form would not entail a loss of information at all, since a last cluster segment is redundant and irrelevant in terms of psycholinguistic processing (this also explains why monomorphemic clusters are more frequently reduced than bimorphemic ones – cluster-final stop deletion may be deleted at little cost since it does not carry morphological meaning).

The case is radically different in the case of initial cluster reduction. If initial sequences of lexical items are modified (no matter whether they start with a consonant cluster or not), then their recognition is impeded. A whole cohort of inadequate candidates is activated and searched and correct identification may be impossible. We can contextualise this with the case of Sranan (discussed in Chapter 3), where initial /str-/ is reduced to /tr-/ through initial sibilant deletion (*strong* /traŋga/). English speakers not familiar with this change mechanism will immediately activate lexical items beginning with /tr-/, *trick*, *tree*, *trench*, *trigger* and so on, and pursue this until they have either selected an incorrect candidate (for example, *trip* for *strip*) or else fail to recognise the item entirely. With reference to iconicity again, it now becomes clear that the deletion of form entails differential degrees of information, and that this very heavily depends on syllable structure. Clusters in coda position (that is, when the recognition process is already completed or at least advanced) can be deleted at little cost and the loss of information is minimal, whereas the reduction of onset clusters entails maximal loss of information and in fact seriously impedes its psycholinguistic processing.

This accounts for two findings for which we have not had an explanation yet: first of all, for the fact that English-based pidgins and creoles keep initial clusters from the lexifier intact even though they typically have high levels of final CCR. Huber (1999: 170) notes that 'GhaPE [Ghanaian Pidgin English] – like other WAPEs [West African Pidgin Englishes] . . . – allows quite complex syllables' and continues to state that 'in its complexity GhaPE syllable structure follows that of British or Ghanaian English quite closely. The reason for this is that, because of the ongoing contact of GhaPE with these varieties, words (and with them their phonological shape) are consequently adopted into the pidgin' (1999: 172). This applies to many other English-based creole varieties as well, since they behave like native-speaker varieties in that final clusters

are universally reduced whereas initial clusters are comparatively stable. It is noteworthy that initial cluster reduction only occurs in language contact settings where phonotactic transfer of CV syllable structures is particularly strong. This was the case in Sranan, where an English role model has been absent for centuries. Similarly, initial reduction is reported in Belizean Creole English (as in *stomach* [tamak]: Greene 1999: 27–32) and also in Tobago and Trinidad ('there is also a widespread tendency in Trinidadian speech to simplify certain initial consonant clusters. Thus the /r/ tends to be lost from initial /pr-/ and /fr-/(*probably*, *pretend*, *from*, *Frederick*), while the /t/ is sometimes lost from initial /st-/ (*still*, *steady*)': Wells 1982: 580). In these particularly strong cases of phonotactic change, mutual intelligibility with the lexifier language is very low (or even no longer given), and substantial phonotactic transfer of substratal structures is one of the many reasons to account for this.

The second advantage of a psycholinguistically based explanation is that it is better suited to account for the historical trajectories of initial cluster loss in English. All of these processes took hundreds of years to reach completion and they were characterised by centuries of coexistence of two variant forms. An abrupt change, as in pidginisation, entails maximal problems for lexical recognition. On the other hand, if it is slow and gradual, following an S-curve development over several centuries, then the transition between traditional and innovative variants is smooth and perceptual problems are minimised. Principles of word recognition may therefore lie at the very heart of the question why word-final and -initial CCR is in many ways a fundamentally different process. Even though they are similar in that they by and large adhere to sonority and syllable structure constraints, the different developmental paths and trajectories may at least in part have a psycholinguistic motivation (principle 7).

- *Principle 7*: Lexical processing is a crucial factor to explain why initial clusters are more stable than final ones. Information lost at the beginning of words impedes word recognition whereas information lost at the end of words often occurs at little cost, word recognition being completed already.

