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Introduction to Cognitive and Cultural Factors in Linguistic Change

This third volume of *Principles of Linguistic Change* (henceforth PLC) has a broader scope and a broader database than the first two. Volume 1 investigated the internal factors that control change, beginning with a review of completed changes in the historical record and continuing with studies of change in progress. It examined the regularity of sound change and reviewed the evidence for functional explanations of linguistic change. Volume 2 looked at the social factors governing linguistic change and searched for the social location of the leaders of change, largely through a detailed study of ten Philadelphia neighborhoods. That volume also proposed models for the transmission and incrementation of change.

In the interim, there has appeared the *Atlas of North American English* (Labov, Ash and Boberg 2006: henceforth ANAE). The Atlas provided the first national (and continental) view of the phonology of English as spoken in North America, on the basis of a study of 332 North American cities. It expanded the previous views of change in progress to a panorama of changes in vowel systems on a vast scale – changes that drive neighboring regions in opposing directions.

The *Atlas* finding of steadily increasing regional divergence in North American English sets the problem for Volume 3: What are the consequences of this increasing divergence? What are its origins? And what are the forces which continue to drive divergence over time? To answer these questions, the present volume will explore more deeply the internal factors considered in Volume 1, focusing on the cognitive factors that determine the capacity of the linguistic system to transmit information. It will also expand the social factors considered in Volume 2, moving from the study of face-to-face interaction in local neighborhoods to the development of large-scale cultural patterns across vast regions and over a time span of several centuries.

1.1   Cognitive Factors

In its most general sense, *cognition* denotes any form of *knowing*. The most relevant *OED* definition of cognition is "the action or faculty of knowing taken in its

widest sense, including sensation, perception, conception, etc., as distinguished from feeling and volition." *Cognitive factors* will here be used in a more limited sense: as factors that influence the acquisition of the linguistic system that conveys information on states of affairs – on *what* is being said rather than on the manner or style of expression. The study of the cognitive effects of sound change calls for a measure of listeners' abilities to identify the phonemes in the stream of speech and so to retrieve the words intended by the speaker. Chapters 2 to 4 of this volume will draw upon a series of observations and experiments that preceded and indeed motivated the *Atlas*. These chapters will examine the cognitive consequences of the sound changes that differentiate the dialects of the major cities of Philadelphia, Chicago and Birmingham.

Cognitive factors will be further explored in Chapter 6, which reviews the general principles governing chain shifts and mergers, along with the underlying mechanism of probability matching. The cognitive basis of phonemic categories will be the focus of Chapters 13 and 14. Chapter 13 uses the massive database of ANAE to address the question of the regularity of sound change and to determine whether the fundamental unit of sound change is the phoneme or the word. Chapter 14 examines the *binding force* that unites the allophones of a given phoneme and operates so as to counter the disruptive effects of coarticulation. Age differences in cognitive processing will be central to Chapters 15 and 16. These chapters distinguish the *transmission* of linguistic forms by children from the *diffusion* of forms by adults, and so distinguish the family-tree model from the wave model of change.

1.2   Cultural Factors in Linguistic Change

Cognition is of course not limited to the content of what is being said, but is sensitive to systematic variation in the way in which the message is delivered, yielding information on the speakers' social characteristics and relations to the addressee or audience. Volume 2 was concerned with such social factors in the study of linguistic change in ten Philadelphia neighborhoods from 1972 to 1979. The interviews, the narratives and the long-term ethnographic observations were focused on the effects of face-to-face interaction, as they are reflected in the studies of neighborhood effects in Chapter 7 and of social networks in Chapter 10. Cognitive aspects of that social variation were reported in Chapter 6 of Volume 2: they were the results of matched-guise experiments on the social values attributed to various stages of linguistic changes in progress. Philadelphians rarely referred to these vowel shifts when they talked about the city dialect, but showed greater sensitivity than expected to their social status in the matched-guise responses. Thus there was evidence of *social cognition* of linguistic change in Philadelphia – evidence which was parallel to the findings of field experiments in New York City (Labov 1966) – and this cognitive effect was partly responsible for the systematic differentiation of change

Table 1.1 Tensing and laxing of short *a* before /d/ in the spontaneous speech of 112 adults in the Philadelphia Neighborhood Study

	Tense	Lax
bad	143	0
mad	73	0
glad	18	1
sad	0	14
dad	0	10

by social class and gender. Section 10.4 of Volume 2 argued that the diffusion of linguistic change throughout the city followed the two-step model of influence of Katz and Lazarsfeld (1955), and the leaders of linguistic change located in Chapter 12 were comparable to the opinion leaders defined in that model.

Volume 2 did not, however, resolve the problem of accounting for the uniform direction of sound change throughout the Philadelphia speech community, or for the uniformity of its structural base (Labov 1989b). Thus the raising of (æh) showed sharp stratification by social class, but no social differentiation at all as to which vowels were raised, as shown in the near-total agreement of Table 1.1.

