The Atlas of North American English

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Phonetics, Phonology and Sound Change

A Multimedia Reference Tool

by
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Preface

The Atlas of North American English [ANAE] is a report on the regional phonology of the English of the United States and Canada. Based on a telephone survey carried out in the years 1992–1999 [Telsur], it provides a portrait of the phonology of the continent at one rather extended moment in its history. The view that it provides of English dialects is dynamic rather than static. The main focus of the Atlas is on the mechanism, the causes, and the consequences of linguistic change. Dialects are defined by changes in progress more than changes completed and boundaries between them represent the outer limits of ongoing change.

A major aim of the Atlas is the re-establishment of the links between dialect geography and general linguistics. The Atlas provides considerably more data on the general principles of chain shifting and merger than has been available before. There is extensive information on the role of gender, age, and city size in the development of sound change in North America. The findings of the Atlas bear on many synchronic issues as well: the status of the phoneme as an abstract and unitary symbol; the existence of subsystems and their hierarchical arrangement; the uniformity of co-articulatory effects; the role of duration in phonological contrast.

In many respects the data of dialect geography provide more decisive evidence on general linguistic questions than studies of single speech communities. However, it is not the same kind of data. Studies within the local community focus on variation, rather than the homogeneous structural framework in which that variation is defined. The Atlas charts the distribution of such frameworks across the landscape: that is why the dialect regions defined here have such high ratings in homogeneity and consistency.

Many users of this Atlas will be interested in the portrait of phonology and sound change in their local region, while others will want to take advantage of the continental view provided and develop its implications for sound change on other continents and other languages. It is hoped that both directions of development will occur. One of the primary aims of the Atlas is to stimulate a series of local studies that will fill in the broad schema provided with more detailed and accurate data and supplement the studies of the major urbanized areas with investigations of the smaller cities in the interstices. There is also much to be done with the data that the Telsur project has provided. We hope that the unanalyzed maps of Chapter 10, and the complete spread sheets of Telsur data provided on the CD, will be useful to those who would like to adapt these materials to their own theoretical framework.

Acknowledgments

One must recognize two groups of predecessors on whose work the Atlas is built: dialect geographers on the one hand, and students of change in progress on the other.

Almost every chapter of the Atlas refers to the work of Hans Kurath and Raven McDavid. The fundamental divisions they made into North, Midland and South, and the connections they made with settlement history, stand up well in the light of current developments. Their insights were extended by the work of Roger Shuy, A. L. Davis, Harold Allen, Albert Marckwardt and Craig Carver's work with DARE materials.

Three studies anticipated the central themes of Atlas methodology, focusing on the geographic dispersion of changes in progress: Trudgill's study of the sound changes in the Hemnesberget peninsula (1974b), Callary's report on the raising of /æ/ in northern Illinois (1975), and Bailey's telephone surveys of Texas (Bailey and Ross 1992) and Oklahoma (Bailey, Wikle, Tillery and Sand 1993).

The Atlas would not have been possible without the financial support of the National Science Foundation, the National Endowment for the Humanities and Bell Northern (Nortel) Corporation. We are particularly grateful for the initial guidance of the program officers of NSF and NEH, Paul Chapin and Helen Aguerra, and the head of the Nortel research group, Matthew Lennig. The various grants and contracts that supported the Atlas are listed in detail in the description of various stages of the Atlas in Chapter 4.

Thirteen telephone interviewers were responsible for the creation of the database of 805 recorded interviews, reduced finally to the 762 data points of Chapters 7–9): Joyce Albergottie, Sharon Ash, Atissa Banuazizi, Charles Boberg, Crawford Feagin, Alice Goffman, Janet Hill, Shawn Noble Maeder, Christine Moisset, Marc Mostovoy, Carol Orr, Tara Sanchez, and Hillary Waterman.

The acoustic analysis of the 439 interviews that form the data base for Chapters 10–20 was largely the work of Boberg, with the initial impetus from Ash. Maciej Baranowski, David Bowie, Jeff Conn, and Ken Matsuda made important contributions to this work.

The principles of chain shifting have their origin in early work at Columbia University by myself and Benji Wald. Wald's exploratory interviews in Chicago have played an important role in our interpretation of the time sequence of the Northern Cities Shift, and his insights are gratefully acknowledged.

We are particularly indebted to Terry Nearey, and the log mean normalization program that he developed and first tested. Though no normalization program can be considered perfect, our ability to track change quantitatively across age and gender rests upon the success of this algorithm in eliminating differences in formant values that are the result of differences in vocal tract length, without eliminating those differences in sex and age that are intrinsic to the speech community.

It would be impossible to overstate our indebtedness to our publisher, Mouton de Gruyter, who has with great patience and fortitude supported the project with technical, editorial and moral support from 2001 to its completion in the present year. Our editor Anke Beck has been the guiding spirit of this enterprise. Mouton engaged our linguistic engineer, Jürgen Handke of the University of Marburg. He and his staff have developed the ANAE web site and the CD well beyond our original conception.

The finished version of the Atlas is the joint work of three authors, following several years of intensive discussion, revision, and exchange of ideas. But in even the closest collaboration, there remain the marks of original contributions that persist in the finished product. The original design of the telephone interview and the construction of the sample of North American speakers is largely the work of Ash, and she is the primary author of Chapter 4. Ash was also responsible for the adaptation of Kaye Elemetric's CSL program that made it possible to analyze more than half of the vowel systems in the Telsur data base. The lion's share of

the acoustic analysis of the 439 subjects was done by Boberg, whose speed, accuracy, and phonetic sensitivity were essential factors in the completion of the Atlas and its success in tracking sound change in progress. He is the primary author of Chapter 5, Chapter 15 on Canada, and the analysis of Western New England in Chapters 14 and 16. Beyond this, his critical thinking is present at every step of the way. Ash and Boberg together discovered the phenomenon of "Northern Breaking" (Chapter 13), one of the most remarkable and unexpected findings of the Atlas. Much of the analysis and the main lines of interpretation were first written by me, but not without many cycles of correction and revision from my co-authors. While we have consistently developed the many connections between the Atlas data and the general theory of sound change, we have preferred to remain on the conservative side in both notation and interpretation. The phonological, phonetic and historical implications of the Atlas findings will be pursued in publications to follow.

William Labov
October 2005

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Abbreviations

ANAE	*Atlas of North American English*
DARE	Cassidy 1985–, *Dictionary of American Regional English*
AE1	The isogloss defining systems with F1(æ) < 700 Hz
AWY	The isogloss defining systems with the nucleus of /aw/ backer than /ay/
AYM	The isogloss defining the South with glide deletion of /ay/ before obstruents
CA	Canada
CS	Charleston
ED	The isogloss defining systems with close approximation of /e/ and /o/ on the front-back dimension: F2(e) – F2(o) < 375 Hz
ENE	Eastern New England
EQ	The isogloss defining systems with /e/ higher and fronter than /æ/
F1	first formant, an acoustic measure corresponding to vowel height
F2	second formant, an acoustic measure corresponding to vowel fronting
FL	Florida
Hz	Hertz
IN	Inland North
LAGS	*Linguistic Atlas of the Gulf States*
LAMSAS	*Linguistic Atlas of the Middle and South Atlantic States*
LANE	*Linguistic Atlas of New England*
LYS	Labov, Yaeger, and Steiner 1972, *A Quantitative Study of Sound Change in Progress*
M	Midland
MA	Mid-Atlantic
ms	milliseconds
N	North
NCS	Northern Cities Shift
NWNE	Northwestern New England
O2	The isogloss defining systems with fronted /o/: F2(o) > 1450 Hz
PEAS	Kurath and McDavid 1961, *The Pronunciation of English in the Atlantic States*
PI	Pittsburgh
SENE	Southeastern New England
SWNE	Southwestern New England
TS	Texas South
UD	The isogloss defining systems with /ʌ/ backer than /o/
W	West
WNE	Western New England
WPA	Western Pennsylvania

Part A Introduction and methods

1. Introduction

1.1. The scope and goals of this work

This *Atlas of North American English* [ANAE] is a record of the regional dialects of English spoken in the urbanized areas of the United States and Canada in the years 1992 to 1999.[1] It provides the first comprehensive view of the pronunciation and phonology of English across the North American continent. The Atlas builds on the work of American dialectologists from 1933 to the present, particularly the work of Hans Kurath and Raven McDavid in the Atlantic States. ANAE represents new departures in American dialectology in several respects: it provides information on perception as well as production, on acoustic measurements as well as impressionistic ratings, on the realization of phonemic categories as well as phonetic forms, and on phonological systems as well as individual phonemes. Most importantly, it provides a view of the systematic sound changes in progress that are responsible for increasing diversity among the regional dialects of North America.

The design of the Atlas is a response to the fact that traditional methods of sampling the United States produced only a fragmentary view of American linguistic geography. The methodical procedures of traditional dialect geography – the creation of a spatial grid, the training of field workers, the selection and interviewing of informants – were completed for the eastern United States, but for not more than a scattering of other states and areas. Furthermore, the conservative character of these methods in both sampling and analysis inhibited recognition of the vigorous linguistic changes taking place in large cities. Recent sociolinguistic studies show that extensive changes can go to completion within two or three generations.[2] It follows that a valid study of the phonology of the North American continent would have to be completed within five or ten years. Otherwise, the differentiation of regional dialects could not be distinguished from different temporal stages of a common process.

The Atlas is based upon the Telsur telephone survey (Chapter 4), which uses the technology of telephone interviewing to create a sample sensitive to both population and geography. The basic sample represents all urbanized areas of North America with a population of over 50,000; a number of smaller cities are added to achieve a more even geographic coverage. The total number of speakers of English represented is 68 percent of the population of North America (Table 11.2). This limitation to urbanized areas means that the Atlas contains no information on rural and small town areas that are important to an understanding of the development of North American English; such enclaves as Martha's Vineyard, or the Outer Banks of North Carolina, or the rural southeastern area of Ohio are not represented. The Atlas view of any one urbanized area is limited to a small number of speakers – two in most cases – so that it cannot be considered definitive for any one community. A sample of two or three speakers for a given city cannot reveal the social differentiation of linguistic variables, although it may show that the city is representative of a larger region. For these larger regions, the diversity of age and education in the speakers sampled will provide a limited report on social differentiation. The Atlas is designed to produce an overall view of regional patterns that will guide and stimulate local studies to provide a more detailed view of the sociolinguistic and geographic variation in a given area.[3]

Given the mobility and diversity of the American population, it seems unlikely that the Telsur sampling procedure would produce clear regional patterns. In 1990, 39.2 percent of the U.S. population was born in a different state from the one in which they then lived, with considerable variation by state (from Pennsylvania, at 19.8 percent to Nevada, at 78.2 percent).[4] In some areas, Atlas interviewers had to contact a great many individuals to find one local person (Chapter 4). Moreover, the speakers who are the targets of the Telsur survey are in frequent contact with people born in other areas, and it might seem that such interaction would lead to leveling and confusion of local dialect patterns. One might therefore want to limit the search to relatively isolated individuals who have had minimal contact with outsiders. Nevertheless, the Atlas design is based on the premise that the first two local residents to answer their telephones – people who were born or raised in the speech community – could be taken to represent adequately the linguistic pattern of that community. It was proposed to the funding agencies – NSF, NEH, and Nortel – that such a telephone inquiry would yield coherent geographic patterns, rather than a random mixture of traits derived from a variety of dialects in contact. In fact, the Atlas data does show clearly defined and relatively homogeneous patterns of regional distribution of phonological and phonetic features. This can be seen most clearly in the maps of Chapter 10, which display unselected geographic distributions of formant values for all vowels. These and other maps to follow will allow users themselves to judge whether the Atlas strategy has succeeded in locating geographic patterns of interest.

If the ANAE sampling method has in fact succeeded, it must be asked, how is such success possible? Sociolinguistic studies of large cities like New York, Detroit, Memphis, or Philadelphia have shown that a minimum of 25 speakers is needed to give a clear record of the socio-economic stratification of linguistic variables, and 80 to 100 subjects are needed if gender and ethnic differentiation are to be considered as well. ANAE, however, is not a study of social variation within individual cities. The Atlas traces the geographic distribution of the dynamic patterns that determine the direction of change for the regional dialect, defined by the larger phonological or phonetic patterns that are common across it. Regional dialects like the North, South, West, or Midland are represented by fifty to several hundred speakers. Within these larger units, ANAE can trace social differentiation by gender, social class, and age, although the sampling of most cities is not large enough to detect these effects at the city level.

The Atlas focus upon linguistic changes in progress entails that the sample cannot be insensitive to age. Chapter 4 will elaborate the sampling procedure in this respect. The telephone numbers are not selected at random, but are chosen from names that are clearly identifiable with the major ethnic groups in that ur-

1 The work as a whole will be referred to as ANAE or "the Atlas." Earlier atlases of American English will be referred to by their abbreviations [LANE, LAMSAS, etc.].
2 As in New York City (Babbitt 1896; Labov 1966) and Philadelphia (Tucker 1944; Labov 1994).
3 A number of such local studies have been completed in recent years. See for example Fridland's studies of the Southern Shift in Memphis (1998, 1999) and Gordon's examination of the Northern Cities Shift in two small Michigan towns (2001).
4 U.S. Census State of Residence in 1990 by State of Birth: 1990 (90pob).

banized area. The final sample has a common age distribution across regions and gender (Tables 2.2–3), but an excess of women between 20 and 40, a product of a selection policy to include at least one woman in the 20 to 40 age range – the group that has generally been found to be in the forefront of change. Additional subjects were often interviewed to help fulfill this criterion, and it also governs the selection of subjects for acoustic analysis (439 out of 762) in the main sample.

In the North, the Midland, and the West, the Telsur sample is centered primarily on the Euro-American population of North America, the chief exponents of the active sound changes that define regional dialects. Only a few of the speakers in these areas are African-American or Latino. While African-American and Latino populations of many Northern cities are very large, and in some cases form the majority of the population, it has been consistently reported that they participate to only a limited extent in local and regional dialects (see Section 4.5.2). The most striking aspect of African-American Vernacular English is its supralocal character, so that the many studies of this dialect have found parallel results in New York, Philadelphia, Washington, Chicago, San Francisco, and Los Angeles. In the South, it is a different matter, and any representative sample of regional speech must include African-Americans. In the five largest Southern cities, the Telsur sample will allow us to compare local African-Americans with the Euro-American population (Chapter 22).

Finally, it should be noted that the Atlas is primarily a study of the stressed vowels of North American English, since it is the vowel patterns that differentiate regional dialects of English on this continent. There is data on the vocalization of tautosyllabic /r/, but not the vocalization of /l/, since the telephone signal does not give us reliable information on that process. Chapter 21 contains maps of grammatical and lexical variables. But the main focus of the Atlas is on the vowel systems of each region, and the mergers, splits, and chain shifts that are taking place within those systems.

The separation of linguistics and dialect geography

In the nineteenth century, the results of dialect geography were of major concern to historical linguists, and the relations of diffusion in time and diffusion in space were much discussed. This was partly the consequence of the reliance of the Neogrammarians on the evidence of dialect geography to support their view of the regularity of sound change (Osthoff and Brugmann 1878; Winteler 1976) and the use of dialect data in reactions against that view (Gilliéron 1918; Malkiel 1967; Labov 1994). But the link between dialect geography and general linguistics all but disappeared, and for the largest part of the nineteenth and twentieth centuries, dialect atlases were produced as works of reference without any immediate connection with the issues that concerned theoretical or descriptive linguistics. Many of the editors of dialect atlases took as their explicit goal the systematic compilation of data without reference to theoretical issues (e.g. Orton and Dieth 1962).

The separation of dialect geography from linguistic concerns is not unjustified. It responds in part to the desire of scholars to minimize the distortion of the data by theoretical preconceptions (Kretzschmar 2000: 280) and the conviction that the primary task of dialect geography is to present the data.

> The business of the linguistic atlas is to provide the evidence, not verdicts ... Those of us on the inside have a responsibility to get the data out, and this we will do, in time, as clearly, fully and objectively as possible. (McDavid et al. 1986: 404–05, cited in Kretzschmar 2000: 208)

It is now generally recognized that theory cannot be avoided so easily, and that theoretical assumptions are bound to enter into the design of the sample and the questionnaires. To the extent that dialect geography has addressed general issues, it has acted more as a branch of cultural history than of linguistics. The major aim of most dialect geographers has been to explain dialect patterns by settlement history (Haag 1898; Kurath 1949, 1972). Traditional dialect geography uses spatial diffusion to reconstruct the external history of the language, rather than its internal history.

The distance from linguistic issues is evident in the design of fieldwork procedures, which rarely take into account the Saussurian principle that language is not a set of forms, but a set of categorical oppositions. The interview schedules of traditional dialectology do not include questions about minimal or near-minimal pairs. One of the major changes taking place in North America is the low back merger – the unconditioned merger of the category /o/ in *cot*, *Don*, *stock* with the category /oh/ in *caught*, *dawn*, *stalk*. The Linguistic Atlas protocols, starting with LANE, do not ask subjects to give their pronunciations of any of these word pairs or their judgments on whether they were the same or different. To decide whether a given subject has the merger or not, it is necessary to make inferences from phonetic forms that were recorded for other purposes. We must therefore operate with the forms given for the words *law*, *salt*, *dog* and *oxen* in the maps of *The Pronunciation of English in the Atlantic States* (Kurath and McDavid 1961 [PEAS]).

The task of interpreting these data is not an easy one, because these words are not matched as minimal pairs, and differences in the consonantal environments may be responsible for any phonetic differences recorded. The number of PEAS maps designed to represent general phonological patterns is limited. The majority represent the lexical incidence of phonemes, data that are useful in tracing settlement patterns but of less value for determining the larger phonological patterns of North America.