All this suggests that phonotactic variation and change is a multidimensional process that involves numerous disciplines, all of which contribute to its complexity.

6
Summary and Conclusion

The modification of English consonant clusters in syllable-onset and -coda positions is a common process, subject to synchronic variation and historical change alike. This has a phonological motivation, namely through co-articulation and assimilation processes, but also a typological one, namely through the marked, 'unnatural' status of consonant clusters in the world's languages. The strategies used to modify clusters and thus to adapt syllable structure fall into two main categories: deletion of a cluster segment or insertion of an additional (vocalic) segment to break up or to resyllabify the cluster. The most commonly employed strategy is the deletion of the cluster-final/-initial plosive, which is prominent in all varieties of English (and was thus most extensively discussed here). The other mechanisms, insertion of a vowel before a cluster (#CC->#VCC-) or breaking up of a cluster through intermediate vowel epenthesis (#CC->#CVC-), occur less often and are mostly found in ESL and EFL varieties. These strategies alternate, occasionally within one and the same variety (as in IndE), and the variety-specific preferences are mostly explained by external history, the developmental stage of English in various regions and the phonological structures or phonotactic properties of the substratal languages (for instance, prothesis is common when the substrates do not permit empty nuclei in syllable onsets).

By far the most frequent (and most widely researched) process is final CCR. On the other hand, the varieties studied and discussed in Chapters 3 and 4 indicate the existence of common core constraints that condition this process in English around the world. This is evidenced by the fact that context-sensitivity and morphemic conditioning apply in virtually all varieties. On the other hand, there are massive differences regarding the frequency with which this process applies. The correlation of CCR frequencies with contact histories brought to light large-scale

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phonotactic transfer of substratal structures during language contact; this affected clusters as substratal syllable patterns were 'grafted' onto the English target so that syllable-peripheral clusters were modified accordingly. As a result, final CCR was particularly high in varieties of English with extensive contact of phonotactically distinct systems (for example, in creolisation). The quantitative application of CCR processes is thus a highly diagnostic indicator of linguistic differentiation and diversification in English.

Moreover, qualitative and typological features set the various Englishes apart also. A global view of English phonotactics, integrating synchronic *and* diachronic considerations, challenges current assumptions and varieties of English are not as homogeneously patterned as assumed. A number of claims on the manifestation and conditioning of final CCR cannot be upheld, at least not in their current formulations mostly based on insights from AmE. To mention but two of the most salient misconceptions: cluster reduction may occur language-internally and is not necessarily a contact-induced phenomenon (as Wolfram, Childs and Torbert (2000) claim) and the voicing constraint is not a universal in World English (as hypothesised by Guy (1980)). The tapestry of common and specific constraints reveals a pattern of principled variation that is more complex than hitherto assumed. For instance, whereas some following segment effects are generally valid (following consonants always favour CCR whereas following vowels have an inhibiting effect), the role of a following pause cannot be clearly determined and is found to vary between varieties. Even though the general trend is not clear-cut, there is evidence to suggest that pauses behave like consonants in many contact-derived varieties whereas they align with vowels in British, American and White New Zealand varieties. It was hypothesised that these effects were to some extent phonotactically conditioned, namely in that transfer during language contact led to the adoption of (C)VC# syllable structures in prepausal environments.

Even more diagnostic are the effects exerted by the segment preceding the cluster and the morphemic status of the CC-final plosive. The case studies presented in Chapter 4 indicated differential constraints with regard to sonority effects of preceding segments. In fact, the well-established hierarchies of BrE and AmE were practically reversed, since C_1s with lower sonority values favoured the deletion of a following plosive in SAtlE. This pattern was also found in mesolectal JamCE, so this constraint reversal may be a more common outcome of language contact and creolisation than hitherto assumed. The alignment of JamCE with SAtlE was further strengthened by the fact that their morphological