The problem is to deduce what form of communication is responsible for the uniformity of this pattern. Our oldest upper-class speaker has the same short-*a* system as our oldest lower working-class speaker, and the chain of events that links them would be difficult to trace. At the time that Volume 2 was completed, enough evidence had emerged from ANAE to show that the problem was broader than Philadelphia, extending to the "extraordinary uniformity of the Northern Cities Shift throughout the Inland North, and the regional shifts of the South and Canada." At the end of section 16.4 of Volume 2, the question was posed:

> If the incrementation of these changes is driven by socially motivated projections, how can we explain the fact that they affect so many millions of people in widely separated cities who have no connection with each other? (p. 511)

Chapter 16 of Volume 2 developed the concept of "abstract polarities which may take the same form in many widely separated communities" (p. 514). The "abstract polarities" will here be termed *cultural factors*. In the terminology adopted here, cultural factors will be distinguished from other social factors in their generality and remoteness from simple acts of face-to-face communication. Thus neighborhood, ethnicity, social network and communities of practice can be considered social factors in linguistic change in the light of the transparency of the social processes responsible for the diffusion of change. At the same time, they are not as strongly correlated with change as the larger categories of gender and social class.

Throughout this volume, the term *cognitive factors* will be used to designate the processes of cognition in the limited sense defined in the preceding section: the ability to decode what is being said through the accurate identification of linguistic categories. The relationship between these factors and linguistic change will bear in both directions: the effect of linguistic change on cognitive factors, as in Chapters 2–4; and the effect of cognitive factors on linguistic change, as in Chapter 6. *Social factors* will designate the effects of linguistic interaction among members of specific social groups, including the recognition of these effects by members and nonmembers. *Cultural factors* will designate the association of linguistic change with broader social patterns that are partly, if not entirely, independent of face-to-face interaction. These must involve the cognitive processes that recognize such cultural patterns, though this volume has less to say about them.

In this terminology, are *gender* and *social class* to be categorized as social or as cultural factors? It depends on what we consider to be the main route in the diffusion of these traits. While children certainly learn gender roles from their parents, they also acquire a broader cultural construct of how men and women differ in their speech. Social class differences in language behavior are also more general and wide-ranging than any particular mechanism generated by face-to-face contact.[1]

This volume will continue the line of thought developed in the final chapter of Volume 2, searching for the larger cultural factors responsible for the uniformity and continuity of linguistic change. Chapter 5 will examine the historical matrix in which current North American English sound changes originated, searching for their "triggering events." Chapter 9 will review the various proposals for the social factors that motivate linguistic change, and conclude that the extent and uniformity of these changes must be accounted for by a cultural history that is at least in part independent of face-to-face interaction.

This uniformity represents only half of the deeper problem of explanation that emerges from the ANAE data. The other half concerns the divergence of neighboring regions which have been and remain in close contact. The sections to follow will outline the relevance of cognitive and cultural factors to our understanding of this most problematic aspect of linguistic change.

1.3   Convergence and Divergence

Efforts to understand human language over the past two centuries may be sharply divided into two distinct undertakings. Both spring from an acknowledgment that language, like the species that uses it, had a single origin. Given this perspective, one task is to discover those constant properties of language that reflect the innate biological endowment of the human species – the language faculty. The other, equally challenging, task is to discover the causes of the present diversity among the languages of the world. As part of a general redirection towards a historical perspective on

the understanding of language, this volume will focus on the problem of *divergence*: how linguistic systems that were once the same have come to be different.

The mere fact of diversity is usually not a challenge to our understanding of the mechanisms of linguistic change, even when we cannot trace the exact historical paths leading to such divergence. When two groups of speakers become separated over time through migration to distant parts, and communication between them is drastically reduced, we expect their linguistic systems to diverge. The many sources of variation in vocabulary, grammar and phonology will inevitably lead them to drift apart. We are not surprised that the phonology of English, transplanted from continental Europe in the fifth century AD, is now much different from that of the West Germanic languages Frisian or Low German. One would not expect, for instance, that the same lexical replacements that operate at the rate of 15 percent per millennium, as predicted by glottochronology, would occur on both sides of the North Sea. The normal work of historical linguistics is then devoted to describing the divergence that follows from reduced contact and to extracting the general principles that determine what form and direction this divergence will take. When such distant relatives converge on parallel paths, we are surprised and puzzled. Trudgill's studies of the convergence of postcolonial English dialects in the Southern Hemisphere (2004) are a case in point.

On the other hand, we are not surprised when neighboring dialects converge. The diffusion of linguistic features across dialects has been studied in considerable detail by Trudgill (1986) and more recently reviewed by Auer and Hinskens (1996). They show how the effects of dialect contact lead to the reduction of dialect diversity in the form of "dialect leveling" or, in more extreme cases, koineization: the formation of new patterns of an "historically mixed but synchronically stable" dialect (Trudgill 1986: 107). Bloomfield's principle of accommodation leads us to expect such dialect leveling:

[1] Every speaker is constantly adapting his speech-habits to those of his interlocutors. (Bloomfield 1933: 476)

However, when two groups of speakers living side by side, in daily communication, begin to speak differently from one another, we encounter a type of divergence that calls for an explanation. To sum up,

[2a] When two speech communities are separated so that communication between them is reduced, then divergence is expected, and any degree of convergence requires an explanation.