An atlas is properly a work of reference and not a theoretical tract. One would hope that a successful atlas would be followed by a stream of analytical papers. But the substantial findings of Kurath (1949) and PEAS were not followed by many papers that built on the linguistic implications of their results. While dialect geographers have never been opposed to efforts to account for their data by linguistic or historical principles, the tasks of collecting, processing and classifying has taken precedence over interpretation. Kretzschmar notes with acute insight that “the failure of dialectologists to provide analysis of their materials has actually *prevented* publication of the data” (2000: 281), since reviewers of their proposals for funding did not necessarily share their priorities. He also notes that the greatest contribution of American dialectology has been through preliminary analyses published before most of the data were collected. The same can be said of the *Language and Culture Atlas of Ashkenazic Jewry* [LCAAJ] (Weinreich 1963).

The renewal of the connection

Among early counter-examples to the general avoidance of theoretical matters were studies of the dialect geography of Swiss German by Moulton (1960, 1962), strongly supporting Martinet’s functional theories of sound change (1952, 1955). In 1963, S. J. Keyser published an insightful review of PEAS, which called attention to the value of data on dialect variation for theories of rule ordering.

The renewed connection between dialect geography and general linguistics was stimulated to a degree by the development of sociolinguistic research and the systematic study of variation within speech communities. The evidence of dialect geography was a major part of the program for developing an empirical foundation for the theory of language change by Weinreich, Labov, and Herzog (1968), drawing upon LCAAJ (Weinreich 1963; Herzog 1965).

This connection has been slow in realization. Sociolinguistic studies of large urban communities in the 1960s began with close attention to the stratification of linguistic variables by age, gender, social class, ethnicity, and network density. Most of these studies were of the largest city in the country or urban regions of more than a million in population: New York (Labov 1966), Panama City (Cedergren 1973), Sao Paolo (Tarallo 1983), Montreal (Sankoff and Sankoff 1973), Paris (Lennig 1978), Amman (Abdel-Jawad 1981), Belfast (Milroy and Milroy 1978), Teheran (Modaressi 1978), Seoul (Hong 1991; Chae 1995), Tokyo (Hibiya 1988), Cairo (Haeri 1996). These large cities have been found to have their own characteristic patterns of social and stylistic stratification; they influence the surrounding territory more than they are influenced by it. The relation of the city's dialect to neighboring speech communities was therefore not in focus. (An exception is Modaressi's adjoined study of the neighboring community of Ghazvin.)

The earliest sociolinguistic studies tended to examine the social correlates of isolated linguistic variables but more recent research has focused on structurally related parallel changes and chain shifts. The formulation of general principles governing such shifts was based on a review of long-term historical cases and the close study of a small number of changes in progress (Labov, Yaeger, and Steiner 1972 [LYS]; Labov 1994). LYS reported the Northern Cities Shift to be active in Chicago, Detroit, Buffalo, Rochester, and Syracuse. But it was not possible to say if this major chain shift involved a continuous territory or how it affected the intervening cities. The Southern Shift, moving in the opposite direction, was identified by studies in Knoxville, the Outer Banks, Birmingham, Atlanta, and central Texas, but there was then no clear indication of how far it extended and where – if anywhere – it confronted the Northern Cities Shift.

One of the most important problems in the study of such chain shifts is the explication of their internal mechanism. One theoretical issue concerns the distinction between a drag chain – motivated by a gap in phonological structure – and a push chain, motivated by a decrease in the margin of security between two phonemes. Studies of individual cities rely upon the evidence of age distributions in apparent time and scattered evidence from earlier studies in real time, but these arguments are often uncertain. Dialect geography offers a much clearer type of evidence, since the diffusion of a change outward typically shows the ordering of successive stages as a series of concentric rings around the originating center, with the initial change diffused most widely.

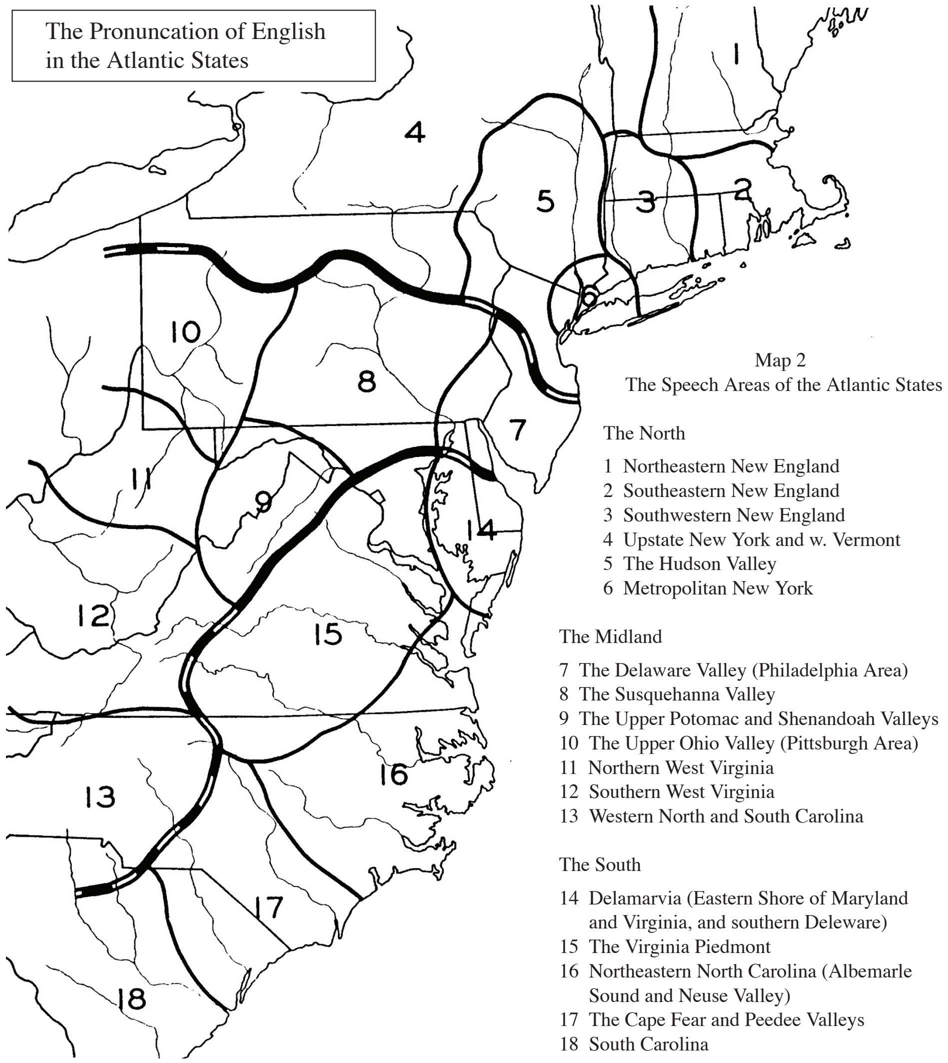
Dialect geography offers insight into the larger sociolinguistic setting of a change in progress. PEAS shows that (in the 1940s) all of the major cities of the Eastern Seaboard except Philadelphia and Baltimore had adopted the *r*-less pronunciation that was the London standard at the end of the eighteenth century. The sociolinguistic study of New York City (Labov 1966) began with a detailed examination of the effects of a reversal of this norm in favor of a constricted /r/ in formal speech, beginning apparently at the end of World War II. Informal observations indicated that similar trends could be found in Boston and Atlanta. But without a comprehensive re-study of the Eastern United States, it was impossible to say whether these events were local or national and whether they were driven everywhere by the same general forces (Chapter 7).

The Atlas results also bear upon the relative strength of internal and social factors in generating dialect patterns, the origin of regional differentiation and the relation of present-day boundaries to lines of communication. Atlas evidence is pertinent to many internal linguistic issues concerning the units of linguistic structure and their hierarchical relations. The Atlas will not attempt to explore these issues in detail, but it lays the the foundation for further studies that will strengthen the relations between dialect geography and linguistic theory.

1.2. A brief history of American dialect geography

The plan for mapping the dialects of North American English was first set in motion in the early 1920s, when the Linguistic Atlas of New England (Kurath et al. 1941, [LANE]) was initiated by a group of scholars that included some of the most prominent American linguists of the time. It was designed on the model followed by Romance dialectologists, specifically the methods of Jaberg and Jud (1928–1940). Field workers traveled to a pre-selected grid of communities, located informants who satisfied one of three demographic profiles, interviewed them with lengthy schedules that were organized loosely around semantic fields, and recorded their responses in an IPA notation modified to fit the phonetic features of the American vowel system. LANE was completed by the end of the decade, and its publications (Kurath and Bloch 1939; Kurath et al. 1941) are the most complete in the history of American dialectology. The detailed maps showed the actual phonetic form of the words and phrases representing the responses of informants.

LANE was followed by the Linguistic Atlas of the Middle and South Atlantic States [LAMSAS] under the direction of Hans Kurath, with a single field worker



Map 1.1. The dialect divisions of the Eastern United States (from Kurath 1949 and Kurath and McDavid 1961)

(first Guy Lowman, then Raven McDavid). The first publication was *A Word Geography of the Eastern United States* (Kurath 1949), which established the major and minor dialect divisions on the basis of regional vocabulary. Kurath replaced the traditional North/South/General American view of American dialects with a division of the eastern seaboard into Northern, Midland, and Southern regions.

Twelve years later, Kurath and McDavid (1961) published the corresponding volume dealing with phonetic forms, *The Pronunciation of English in the Atlantic States* [PEAS]. The basic map of Kurath 1949 was reproduced without change (and is here shown as Map 1.1). Systematic inventories of the phonetic realization of phonemes were provided for a selection of cultivated informants, while the maps showed the distribution of major variants of key words. The initial maps report pronunciations of key words that represent major word classes. The pronunciation of short-*o* words, for example, is represented by the variants used in the word *oxen* in Map 15. The legend of Map 15 appears as

○ [ɑ - ɑ$^<$ - a$^>$]
⦶ [ɑ$^>$]
● [ɑ - ɑ$^>$]
▲ [ɒ - ɔ] = /ɒ/

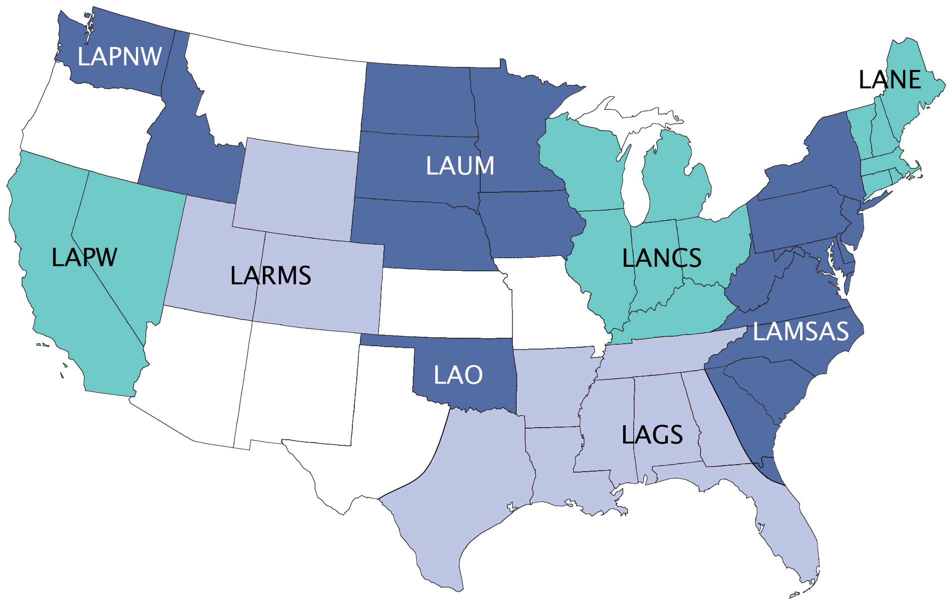
The open circle groups three low back to low central vowels; the barred circle identifies a backed version of the unrounded back vowel, one step backer than any of the three categories symbolized by the open circle; the solid circle indicates two further stages of backing, still unrounded; and the triangle identifies any back rounded vowel, from low back to lower mid. The phoneme after the "=" sign indicates the view of the analyst that any such rounding of the vowel in *oxen* demonstrates a merger with long open-*o* (since it is the unrounding of the vowel that preserves the distinction). Map 15 of PEAS shows a heavy concentration of such triangles in two areas: Western Pennsylvania and Eastern New England. Later studies have confirmed the accuracy of the PEAS for that region, but in Texas, it is the unrounding of long open-*o* words that signals the merger (Bailey, Wikle, and Sand 1991).

It is not a simple matter to use these phonetic maps to chart the present state of phonemic distinctions in the United States. The impressionistic transcriptions cannot be checked against more objective data; there is no information on the speakers' perceptions or judgments, and the data is now quite old. Yet current studies that include perceptual data and acoustic measurements confirm the mergers indicated in PEAS (Chapter 9).

The key decisions made by Kurath were based on lexicon, not phonology. It will also appear that the dialect boundaries constructed from ANAE data largely coincide with the dialect divisions established in Map 1.1 above, based on lexical evidence (Map 14.11). The words selected by Kurath as diagnostic of the Northern, Midland, and Southern regions became the criteria for extending the boundaries westward, and the identification of the Northern, Midland and Southern components of the regional lexicon became the central task of dialect research. One of the most important published results of the Linguistic Atlas of the North Central States [LANCS] was a paper by Shuy on the extension of the North/Midland isogloss through Ohio, Indiana, and Illinois (1962). Carver (1987) re-draws this boundary with additional lexical evidence but with no important changes. (See Chapters 11 and 14 for the continuity of this work with ANAE findings.)

A complete record of American projects in dialect geography is shown in Map 1.2, adapted from the LAMSAS homepage.

At first glance it appears that much of the territory of the United States was covered during this period, but the map actually indicates areas where field work was done rather than results published. The achievements of American dialectology are summarized in Table 1.1, along with comparative data for the Atlas of North American English.



Map 1.2. Linguistic Atlas Projects of the United States, 1931–1998

Table 1.1. Achievements of Linguistic Atlas Projects in the United States

		Field-work begun	Field-work ended	No. of subjs.	Lexical pub'n.	Phonetic pub'n.	Maps
LANE	Linguistic Atlas of New England	1931	1933	416	1943	1943	Yes
LAMSAS	Linguistic Atlas of the Middle and Atlantic States	1933	1974	1162	1949	1961	Yes
LANCS	Linguistic Atlas of the North Central States	1933	1978	1564			No
LAGS	Linguistic Atlas of the Gulf States	1968	1983	1121	1993	1993	
LAUM	Linguistic Atlas of the Upper Midwest	1949	1962	208	1976	1976	No
LAO	Linguistic Atlas of Oklahoma	1960	1962	57			
LARMS	Linguistic Atlas of the Rocky Mountain States	1988			[1971]		No
LAPW	Linguistic Atlas of the Pacific West	1952	1959	300	1971		No
LAPNW	Linguistic Atlas of the Pacific Northwest	1953	1963	14			No
ANAE	Atlas of North American English	1992	1999	762		2005	Yes

Source: Linguistic Atlas Projects web site information pages

The Linguistic Atlas fieldwork covers a period of 52 years, from 1931 to 1983 (though the LARMS fieldwork is continuing). Most of the projects used modifications of the worksheets of LANE and LAMSAS, and these records are generally available (see the LAP website). The sixth and seventh columns show the year of publication. Five of the nine projects have published lexical data (the LARMS publication is Hankey's *Colorado Word Geography*, 1960). Four of the nine have published phonetic information, but only two have published maps to interpret these data. McDavid's goal of complete publication of Atlas results has been realized to only a limited extent.

Nevertheless, the achievements of the Linguistic Atlas Projects provide a substantial and reliable base for further investigation of American linguistic changes in progress. Bailey, Wikle, Tillery, and Sand (1991) found that the LAGS data fit in with earlier and later records to give a coherent record of linguistic change in real time. The sociolinguistic studies of New York and Philadelphia have built profitably upon prior LAMSAS records, and ANAE will refer to Linguistic Atlas data in almost every chapter. At the same time, it must be admitted that no national map of the pronunciation of English was created by Linguistic Atlas projects, nor is it likely that the Linguistic Atlas materials now stored in various archives can be the basis of such a map, since the records are spread too widely across time and do not represent a view of American dialects at any one stage.

A national survey of the regional vocabulary of American English has been completed by the Dictionary of American Regional English [DARE], under the original direction of Frederic Cassidy. In the years 1965 to 1970, field workers for DARE gathered data on regional vocabulary in all 50 states, and four volumes have been published to date [up to the letter S]. The DARE sample was based on population rather than geography, and DARE maps are a reconfiguration of American states with areas proportional to their population (Fig. 1.1).

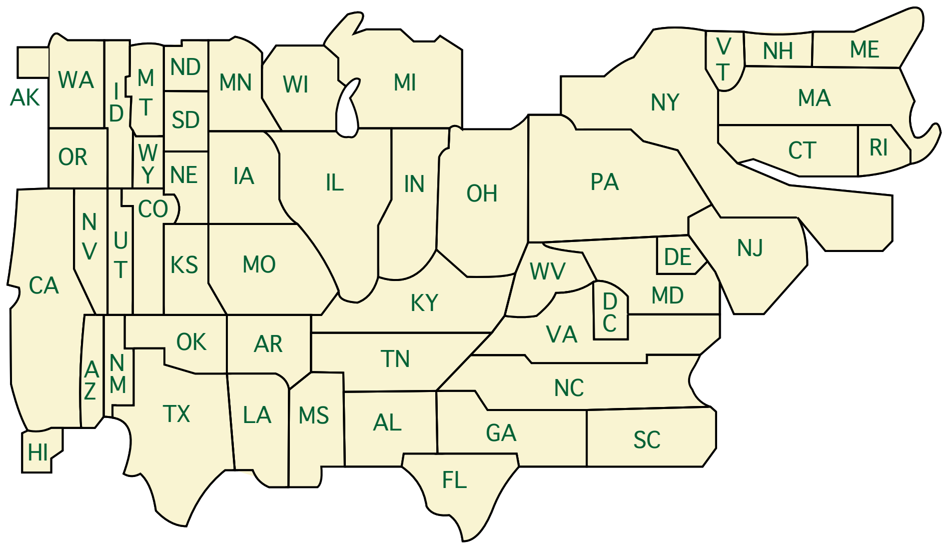


Figure 1.1. DARE map, with state areas proportional to population

A comprehensive analysis of the DARE regional vocabulary was used by Craig Carver to produce a new national map of the dialects of the United States: *American Regional Dialects: A Word Geography* (1987). In several ANAE chapters, the boundaries drawn by Carver will be compared to the boundaries established by phonological isoglosses.