constraints display a highly uncommon patterning. Cluster-final plosives that represent regular *-ed* tense morphemes are typically much more resistant than stops in monomorphemic clusters. This emerged in all varieties analysed; however, JamCE and StHE (as well as TdCE) represent a noteworthy exception as they effectively reverse this pattern. Again, the most convincing explanation for such divergence lies in contact-induced language change, namely that creoles typically express past-tense reference through preverbal tense markers and not by means of suffixation. Moreover, they have a strong tendency to CV(C) syllable types and thus generally fewer consonant clusters. Consequently, this pattern is most plausibly explained by the combination of high cluster reduction values and a trend not to mark past reference morphologically (which means that this specific pattern may have a general, that is, non-specific, validity since the varieties discussed are not genetically related).

A third qualitative difference concerned the phonetic nature of the clusters that could undergo (variably) reduction. The examples from StHE and IndE indicated that, in contrast to other varieties, hetero-voiced clusters consisting of a voiced and a voiceless segment could undergo reduction as well (sometimes as frequently as homo-voiced ones). Typological distinctions of this kind are indicative of generalisation: the original application of reduction rules is extended to a larger number of clusters with different characteristics, which again increases in processes involved in language learning and transfer. In sum, the combined evidence from preceding segment constraints, alternative morphological hierarchies and typological cluster characteristics manifested a dimension of linguistic differentiation that has hitherto not been documented. Along with the integration and comparison of an unprecedented amount of data, the four varieties analysed here uncover local and global characteristics and identify both general and specific features that accompany consonantal variation and change in English. The further one moves away from BrE and AmE norms and the more diverse contact settings one takes into account, the more complexity and heterogeneity there is in terms of CCR (or CC modification, since we are also dealing with prothesis and epenthesis). This emphasises the importance of investigating this feature in distinct settings and of focusing on its development in contact-induced and internally-motivated language change, all of which are instrumental in the continuing diversification of English.

The combination of various scenarios allows us to outline a putative trajectory of phonotactic developments upon language contact. Crucially, the type of strategy adopted in the first stages is variety-specific. On the

one hand, there is a strong trend towards epenthesis of /i/ or /ɯ/ vowels in many Asian and African EFL varieties. On the other hand, cluster reduction is most pertinent when the substrates have canonical CV syllable structure (as in VietnE, Maori, West African languages and so on). Then, however, the production of clusters typically increases and native-speaker constraint types begin to emerge as accommodation to the target intensifies. Even varieties that maintain absolute quantitative differences may display a British/American constraint hierarchy (as witnessed in early VietnE, AAE and MNZE). The studies presented and discussed in this book have shown that further phonotactic developments are very often variety/community-specific and difficult to predict. Fossilisation effects may be long-term, persist for centuries and remain as markers of ethnolinguistic differentiation; alternatively, they may eradicate when language shift is completed and when target norms are mastered with native-speaker competence. The eventual outcome, completion of phonotactic accommodation or fossilisation of CCR, depends on the particular characteristics of the scenario, that is, on a number of linguistic, sociopsychological and attitudinal factors, which emphasises the interface of social and linguistic factors in language contact, convergence and shift.

Linguistic contact involving language types with distinct phonotactic systems has a catalysing effect on final CCR. In contrast, the deletion of C_1 stops in syllable-onset position followed a different trajectory. Chapter 3 documented the historical dimension of initial cluster loss in Old and Middle English, the sociolinguistic conditioning of cluster reduction in contemporary (New Zealand) varieties and their development in a dialect contact scenario, as well as the increase of phonotactic reduction in varieties shaped in intense language contact, such as Sranan or Saramaccan. The main finding was that, barring heavy restructuring and reduction in creolisation, the deletion of cluster-initial stops was primarily an internal process, most plausibly induced by analogical language change. If cluster segments change their tactic behaviour and two consonants no longer co-occur (even though both are maintained in the language's phonemic inventory), then this typically represents a lengthy and gradual process which manifests itself in the consecutive weakening of the least sonorous cluster segment. English historically lost a number of clusters this way. Some of these developments represented continuations of changes that started in Proto-Germanic (such as the successive weakening of initial /k/ in onset clusters) only to reach their completion in Early Middle English. This is indicative of continuing language change upon regional separation. Other changes