[2b] When two speech communities are in continuous communication, linguistic convergence is expected, and any degree of divergence requires an explanation.

This volume will confront the problem of explanation for a number of changes of the type [2b], as they are described in ANAE.

1.4   The Darwinian Paradox Revisited

An inquiry into the causes of divergence returns us to the issue raised in Chapter 1 of the second volume of this series, the "Darwinian Paradox" – an issue repeated here as [3]:

[3]   The evolution of species and the evolution of language are identical in form, although the fundamental mechanism of the former is absent in the latter.

The fundamental mechanism referred to here is natural selection. Darwin cited Max Müller's argument that words become better (more fit) as they become shorter; but the vast majority of linguists have been skeptical of such claims. The position of Hermann Paul on the functionality of sound change is prototypical of that of the the many scholars cited in Chapter 1 of Volume 2:

[4]   [T]he symmetry of any system of forms meets in sound change an incessant and aggressive foe. It is hard to realize how disconnected, confused, and unintelligible language would gradually become if it had patiently to endure all the devastations of sound change. (Paul 1970: 202)

Paul's evaluation of sound change is based on its relation to the fundamental cognitive function of language: to convey information about states of affairs across temporal and spatial dimensions. One can indeed find many analogies between social variation and communicative acts among nonhuman species in the signaling of territoriality, of local and personal identity, and of accommodation in terms of domination and submission (Cheney and Seyfarth 1990, 2007). However, an understanding of human language demands an accounting of how linguistic change and diversity relate to the unique capacity of human language to convey truth-conditional information and thereby adapt successfully to real-world conditions. Chapters 2, 3 and 4 will report observations and experiments that evaluate the effect of the sound changes discussed in Volumes 1 and 2 on the capacity to transmit information across and within the community. The results confirm the prediction of serious interference with that capacity. To the extent that we find that language change interferes with communication, we will have to agree with Paul in rejecting Müller's naïve optimism on the operation of natural selection in language change.

One way of salvaging the functionality of change is to argue that change optimizes ease of communication, responding to the principle of least effort:

[5]   It is safe to say that we speak as rapidly and with as little effort as possible, approaching always the limit where our interlocutors ask us to repeat our utterance, and that a great deal of sound change is in some way connected with this factor. (Bloomfield 1933: 386)

Most of the changes referred to by Bloomfield are cases of lenition that reduce phonetic information; mergers that simplify the phonemic inventory; or interlocking allophonic changes that disrupt the transparency of phonemic relations (see also Jespersen 1946, Saussure 1949). All such changes lead to a loss of contrast, which seems normal and predictable, as in the case of vowel reduction. The unstressed vowels of English, as in most other languages, occupy a smaller area of phonological space than the stressed vowels, have smaller margins of security available, and maintain fewer contrastive categories.

The chain shifts studied in Volume 1 and the changes in the Philadelphia vowel system that are the main focus of Volume 2 do not as a whole involve lenition, but rather exhibit fortition – an increase in effort. The general raising of /æ/ in the Inland North that initiated the Northern Cities Shift involves lengthening, fronting and raising, and breaking into two morae of equal length (ANAE, Ch. 13). Southern breaking of the same vowel involves the creation of a triphthong that moves from a low front steady state to a high front glide and back to a low central target. The London and New York development of /ay/ involves a steady state of 60 msec in low back position, a shift to a point of inflection in low central position, and a final glide with a high front target. Once the nature of these shifts and their vigorous development in real and apparent time are clearly defined, the principle of least effort recedes into the background, and the impact on comprehension returns to the foreground.

1.5 Divergence and the Central Dogma

The central dogma of sociolinguistics is that the community is prior to the individual. This means that, in linguistic analysis, the behavior of an individual can be understood only through the study of the social groups of which he or she is a member. Following the approach outlined in Weinreich et al. (1968), language is seen as an abstract pattern located in the speech community and exterior to the individual. The human language faculty, an evolutionary development rooted in human physiology, is then viewed as the capacity to perceive, reproduce and employ this pattern.

It follows that the individual is not a unit of linguistic analysis. Though the recordings and judgments on which the present work is based are gathered from individual speakers, the focus is not on their idiosyncratic behavior, but rather on the extent to which they conform to widespread community patterns.

Divergence, a central theme of this volume, is also a phenomenon of communities, not of individuals. Individuals do diverge from the pattern of their main speech communities as a function of their personal histories, but their idiosyncrasies are not instruments of linguistic communication. The divergence problem arises when different patterns of communication are generalized across individuals in

neighboring communities. That problem concerns the effect on the main cognitive function of language, as defined above in section 1.1. For that function to be preserved in the face of linguistic divergence, speakers must develop a pandialectal grammar (Bailey 1972), which enables them to decode and comprehend the speech of neighboring communities. Chapters 2–4 will report the results of experiments which reveal that this ability is in fact quite limited.

1.6   The Community Orientation of Language Learning

The communal perspective applies equally to language learning. All of the factors referred to here concern the ability of the language learner to detect and grasp community patterns in the social environment and to modify linguistic behavior so as to fit that pattern. Granted that the language learning ability is constrained biologically in each individual (Hauser et al. 2002), linguistic change is change in the pattern of the speech community, not of the individual.