1.3. The design of the Atlas of North American English

The last section presented an overview of linguistic atlas work showing that in spite of the substantial achievements of American dialectology, no national map of any linguistic feature has been produced. While DARE is close to completing a national view of American vocabulary, the continental distribution of the phonetic and phonological features of North American English remains unknown. Section 1.1 outlined the need to develop a large-scale geographic survey of linguistic changes in progress. The difficulties to be overcome were the product of established practices of traditional dialectology, which are as a rule well motivated. They can be identified under four headings.

The efficiency problem

(a) The methods adopted by LANE in 1931 produced the most satisfactory and reliable results, but the cost of extending these methods over the entire country was prohibitive.
(b) Even if a national survey could be completed using the methods of the Linguistic Atlas, the time required to complete it would be so great that informants from one part of the country could not be compared to those in another.

The sampling problem

(c) The sampling grids designed by Linguistic Atlas projects were representative of geography rather than population, and they underrepresent the majority of the population who live in the larger cities.
(d) Linguistic Atlas informants were concentrated in the rural and small town strata of the population in order to trace settlement history. The linguistic changes in progress that were discovered from 1960 to 1990 were concentrated in large cities. Several followed the "cascade" model, spreading from the largest cities downward by community size (Callary 1975; Trudgill 1974; Bailey, Wikle, Tillery, and Sand 1993).
(e) Linguistic Atlas informants representing the larger cities were usually middle-aged and cultivated (well-educated) persons. Sociolinguistic studies have found that the most advanced speakers were younger and more representative of the majority culture.

The obsolescence problem

(f) The regional vocabulary in Linguistic Atlas protocols has a heavy concentration of rural and agricultural terms and other words and phrases that are no longer current. The stream of evidence for dialect differentiation therefore shrinks over time, and contributes to the widespread impression that regional dialects are disappearing.

Problems of reliability and validity

(g) Where Linguistic Atlas phonetic transcriptions could be compared with recordings or other phonetic records, they tended to be conservative. Throughout the Eastern United States, no short-*a* words were recorded in LAMSAS records with any nucleus higher than raised [æ^], while other evidence showed that this vowel was merged with the mid-front vowel of *bared* as early as 1896 (Babbitt 1896; Labov 1966). In the Southern Shift, the vowels of *bit* and *bet* are often raised and fronted to the tense position occupied by *beat* and *bait* in other dialects, but LAMSAS records always show lax nuclei for these ingliding forms (Chapter 18).

(h) Linguistic Atlas protocols do not inquire directly into phonological contrasts, so it is difficult at best to trace the progress of the many mergers in progress (Chapters 8, 9).

(i) The protocols of the Linguistic Atlas are question and answer routines that produce "consultative" style, and do not focus on the matters of maximum interest that generate the free flow of spontaneous speech.

The Telsur design

The major impetus which led to ANAE was a proposed solution to the efficiency problem (a, b). To capture the current state of sound changes now in progress, it was argued that the time gap between the first and last interviews should be less than half a generation. Instead of dispatching a field worker to a pre-arranged series of geographically scattered communities, it was proposed to contact subjects more quickly and directly by telephone.

Telephone surveys have been used successfully at several points in the history of American dialectology.

(1) A national map of one feature of American phonology was constructed in 1966 by W. Labov through calls to long-distance telephone operators. The map showed progress of the merger of /o/ and /oh/ obtained through the operators' pronunciations of the words *hock* and *hawk* and their judgments as to whether these two words were the same or different (Map 9.4).[5]

(2) The study of Linguistic Change and Variation in Philadelphia in the 1970s used a telephone survey as its principal means of random selection. The main database was not a random sample, but long-term studies of a judgment sample of ten neighborhoods. The telephone survey of 60 individuals was carried out by Donald Hindle (1981). Speakers were selected randomly from the white pages of the telephone book. Although the telephone interviews were much shorter and more formal than the neighborhood interviews, the results showed good agreement with the neighborhood data (Labov 1994, 2001).

(3) The Texas Poll is an annual telephone survey conducted by the Public Policies Resources Laboratory at Texas A&M. It polls a sample of 1,000 Texans over the age of 18, asking questions for governmental, business, and academic agencies. Guy Bailey obtained permission to add questions on nine linguistic variables to this survey in 1989 (Bailey, Wikle, and Sand 1991). The results included good information on age, gender and history of residence, but since the sample was proportional to population rather than area, it did not give a systematic view of the geography of Texas. In a later Oklahoma telephone survey, Bailey corrected this problem by stratifying for area as well as population (Bailey et al. 1991).

The initial proposals for the Telsur survey extended the target range to all of English-speaking North America. This step was motivated by the fact that from a linguistic point of view, the evolution of Canadian English is of equal interest to the study of English in the U.S. It is also clear that the influence of state or national boundaries can only be assessed if they are not set as arbitrary limitations to the field of study. It was therefore decided to avoid confining the scope of the survey by any political frontier and to sample all English-speaking communities on the continent of North America.

The sampling limitations (d) of traditional dialectology are a natural outcome of the concentration on the history of settlement of the rural population. The findings of sociolinguistic research on new urban sound changes led to the proposal to reverse this traditional concentration. Telsur samples the urbanized areas where changes in progress were expected to be most advanced, focusing on that part of the population that had been given least attention in earlier studies (Chapter 4). This initial approach was then modified to construct a sample sensitive to both population and geography, adding smaller communities to the sample whenever large, sparsely populated (or non-urban) areas were unrepresented in the sample of urbanized areas.

The solution to the sampling problem was simultaneously a solution to the efficiency problem. By limiting the Telsur survey to urbanized areas of 50,000 or more, it was possible to cover the entire continent in less than ten years. A representative sample of smaller towns and villages would require a much longer period of time.

The obsolescence problem (f) was not an issue for the Telsur project, since the field methods were designed to study phonological changes that were actually in progress. Some of the variables studied in the Atlas are distinctions that have almost disappeared, but the areas where they are still present form clear geographic patterns (Chapter 8).

Problems of reliability and validity were a major issue in planning the Telsur survey. In the early stages, strenuous efforts were made to increase the reliability of impressionistic transcriptions, especially when the analysts' judgments of 'same' and 'different' differed from the subjects' judgments. It was finally concluded that acoustic analysis must be added to impressionistic judgments to obtain satisfactory reliability levels. The problem of overcoming the effects of formal observation (and tape recording) was a formidable one, especially since the Telsur survey was explicitly focused on language and devoted considerable time and attention to eliciting pronunciations of particular words. Although the central goal of sociolinguistic research is to record the vernacular – the style used with intimate friends and family – it was recognized that the Telsur surveys could not hope to match longer face-to-face sociolinguistic interviews in this respect, especially in the areas of greatest linguistic self-consciousness like New York City or the South.

Technical developments

Solutions to the efficiency and validity problems depend upon technical developments in recording and measurement. The history of Linguistic Atlas projects shows a gradual adaptation to the introduction of the magnetic tape recorder following World War II (Voegelin and Harris 1951).[6] From 1950 on, some subjects were recorded, but most projects continued to take as their basic data the notations made by the field worker in person. As the study of sound change in progress matured, the advantage of recording and acoustic analysis of speech data

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5 This survey was a by-product of the use of long-distance telephone operators to obtain pronunciation of the names of cities that had recently reached a population size of 2,000 and so were to be included in the 2nd edition of the Columbia Encyclopedia. Operators were asked for the number of *Harry Hock*, the second word pronounced with an unrounded central vowel [hak]. When the result was negative, they were asked to look up H-A-W-K; those with the most complete merger had usually already looked up this spelling. Further questions obtained more detailed pronunciations and judgments.

6 A limited number of recordings were made by Miles Hanley in the 1930s on aluminum disks.

became increasingly clear. This is particularly true when the trajectory of the sound changes depends crucially on small differences in fronting and backing. While traditional phonetic transcription records as many as 16 degrees of height, it is more difficult to get agreement on the diacritics that register degrees of fronting and backing.[7] More generally, the impressionistic phonetician is confined to the use of a small set of discrete symbols and must recognize the well-documented variation in human capacity to agree on the use of these symbols (Ladefoged 1957).

The history of acoustic analysis has registered a steady increase in accuracy and efficiency. At the outset, an electro-mechanical device such as the Kay Sonograph took a minimum of five minutes to create a spectrogram; measurements of formant centers on that spectrogram had margins of errors equivalent at best to 1/4 of a pitch period – 50 Hz for female speakers. The development of linear predictive coding (LPC) and its software implementation has led to a rapid increase in speed and accuracy and the ability to separate the effects of the supra-glottal tract – the position of the tongue and the lips – from the glottal spectrum.

The acoustic analysis of 439 Telsur speakers was made possible only by the advances in speed, efficiency, and accuracy of the CSL program developed by Kay Elemetrics, using methods described in detail in Chapter 5. Telsur procedures obtained measurements of 300 to 500 tokens of the vowel system of a speaker in a single day. This can be compared to the week's effort that was required to produce – and correct – 120 tokens in the original studies of sound change in progress of LYS. Subsequent to the acoustic analysis, further analytical tools were required for dealing with the complexity of English vowel systems. The most important of these is the Plotnik program for plotting, analyzing, and superimposing vowel systems in a two-dimensional, computerized display. ANAE will make extended use of Plotnik displays.

Stages of research and sources of support

The first stage of the Telsur project was a pilot project supported by NSF from 1991 to 1993 [BNS91-11637], under the title of "A Survey of Sound Change in Progress." This pilot project was designed to test the proposition that sound changes could be traced rapidly and effectively through telephone interviews (Chapter 4). It was followed by a larger project "A Telephone Survey of Sound Change in Progress", designed to trace sound changes in progress throughout the Midwest, supported by NSF from 1993 to 1994 [SBR 92-22458]. A grant from NEH from 1994 to 1998 made it possible to extend the Telsur project to cover North America as a whole, under the title of "A Phonological Atlas of North American English" [RT-21599-94]. During this period of data collection and analysis, the project also received support from Bell-Northern Laboratories, the research and development division of Bell Canada and Northern Telecom (now Nortel).

From 1998 to 2003, further grants from NSF made it possible for the project to explore two areas in greater detail. Between 1998 and 2000, the project studied age and social stratification in Midland cities, focusing particularly on Pittsburgh, Columbus, and Indianapolis ("Linguistic Diversity in the North American Midland" [SBR 98-11487]). During the period from 2000 to 2003, the project explored the diffusion of change from large cities to small towns in the region from New York to Baltimore, in the project "A Study of Linguistic Change and Diffusion in the Mid-Atlantic Region" [BCS 0002225]. The great majority of the ANAE data was gathered from 1992 to 1999, but some data derived from these more detailed studies will appear, insofar as it contributes to the study of the phonology of the major urbanized areas.

1.4. Data to be presented and questions to be answered

This Atlas will respond both to the traditional questions of dialect geography and to linguistic questions concerning the causes and mechanisms of language change. It will present systematic data on the phonology of the urbanized areas of North America in a form that ideally would be accessible to all those interested in North American English. However, much of the discussion in the printed version of the Atlas is necessarily technical, since there is no non-technical vocabulary to describe changes in the acoustic and auditory character of vowel sounds. The CD-ROM and website accompanying this volume include extensive glossaries and explanations, along with sound samples to provide direct acquaintance with the dialect forms and changes taking place in North American English.

The Atlas will address certain primary questions of dialect geography:

- How many dialects of North American English are there?
- What phonological features define them?
- What are their boundaries?

The ANAE approach to these questions will develop issues that are specific to the study of linguistic change and variation:

- What are the trajectories of change in NAE dialects?
- In what ways are NAE dialects converging or diverging at the phonetic and phonological levels?
- How do current changes in NAE dialects conform to or modify the general principles that govern the evolution of sound systems?

Though the last of these questions will be integrated into the presentations of Atlas maps, the full treatment of the more general theoretical issues will be reserved for further publications. Atlas findings will also bear upon the broader questions of causation that are specific to dialect geography:

- How is settlement history reflected in the current location of dialect boundaries and isogloss bundles?
- What internal, structural factors lead to the expansion of dialect boundaries beyond their historical origin?
- How do current patterns of communication affect the development of sound change and the location of dialect boundaries?

These questions will be considered in the Atlas chapters, but the thorough consideration of historical and demographic factors will be reserved for future treatment.

All of these questions take on a more acute form in the light of the remarkable clarity of the dialect differentiation emerging from the ANAE maps. The data developed by ANAE does not reflect the dialect continuum projected by many exponents of traditional dialectology.

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7 The syllabi of LANE, PEAS, and LAUM show an unusually high frequency of fronting and backing diacritics, so that a total of nine degrees can be recorded on this dimension. However, the maps of PEAS do not make use of this distinction. The PEAS syllabi show backing diacritics for three Southern cultivated speakers (a crucial characteristic of the Southern Shift), but no such distinction appears in the maps for *day* or *bracelet* (PEAS Maps 18, 19).

> A map of language variation is merely a static representation of a phenomenon whose most salient characteristic is its fluidity. It is an almost seamless fabric covering the land. (Carver 1987: 19)

In contrast, ANAE will show many sharp and well-defined boundaries dividing the major regional dialects, in which a number of phonological isoglosses are tightly bundled. Archetypical of such boundaries is the North/Midland line. In other areas, particularly in the West, dialect boundaries are less discrete and the definitions of dialect areas are correspondingly complex. The ANAE data will also indicate a drift towards the increasing differentiation of the dialects on either side of these boundaries. Such evidence of change in progress will be drawn largely from age distributions (apparent time), since real-time data are not available for most of the urbanized areas studied. These divergent trends are due to the operation of chain shifts moving in radically different directions: the Northern Cities Shift, the Southern Shift, the Canadian Shift, the Back Upglide Shift, and the Pittsburgh Shift.

Divergence and differentiation are not the whole story. While the larger regional dialects show solidification and further development, many smaller local dialects are weakening or have almost disappeared, giving way to the more general regional patterns. In this sense, ANAE shows convergence as well as divergence. The convergence shown is not a movement towards a national norm, but rather towards broader regional patterns.

1.5. Organization of the Atlas

Part A (Chapters 1–6) presents a detailed account of the methods of the Atlas for collecting and analyzing data.

Part B (Chapters 7–9) will report the progress of a wide variety of ongoing mergers in North America, based on data from all 762 Telsur subjects. Chapter 7 deals with the importation of consonantal /r/ in areas that were formerly *r*-less, with a consequent reduction in the long and ingliding vowel system. Chapter 8 presents data on mergers that are almost complete, where the relevant distinction is maintained in only a few communities. Chapter 9 considers the progress of ongoing mergers that involve roughly half of the North American territory. For each variable, the relations of perception and production are considered, along with the extent to which these developments exemplify the general principles that have been found to govern mergers (Labov 1994: Ch. 11).

Part C (Chapter 10) presents 38 maps that summarize quantitative data on the pronunciation of the stressed vowels of English for 439 subjects, based on the acoustic analysis of 134,000 vowels. The maps present the data in a form that is neutral to any theoretical issue and available for inspection with minimum interference from the perspective of the investigators. The accompanying CD-ROM contains a complete database of reported judgments, measurements, and the Plotnik vowel plotting program that will allow any reader to continue the analysis in their own perspective, along with extensive sound samples.

Part D (Chapters 11–13) deals with the regional dialects of North America, beginning with definitions of dialect areas on the basis of current changes in progress (Chapter 11). Chapter 12 examines those changes in progress that affect the entire continent, beginning with the large-scale fronting of the back upgliding phonemes /uw, ow, aw/. Chapter 13 deals with the diverse patterns of raising and fronting of short-*a*, concluding with a continental map of short-*a* systems.

Part E (Chapters 14–20) takes up successively the individual regions defined in chapter 11: the North, Canada, Eastern New England, the Mid-Atlantic States, the South, the Midland, and the West. These chapters deal with the progress of the chain shifts that define each region, their relation to general principles of linguistic change, and the ways in which the various components of the shift relate to each other and to the region's boundaries.

Part F (Chapters 21–23) presents information on a limited number of lexical and grammatical variables, comparing their boundaries to the boundaries established by phonological processes and comparing the vowel systems of African-American with white speakers in the larger Southern communities. A final chapter summarizes the findings of the Atlas.

2. The North American English vowel system

The general framework used by ANAE for the description of North American vowel systems is presented in this chapter. These vowel systems all show some relatively stable vowel classes and other classes that are undergoing change in progress. A systematic description of the sound changes will require a point of departure or *initial position* that satisfies two criteria:

(1) each of the current regional vowel systems can be derived from this representation by a combination of mergers, splits, shifts of sub-system or movements within a sub-system, and
(2) the differential directions of changes in progress in regional dialects can be understood as the result of a different series of changes from the initial position.

Within the evolutionary and historical perspective of this Atlas, we are free to take up any point in the history of the language as an initial position to trace the evolution of a given set of dialects. The degree of abstraction of these initial forms depends upon the nature and extent of the sound changes that differentiated the dialects. If mergers are involved, the initial position will show the maximum number of distinct forms; if splits are involved, it will be the minimum. For conditioned sound changes, such as the vocalization of postvocalic /r/, the initial position will show the undifferentiated forms, for example, /r/ in all positions. Since chain shifts by definition preserve the original number of distinctions, the initial representations will be identical in this respect; but if the chain shift has crossed sub-systems, it may have introduced a different set of phonetic features in that system and is not in that sense structure-preserving.

An initial position is an abstraction that may not correspond to any actual uniform state of the set of dialects in question, since other intersecting sound changes, including retrograde movements, may have been operating at an earlier period. Its major function is to serve as the basis for an understanding of the internal logic of the patterns of change now taking place in North American dialects and to show the relations among the various mergers and chain shifts that drive regional dialects in different directions.[1]

2.1. Long and short vowels

The classification of any English vowel system must begin by recognizing the distinction between the **short** vowels of *bit*, *bet*, *bat*, *pot*, etc. and the **long** vowels of *beat*, *bait*, *boat*, etc. This is not because the members of the first set are shorter than the members of the second, though they frequently are. In some English dialects, like Scots, the phonetic length of a vowel is determined entirely by the consonantal environment, not the vowel class membership. But Scots, like other dialects, is governed by the structural distinction between long and short vowel classes, which is a product of the vocabulary common to all dialects.