started as late as in Early Modern English and thus represent specifically English developments, since the very same clusters have been retained in related Germanic languages. The corpus-based analysis showed that initial cluster loss is an internal process, typically following the S-curve trajectory which is characteristic of linguistic innovation and change. Moreover, it is conditioned by language-internal factors such as phonetic environments and lexical status; we saw in the case study of /hw-/ loss in New Zealand that it is subject to regional differentiation, individual variation and social stratification. Notwithstanding, one can postulate the existence of general principles that underlie phonotactic change. These principles are independent of syllable position and are evidenced by the strong impact of sonority effects. It is always the syllable-peripheral and thus the least sonorous cluster segment that is deleted or weakened; other effects (phonetic environment, morphemic status) are overridden and do not apply when the sonority hierarchy is reversed and the peripheral segment is more sonorous than the one closer to the syllable's nucleus. The strength of sonority explains why some clusters are adapted whereas others remain intact, providing further evidence that phonotactic processes are to a large part conditioned by language-internal factors.

In conclusion, the analysis of consonant variation and change in English can only gain from a broad, interdisciplinary approach which aims at integrating insights from disciplines as diverse as language acquisition, historical linguistics, psycholinguistics, phonological theory and contact linguistics. To highlight these connections was one of the main aims of this book. The interdisciplinary character of consonant change in English was omnipresent in all the chapters; the synchronic and diachronic studies emphasise that this is a truly ahistorical process and that its full complexity and theoretical foundations can only be grasped when considering it from all angles. In this sense, this book represents an effort to cover new territory and it is hoped that it thus contributes to our understanding of the multifaceted nature of consonantal variation and change in English.

Notes

2 Consonant Clusters: General Observations

1. The main focus here is on the development and restructuring of English consonant clusters. This means that some general issues are simply too extensive to be dealt with here. For instance, one important historical question not addressed concerns the origins of CCs: given that the majority of syllable structures in the world's languages do not permit clusters, and given the common perception that CCs are linguistically marked and less natural than other syllable types, how can we explain that English (and indeed, the Germanic sub-branch of Indo-European) has them in the first place?
2. This function is taken by a consonant, in languages where this is permissible.
3. This question is not pursued here, but it is of interest for phonological (or phonotactic) theory to identify how and when consonants in such syllable types may undergo reduction. This question is beyond the scope of phonotactic variation and change in English but would certainly contribute to and provide an exciting perspective on the universal versus specific dimension of cluster reduction.
4. One should add that this example is dubious. Other dictionaries feature no such pronunciation and my native accent of Swiss German has /m-/ (and other Swiss German accents I am familiar with as well).
5. It can also occur with laterals and labiodental fricatives, but *svelte* or *sphinx* represent loanwords, and we just saw that one needs to take care when juxtaposing these combinations as the equivalent of productive clusters with a long-standing continuity.
6. Of course, English also allows CCs in word-medial position (*wander*, etc.), and CCs that occur when free and bound morphemes are combined through suffixation and/or compounding of some sort (e.g., *birdcage*, *gangster*). CCs are also found across morpheme boundaries, that is, through apposition of two consonants in coda and onset (most notably in lexical compounds, e.g., *newsreader*, *windbreaker*).
7. This is indicative of the increase of unnatural phonotactic sequences through suffixation.
8. Word-final CCs that derive from such suffixation are subject to similar phonological conditioning. When an *-ed* suffix is preceded by a coronal stop, such as in *grant* or *mend*, then the surface realisation [ɨd] or [əd] does not lead to a word-final CC. In a sense, this context represents a reflex of the earlier diachronic pattern.
9. Interestingly, this cluster is reported to be most resistant to reduction generally, consisting of two segments with hetero-voicing.
10. The cluster consisting of /r/ and /b/ is only found in accents of English that have retained the production of /r/ in post-vocalic and word-final or syllable-coda position, such as in Scottish and many accents of American English.