The ability to grasp social patterns is not constant across the life span. When children learn their first language from their caretakers, their cognitive abilities (in the sense defined in section 1.1) are at a maximum. These abilities decline rapidly in late adolescence (Sankoff 2002, 2004). Since children's view of the social differences in linguistic patterns does not expand until they move beyond the influence of their immediate family, the window of opportunity for acquiring social and cultural patterns is limited. There is ample evidence that a native-like command of a linguistic pattern different from that first learned is possible only for children who move into the new community before the age of nine or ten.

In the study of the New York City dialect, children who spent the first half of their formative years (ages 4 to 13) in the city displayed the characteristic NYC phonological system; but not those who arrived after 9 years of age (Labov 1966). Oyama (1973) also found that children of Italian background who arrived in New York City before the age of 9 showed the basic NYC pattern. Similarly, Payne found that children who had come to Philadelphia before the age of 9 acquired the characteristic Philadelphia sound changes; but not those who moved there at a later age (Payne 1976, 1980). In England, 4-year-old children in the new town of Milton Keynes showed the typical pattern of their parents, but 8-year olds acquired the new community pattern (Kerswill 1996, Williams and Kerswill 1999).

Though 9–10 appears to be a critical age for entering a new community, this does not imply that the language learning mechanism declines abruptly at that age. It seems rather that it is the proportion of the formative years exposed to the new system that counts. Thus children who moved into Philadelphia at the age of 8 did not acquire Philadelphia phonology in the single year that remained before age 9. Their behavior when interviewed at ages 13 to 17 registered the effects of 5–9 years of exposure to the new system.

The central fact of language learning is that children are not programmed to learn the language of their parents, or the language of any other individuals. Children accept the linguistic forms of their parents only when they are convinced that their parents are representative of the broader speech community. This is most obviously demonstrated when parents are not native speakers of the language that children are acquiring. The children's language learning faculty drives them towards the speech pattern they perceive as the most valid instrument of communicative exchange.

Given this tendency to adopt stable community patterns, the mechanism of transmission becomes even more problematic. When change is occurring rapidly, local children are in the same situation as newly arrived immigrants. Having learned their parents' system, they must adjust to the new community system between the ages of 5 and 17. The most precise evidence on early language learning of a changing pattern comes from the real-time studies of the shift from apical to uvular /R/ in Montreal French (Sankoff et al. 2001, Sankoff and Blondeau 2007). Of 11 speakers between age 15 and age 20 in 1971, 6 had replaced the 100% apical /r/ of their parents with 90–100% uvular /R/. Four of the others had acquired a variable use of more than 20% /R/ in 1971, but went on to a categorical use of /R/ by the time they were restudied in 1984. For variables such as these, it is clear that the formative period can extend to early adulthood.

The largest body of evidence on the acquisition of community patterns comes from ANAE. The vowel systems of North American English were studied by a sample of 762 subjects in 323 communities, representing all cities with a population of over 50,000 in 1990. It was not possible to confine the study to speakers whose parents were local to the area, since in many regions of the South and West these form a very small percentage of the population. The first two speakers who answered their telephone and answered "Yes" to the question "Did you grow up in (the city being studied)?" were accepted as representative of that city. Given the mobility of the North American population, it was inevitable that a large proportion of these subjects grew up in households where a dialect was spoken which was quite different from that of the surrounding community. If we add to this the influence of non-local friends and neighbors, one might expect the end result to be maps of a pepper-and-salt pattern in which the local dialect was obscured by individual variation. Instead, the *Atlas* shows remarkably uniform displays. Measures of homogeneity (percent within the isogloss that are X) and consistency (percent of all Xs within the isogloss) are almost all above .8 (ANAE, Ch. 11; see Figures 5.19, 8.3, 10.3 in this volume).

Within the speech community, change in progress is reflected by the steady advance of younger speakers over older speakers within each social group. This incrementation within social classes can be seen in Figures 9.5, 9.6, and 9.10, which trace the acquisition of the newer patterns by youth as they increase the levels of sound change that they acquired in first-language learning.

The recurrence of common patterns in ANAE makes even more problematic its central findings: increasing diversity of regional dialects in North American English

and divergence among speakers who are in continuous contact. The task of the present volume is to explain these findings within a broader framework of cognitive and cultural factors in linguistic change.

1.7   The Argument of this Volume

Part A (Chapters 2–4) looks directly at the cognitive consequences of sound change in studies of cross-dialectal comprehension. The observations and experiments reported all lead to the conclusion that the consequences of sound change interfere severely with the primary function of the linguistic system: the transmission of information. It then becomes even more urgent to search for the origins, causes and driving forces behind linguistic change.

Part B examines the life history of linguistic change, beginning with the triggering events in Chapter 5. Chapter 6 reviews and revises the governing principles of change that were first launched in Volume 1. Chapter 7 deals with forks in the road, locating those choice points where change can go in either one direction or another. Chapter 8 then deals with conditions for divergence – the conditions under which two neighboring dialects in full communication become more different from each other over time.