English short vowels cannot occur word-finally in stressed position, so there are no words of the phonetic form [bɪ, bɛ, ba, bo or bʊ]. Long vowels can occur in such positions, in a variety of phonetic shapes. The word *be* can be realized as [bi, bi¹, bɪi, biʲ, bɨʲ], etc. Thus in English, long vowels are *free* while short stressed vowels are *checked*. It follows that a short vowel must be followed by a consonant.[2] The checked–free opposition is co-extensive with the short–long distinction that is common to historical and pedagogical treatments of English, and it is central to the ANAE analysis of North American English as well.

2.2. Unary vs. binary notation

In the tradition of American dialectology initiated by Kurath, a simplified version of the IPA was adapted for phonemic notation, choosing the phonetic symbol that best matches the most common pronunciation of each vowel in a particular variety. In this *unary* notation, both checked and free vowels are shown as single symbols, except for the "true" diphthongs /ai, au, oi/.

Table 2.1. Phonemes of American English in broad IPA notation (Kurath 1977: 18–19)

Checked vowels				Free vowels					
Front		Back		Front		Central		Back	
bit	/ɪ/	/ʊ/	*foot*	*beat*	/i/			/u/	*boot*
bet	/ɛ/	/ʌ/	*hut*	*bait*	/e/	/ɜ/	*hurt*	/o/	*boat*
bat	/æ/	/ɑ/	*hot*					/ɔ/	*bought*
				bite	/ai/			/au/	*bout*
				quoit	/oi/				

A similar notation, resembling broad IPA, is found in many other treatments of modern English, particularly those with a strong orientation towards phonetics (Ladefoged 1993) or dialectology (Thomas 2001; Wells 1982).

Such a unary approach to phonemic notation was rejected for the Atlas on the basis of several disadvantages. First, it is a contemporary, synchronic view of vowel classes that differ from one region to another.[3] This limits its capacity for representing pan-dialectal vowel classes that are needed for an overview of the development of North American English. The historical connection between modern /ɑ/ and Middle English short-*o* is not at all evident from the transcription of Table 2.1.

Second, it makes more use of special phonetic characters than is necessary at a broad phonemic level, contrary to the IPA principle that favors minimum deviation from Roman typography.

1 The concept of initial position is not unrelated to the synchronic concept of *underlying form*, the representation used as a base for the derivation of whatever differences in surface forms can be predicted by rule. An initial position is a heuristic device designed to show the maximum relatedness among dialects as a series of historical events.

2 There are very few counter-examples to this principle. In New York City, words like *her* and *fur* are frequently realized with final short vowels: [fʌ, hʌ]. In unstressed syllables, conservative RP used final short /i/ in words like *happy* and *city*, but that is now being replaced by /iy/ among younger speakers (Fabricius 2002).

3 Kurath differentiates three American systems, one of which is identical with British English. He follows this presentation with a perspective on the historical development of these systems.

Third, and most important, the unique notation assigned to each vowel fails to reflect the structural organization essential to the analysis of the chain shifts that are a principal concern of this Atlas. Though the vowels are listed as "checked" and "free" in Table 2.1, the notation represents all vowel contrasts as depending on quality alone.

For these reasons, the transcription system used by ANAE was based instead on the binary notation that has been used by most American phonologists, beginning with Bloomfield (1933), Trager and Bloch (1941), Bloch and Trager (1942), and Trager and Smith (1951). Hockett's (1958) textbook and Gleason's (1961) textbook both utilized a binary notation for English vowels. The feature analysis of Chomsky and Halle (1968) incorporated such a binary analysis, and a binary analysis of English long vowels and diphthongs is a regular characteristic of other generative treatments (e.g. Kenstowicz 1994: 99–100; Goldsmith 1990: 212).[4]

A binary notation makes two kinds of identification. Front upglides of varying end-positions [j, i, ɪ, e, ɛ] are all identified as /y/ in phonemic notation. Similarly, the back upglides [w, u, ʊ, o, ɤ] are identified uniformly as /w/. Secondly, the nuclei of /i/ and /iy/, /u/ and /uw/ are identified as 'the same.' Such an identification of the nuclei of short and long vowels is a natural consequence of an approach that takes economy and the extraction of redundancy as a goal. The same argument can be extended to the nuclei of /e/ and /ey/, /ay/ and /aw/.[5] In the binary system, short vowels have only one symbol, which denotes their nuclear quality, while long vowels have two symbols. The first denotes their nuclear quality, the second the quality of their glide. There are three basic types of glide at the phonemic level: front upglides, represented as /y/, back upglides (/w/), and inglides or long monophthongs (/h/).[6]

Another important generalization made by the binary system is that, at a broad phonemic level, the traditional representation of the lax–tense difference between short and long vowels such as /ɪ/ vs. /i/, /ʊ/ vs. /u/, etc., is redundant. Both /ɪ/ and /i/, for instance, share a high-front nucleus. The exact quality and orientation of these nuclei differ from one dialect to another. What consistently distinguishes them phonologically is the presence or absence of a front upglide. The vowel of *bit* can therefore be represented simply as /bit/, and that of *beat* as /biyt/. At the phonetic level, these are often realized as [bɪt] and [bit], depending on the dialect, but at the phonemic level, the use of a special character for *bit* can be dispensed with.

2.3. Initial position

Table 2.2 presents the initial position of North American dialects, showing in binary notation the maximal number of distinctions for vowels (not before /r/). Table 2.2 identifies three degrees of height and two of advancement.[7] The six short vowels are accompanied by eight long upgliding vowels and two long ingliding vowels.[8] Rounding is contrastive only in the ingliding class.[9] The word-class membership of these phonemes is illustrated in Table 2.3, with words in the *b__t* frame wherever possible.

Table 2.2. The North American vowel system

	SHORT		LONG					
			Upgliding				Ingliding	
			Front upgliding		Back upgliding			
	V		Vy		Vw		Vh	
nucleus	front	back	front	back	front	back	unrounded	rounded
high	i	u	iy		iw	uw		
mid	e	ʌ	ey	oy		ow		oh
low	æ	o		ay		aw	ah	

Table 2.3. Keywords for the phonemes of Table 2.2.

	SHORT		LONG					
			Upgliding				Ingliding	
			Front upgliding		Back upgliding			
	V		Vy		Vw		Vh	
nucleus	front	back	front	back	front	back	unrounded	rounded
high	*bit*	*put*	*beat*		*suit*	*boot*		
mid	*bet*	*but*	*bait*	*boy*		*boat*		*bought*
low	*bat*	*cot*		*bite*		*bout*	*balm*	

Following the logic of binary notation, this representation greatly reduces the number of special symbols necessary for the phonemic transcription of the vowel contrasts in English dialects. Furthermore, it captures important generalizations about the sub-systemic organization of the vowel space that are missed by a more phonetically based transcription. It is not linked to typical phonetic values of one arbitrarily selected reference dialect, since its relation to the phonetic values of IPA symbols is abstract and historical rather than concrete and descriptive.

In addition to transcribing each vowel phoneme, the occurrence of marked allophonic variation often makes it necessary to add a symbol to indicate the presence, absence, or quality of following consonants. The allophone of /ay/ before voiceless consonants is designated /ay0/ as opposed to the residual category /ayV/. The checked allophone of /ey/ is sometimes shown as /eyC/ as opposed to the free allophone /eyF/.

The use of /h/ to indicate a class of long and ingliding vowels, which show no formant movement or move in a centering direction, was a prominent feature of the binary analysis introduced by Bloch and Trager. It is not as generally used as /y/ and /w/.[10] Instead, one often finds along with /iy, ey, uw, ow/ the symbol /ɔ:/ for the class of *caught*, *law*, etc. or /a:/ for the class of *father*, *pa*, etc. This special

4 Recent treatments of English vowels in Optimality Theory tend to show binary representations at a lower level of abstraction. Thus /ey/ frequently appears in Rutgers Optimality Archive papers as [eɪ] and /ow/ as [oʊ].

5 In the most commonly accepted notation, the mid-back nuclei of /ʌ/ and /ow/ are not transcribed with the same nuclei, and the redundant phonetic difference in rounding is preserved. Nevertheless, Chapter 14 will develop the argument that at least in the eastern United States, these nuclei are structurally identified and move together in the course of Northern and Midland sound changes.

6 The /h/ glide is an abstract notation indicating either a lengthened vowel or an inglide towards schwa. These are generally in complementary distribution: low back vowels are generally long monophthongs, while high and mid vowels are ingliding.

7 The /a/ in /ay, aw, ah/ is frequently represented by a low central vowel in many dialects, but at the abstract level of the initial position, it is a back vowel, opposed to /æ/. In the majority of North American dialects, the nucleus of /aw/ is front of center. Chapter 18 will show that a chain shift in Southern English, initiated by the diphthongization of long open-*o* words, forces a structural reinterpretation of initial /aw/ as /æw/.

8 These positions can be represented as a set of binary features in which the nuclei are combinations of [+voc, –cons, ±high, ±low, ±back, ±round] and the glides are combinations of [–voc, –cons, ±back, ±high].

9 Table 2.2 omits several marginal classes that are limited to a few words, like /eh/ in *yeah*, /ih/ in *idea* and *theatre*, /uh/ in *skua*.

10 Gleason (1961) substituted a capital /H/ for /h/, to avoid the implication that this centering glide was 'the same' as initial /h/. Although initial and final /h/ are in complementary distribution, it can be argued that the phonetic differences are not motivated by the environmental difference.

notation captures the phonetic character of the word classes involved. But it does not reflect the generalization that English words with final stress must end with a glide or a consonant. By writing /oh/, /ah/, for the long and ingliding sub-system, we incorporate this generalization, which plays a central role in the description of mergers and chain shifts in the chapters to follow.[11]

As noted above, a binary notation is more favored by North American than British linguists. This is largely due to the different status of diphthongization in British and American dialects. Diphthongization of all long vowels, especially in final position, is the general rule in North America. Monophthongal /eː/ and /oː/ do occur, but only in limited areas. Wells (1982) uses monophthongal symbols for the long high vowels /iː/ and /uː/, a representation that seems useful for RP. Many regional British dialects have consistently monophthongal long vowels, as well as the Caribbean dialects strongly represented in Britain today. To apply the notation /iy, ey, ow, uw/ to this range of British dialects would seem artificial at best. On the other hand, Wells's use of /iː/, /uː/, and /o/ for the phonemes of "General American"[12] is an odd extension of the British system. Nevertheless, the organization of vowels presented by Wells in his 1982 overview of English dialects is strikingly similar to the ANAE initial position. Wells divides English vowels into long and short (checked and free). Furthermore, he separates the long vowels into front upgliding, back upgliding and ingliding (without using those labels). Table 2.4 shows the relations of the two representations by inserting the labels for lexical sets introduced by Wells, now widely adopted in British dialectology, into the framework of Table 2.2.3.[13]

Table 2.4. Wells' view of "General American" vowel classes

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

2.4. Description of the word classes

The vowel classes labeled in Table 2.2 are defined in the following section. Historical vowel classes are indicated in boldface, modern lexical reflexes in italic. Conventional labels for phonemes are given in quotes. In each case, the historical word class is composed of a core set or sets of reflexes of Old English and Middle English words, along with a variety of loan words, principally from French and Latin, but from other sources as well.

/i/ "short-*i*", derived primarily from M.E. short **i**, in *bit*, *sit*, *will*, *tin*, *bitter*, *dinner.*

/e/ "short-*e*", derived primarily from M.E. short **e**, in *bet*, *set*, *red*, *ten*, *better*, etc. along with a number of shortened M.E. **ea** words in *head*, *dead*, *lead*, *breakfast,* etc.

/æ/ "short-*a*", derived primarily from M.E. short **a**, in *bat*, *sat*, *had*, *man*, *batter*, etc. along with foreign **a** loan words that may or may not alternate with /ah/: *fact*, *lamp*, *cab*, *jazz*, *pasta*, *Mazda*.

/o/ "short-*o*", derived primarily from M.E. open **o** or **ɔ** in *cot*, *rot*, *odd*, *Tom*, *hotter*, etc. In most British dialects, this is the short back rounded vowel realized on a non-peripheral track (see below). In most North American dialects, it was unrounded and lowered to [ɑ] by the nineteenth century (Barton 1832). It was then merged with the small sub-class of words with /a/ after initial /w/ (*watch*, *wander*, *warrant*) and generally with the /ah/ class (*balm* = *bomb*, see below). In Eastern New England, Pittsburgh and some Canadian communities, /o/ remained as a rounded vowel, and merged with /oh/. /o/ does not remain in its original back rounded position as a separate phoneme in any North American dialect.

In those dialects that retained the opposition between /o/ and /oh/, a large number of /o/ words shifted to the /oh/ class, before back nasals, as in *strong*, *song*, *long*, *wrong*, etc.; before voiceless fricatives (in *loss*, *cloth*, *off*, etc.), and irregularly before /g/, as in *log*, *hog*, *dog*, *fog*, etc. This process occurred by lexical diffusion, leaving many less common words in the /o/ class, such as *King Kong*, *Goth*, *doff*, etc.

/ʌ/ "wedge", derived primarily from M.E. short **u** in *but*, *bud*, *come*, *some*. The North American mid-back unrounded vowel is the result of the unrounding of the majority of M.E. short **u** words. In addition, two M.E. long **u:** words were unrounded to /ʌ/: *flood*, *blood*.

/u/ "short-*u*". A certain number of M.E. short **u** words did not undergo this unrounding, largely after labials and before /l/: *put*, *push*, *bush*, *full*, *wool*, *bull,* as opposed to *putt*, *hush*, *mush*, *dull*, *gull*, etc. Some M.E. long **o** words were shortened to join this class, largely before /k/ and /d/: *hook*, *cook*, *look*, *good*, *hood*, *stood* and also *foot*, *soot*.

/iy/, "long-*e*", derived primarily from M.E. **e:** after merger with M.E **ea:**, in *see*, *seed*, *sea*, *bead*, etc. This vowel was raised by the Great Vowel Shift to high front position and diphthongized to /iy/. In hiatus position, M.E. **i:** remained in high front position and joined this class (*idiot*, *maniac*). A large number of recent loan words with [i] in other languages are now a part of this class: *machine*, *visa*, *diva*.

/ey/, "long-*a*", derived primarily from M.E. **a:** after merger with M.E. **ai:**, in *made*, *name*, *maid*, *say*, etc. This was raised from a low front to a mid front position by the Great Vowel Shift and diphthongized to /ey/.[14]

/ay/, "long-*i*", derived primarily from M.E. **i:**, undergoing diphthongization and nucleus-glide differentiation in the Great Vowel Shift: *sigh*, *high*, *buy*, *ride*, *die*, *bite*, *time*, etc.

/oy/, a small class from early French loans, in *soil*, *boil*, *choice*, *noise*, etc., along with a number of common words of uncertain origin: *boy*, *toy*, etc.

/uw/, "long-*u*", derived primarily from M.E. **o:** in *mood*, *food*, *fool*, *room*, *too*, *do*, etc., excluding words that were shortened before /d/ and /k/ (see /u/ above). This vowel was raised to high position by the Great Vowel Shift and diphthon-

11 It can be pointed out that the use of /h/ to represent a free vowel is well entrenched in English orthography. Spellings such as *yeah*, *huh*, *ah* and *oh* are found in place of *ye*, *hu, a*, and *o*; monophthongal /ay/ is normally spelled *ah* for *I* and *mah* for *my*. In Pittsburgh, monophthongal /aw/ is regularly spelled *ah* as in *dahntahn*. Users of this every-day practice are not troubled by the fact that in *huh*, final /h/ is phonetically distinct from initial /h/.

12 This term has not been used by American dialectologists to any extent since the appearance of Kurath (1949), but it continues to be used in Europe. The exact referent is difficult to determine, but it almost always indicates a rhotic, non-Southern dialect.

13 This table does not correspond precisely to the initial position of Table 2.3, but rather reflects the typical American dialect in which /o/ has merged with /ah/ (Chapter 14) and /iw/ has merged with /uw/ (Chapter 8). Wells represents the mid-central nucleus in the NURSE class as a vowel /ɜ/, as in British English, whereas ANAE places this constricted nucleus with other vowels before tautosyllabic /r/ (see Table 2.6). Wells uses /o/ as the vowel of the GOAT set in America, where ANAE uses /ow/, while his notation for the British GOAT set is the diphthong /əʊ/

14 Some scholars believe that M.E. **ai**, **ay** did not merge with monophthongal **a:** but retained its separate status until M.E. **a:** reflexes were diphthongized in the seventeenth century.

gized in most dialects. Words with M.E. **u:** that did not undergo the Great Vowel shift are joined with this class (*soup*, *you*, etc.).

/ow/, "long-*o*", from M.E. open **o:**, in *boat*, *road*, *soap*, as well as M.E. diphthongal **ow**, in *stow*, *flow*, *know*, *bowl*, etc.

/aw/, from M.E. **u:**, respelled in the French style as **ou**, diphthongized with further nucleus-glide differentiation in the Great Vowel Shift, in *house*, *mouth*, *proud*, *now*, *cow.* This process did not affect vowels before labials or velars or after /y/, which remain in the current /uw/ class: *you*, *your*, *youth*, *soup*, *group*, etc.

/iw/, from a wide variety of M.E. and French sources, spelled *u*, *eau*, *ew*, *ui*, which were generally realized with a palatal onglide as /juw/. The loss of the glide after coronals in North America created the opposition of /iw/ and /uw/ in *dew* vs. *do*, *suit* vs. *shoot*, *lute* vs. *loot*, *rude* vs. *rood*, etc.