3 Initial Cluster Reduction in English

1. Phonotactic interference thus causes problems for German learners of English, who fully realise some initial clusters even though there is no equivalent for it in the target (such as /ps-/, e.g., in *psychology* /psaɪ'kɒlədʒi/).
2. Peter Trudgill (personal correspondence, November 2004) reminds me in this context that 'People often mention place names like, to pick an example at random, Norwich, to illustrate (later?) w loss.'
3. This echoes what was said concerning the increase of English phonotactics through loanword integration (/ʃl-/, /vr-/ etc.).
4. Note that entries for <hlaford ~ lorde> etc. are not included here, since this is by far the most numerous lexical item and would distort the rate of this development considerably.
5. Even though this point is not pursued here, one could argue that the Scottish English phoneme /ʍ/ is undergoing 'rephonemisation', as a result of which younger speakers increasingly consider it as a bisegmental /hw/ sequence. This goes hand in hand with the question as to whether /hw > w/ in ScE represents phonemic loss (and systemic language change) or phonotactic change (see above).
6. Interestingly, however, /hw/ is not found in Newfoundland, which shares a number of features with Irish English thanks to its social history. According to Hickey (2002: 297), 'This distinction is not available in either Irish or English derived communities [in Newfoundland]. This is somewhat surprising, given that the distinction is found almost ubiquitously in Ireland.'
7. A minority of settlers came from other places, such as America, Scandinavia, Germany or China, but the total number of these settlers was at all times small and sociodemographically insignificant.
8. The statistical analysis was carried out by Jennifer Hay, whose help I gratefully acknowledge.
9. The stepwise binomial analysis yielded the following model coefficients:

   Intercept: 313.52701
   Male: –547.15665
   Birth date: –0.16894
   North: 111.58227 South: –320.59419
   Fricative: –.79444; Plosive: –.84502; Sonorant/Consonant: –1.33498; Vowel: –.99592
   DRESS: 9.05653; FLEECE: 8.35866, KIT: 9.34168; LOT: 8.95165; PRICE: 9.71106;
   SQUARE: 9.14920; TRAP: .214
   Male*Birthdate: .28450
   Male*North: 2729.65415; Male*South: 4999.27706
   Birthdate*North: –.05836; Birthdate * South: 0.16822
   North * content: –1.90224; South * content: –1.16104
   Male*Birthdate*North: –1.42407
   Male*Birthdate* South: –0.25965
   (Degrees of Freedom: 2157; Total (i.e. Null): 2131; Residual Null Deviance: 2367; Residual Deviance: 1839; AIC: 1893)

10. It must be mentioned that there were population movements as well. Economic fluctuations, most notably the gold rushes in the 1860s and 1870s, obviously had an impact on in- and out-migration, and some settlements were certainly more dynamic than others.
11. Note that the word-final /mp/ cluster in this example is not reduced, which may shed light on how sonority effects of cluster segments influence variable deletion; see Chapter 2.
12. Holm (ibid.) suggests that this may be due to substratal effects, and points to the fact that verbs in many West African languages never begin with a vocalic segment. This may have triggered the loss of unstressed initial vowels in contact-derived varieties, as in Príncipe Creole Portuguese *bí* (< Portuguese *abrir*, 'open'), *kupa* (< ocupar, 'occupy'), or *géza* (< *igreja*, 'church'), or in Trinidadian Creole French *vale* (< French *avaler*, 'swallow') or *rive* (< *arriver*, 'arrive').