Chapter 9 searches for the driving forces behind change, considering the many social and cultural factors that have been associated with particular changes: local identity, gender asymmetry, reference groups, communities of practice. Again, it is the great extent and uniformity of the Northern Cities Shift [NCS] that offers the most severe challenge to local explanations. Chapter 10 searches for larger-scale ideological correlates of the NCS in Yankee cultural imperialism, confronting the striking coincidence between the NCS and the Blue States in the presidential elections of 2000 and 2004. Chapter 11 provides some experimental evidence to support the existence of such ideological correlates. Chapter 12 observes that almost all features of currently spoken languages are the *endpoints* of completed changes, and aims at an account of how such endpoints are achieved.

Part C returns to a consideration of the units of linguistic change, pursuing further the questions raised in Volume 1. Chapter 13, "Words Floating on the Surface of Sound Change," re-engages the regularity issue, taking advantage of the massive ANAE database to search for lexical effects in sound change. The results support the neogrammarian view of change as affecting all words in which a phoneme appears; yet there remain slight fluctuations from word to word that remain to be accounted for. Chapter 14 raises the question as to whether the allophone is a more fundamental unit of change than the phoneme, and looks for evidence of allophonic chain shifting. The negative results of this inquiry leads us to estimate the strength of the binding forces which hold allophones together in the course of change.

Part D distinguishes between the transmission and the diffusion of linguistic change. *Transmission* is seen as the product of children's cognitive capacities as language learners: it is the basic process responsible both for stability and for the regularity of change within the speech community. *Diffusion* across speech communities, on the other hand, is seen as the product of the more limited learning capacity of adults. Because adults acquire language in a less regular and faithful manner than children do, the results of such language contact are found to be less regular and less consistent than transmission within the community. Chapter 15 deals with diffusion across geographically separate communities, and Chapter 16, with diffusion across segregated communal groups within the community.

1.8   The English Vowel System and the Major Chain Shifts of North American English

THE SUBSYSTEMS OF INITIAL POSITION   Most chapters in this volume will make reference to one or more of the major chain shifts that are responsible for the increasing divergence of North American English dialect regions. The mechanism and motivation of these chain shifts are best approached through the concept of *subsystem*, the domain of the general principles of chain shifting (Vol. 1, Chs 5–6). Figure 1.1a

	SHORT		LONG					
			Upgliding				Ingliding	
			Front upgliding		Back upgliding			
	V		Vy		Vw		Vh	
nucleus	front	back	front	back	front	back	front	back
high	i	u	iy		iw	uw		
mid	e	ʌ	ey	oy		ow		oh
low	æ	o		ay		aw	oh	ah
high	*bit*	*put*	*beat*		*suit*	*boot*		
mid	*bet*	*but*	*bait*	*boy*		*boat*		*bought*
low	*bat*	*pot*		*bite*		*bout*	*halve*	*father*

Figure 1.1a   Organization of North American English vowels in initial position

shows the feature-governed organization of English vowels in their initial position, from which current sound changes depart.[2] Vowels are divided into two major categories: long and short. This distribution depends upon a vocabulary distribution that is invariant across dialects and independent of phonetic realization: long vowels appear in free (word-final) or checked (word-nonfinal) position, while short vowels appear only in checked position. This is the binary notation common to most phonological treatments of English: long vowels are analyzed as bimoraic, with the second mora as a [−consonantal, −vocalic] glide. This permits the major generalization: no words end with a [+vocalic, −consonantal] segment. The three vowel subsystems are divided into two upgliding sets, distinguished by the direction of their glides, and one ingliding set.[3] In addition, they are organized by a trinary dimension of height[4] and a binary dimension of fronting. In various dialects, the inventory of these subsystems is altered through shortening, lengthening, diphthongization, monophthongization, and merger across subsystems. Change in the inventory within a subsystem initiates chain shifting in the direction of maximum dispersion.

The /h/ notation for the long and ingliding vowels identifies a subset that plays an important role in the dynamics of English sound change. The /h/ glide is realized phonetically as length for low vowels and as the inglide [ə] for mid and high vowels.[5]

The ANAE notation is useful for all English dialects that underwent diphthongization of the Middle English high and mid long vowels /iː, eː, uː, oː/. The chief consequence of this diphthongization is that they become integrated into subsets with the "true diphthongs" /ay, oy, aw/, and so participate in chain shifts with them. This is most evident in the "Southern Shift" (to be described below), which is common to the southern US, the South of England, Australia, New Zealand and South Africa.

Figure 1.1a is not a useful notation for those dialects which did not develop such diphthongization, as for example Scots, Caribbean English, traditional upper-class Charleston English, or forms of American English with a German or Scandinavian substrate (such as those spoken in Eastern Pennsylvania, Wisconsin, Minnesota). Dialects with monophthongal long vowels have a different phonological hierarchy and do not participate in the various shifts to be described here, but move in other directions.[6] The binary notation does not therefore provide an initial position for all English dialects and does not predict the directions of change in those which do not have glides /y/ and /w/ in hiatus (V to V transitions).