/oh/, "long open-*o*". This class has a highly skewed distribution that reflects the complex and irregular history of its composition. It is the result of monophthongization of **au** in *law*, *fault*, *talk*, *hawk*, *caught*, in turn derived from O.E. **aw** (*thaw*, *straw*, *claw*); O.E. **ag** (*maw*, *saw*, *draw*); O.E. **ah**, broken to **eah** (*fought*, *taught*); O.F. **a + u** in the next syllable (*brawn*, *pawn*), M.E. **av** (*hawk*, *laundry*); O.F. **au** (*applaud*, *fraud*, *because*); O.F. **am**, **an** (*lawn*, *spawn*). In addition, some long open-*o* words are descended from O.E. **oht** (*thought*, *daughter*, *brought*). Its current distribution is largely limited to final position and words terminating in /t, d, k, n, l, z/. The lengthening of /o/ before nasals and voiceless fricatives enlarged the /oh/ class considerably, but did not materially affect the number of environments where contrast with /o/ is to be found.

/ah/ "broad-*a*". Original O.E. **a:** was raised to a mid-back vowel **oa.** When a new M.E. **a:** was created by lengthening in open syllables, it was raised to a mid front vowel which became modern /ey/. A residual **a:** class is centered about the unique word *father* with **/ah/** in an open syllable, joined by a few words with word-final /ah/: *pa*, *ma*, *bra*, *spa*, and a number of marginal onomatopoetic and affective forms, *rah rah*, *haha*, *tra la*, *blah blah*, etc. Words with vocalized /l/ formed a part of this class: *calm*, *palm*, *balm*, *almond*, though a large number of North Americans have retained or restored the /l/. To this small nucleus is joined a very large number of "foreign a" words: *pasta*, *macho*, *lager*, *salami*, *nirvana*, and *karate*, though some of these are assigned instead to /æ/ in some dialects (Boberg 2000). As noted above, /o/ has merged with this class for most North American dialects. In traditional Eastern New England speech, some members of the British broad-*a* class have been added, so that some words before voiceless fricatives and nasal clusters appear with /ah/: *half*, *pass*, *aunt*, *can't*, etc.

2.5. Vowels before /r/

The keywords of Table 2.3 are almost all before /t/; the vowel phonemes are in direct contrast in the same environment. Other such sets, before /d/, /g/, or /s/ will show similar contrasts. The discussions of chain shifts in the chapters to follow will confront the question as to whether vowel contrasts operate primarily between allophones or phonemes. If the former, then one might expect to find allophonic chain shifting, where vowels rotate before /n/ but not before /t/. In fact, there is very little evidence of such shifts. Chapters 12 to 20 will show that following consonants are responsible for many strong co-articulatory effects and many categorical constraints. There are fewer distinctions before nasal consonants than before oral consonants. The diphthongs /aw/ and /oy/ do not occur before labials and velars. But in general, there is little difficulty in identifying vocalic allophones before various consonants with the general schema of Table 2.2. Native speakers find it easy to identify the vowels in *beat*, *bean*, *bead* and *beak* as 'the same.'[15] This is not true, however, for vowels before /r/. In some dialects, it is not immediately evident whether the vowel of *bore* is to be identified with the vowel of *boat* or the vowel of *bought*, or whether *bare* belongs with *bait* or *bet*.[16] As a result, sets of vowels before /r/ show a puzzling array of mergers and chain shifts quite distinct from those operating in the rest of the vowel system.

In fact, there are only minor problems in assigning vowels before intervocalic /r/. They are centralized in comparison to the corresponding allophones before obstruents, but can be identified with the categories of Table 2.2, as shown in Table 2.5.[17] This shows the maximal set of oppositions, which are greatly reduced in many dialects. Before intervocalic /r/, /iy/ and /i/, /uw/ and /u/ are merged in most current dialects. Chapter 9 will show that for the majority of North American speakers, there is complete merger of /ey/, /æ/, and /e/ in *Mary*, *marry*, *merry*. Philadelphia preserves these distinctions, but suspends phonemic contrast of *merry* and *Murray* in a near-merger (Labov 1994: 397–418). Great lexical variation is shown in the assignment of words to the /or/ or /owr/ classes, as in *moral*, *coral*, *tomorrow*, *borrow*, etc.

Table 2.5. Initial position for vowels before intervocalic /r/

	SHORT		LONG			
			Upgliding			
			Front upgliding		Back upgliding	
	V		Vy		Vw	
nucleus	front	back	front	back	front	back
high	/i/ *mirror*	/u/ *jury*	/iy/ *nearer*			
mid	/e/ *merry*	/ʌ/ *Murray*	/ey/ *Mary*	/oy/ *Moira*		/ow/ *story*
low	/æ/ *marry*	/o/ *morrow*		/ay/ *spiral*		/aw/ *dowry*

While the vowels before intervocalic /r/ show an opposition of short to long vowels, no such opposition can be found for vowels before a tautosyllabic /r/ that cannot be assigned to syllable-initial position. The high and mid short vowels in *fir*, *her*, *fur*, and words with *-or-* after /w/ have all merged to syllabic /r/ which falls structurally into the mid-back unrounded position.[18] While upglides can occur before intervocalic, syllable-initial /r/ as in *Mary*, they never occur before tautosyllabic /r/, where the transition to full /r/ constriction is through an inglide. Vowels before tautosyllabic /r/ fall naturally into the sub-class of long and ingliding vowels. When syllable-final /r/ is vocalized, the small group of two ingliding vowels /ah/ and /oh/ in Table 2.2 is augmented with /ih, eh, uh/.

Table 2.6 presents vowels before tautosyllabic /r/. As on the right side of Table 2.2, there is a rounded–unrounded distinction among the back vowels and a three-way distinction of height among the back vowels. This is the result of the

15 Techniques for investigating mergers developed by Di Paolo (1988) make use of this capacity of subjects to identify vowels in one context with vowels in another.

16 Such identifications are problematic to a lesser degree for vowels before /l/, where many mergers are now in progress (Chapter 8). But in most dialects, the vowel of *fall* will be easily identified with the vowel of *fought* rather than the vowel of *foal*. Di Paolo (1988) asks subjects to identify vowels across allophones to trace the merger of vowels before /l/.

17 In Table 2.5, the long and ingliding class is eliminated. However, it would not be unreasonable to assign the vowel of *nearer* to /ih/, *Mary* to /eh/, *story* to /oh/. These vowels usually do not show upglides, and they are phonetically closer to the long and ingliding set. From a structural viewpoint, the assignments of Table 2.5 are simpler.

18 Here too the contrast with the situation in Great Britain can be striking. Scots preserves the distinction between *fir* and *fur*, *kernel* and *colonel*.

continuation of the opposition of M.E. close-*o* and open-*o* in the set of *mourning* vs. *morning*, *four* vs. *for*, *ore* vs. *or*, *port* vs. *storm*. Chapter 7 will show that this distinction has almost disappeared in North American English. Nevertheless, there are enough remnants to require it to be represented in the initial position of Table 2.6.

Table 2.6. Initial position for vowels before tautosyllabic /r/

	Ingliding Vh		
	front	back	
		unrounded	rounded
high	/ihr/ *fear*		/uhr/ *moor*
mid	/ehr/ *fair*	/ʌhr/ *fur*	/ohr/ *four*
low		/ahr/ *far*	/ɔhr/ *for*

2.6. The linguistic status of the initial position

The presentation of the English vowel system began with the schemata developed by Bloomfield, Bloch, and Trager. Although their approach to phonological analysis is remote from current practice in many respects, it is immediately relevant to the task of the Atlas, for several reasons. They explored the logic of the binary notation explicitly, and they were concerned with accounting for the range of dialect diversity that is the subject matter of the Atlas. Their references to the dialects of the Eastern United States, which were then well charted, are accurate and relevant, though their references to Southern or "mid-western" dialects must be revised in the light of current knowledge. They were not concerned with the structural relations among the phonemes that form the basic inventory for any one dialect, which (following Martinet 1955) must be the central focus of the present work. The configuration of the six short vowels of Table 2.2 represents a set of oppositions that are fully operative in most American dialects, although the low vowels frequently migrate from the V sub-system of checked vowels to the Vh sub-system of free vowels. The members of the Vy and Vw sub-systems are intimately related internally in ways that are fully exemplified in chain shifting and parallel shifting.

Table 2.2 has many empty cells, indicating unrealized combinations of vowels and glides. Sound changes that move a single phoneme without affecting the inventory could therefore be represented by a change of notation. For example, when the nucleus of /aw/ moves from back of center to front of center, it might well be written as /æw/. This implies a phonemic change for what might be considered a low-level phonetic shift in the realization of a phoneme. The Atlas will not make such changes of notation, but will retain the original notation to preserve the identity of the historical word classes of Table 2.2. Changes in notation will occur only when structural shifts in neighboring phonemes require it. For example, Southern /aw/ in *house* will be written with the /a/ nucleus as long as the word class /oh/ is realized with a rounded nucleus and a back upglide. But when the nucleus of /oh/ is unrounded, it assumes the structural identity of /aw/, and this is only possible if the original /aw/ has assumed the identity of /æw/.

The initial position therefore represents a balanced set of contrastive oppositions which functioned effectively for North American English dialects at the outset and continues to function in this way for a limited number of dialects. The weak points of the initial position that became the loci of change are:

(1) The skewed distribution of /oh/ and its limited contrast with /o/
(2) The skewed distribution of /ah/ and its limited contrast with /o/
(3) The skewed distribution of /iw/ and its limited contrast with /uw/
(4) The skewed distribution of /ohr/ and its limited contrast with /ɔhr/

Chapters 9 and 11 will deal with the consequences of the instability noted in (1); Chapters 11 and 14 will explore the consequences of (2); and Chapter 12 will discuss the massive continental changes that followed from the instability of (3). Chapter 8 will show that the instability of (4) has led to the almost complete elimination of this contrast.

3. Principles of chain shifting and mergers

Chapter 2 developed the binary notation for English vowels that is used throughout the Atlas. A major motivation for this notation proceeds from the principles governing chain shift that were first stated in LYS 1972.

3.1. General principles of chain shifting

(1) In chain shifts,

I. Long vowels rise.
II. Short vowels and nuclei of upgliding diphthongs fall.
III. Back vowels move to the front.

These unidirectional principles operated in the historical record to produce the initial position of Table 2.2. They operate on regional dialects to drive vowels further along these unidirectional paths. As Chapter 11 will show, ANAE defines regions and dialects on the basis of these dynamic tendencies – the changes in progress now taking place in each region and the initial conditions for those changes.

3.2. Long/short, tense/lax, peripheral/non-peripheral

In the formulation of (1), the categories *long* and *short* refer to the opposition of long and short monophthongs as they are usually inferred from the historical record and in some synchronic descriptions. More specific phonological features are needed to understand the directions of sound change in particular regions.

In West Germanic languages (German, Dutch, Frisian, English), long and short vowels enter into a phonological opposition of *tense* vs. *lax* vowels. The feature [±tense] is a cover term for a complex of phonetic features: extended duration and extreme articulatory position with an accompanying increase of articulatory effort. This is realized acoustically as an F1/F2 location near the outer envelope of the available acoustic space. The phonological space available to North American English vowels is defined acoustically in Figure 3.1, where both front and back regions show peripheral and non-peripheral tracks.

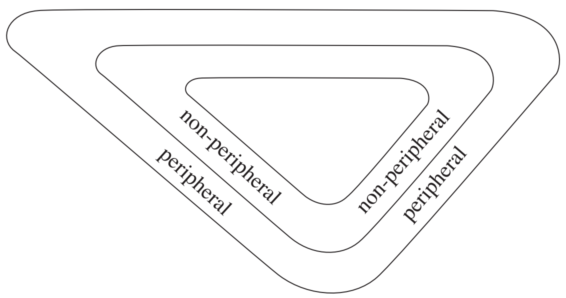


Figure 3.1. Peripheral and non-peripheral tracks in English phonological space

In the initial position of North American English vowels, the nuclei of the upgliding vowels are tense – that is, located on the peripheral tracks. The nuclei of short vowels are located on the non-peripheral tracks, though they frequently shift to non-peripheral position, as illustrated in Figure 3.2.[1]

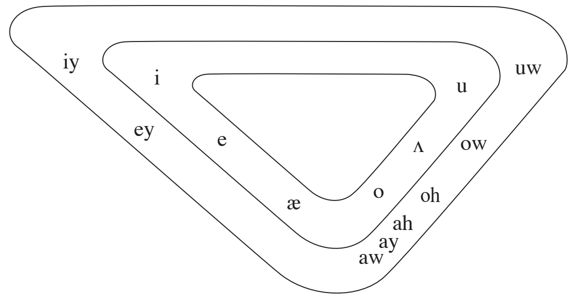


Figure 3.2. Location of initial position vowels in acoustically defined space

Location in this acoustic space is relevant to the direction of movement of vowels when change is in progress. The general principles of chain shifting can be restated as:

(2) In chain shifts,

I. Tense nuclei move upward along a peripheral track.
II. Lax nuclei move downward along a non-peripheral track.

Figure 3.3 illustrates the typical direction of movement in chain shifts. The arrows represent the typical directions of movement if the nuclei remain in their initial position; in North American English, they often shift peripherality.

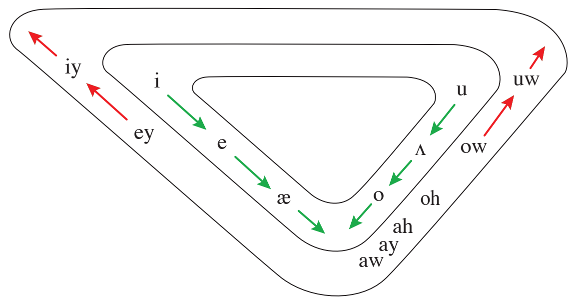


Figure 3.3. Directions of movement in chain shifts along peripheral and non-peripheral tracks

1 In this figure, the three vowels /ah, ay, aw/ are shown as peripheral low vowels back of center. It may be assumed that /aw/ moved forward to /æw/ some time in the formative period of the South and Midland, since current U.S. dialects show a sharp opposition of back /aw/ in the North and front /aw/ elsewhere. However, it is possible that the North and the other areas differed in this respect from the outset, so that the South and Midland had /æw/, not /aw/ in this notational scheme.

The general principles governing movement can also be defined in an articulatory space, derived from X-ray measurements of the highest point of the tongue, shown in Figure 3.4. Here phonological space appears in an ovoid shape, without any high back corner: the two anchor points are the high front /iy/ and low back /o/. The figure plots ten vowels of a conservative speaker from the North Central states. To these are added arrows indicating the typical directions of movement in chain shifts.

In this articulatory space, the fronting of /uw/ appears as a continuation of a raising process, since the high point of the tongue for /uw/ is considerably lower than the high point for [i]. The backing of /e/ and /i/, which will play a major role in Chapters 11, 14, and 15, now appears as a downward movement through the non-peripheral space of the center.

In this space, we can define the movements of vowels in a somewhat different manner. In chain shifts,

I. Peripheral vowels move upward along a peripheral track.
II. Non-peripheral vowels move downward along a non-peripheral track.[2]

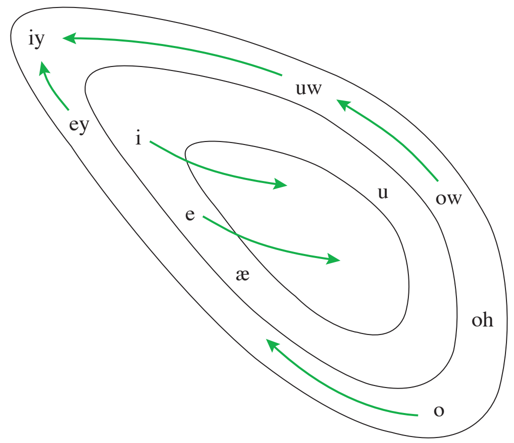


Figure 3.4. The articulatory space of North American English vowels, based on X-ray measurements of the highest point of the tongue. Based on Lindau 1978

In discussing chain shifts, the Atlas will continue to use the acoustically defined space of Figures 3.1–3.3, since the data are derived from acoustic measurements. However, the logic of Figure 3.4 will be cited in relating movements within individual chain shifts to the more general principles of chain shifting.

3.3. Acoustic evidence for the Peripherality Hypothesis

The foregoing discussion can be summed up as the *Peripherality Hypothesis*. It asserts two distinct propositions:

(a) The formant space in which English vowels move contains a peripheral and a non-peripheral area in both the front and the back.
(b) In chain shifting, vowels rise in peripheral areas and fall in the non-peripheral areas.

The final section of this chapter will present further empirical support for (1); Chapters 11–20 will provide further data to support (2).

Past discussions of the peripheral and non-peripheral tracks have been based upon the study of individual vowel systems, and the definitions of peripherality have been abstracted from displays of 300 to 500 vowels. The data assembled for ANAE has greatly enlarged the field of evidence, now consisting of measurements of 134,000 vowels. The application of this database to the empirical confirmation of the hypothesis depends upon the success of the normalization procedure which converts the 439 speakers to a common grid. This log mean normalization (Chapter 5) is generally effective in eliminating the acoustic differences that are the result of variation in vocal tract length, while preserving those social differences that are characteristic of the speech community (Nearey 1978; Hindle 1978; Labov 1994: Ch. 5; Adank 2003).

Figure 3.5 is a Plotnik mean file diagram for the 22 dialects to be defined in Chapter 11. The mean values for 14 vowels are shown for each dialect. Each symbol represents the mean value for a given dialect. The light green lines represent the grand means of F1 and F2. Some vowel distributions are globular, like that for /ʌhr/ just above and back of the mid-center position (tan squares with vertical crosses). For most dialects, this vowel class is stable. The light blue circles with arrows pointing to upper right are the symbols for /uw/ means. These show a very different distribution: a continuous band of high vowels stretching from back to front. This is a reflection of the general fronting of /uw/ in all but a few dialects, a continent-wide process discussed in Chapter 12.