4 Final Cluster Reduction in English

1. However, this assessment was impressionistic and the effect of cluster length on reduction rate was not analysed quantitatively, since trisegmental clusters were 'somewhat rare (and predominantly [found in] past tense verbs)' (Guy 1980: 9).
2. In their analysis of CCR in New Zealand, for instance, Holmes and Bell (1994: 68) state: 'It is also worth noting, for the benefit of future researchers, that the analytical effort in making fine divisions between different types of following consonants are probably not justified . . . Consonants can be combined with minimal loss of information.'
3. The fact that certain clusters may undergo reduction in some varieties is of importance for contact histories and internal constraints. Chapter 5 discusses why this is an important indicator of genetic relationships and contact-derived adaptation processes.
4. This is also found in some non-standard varieties of BrE, for instance in bare root extension of *tell* (Hughes and Trudgill 1996). However, this is restricted to very few verbs in BrE whereas it is much more general in other forms of English.
5. This, by the way, is in agreement with Bell's (1997) analysis of centralised KIT variants in early twentieth-century NZE. Bell finds that some of the oldest Maori in his sample have close front variables of KIT (thus more resembling Australian English) in levels that are 'high enough to represent an almost qualitative difference from the low level used by Pakeha' (1997: 264). Bell also finds that close KIT realisations were no longer found in younger speakers, from which he concludes that original substratal effects were not persistent and disappeared by about the time of the First World War.
6. A caveat, however, is that the authors did not provide a detailed breakdown of CCR in their individual environments. It could thus be objected that differences concerning the operation of CCR are disguised by the way the findings are presented.
7. Additional evidence suggests that language shift has de facto been completed. A number of studies come to the conclusion that neither variety has

uniquely distinct traits of its own, even though the shared features are quantitatively different. For instance, speakers of MNZE are reported to use more 'eh' discourse tags in sentences such as 'we've all gotta go one day eh' (Meyerhoff 1994), and Britain (1992) reports that Maori use high rising terminal contours (HRT) more often than their Pakeha cohorts (see also Holmes (1997) on devoicing, and Bell's (1997) study mentioned above).

8. At the same time, TdCE is very unlike StHE and does thus not simply represent a transplanted variety of StHE, not only in terms of segmental phonology (Schreier 2003a; Schreier and Trudgill forthcoming), but also in its grammatical system (Zettersten 1969).
9. It would be insightful to examine this feature in other BrE varieties to see whether the weakening of this effect holds elsewhere in the British Isles as well.
10. This variety could also have been discussed in the previous section (on language shift), as there are certainly similarities with the situation of the Maori in New Zealand. It is discussed here, however, as we do not yet know the outcome of this contact scenario (in contrast to nineteenth-century NZE), and what may ensue in the case of the Vietnamese community in the USA is either complete language shift (long-term or short-term) or else bilingualism, as is the case for many speakers of ChicE.
11. One should note that these findings only include clusters in prepausal and prevocalic environments, that is, that the CCR percentages would be higher still if preconsonantal environments had also been included in the analysis.
12. I decided not to provide the data in a figure because Khan only published global percentage rates; there is no indication as to the total number of tokens in the various categories. As a result, we cannot calculate the total amount of CCR in IndE and it is impossible to present data in a table, as was done in the other analyses.

5 Theoretical Implications

1. This may explain why, until recently, this feature has not been studied in British dialects or dialect contact scenarios that involve British inputs exclusively; see Chapter 3.
2. The notable exception here is extensive language contact. The discussion of creolisation processes in Suriname showed that initial plosive deletion in Sranan occurred within 20–30 years and that it persisted for centuries.
3. This is implicit in Mossé (1952: 43), whose analysis of <hw ~ w> spellings in southern England revealed that 'In the South, or more exactly, among Anglo-Norman scribes . . . there is *wīle* instead of *whīle* "while", *wō* instead of *whō*, *wī* instead of *why*, etc. This may come from a difficulty in articulating a breathed *h*, for we also have *ōure* for *hōure* "hour".'
4. I owe this point to Edgar W. Schneider.

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