Many of the oppositions shown in Figure 1.1a will play a major role in the discussions of sound change in the chapters to follow. A few comments on the features of North American English that motivate this framework may be helpful here. In the short vowel subset, the low back phoneme is shown as /o/, even though it is pronounced as an unrounded [ɑ] in most North American dialects. However, the original back rounded [ɒ] is retained in Eastern New England, Canada and Western Pennsylvania (after the merger with /oh/), and we have no reason to think that the unrounding process ever took place in those dialects, as it did in Western New England. Unrounding of /o/ plays a major role in the reconstruction of the history of the Northern Cities Shift in Part B.

The opposition of /iw/ and /uw/ was for some time a stable consequence of the loss of the /y/ glide after coronals in *dew*, *tune*, *tutor*, *suit* and so on (Kenyon and Knott 1953), which opposed *dew* [dɪu] to *do* [dʊu]. ANAE shows that this opposition remains strong in only a few areas; but the merger is a major component of the history of the continent–wide fronting of /uw/ (as presented in Chapter 5 on triggering events).

In *r*-pronouncing dialects, the Vh subset consists of two large classes with limited distribution, /ah/ and /oh/. The /ah/ class is centered on a small lexical set (*father*, *ma*, *pa*, *bra*, *spa*), but has expanded greatly with the accretion of large numbers of loanwords containing "foreign *a*" (*taco*, *pajama*, *Rajah*, *Fujiyama*; see Boberg 1997). It also includes *palm*, *calm*, *balm* and the like when the /l/ in these words is not pronounced. In Eastern New England, /ah/ includes a subset of the "broad *a*" class of southern British English (*half*, *aunt*, *past*).

For much of North America, where /o/ does not merge with /oh/ it merges with /ah/.[7] It will be argued that both the merger of /o/ and /ah/ and the merger of /o/ and /oh/ represent the migration of /o/ to the subset of long and ingliding vowels, with the consequent acquisition of phonological length (Labov and Baranowski 2006). The third member of the Vh subset, /æh/, is indicated in only a few words, which (for some dialects) participate in the opposition of short /æ/ (as in *have*, *Sam*) to long and ingliding /æh/ (as in *halve*, *salve*, *Salmon*).[8] This opposition is amplified in the short-*a* split in New York City and the Mid-Atlantic states, discussed in detail in Chapter 16 and elsewhere. In *r*-less dialects, the long and ingliding subset is of course greatly expanded to include /ih, eh, uh/ (as in *here*, *there*, *moor* etc.).

Figure 1.1b inserts into the framework of Figure 1.1a the word class labels of J. C. Wells (1982), which are familiar to many readers in the British tradition. A more detailed definition and history of the word classes of Figure 1.1a is given in Chapter 2 of ANAE.

	SHORT		LONG					
			Upgliding				Ingliding	
			Front upgliding		Back upgliding			
	V		Vy		Vw		Vh	
nucleus	front	back	front	back	front	back	front	back
high	KIT	FOOT	FLEECE			GOOSE		
mid	DRESS	STRUT	FACE	CHOICE		GOAT		THOUGHT
low	TRAP	LOT		PRICE		MOUTH		FATHER

Figure 1.1b ANAE vowel categories identified with the word classes of Wells (1982)
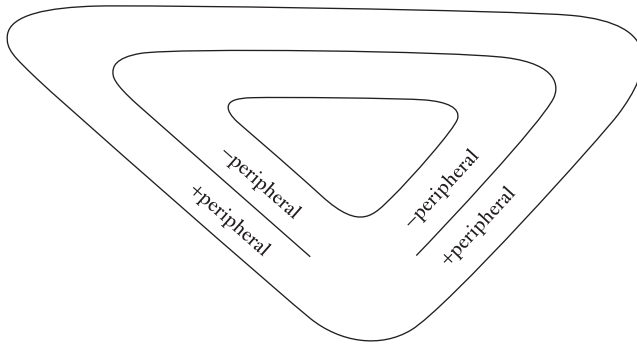
Figure 1.2   Structure of West Germanic phonological space

PHONOLOGICAL SPACE   The connection between the abstract categories of Figure 1.1a and our descriptions of current sound changes is through their realization in a phonological space that is here portrayed by the first two formant values of the resonant portion of the sound wave. The outer limits of this space are defined by the outer limits of formant values, and the internal organization, by distance from that periphery. The [±peripheral] dimension was first introduced in Labov, Yaeger and Steiner (1972: henceforth LYS), where it was found that the vowel systems and sound changes of West Germanic languages showed peripheral and non-peripheral tracks in both front and back regions. In chain shifts, vowels were found to rise along the peripheral track and fall along the nonperipheral track. Chapter 6 reviews the evidence for this analysis and tests it through the superposition of the mean values of all vowels for twenty-one North American English dialects, on the basis of the 130,000 measurements of ANAE vowels (Figure 6.18). The conclusion is that peripherality is defined in terms of formant values for high and mid vowels, but not for low vowels, where duration may be the major factor. The end result is the view of phonological space in Figure 1.2.