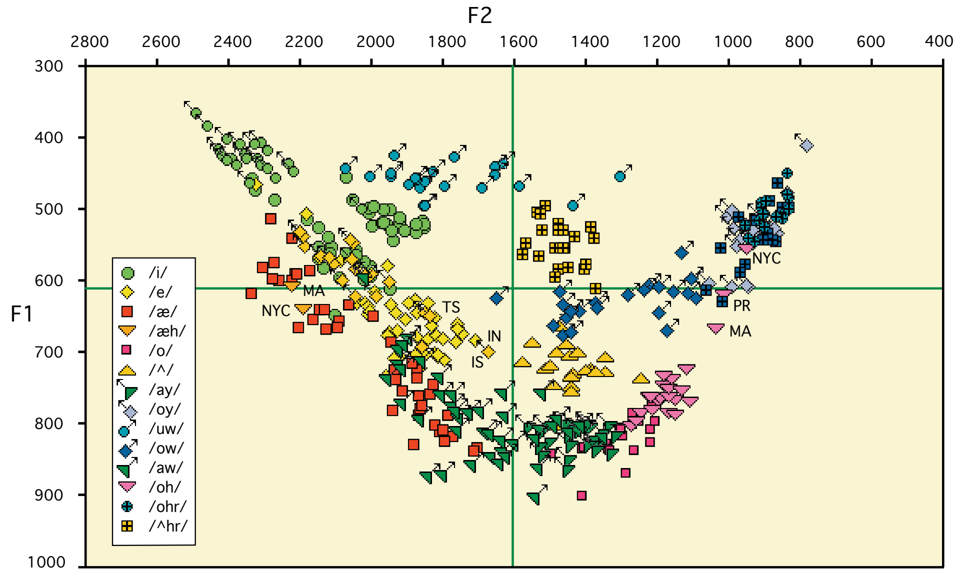


Figure 3.5. Peripheral and non-peripheral tracks in the mean file diagram of 14 vowels for the 22 dialects defined in Chapter 11

The front peripheral track

The front peripheral track is clearly outlined by two phonemes which are extended along the outer diagonal path leading from low front to high front. The red squares represent means for /æ/, which has in part or whole shifted to the peripheral track for various dialects, and undergone varying degrees of raising

2 Chapter 8 of Labov 1994 condensed these two statements into the proposition that in chain shifts, *peripherality and openness dissimilate*.

and fronting (Chapter 13). Separate means are calculated for /æ/ before nasal consonants and in all other environments. The upper set in Figure 3.5 consists largely of means for /æ/ before nasal consonants, which are generally further along the peripheral path. The two orange triangles labeled "NYC" and "MA" are the special subsets of tensed /æh/ in New York City and the Mid-Atlantic States, which are the result of a lexical split between lax and tense short-*a* characteristic of those dialects only (Chapter 17). Over half of the tokens in this category are before oral consonants, but they occupy the same position along the peripheral track as the pre-nasal allophones. The peripheral path is not therefore a property of nasal allophones, but it can be said that nasal allophones favor peripherality.

The lower section of the front peripheral track is also occupied by the mean tokens for /aw/, which is seen to be moving towards mid front position for many dialects.[3]

The front non-peripheral track

The front non-peripheral track is defined here by two vowels, following opposite distributions for the various dialects. The yellow diamonds are the means for /e/, which moves along the non-peripheral track, down and towards the center, in the course of the Northern Cities Shift (Chapter 14). The most advanced dialect in this respect is the Inland North, the lowest and most central mean symbol labeled IN in Figure 3.5. Other yellow diamonds along this track have arrows pointing to the upper left; these are the mean symbols for /ey/. For the majority of dialects, the nucleus of /ey/ has shifted to upper mid non-peripheral position. Only a few /ey/ tokens follow the downward non-peripheral path: these are the Southern dialects following the Southern Shift (see below). The lowest and most central symbol is that for the Inland South, the area where the Southern Shift is most complete; it is labeled IS in Figure 3.5. Behind this is the symbol for the other advanced Southern dialect, the Texas South (TS).

This discussion of a non-peripheral track is necessarily in acoustic terms. We do not have enough information on the articulatory correlates to know how the movements of the tongue through the central, non-peripheral space might be organized.

The back peripheral path

The back peripheral track is outlined by the /oh/ class. The great majority of mean symbols form a globular distribution in lower mid back position, but three dialects show higher and backer values of /oh/: Mid-Atlantic (MA), Providence (PR) and New York City (NYC). The NYC symbol is located squarely within the mid to high back distribution characteristic of /oy/ and /ohr/. This track is also occupied by back vowels before /l/, which are not shown here. The peripheral position of /uwl/ and /owl/ is used as a basis for measuring the degree of fronting of the main body of /uw/ and /ow/ words (Chapter 12).

The back non-peripheral path

In the current state of North American English, there is only one example of a sound change along the back non-peripheral path. In Pittsburgh, /ʌ/ has shifted downward in the course of the Pittsburgh Chain Shift (Chapter 19). In many Southern British dialects, particularly in London, /ow/ moves downward along this track to become a low non-peripheral vowel (Sivertsen 1960, LYS) The pattern shown for North American dialects in Figure 3.5 shows a slight downward movement, but it essentially shows fronting of /ow/ to central position.

3.4. Movements across subsystems

The principal finding of the Atlas is that regional diversity is increasing as a result of opposing movements within vowel systems. Since the principles of chain shifting are unidirectional, it is not immediately obvious how they can drive dialects in different directions to achieve such a result. Since they operate within subsystems, it might appear that their continued operation could only lead to the uniform result that all long vowels are high, all short vowels are low, and no vowels are back. In fact, it is well known that the opposite is the case: vowel systems tend to show maximal dispersion, making maximal use of phonological space to maintain distinctions (Liljencrants and Lindblom 1972; Lindblom 1988; Flemming 1996). The diversification of phonological systems and dispersion in phonological space is the result of a combination of the principles of chain shifting with others that govern movement across subsystems (Labov 1994, Ch. 9). One such principle which is active in North American English, is

The Lower Exit Principle
In chain shifting, low non-peripheral vowels become peripheral.

Non-peripheral vowels that have descended in accordance with Principle II so far as to reach the bottom of the non-peripheral track, if pressured to move further, have nowhere to go but the lower peripheral track, where they change subsystems and become subject instead to Principle I. This happened with /æ/ and /o/ in most NAE dialects: as shown in Fig. 3.5, these are now peripheral vowels in most regions. Peripheralized /o/ has in fact merged in these regions with originally peripheral /ah/, as first discussed in Chapter 2. In the Northern Cities Shift, /æ/ and /o/ rotate as /æh/ and /ah/ along the peripheral track. Since peripheral vowels are longer than non-peripheral vowels, the lengthening that accompanies the peripheralization of short vowels can reduce the margin of security with neighboring long vowels. Such a lengthening of low central /a/ is the event that triggered the Swedish chain shift (Labov 1994: 281; Benediktsson 1970). The lengthening of /a/ in open syllables was among the most general processes of Early Modern English (Jespersen 1949: 3.3.4, 4.2.1),[4] and the resultant set of *name*, *shade*, *snake*, *acre*, *lane*, *bathe*, *ale*, etc. was integrated into the general chain shifting of long vowels in the Great Vowel Shift, following Principle I, as [a:], [æ:] rose to [e:].

The Great Vowel Shift also embodied another of the principles governing movement across subsystems (Labov 1994: 281–284):

The Upper Exit Principle
In chain shifting, one of two high peripheral morae becomes non-peripheral.

This principle operates upon bimoraic high vowels and appears to be specific to the West Germanic languages.[5] By this principle, [i:] can become either [ɪʲ] or [iə], as the first or second mora becomes lax/non-peripheral. The vowel leaves the subsystem of long monophthongs to create or join a subsystem of ingliding or upgliding diphthongs. In the Great Vowel Shift, the first option was selected, and

3 The means for /aw/ before nasals are again calculated with separate values, and these are also shifted further along the peripheral path.

4 But see Minkova (1982) for the suggestion that the lengthening was the result of incorporating final schwa within the stressed syllable. This possibility brings the historical process closer to the current development of short /æ/ in Chapter 14.

5 Kim and Labov (forthcoming) recognize such diphthongization in a number of Indo-European languages outside of West Germanic (Polabian, Old Czech, Latvian, Romantsch, etc.) but argue that all such cases are the result of intimate contact and influence from German.

the lax nucleus [ɪ] of /iy/ was then progressively lowered under Principle II to the current diphthong [aɪ] as a realization of /ay/.[6] A parallel development affected M.E. /u:/, which became /uw/ and then modern /aw/.

The same principle continues to operate upon diphthongal /iy, ey, uw, ow/ that resulted from the seventeenth-century diphthongization of the long vowels raised by the Great Vowel Shift. As the binary notation indicates, there is a difference in quality between the first and second mora of the long vowels in initial position. Under the operation of the Upper Exit Principle, the nuclei of these vowels shift to the non-peripheral track.

The operation of either the Lower and Upper Exit Principles can be the initiating event of a chain shift, since they both create vacant slots in the original subsystem. Thus the diphthongization of M.E. **i:** was followed by the raising of the other long vowels in the subsystem of long monophthongs in the Great Vowel Shift.

The opposite direction of change occurs when the Lower Exit Principle applies to diphthongs in the Vy subsystem. In the Southern United States, glide deletion of /ay/ converts the diphthong [ai] to a long monophthong [a:] and inserts it into the subsystem of long and ingliding vowels. This is the initiating event for the Southern Shift. As the red arrows in Figure 3.6 show, this triggers the downward shift of /iy/ and /ey/ under Principle II as part of the Southern Shift (Chapters 11, 18). A close parallel is found in Central Yiddish, where /ay/ becomes a monophthong, and /ey/ falls to /ay/ (Labov 1994: 286; Herzog 1965).

Figure 3.6 also shows (blue arrows) the Back Upglide Shift: a migration of /oh/ from the ingliding Vh set to back upgliding /aw/ in the Vw set, with an accompanying shift of /aw/ to /æw/ within the Vw subsystem.

	V		Vy		Vw		Vh	
	−back	+back	−back	+back	−back	+back	−round	+round
high	i	u	iy		iw	uw		
mid	e	ʌ	ey	oy		ow		oh
low	æ	o		ay	æw	aw	ah	

Figure 3.6. Movements across and within subsystems in the Southern Shift (red) and Back Upglide Shift (blue)

The combination of movements across subsystems and movements within subsystems operates to move languages or dialects in different directions. If a hole in the pattern of long vowels is created by the Upper Exit principle, then the remaining long vowels will rise. A hole in the pattern created by the Lower Exit principle will be followed by a downward movement, as the nuclei of the front upgliding vowels become lax and fall along the non-peripheral track, illustrated more concretely in Figure 3.7. In the Southern Shift, the laxing of /iy, ey/ is accompanied by a compensating shift of the short vowels to the peripheral track, where they are subject to Principle I and begin to rise, switching relative positions with their long counterparts as shown in the figure.

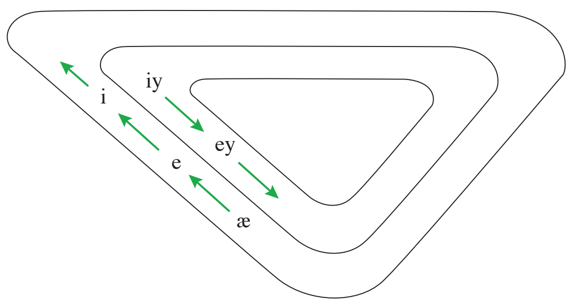


Figure 3.7. Movements along peripheral and non-peripheral tracks in the Southern Shift

3.5. General principles of merger

A chain shift by definition maintains the number of oppositions and phonemic categories that existed at the outset. The obverse of chain shifting is merger, where just the opposite happens. Mergers are also unidirectional processes, governed by two closely related principles (Labov 1994: 311–313):

Garde's Principle
Mergers are irreversible by linguistic means.

Herzog's Corollary
Mergers expand at the expense of distinctions.

The first principle concerns the sequence of events in the history of any one dialect. The second principle is the spatial reflection of these events as they affect neighboring dialects. In any case, a merger will have the same effect as an exit movement in altering the functional economy of a subsystem. The initiating event for a chain shift is often a merger which may create a vacant position in the subsystem or increase margins of security among the remaining elements.

One of the major events in the differentiation of North American dialects is the low back merger of /o/ and /oh/. In some areas, particularly Canada, this event triggers a chain shift among the front short vowels, which have been relatively stable over long periods of English history. The Canadian Shift, shown in Figure 3.8, is triggered by this merger, whereby short-*o* becomes a long open /oh/, migrating from the short subsystem to the long and ingliding subsystem (Clarke et al. 1995).

	V		Vy		Vw		Vh	
	−back	+back	−back	+back	±back	+back	−round	+round
high	i	u	iy		iw	uw		
mid	e	ʌ	ey	oy		ow		oh
low	æ	o		ay		ɑw		

Figure 3.8. The Canadian Shift

Most of the arrows in the preceding diagrams are a reflection of observed phonetic movements. In the case of the low back merger, it is not immediately obvious in which direction the arrow should be drawn. Is the result of the low back merger a member of the short vowel subsystem or a member of the long and ingliding system, as in Figure 3.8? As Chapter 2 pointed out, the long vowels in English are defined by privileges of occurrence in word structure. Long vowels

6 Among high vowels, the organization of long, ingliding and upgliding vowels involves different groupings to produce binary oppositions. There is usually no stable opposition between [i:] and [iə] or between [i:] and [ɪi]. Once the system of diphthongs develops, the monophthong can be interpreted as a variant of the upgliding diphthong or of the ingliding diphthong, but not as an independent unit contrasting with both.

occur in word-final position, while short vowels do not. When /o/ merges with /oh/, it becomes by definition a member of the long and ingliding subsystem. The vowel of *cot*, *rock*, *stop* is then a member of the class that includes *saw*, *law*, *draw*, and is logically represented as /koht, rohk, stohp, soh, loh, droh/.

A similar conclusion must be drawn from the merger of /o/ with /ah/. /o/ is a short vowel which cannot occur in word-final position. When it merges with /ah/ it is then a member of a category that occurs freely in word-final position. *Sod* and *sob*, with /o/, have the same vowel as *facade* and *Saab*, with /ah/, and therefore also as *spa* and *bra*, with /ah/ in final position. The resulting merged phoneme must be considered a member of the long and ingliding system. But to preserve clarity of comparison across dialects, the Atlas chapters retain the initial position of Table 2.2. The forward movement of the *got*, *rock*, *odd*, *doll* class is described as a fronting of /o/, even when /o/ is merged with /ah/ and is a member of that class.

4. Sampling and field methods

4.1. The pilot project

The Telephone Survey "Telsur" and Atlas project "ANAE" began as a pilot study of dialect differentiation in North American English, conducted from November, 1991 to April, 1993.[1] The area chosen for study consisted of all or parts of six states: Illinois, Wisconsin, Minnesota, Iowa, Nebraska, and South Dakota. This project aimed to contribute both to the specific geography of American dialects and to the study of the principles of sound change. The specific area to be studied was chosen because it included major regional boundaries and new phenomena that had not previously been mapped. Sampling in communities with a range of sizes was undertaken in order to represent both the dimensions of geographic dispersion and population density. First, seven focal places were targeted: Chicago, IL; Milwaukee, WI; Duluth, MN/Superior, WI; Minneapolis/St. Paul, MN; Des Moines, IA; Sioux Falls, SD; and Omaha, NE. Four of these are dominant metropolises with a 1990 population over 300,000: Chicago, Milwaukee, Minneapolis/St. Paul, and Omaha. The remaining three were selected to provide geographical coverage; they all have a population over 100,000, and they provide points 150 miles or more from the four larger cities.

The sample design for the pilot project entailed the selection of places within this 150-mile radius of each of the focal cities. In each area, eight cities were to be selected, two in each of four ranges of population:

50,000 to 200,000
10,000 to 50,000
2,000 to 10,000
under 2,000

Cities were selected within a 150-mile radius of the largest cities first. Where the territory of focal cities overlapped, sampling was frequently reduced because not enough cities of the requisite size existed.

Each of the focal cities was to be represented by two subjects, with the exception of Chicago, which was to be represented by four speakers. The smaller towns within the 150-mile radius of the focal cities were each represented by one speaker. In the course of the pilot project, 52 speakers were interviewed in 41 communities ranging in population from 2,605 (Lena, IL) to 6,793,132 in the urbanized area of Chicago, IL in 1992 and 1993.

4.2. Expansion of the project

The acoustic analyses of the first set of speakers showed a clear differentiation of the dialect regions of the Inland North, the North Central region, and the Midland, generally in accordance with the dialect boundaries established by other researchers, but showing a level of detail, precision, and consistency not previously achieved. The next phase of the project extended the territory to a fifteen-state region, from Ohio to the Continental Divide and from the Canadian border to the Ohio River, with Missouri, Kansas, and Colorado forming the southern tier of states west of the Mississippi River (1993–1994).[2] In the third phase, coverage was extended to the entirety of English-speaking North America (1994–1998).[3] As that sample approached completion, more detailed investigation of a set of cities in the Midland region was undertaken (1998–2000) to try to account for the extensive variation found among them. In addition, in 1997 and 1998, interviews of a sample of 41 African-American speakers were conducted in 15 cities with a high proportion of African-Americans.[4]

The sampling strategy for the Telsur/Atlas project was designed with the goal of representing the largest possible population, with special attention to those speakers who are expected to be the most advanced in processes of linguistic change. It has been established that most sound changes are initiated in urban centers (Trudgill 1974; Callary 1975; Bailey et al. 1991); thus the first tier of communities to be sampled consisted of places with the greatest concentration of population. Each community was selected as the focal point of an area, and the areas were determined so as to cover all the territory of English-speaking North America. Three defining terms are involved: Zones of Influence (ZI), Central Cities, and Urbanized Areas (UA). The selection of places to be sampled involves intersecting characteristics of the three levels, as will be explained below. The terms will first be defined, and then the selection criteria that produced the overall sampling plan will be described.