INSERTION OF NORTH AMERICAN ENGLISH SUBSYSTEMS INTO PHONOLOGICAL SPACE   The general principles of chain shifting (PLC, Vol. 1, Chs 5–6) and the large-scale acoustic investigation in Chapter 6 show that, in initial position, the long subsystems are located on the peripheral track and the short subsystem on the nonperipheral track. Thus Figure 1.3 inserts the abstract schemata of Figure 1.1 into the phonological space of Figure 1.2.

THE MAJOR NORTH AMERICAN ENGLISH CHAIN SHIFTS   The Northern Cities Shift [NCS] involves the rotation of six vowels, as shown in Figure 1.4. The NCS involves the general tensing, raising and fronting of /æ/, the fronting of /o/, the lowering and fronting of /oh/, the falling and backing of /e/, and the backing of /ʌ/.[9] The most advanced versions show the reversal of the relative positions of /e/ and /æ/,
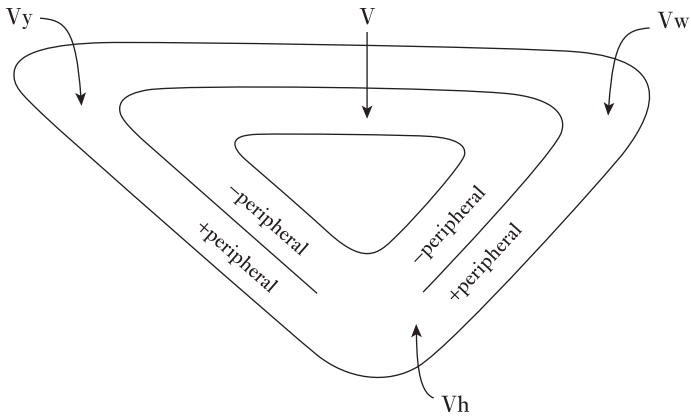
Figure 1.3 Insertion of North American English vowel subsystems into West Germanic phonological space
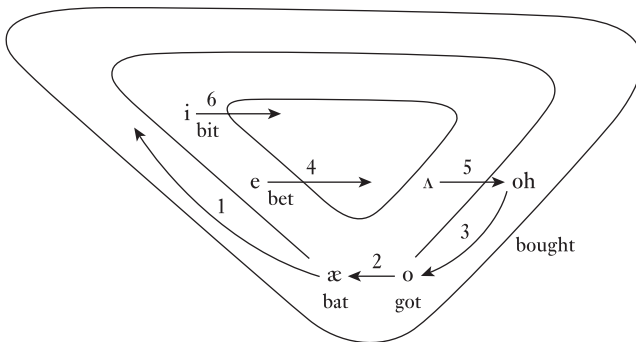

Figure 1.4 The Northern Cities Shift

the front–back alignment of /e/ and /o/ and the reversal of the relative positions of /o/ and /ʌ/.

The ordering of events in the NCS is a matter of ongoing investigation. Chapter 5 will show that the general raising of /æ/ in Western New York State was a triggering event for the shift. Yet the unrounding of /o/ in New York State may be considered a precondition for this general raising of /æ/. Boberg (2001) points out that several preconditions for the NCS are found in Southwestern New England (see also ANAE, section 14.2 and Map 14.9).

The Southern Shift, shown in Figure 1.5, is initiated by the monophthongization of /ay/, followed by the lowering and backing of the nucleus of /ey/ along with the tensing, raising and fronting of /e/ This is followed by the lowering and backing of the nucleus of /iy/ and the tensing, raising and fronting of /i/.[10]
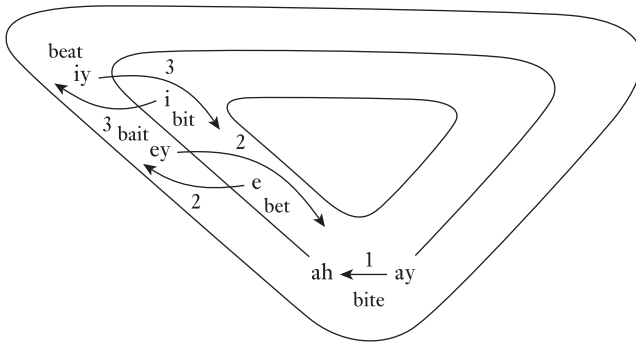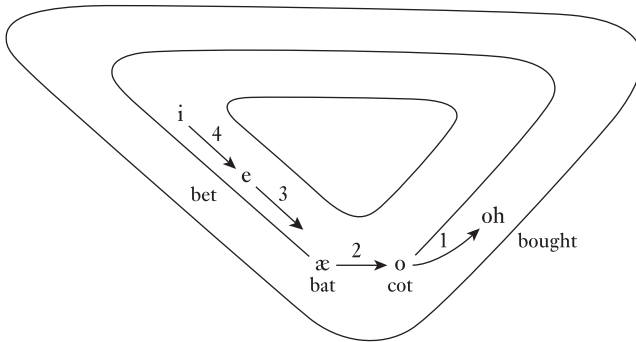
Figure 1.5 The Southern Shift

Figure 1.6 The Canadian Shift

The Canadian Shift is displayed in Figure 1.6. It is initiated by the low back merger of (o) and (oh) in lower mid back position, close to cardinal [ɔ]. This was followed by the backing of /æ/ to low central position [a] and by the backing and lowering of /e/. In some systems the movement of /e/ is only to the back, thus appearing as a parallel backing rather than as a chain shift.[11] More recent studies have confirmed the initial finding that lowering (and/or backing) of /i/ is involved as well.

The Pittsburgh Shift, first reported in ANAE, represents a different response to the low back merger, as shown in Figure 1.7. In Pittsburgh, as in Canada, the low back merger takes place in lower mid back position; but, instead of a shift of /æ/ into the space vacated, we observe a downward movement of /ʌ/.

The Back Shift Before /r/, shown in Figure 1.8, is found widely in the Midland and South, which together make up the the Southeastern superregion (ANAE, Chs 17–19). It appears to be initiated by the backing and raising of /ahr/ to lower mid
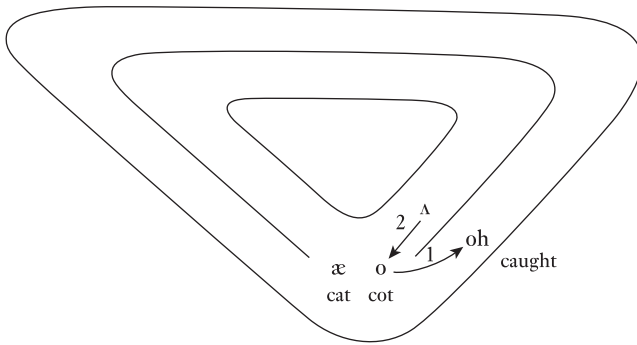
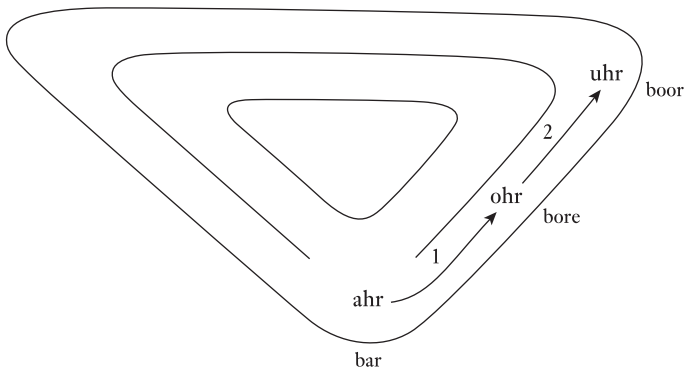**Figure 1.7**   The Pittsburgh Shift

Figure 1.8   The Back Shift Before /r/

back position [ɔːr], which is completed in Philadelphia for all ages and social groups; this movement is followed by the upward shift of /ohr/ (which is long since merged with /ɔhr/). This shift resembles the most common pattern of vowel shifting in Western Europe, discussed in Haudricourt and Juilland (1949) and Martinet (1955). In Western Europe it is frequently accompanied by the fronting of /o/ and /u/. Since no North American dialect shows fronting of back vowels before /r/, /ohr/ fully or partially merges with /uhr/.[12] A row of communities along the Eastern Seaboard show a parallel raising of /oh/ to upper mid position, but no coupling with a movement of /ah/ has been demonstrated.

The Back Upglide Shift of Figure 1.9 is a phenomenon peculiar to the South: a phonological reinterpretation of the fronting of /aw/, general across the South-eastern superregion. It represents the logic initiated by the southern development of long open *o* to a back upgliding form [ɔo] instead of an ingliding form [ɔə], as in other areas. The shift to [ɔɑ] must have followed the lengthening of short *o*
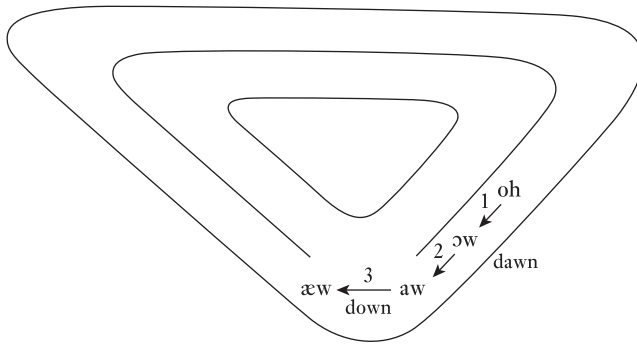
Figure 1.9   The Back Upglide Shift

before voiceless fricatives and velar nasals (as in *lost*, *song*, etc.). Among younger speakers, the rounded nucleus tends to give way to an unrounded one as a form of nucleus–glide differentiation. The result is [ɑɔ], which would be identical with the phonetic reflex of /aw/ in the North. However, the diphthong /aw/ is realized with a fronted nucleus in the South, [æo, ɛo, eo] – a development which justifies the phonemic categorization of the /aw/ of initial position as /æw/ in the framework of Figure 1.1. The same development of /aw/ in the Midland does not support rewriting /aw/ as /æw/.

   These schematic views of the major chain shifts taking place in present-day North American English will be a point of reference for all the chapters to follow.