Zone of Influence

A Zone of Influence (ZI) is a set of counties. It is derived from the 1992 County Penetration Reports of the Audit Bureau of Circulations (ABC). ABC audits data from member organizations on the circulation of newspapers and other publications. For every county with at least 100 households, the County Penetration Report lists the name of each member newspaper, gives its circulation, and indicates whether it is a daily or weekly and morning or evening publication. A ZI, defined for the Telsur/Atlas project, is determined by Central Cities (see below). A county belongs to the ZI of a given Central City if, in that county, the circulation of the newspaper(s) from that city is greater than the circulation of the newspaper(s) from any other city that has been designated a Central City for the purposes of the research project.

Once the Central Cities have been selected, it is in theory possible to assign every county to a ZI. In practice this is not true, because some counties have fewer than 100 households and so are not listed in the County Penetration Reports. In most cases, such counties can confidently be assigned to a ZI on the basis of

1 This project was supported by NSF under grant BNS91-11637, "A Survey of Sound Change in Progress".
2 The second phase of the Atlas was supported by NSF under grant SBR 92-22458, "A Telephone Survey of Sound Change in Progress".
3 The third phrase of the Atlas was supported by grant RT-21599-94 from NEH, "A Phonological Atlas of North American English".
4 The study of the Midland was supported by grant SBR 98-11487 from NSF, "Linguistic Diversity in the North American Midland".

the ZI assignment of surrounding counties. In a few cases, the assignment of a given county could arguably be made to either of two ZIs. In those instances, the assignment was made on the basis of considerations such as proximity to the Central City.

Central City

This term is used in two senses. First, it is used as a synonym for the U.S. Census Bureau's definition of a Central Place as the defining feature of larger census units, including the Standard Metropolitan Statistical Area (SMSA) and the Urbanized Area (see below). The second sense is defined for the Telsur/Atlas project: a Central City is the central place of a Zone of Influence. As in the Census Bureau definition, a Central City may actually consist of more than one city: examples are Minneapolis/St. Paul, MN and the Quad Cities on the Mississippi River (Moline and Rock Island in Illinois and Davenport and Bettendorf in Iowa). The basic criterion for the selection of a Central City of a ZI is that it is a place for which the Urbanized Area (see below) has a population of at least 200,000 according to the 1990 census. Due to low populations in some areas, it was necessary to designate a number of cities smaller than this limit as Central Cities, such as Burlington, VT, Roanoke, VA, and Boise, ID. Three of the Central Cities are even smaller than the threshold of 50,000 which is used by the Census Bureau as a criterion for status as the Central Place of an Urbanized Area; they were assigned the designation of Central Cities for the same reason as the other Central Cities with a population under 200,000: to provide well-motivated geographic coverage. The status of such towns as regional centers is demonstrated by the existence of a local newspaper that has wide circulation in the area. The three Central Cities which are not UAs are Minot, ND, Aberdeen, SD, and Rutland, VT. Thus a Central City serves as the defining place of a Zone of Influence, and at the same time it is the Central Place of an Urbanized Area.

Urbanized Area

This term is defined by the U.S. Census Bureau in order to provide a better separation of urban and rural population than is given by the SMSA, which takes the county as its building block. It consists of a central city or cities and the surrounding densely settled territory. By definition, it has a population of at least 50,000. The densely settled surrounding area consists of contiguous incorporated or census designated places having either a population of 2,500 or more, a population density of 1,000 persons per square mile, a closely settled area containing a minimum of 50 percent of the population, or a cluster of at least 100 housing units. Further details on the definition of an Urbanized Area may be found in the Census Reports. The composition of each Urbanized Area is shown on maps in the series of census reports *1990 CPH-2: Population and Housing Unit Counts*.

In the design of the Telsur/Atlas sample, the Urbanized Area is taken to be a conservative estimate of the territory of the speech community of the corresponding Central City. If a speaker is a native of any place within the Urbanized Area of a Central City, he or she is taken to be linguistically representative of the Central City's speech community. The areal extent of the UAs as mapped by the Census Bureau is quite restricted, which allows us to be confident that this is a valid sampling decision.

The Central Cities selected to define ZIs are further divided into four types by population of the corresponding UA and by area of the ZI, as follows:

p1 UA population > 1 million;
p2 UA population > 200,000, non-restricted (area > 5,000 square miles);
p3 UA population > 200,000, restricted (area < 5,000 square miles);
p4 UA population < 200,000.

These four levels are used to differentiate the amount of sampling to be done in smaller cities within each ZI. At the level of the Central Cities, the only difference in sampling is between the p1 cities and all others: in p1 cities, at least four speakers were to be interviewed, while in all others, at least two were to be interviewed. Furthermore, in every city, an effort was made to insure that at least one speaker would be a woman between the ages of 20 and 40.

Appendix 4.1 lists the 145 Central Cities that were selected for sampling and gives the corresponding ZI and UA populations. The figures show that 54 percent of the population of the United States lives in the 145 Urbanized Areas (or smaller cities) that were selected for sampling. Thirty-three of the UAs have a population over one million, and 112 have a UA population under one million. Thus the total minimum number of speakers to be represented in the completed national sample of the United States would be 356 speakers. A similar sample, consisting of about 40 speakers, was designed for Canada. A sizable number of speakers from smaller towns were interviewed in the course of the pilot project, and it occasionally happened that a speaker in one place was actually a good representative of a different speech community – small or large – and had moved to her/his present community recently. Thus many "extra" speakers were interviewed: the Telsur sample of North America consists of 762 speakers. The additional speakers add greatly to the depth and richness of the data, and they provide further confirmation of the validity of the methods employed through the consistency of the findings that they yield.

4.3. Selection and recruitment of speakers

Once a place was selected, the next step was to locate representative speakers. This was accomplished by searching local telephone directories for names marked by the most prominent national ancestry groups. In most of the pilot project area, the largest group of Euro-Americans is of German ancestry. English and Irish ancestry are also reported widely, Scandinavian ancestry is frequent in the northern region, and Polish ancestry is prevalent in the industrial centers. To maximize the likelihood of reaching speakers who are native to their places of residence, names were selected that occurred in clusters. Ideally, names were chosen that were listed as "Jr." when the senior with the same name was also listed. The initial interchange with a person who answered the telephone was the identification of the interviewer by name, giving the affiliation with the University of Pennsylvania; the explanation that a study of communication among people from different parts of the country was being conducted; and the question of whether the speaker had grown up in the town where he or she was located. If the answer was affirmative, permission to conduct the interview was requested. If the speaker agreed, permission to record the interview was requested. The complete script of this introduction, as well as the entire interview schedule, is given in Appendix 4.2. The make-up of the interview schedule will be discussed below.

Bias in Telephone Listings

By using published telephone listings to locate prospective speakers, we introduce the possibility of bias from the exclusion of those with unpublished telephone numbers. Labov (2001) reports that in the Philadelphia neighborhood study of sound change in progress conducted from 1973 to 1977 (LCV), a strong negative correlation was found between social class and the rate of unlisted telephone numbers, as follows:

Social class	% unlisted telephone numbers
Lower working class	80
Upper working class	56
Lower middle class	44
Middle middle class	31
Upper middle class	0
Upper class	0

This finding was understood by the fieldworkers to stem from the varying degree to which the different groups felt the need or wish to be available to the outside world. The effect of this bias on the study of sound change in progress was tested in the LCV study. Telephone listing for the subjects in the neighborhood study was entered as a variable in the regression analysis of the first and second formants for all the vowels under investigation, and this was compared with the results of a complementary survey of sound change in progress carried out by telephone (Hindle 1980). If telephone listing biased speakers towards either greater or less advancement of sound change, it would appear as a significant effect on the normalized vowel formant value. No such effect was found for any vowel.

While we can therefore assume with reasonable confidence that we are not likely to be misled as to the direction of sound change in the present study by relying on telephone listings to locate speakers, we must recognize that the pool of accessible speakers is reduced as we descend the social scale. This may not alter our finding as to the progress of sound change, but it is likely to affect the speaker sample's representation of the population as a whole. In this work, we have employed the Socio-economic Index (described below) developed by Duncan (1961) and updated most recently by Nakao and Treas (1992) to rank speakers on the social scale. Indeed, the distribution of the Telsur/Atlas speakers by Socio-economic Index appears to be weighted towards those who are higher on the social scale. Table 1 compares the social class distribution of the population in a selection of cities of varying sizes and locations with the social class distribution of the Telsur/Atlas sample as a whole.[5]

Table 4.1. Population by social class in selected cities

	Population	Upper middle	Middle middle	Lower middle	Upper working	Middle working	Lower working
New York City CMSA	8,716,770	16	25	13	30	11	5
San Francisco CMSA	3,239,687	17	26	12	29	11	5
Dallas CMSA	2,010,378	14	24	13	32	12	6
Miami CMSA	1,500,947	13	23	12	33	13	6
Minneapolis/St. Paul, MN	1,329,371	15	24	13	31	12	5
Cleveland, OH	1,266,993	13	22	12	33	13	7
St. Louis, MO-IL	1,154,922	14	23	13	32	13	6
Denver, CO	975,817	16	26	13	30	11	4
Kansas City, MO	777,523	14	23	13	32	12	6
Montgomery, AL	128,656	13	23	13	33	12	7
Muskegon, MI	65,424	10	18	11	36	15	10
Monroe, LA	58,100	13	23	12	33	14	6
All (N)	21,214,588						
Percent		15	24	13	31	12	5
Telsur speakers (N)	633	98	250	65	114	57	49
Percent		15	39	10	18	9	8

Table 4.1 shows that the Middle Middle Class is over-represented in the Telsur/Atlas sample as compared to the general population, and the upper working class is under-represented. The skewing found here is much less than the skewing of telephone listings by social class, however, and, most importantly, all the social classes are well represented. While it is thus evident that the speakers interviewed for the Telsur project do not precisely reflect the social class distribution of the population at large, this does not interfere with the investigation or analysis. The aim of ANAE is to determine those structural patterns that differentiate communities rather than those that differentiate speakers within the community. Various tables throughout the Atlas will take advantage of the distribution of social parameters throughout a dialect or regional area to establish their influence on the progress of a change. In these multivariate analyses, regression coefficients for education and occupation are generally much lower and less significant than those registering the effects of age, gender, and city size

Sociolinguistic studies of large cities show that centrally located social groups – lower middle and upper working class speakers – are the initiators of those sound changes internal to the system, which operate below the level of consciousness. Though these changes eventually affect the entire community, these centrally located speakers are more advanced in ongoing sound changes than are speakers at the extremities of the social scale. With two-thirds of the Telsur speakers falling into the upper working, lower middle, and middle middle classes, we can have some confidence that newly emerging sound changes will be represented in the data. As a further brake on any bias of the sample towards higher-class speakers, in the last stages of interviewing to complete the sample, special techniques were developed to locate speakers who satisfied the strictest criteria of nativity and social class. These will be detailed below.

National ancestry

The methods described in Section 4.4 are appropriate for a study of the central tendencies of speech communities, but not for a detailed examination of social differentiation within a community. Over the past two hundred years, large numbers of immigrants have entered most of the cities studied here; the great majority of them have become speakers of the current local dialect in the second and following generations. Even when a majority of the population consists of groups of foreign stock, the doctrine of First Effective Settlement applies: the new groups assume the cultural patterns of the smaller groups who preceded them (Zelinsky 1992; Mufwene 1996). In order to maximize the chances of recruiting local speakers, the Telsur method tended to focus on the majority ethnic groups in each area.

Table 4.2 gives the overall distribution of the major ethnic groups in the sample by the regions established in Chapter 11. In response to the question, *What's your own family's national ancestry?* (Appendix 4.2), 79 responded "White", "American", "European", or some other non-specific information. These are summed up as "White" in Table 4.2. The other figures show only the first identification given.

Most of the subjects named more than one nationality in response to this question (418 out of 762). Table 4.2 shows only the first response given; the overall proportions of national ancestral groups are similar for second, third, and fourth items given. The bold figures show the mode for each region. The right-hand column gives the percentages of each group in the 2000 U.S. Census for all Americans.

5 The data in Table 4.1 are based on figures given for occupation of employed persons 16 years old and over in Table 18, "Labor force and disability characteristics of persons: 1990" from the census volume series CPH-3.

In general, the proportions of national ancestral groups are ordered similarly to the census. The largest single identification is German. In the Telsur sample, the German group is by far the largest in the Midland, the North, and the West. There is a much more even distribution of ethnic groups in the South, with a heavier representation of English and Scots-Irish. The Scots-Irish are the modal group in Canada. The Mid-Atlantic region (which includes New York City, Philadelphia, Wilmington, and Baltimore) is the only region in which Italians are the predominant ancestral group.[6]

The emphasis of the Telsur method on the predominant ethnic group is seen most clearly in the high numbers of subjects of German background; the proportion is about twice as high (28%) as in the Census (15%). So far, German nationality has not been associated with the greater or lesser development of the phonology of the Midland and the North, but this bias in the population must be borne in mind. The Telsur method has not led to the elimination of smaller ethnic groups. Lithuanian, Finnish, Welsh, and Lebanese are represented in the 22 speakers in the "Other" category. Considering all responses, 14 of the Telsur subjects identify Jewish ethnicity in their background. A much larger number mention some Native American group. In terms of primary identification, the greatest number of Native Americans are found in the South.

Table 4.2. National ancestral groups identified in first response to Telsur questionnaire. Bold figures indicate largest group in a region.

	Canada	Midland	Mid-Atlantic	North	South	West	Transitional	Total	2000 Census %
English	5	11	2	19	23	9	3	72	8.7
Scots-Irish	**11**	7	2	7	21	2	0	50	1.5
Irish	3	17	5	14	16	1	2	58	10.8
German	4	**80**	7	**67**	**29**	**29**	1	**217**	**15.2**
Dutch	1	5	1	5	1	2	0	15	1.6
Scandinavian	0	4	0	20	2	10	0	36	3.5
French	4	5	1	12	5	4	0	31	3.0
Canadian French	0	0	0	4	2	1	0	7	0.8
Italian	0	7	**13**	16	12	2	1	51	5.6
Jewish	1	2	0	2	2	1	0	8	
Polish	1	6	2	11	2	2	0	24	3.2
Other Slavic	5	8	2	9	4	0	0	28	.25
Other	1	4	2	3	3	0	0	13	
"White"	1	17	0	23	27	11	1	80	
Hispanic	0	0	0	2	5	6	0	13	12.5
African-American	0	2	5	7	27	4	0	45	12.9
Native American	1	4	0	1	7	1	0	14	1.5
Total	38	179	42	222	188	85	8	762	

Race

Although thirteen subjects gave some Hispanic or Latino identification in response to the question on ethnicity, the Telsur survey did not focus on the 12.5 percent of the U.S. population that is Hispanic. The studies of Latino/a English that have been carried out in the last several decades indicate that there are some common features of the second generation dialect that differentiate it from others (Santa Ana 1992; Bayley 1994). Detailed sociolinguistic studies have found that Latino speakers are subject to several competing influences: traditional Spanish, AAVE, and the local white dialects (Wolfram 1974; Poplack 1978; Fought 2003). A thorough and accurate study of geographic differences in the English of Latinos from the Caribbean and various countries of Central and South America is beyond the scope of the current work. It is not likely that the Telsur interview would be able to trace the many variable tendencies in these English dialects, where consistent dialect patterns are still in the process of formation.

The study of geographic differentiation among African-American speakers raises a different set of questions. Studies of AAVE have shown a remarkable geographic uniformity in those grammatical and phonological features that are distinctive to this dialect (NYC: Labov et al. 1968, Labov 1972; Detroit: Wolfram 1969, Edwards 1992; Washington DC: Fasold 1972; Mississippi: Wolfram 1974, Loman 1967; North Carolina: Anshen 1969; Los Angeles: Baugh 1983; San Francisco: Mitchell-Kernan 1969). In general, African-American speakers do not participate in the regional sound changes that are the main focus of ANAE (Labov 1966; Labov and Harris 1986; Veatch 1992; Labov 2001: 506–508; Thomas 2001). Thomas finds a remarkable uniformity of vowel systems among African-Americans throughout the U.S. (p. 165), even in the South (p. 170).[7] At the same time, there are consistent differences between African-Americans and whites in the South, even in the earliest records.

Even in those Northern cities in which African-Americans form the majority (e.g. Detroit), African-Americans do not appear to have had any influence on the evolution of the white vernacular, either in the city or the surrounding suburbs. For this reason, the Telsur survey did not specifically search for African-American speakers in the North, the Midland or the West. In those areas, 22 subjects identified themselves as having African-American ethnicity, in whole or in part.

The procedure in the South was the opposite. Using the special methods for locating speakers of a given background discussed in Section 4.7 below, African-American subjects were targeted in five major cities: New Orleans, Jackson, Birmingham, Atlanta, and Durham. Chapter 22 reports on the phonological inventories and phonetic patterns of these speakers, comparing them with the white subjects in the same cities. The chapter includes a summary of the phonetic analyses of rural and small-town African-Americans by Erik Thomas.

4.4. Methods of recruitment

Understandably, many speakers are wary of an unsolicited telephone caller who begins speaking from a prepared script. Telsur interviewers were trained to initiate the interview in a slow speech style to achieve maximum clarity in explaining the purpose of the call. The overt purpose of the interview was explained in the following initial script:

> *Hi, my name is ______. I'm calling from the University Pennsylvania in Philadelphia. We're doing research on communication between people from different parts of the country, so we're looking for people who grew up in one place to help us by telling us a little about how people say things in your area. Did you grow up in ______? If yes: Can you take a few minutes now to answer some questions?*

6 There are 11 subjects in New York City: three are Italian and three are Irish, one German, one Scots-Irish, one Dutch and two African-American.

7 In the North, some recent studies show partial movements of African Americans in the direction of the white regional pattern (Thomas 1989/93 in Ohio, Deser 1990 in Detroit, Henderson 2001 in Philadelphia). Studies of African-American English in Northern cities show stylistic variation in the vocalization of /r/ and monophthongization of /ay/ (Myhill 1988). In the South, African-Americans show vowel systems that are related to general Southern patterns, though the earliest records show consistent differences between African-American and white speech. Many of the older black speakers show monophthongal [e:] and [o:] for the vowel classes of long *e* and *o*, and /aw/ is consistently further back than in white speech (Labov, Graff, and Harris 1986).

If the respondent asked to know more about the purpose of the interview, the interviewer proceeded as follows:

> *People across the country are talking to each other more and more, and at the same time we know that local accents are getting more different, in spite of the fact that we all watch the same TV programs. We want to find out how people talk in each region of the country and whether local ways of talking are changing in any way.*

Since North Americans have a general interest in the existence of dialect differences within American speech, refusal rates were low by comparison with other telephone surveys (see Table 4.3).

Permission to record. The following routine was followed closely in securing permission to record over the telephone.

> *In order to be able to keep track of everything you can tell us, I need to be able to make a tape recording of this conversation. Is that all right with you? (If informant is hesitant: I can assure you that this information is used only by our research group for our reports about general trends in American English, and no information identifying individuals is ever released.* If still hesitant: *If we come to a question you don't think you want to answer, just tell me and we'll skip it. I don't think you'll have a problem with any of the questions I'm going to ask you.)* If permission is given, turn tape recorder on and tell informant you have done so.

In the small number of cases where the person did not agree to be recorded (7 to 16%), the interviewer was instructed to thank the person for their time and terminate the interview.

Though the Telsur interview did not as a rule reach the levels of intimacy and rapport characteristic of the best sociolinguistic interviews, a large part of it was designed to replicate friendly conversation. The interviewer was trained to call upon all of his or her knowledge and experience of the place where the speaker lived. With each successive interview in a given place, the interviewer was better informed about that place and could converse more effectively with people local to the place. The interviewer was trained to be sensitive to the level of interest shown by the subject in order to maximize the flow of spontaneous speech.

Sensitivity to questioning was most likely to arise in the section on demographic data, which was positioned at the end of the interview. It includes the speaker's age and occupation and also the speaker's parents' occupations. Speakers occasionally declined to give some of this information, but the refusal rate was low. Most speakers had already talked about their own occupations by the time the interviewer reached this section, so the question was a matter of filling in details.

4.5. Records of calls required for successful interviews

The Telsur project kept detailed records of all telephone calls made, in order to trace regional differences in the difficulty of locating local speakers and rates of refusal and acceptance. The ease or difficulty of achieving a successful interview varied greatly. The first phone call of the Atlas was made to Sioux Falls, SD, at 3:30 in the afternoon on February 24, 1992. A woman answered the phone and listened politely to the investigator's request for an interview. She explained that she had a day care center in her home, so she was not free to talk during the day. The interviewer thanked her and dialed a second number in Sioux Falls. This call was answered by a man who agreed to be interviewed after asking, "It doesn't cost anything, does it?" The ensuing tape was labeled TS 1. The last interview, TS 835, was conducted by the same interviewer on November 14, 2001, in San Diego, CA. This interview, with a roommate of the college student in whose name the phone was listed, was achieved after dialing the telephone 142 times. The outcomes of these calls to San Diego were as follows:

Frequency	Result
9	No answer (6%)
54	Answering machine (38%)
7	Busy signal (5%)
12	Phone disconnected (9%)
5	Call screening, fax machine, modem (4%)
42	Respondent not local (30%)
10	Interview refused – not interested, busy, refused recording, etc. (7%)
2	Respondent asked interviewer to call back later (1%)
1	Successsful interview (< 1%)
142	Total calls

These two interviews, the first and the last of the Telsur project, represent the extremes of the task of garnering a successful interview. (There were also occasional instances of getting a good interview on the first phone call to a city or town.) In general, the most difficulty was encountered in places where there was a high proportion of non-local residents. City size was not necessarily a problem. In Chicago, for instance, the following record was made in February, 1993, without any special screening for census districts:

Frequency	Result
1	No answer (6%)
5	Answering machine (29%)
3	Interview refused – not interested, busy, refused recording, etc. (18%)
4	Respondent asked interviewer to call back later (24%)
4	Successful interview (24%)
17	Total calls

In a sampling of cities in the Midwest, another investigator made recordings between January, 1993 and April, 1994 in Wisconsin (Hayward, Steven's Point, and Oconto), Minnesota (Chisholm, St. James, and Minneapolis), Iowa (Grinnell and Denison), South Dakota (Redfield), Nebraska (Wayne and Falls City), Illinois (Lena and Fairbury), and Ohio (Cleveland and Cincinnati). These are mostly small towns, but a number of large cities are included as well. The results were as follows:

Frequency	Result
12	No answer (14%)
8	Answering machine (9%)
3	Busy signal (3%)
7	Phone disconnected (8%)
13	Respondent not local (15%)
14	Interview refused – not interested, busy, refused recording, etc. (16%)
5	Respondent asked interviewer to call back later (6%)
4	No adults at home (5%)
20	Successsful interview (23%)
86	Total calls

In another part of the Telsur region, the state of Texas, three interviewers working together made the following record between June, 1996 and January, 1997, in calls to Austin, Amarillo, Houston, and Dallas:

Frequency	Result
34	No answer (14%)
66	Answering machine (27%)
6	Busy signal (2%)
19	Phone disconnected (8%)
19	Fax machine, business, etc. (8%)
62	Respondent not local (26%)
22	Interview refused – not interested, busy, refused recording, etc. (9%)
3	Respondent asked interviewer to call back later (1%)
1	No adults at home (< 1%)
9	Successsful interview (4%)
241	Total calls

In yet another region, the following record was made by two interviewers during April and May, 1995. These calls were made in New York State (Syracuse, Albany, Rochester, and Buffalo) and Pennsylvania (State College, Harrisburg, Pittsburgh, Erie, and Scranton):

Frequency	Result
19	No answer (14%)
50	Answering machine (36%)
4	Busy signal (3%)
9	Phone disconnected (7%)
2	Fax machine, business, etc. (1%)
26	Respondent not local (19%)
8	Interview refused – not interested, busy, refused recording, etc. (6%)
3	Respondent asked interviewer to call back later (2%)
17	Successsful interview (12%)
138	Total calls

These records are summarized for purposes of comparison in the following table of percentages of outcomes of each dialing of a telephone number.

Table 4.3. Percentage of outcomes of dialing the telephone in five cities or regions

	San Diego	Chicago	Midwest	Texas	NY & PA
No answer	6	6	14	14	14
Answering machine	38	29	9	27	36
Busy signal	5	0	3	2	3
Phone disconnected	8	0	8	8	7
Not a residence	4	0	0	8	1
Respondent not local	30	0	15	26	19
Interview refused	7	18	16	9	6
Call back later	1	24	6	1	2
No adults at home	0	0	5	<1	0
Successful interview	1	24	23	4	12
Total number of calls	142	171	86	241	138

Overall, the table reflects the relative difficulty of accomplishing a successful interview in terms of the number of times it is necessary to dial the telephone. There is partial comparability among the different places defined here, but there are also differences, as was stated above. The table registers two general types of outcome, which can be considered separately: the first five lines are outcomes in which the phone is not answered by a live person, and the last five lines are outcomes in which the interviewer speaks to a potential interviewee.

Table 4.4 summarizes the frequencies of outcomes in which the interviewer reached a person, in order to assess the rate of actual refusal and success. The case of no adults being at home – when a child under the age of 18 answers the phone – is not included, since those are cases of the interviewer not reaching a potential participant.

It must be kept in mind that speakers were screened as quickly as possible for locality status, in order to weed out non-local speakers with a minimum investment of time and effort. Respondents were told, "We're looking for speakers who grew up in one place to help us by telling us a little about how people say things in each area. Did you grow up in ______?"

Non-local respondents are not candidates to be a Telsur speaker. However, they still have the opportunity to refuse to be interviewed, without divulging their locality status, by cutting off the phone call before the interviewer is able to determine that they are non-local. (Some respondents simply hung up the phone during or immediately after the interviewer's request for participation. Others had reactions such as "Heaven's sakes!" or "We can't help you. Bye", before hanging up.) The number of flat refusals of the total number of adults reached by phone, including non-locals, is given first, as the minimum refusal rate. In another sense, the refusal rate is the number of refusals out of those who either refused after the request for participation was made or who terminated the interaction before responding to the interviewer at all; this calculation is given on the second line of refusal rates. The "true" refusal rate must be somewhere in between.

The success rate may also be judged by several criteria. The most realistic measure from the standpoint of the interviewer is the rate of successfully completed interviews in relation to the number of live people contacted; this is the proportion given as success rates in the last line of the table.

Table 4.4. Percentages of refusal and success in obtaining interviews

	San Diego	Chicago	Midwest	Texas	NY & PA
Respondent not local	42		13	62	26
Interview refused	10	3	14	22	8
Call back later	2	4	5	3	3
Successful interview	1	4	20	9	17
Refusal rate, incl. Non-locals	18	27	27	23	15
Refusal rate, excl. Non-locals	77	27	36	65	29
Success rate, incl. Non-locals	2	36	38	9	31

These variations in refusal and success rates are related to differences in regional histories and population mobility. The greatest differences between regions are in the proportions of non-locals, reflecting the well-known migration patterns in the U.S. towards the Sun Belt. Chapters 11 and 20 will show that the defining features of the West as a dialect area are more complex and less consistent than for other areas, and the high proportion of non-locals in San Diego is correlated with this situation. Large-scale inmigration to the largest Texas cities is reflected as well in the variable realization of Southern features in that state (Chapter 18).

Finally, we must confront the fundamental question of any sampling procedure: to what extent does the sample represent the population of local speakers? Are the local speakers who refused the interview different linguistically from those who agreed to be interviewed? The early study of New York City included a method of sampling those who refused face-to-face interviews by means of a telephone interview, and found no such bias (Labov 1966, Appendix D), but there is no practical way of re-sampling those who refused the telephone interview. It is possible that persons with greater linguistic insecurity are more likely to refuse the Telsur interview, or that leaders of linguistic change are more likely to accept it. We have no way to estimate such biases. The major way of assessing the representativeness of the sample is through the regularity of the results, in the form of homogeneity and consistency of isoglosses (Chapter 6).

4.6. Contacting speakers: pinpointing the ideal speaker

As we approached the end of the interviewing, we found that we needed a few more speakers in places where experience had demonstrated that it was difficult to locate speakers of the traditional vernacular. One example is New York City, where the status of preconsonantal /r/ is a crucial issue. /r/-vocalization is waning fast among upper middle class speakers, and we needed to determine its status in the working and lower middle class, where vocalization historically has been very high. Yet finding a white, native, working or lower middle class New Yorker in a city of seven million people by choosing names from a telephone directory is difficult. In a borough where such speakers are most likely to be found, such as Queens, 28 percent of the residents are not native-born Americans, 22 percent are African-American, and 20 percent are Hispanic. In several sociolinguistic studies, it has been found that African-American and Hispanic speakers do not participate in the major sound changes in progress that are the focus of ANAE. The problem of ethnicity can largely be circumvented by selecting names from the telephone directory that are marked for national ancestry as Irish, Italian, German, Slavic, Jewish, or other European nationalities that are well represented in the area of interest. We exclude English names, as those are prevalent among African-Americans, and Spanish names. But the problem of locating a native-born speaker from centrally located social classes remains a difficult one.

The same problem arises in Sunbelt cities such as Atlanta, GA and Dallas, TX. These places are populated largely by native-born Americans, but the rate of inmigration from the North and from the surrounding regions raises a serious obstacle to locating natives of the respective cities. Furthermore, under the pressure of so much outside influence, it becomes even more important to interview speakers who participate in relatively closed social networks and thus are less subject to the leveling influence of imported dialects; these speakers, again, are those from the interior social classes.

It may seem paradoxical that it is difficult to locate speakers with the desired characteristics when the goal is to represent the speech patterns of the community as a whole. But it is not uncommon to find that the main stream of vernacular tradition is obscured by the presence of large numbers of recent arrivals in the adult population. Studies of the formation of new communities (Payne 1980; Kerswill and Williams 1994) have shown that the children of these recent migrants adopt the local vernacular with great regularity, confirming the Doctrine of First Effective Settlement (Zelinsky 1992). The future course of any speech community cannot be traced from the diverse patterns of adults whose children reject their non-local dialect. Thus the original study of New York City was based on 81 of the 700 subjects interviewed in the primary social survey (Labov 1966).

Two strategies for reaching speakers who satisfy these criteria present themselves. One is to make many phone calls and to be very particular about which respondents are interviewed. However, the years of interviewing had demonstrated that it is frustrating to the interviewer to have to make an enormous number of phone calls in order to obtain a satisfactory interview. It is also wasteful, in that each telephone call incurs an expense. Most importantly, we do not systematically elicit the information necessary for classification by social class, occupation and education, until the end of the interview. Asking a respondent for this personal information as part of a screening process would likely produce an intolerably high refusal rate.

An alternative method is to identify neighborhoods in the city where the desired speakers live and to restrict calls to those neighborhoods. The 1990 census reports contain a wealth of detailed information on social characteristics of the population, which is listed by census tract in the series *1990 CPH-3: Population and Housing Characteristics for Census Tracts and Block Numbering Areas*. A census tract is a rather small area, usually having a population of 2,500 to 8,000 and averaging about 4,000. If the interviewer can identify census tracts in which a high proportion of the residents satisfy the necessary criteria, it is likely that a much higher success rate can be attained in reaching the desired speakers. In the CPH-3 set of census reports, the most useful tables for this purpose are Tables 8, 16, and 20, dealing with race, ancestry, and social and labor-force characteristics.

The order in which the tables are consulted depends on the nature of the area under consideration. To locate speakers in New York, the county of Queens was selected. A list was made of all the census tract numbers which satisfied the criterion of 10 percent or less foreign born white persons (Table 20). From that list, those who did not satisfy the criterion that two-thirds of the population should be white (Table 8) were eliminated. Table 20 contains data on only about 225 of the approximately 670 census tracts that are listed in Table 8, so many tracts that would otherwise be candidates for consideration were not reviewed. Returning to Table 20, the census tracts still on the list were examined for the percentage of the population holding a bachelor's degree or higher; those in which the rate was greater than about 20 percent were eliminated. Finally, Table 16 was consulted for the predominant national ancestries of the targeted census tracts. There were eight census tracts that satisfied the criteria well, and ten more that were somewhat marginal.

Obtaining telephone listings for the targeted areas requires further steps. The atlas of the census tracts is consulted to locate the boundaries of the tracts. A further resource is the Census Tract Street Locator on the website of the Census Bureau,[8] which locates streets by census tract and gives the corresponding zip code, as well as other information. From commercially available databases of telephone listings, phone numbers are easily searched by zip code.

Using this extensive preparation, telephone listings of a number of Jewish and Irish names were printed for parts of Queens, NY. In three sessions, the phone was dialed 19 times. In eleven cases, no one answered the phone. Of the eight people contacted, four refused to be interviewed and two were not native New Yorkers. Two highly successful interviews were completed with women having precisely the desired social histories. In addition, an arrangement was made to interview the daughter of one of the women a few days later. This and subsequent applications of the method proved to offer a very high rate of return for the time invested.

4.7. Age and gender distribution of the sample

The sampling methods discussed above produced a range of subjects from age 12 to 89. It is not important for the goals of ANAE that all ages be equally represented; as noted above, emphasis was put on the early adult years. It is important that the age range be roughly equivalent for all geographic regions. If not, a

8 The web address for this utility is http://tier2.census.gov/ctsl/ctsl.htm. This and other Census Bureau databases are listed at http://tier2.census.gov/dbappweb.htm.

constant difference in age-grading in the population might appear as a regional difference. Table 4.5 shows the age distribution of the Telsur sample in decades for seven regions.[9] A graphic comparison of the five major regions appears in Figure 4.1. All regions show a heavy concentration in the young adult period, 20 to 40 years. The major differences that appear are differences between the South – with more older subjects. and a modal range of 40 to 49 – and the West, with a modal range of 20 to 29. The three other regions are intermediate, with modes in the 30 to 39 range.

Table 4.6 and Figure 4.2 show the distribution of the sample by gender. The excess of women over men is apparent, and is also the parallel distribution across decades of age. The ratio of women to men is 1.7:1. The chief departure from this is in the concentration of women in the 20 to 29 age range as against the relatively high proportion of men in the decade from 40 to 49. For the decade from 20 to 29, the ratio of women to men is 1.9:1; for age 40 to 49, it is 1.2:1.

Table 4.5. Age distributions of Telsur speakers

Age	Canada	ENE	Midland	Mid-Atl	North	South	West	Total
10–	4	1	13	6	12	26	13	75
20–	10	1	30	4	26	24	24	119
30–	14	0	52	5	57	34	20	182
40–	6	2	36	8	46	47	11	157
50–	3	1	19	6	33	14	11	87
60–	1	1	20	7	17	21	8	75
70	1	2	14	4	20	15	4	60
Total	39	8	184	40	211	181	91	762
Mean	35	48	41	45	44	41	47	42

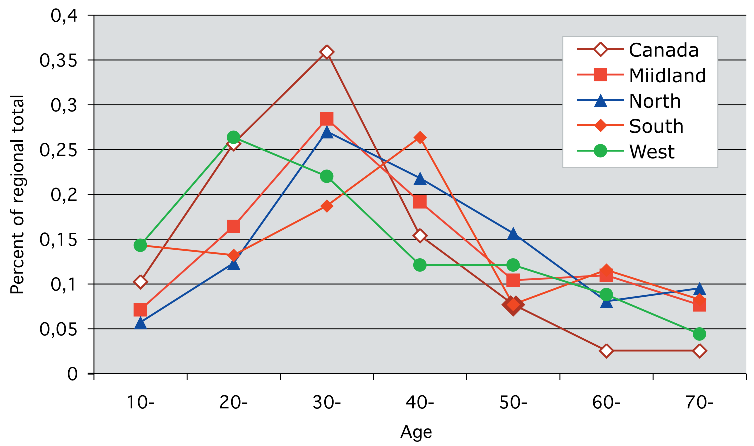


Figure 4.1. Age distribution of Telsur speakers in the five largest regions

Table 4.6. Distribution of Telsur speakers by gender and age

	Age by decade								Total
	10–	20–	30–	40–	50–	60–	70–	80–	
Female	54	80	119	87	55	48	28	9	480
Male	21	41	65	70	34	28	19	4	282
Total	75	121	184	157	89	76	47	13	762

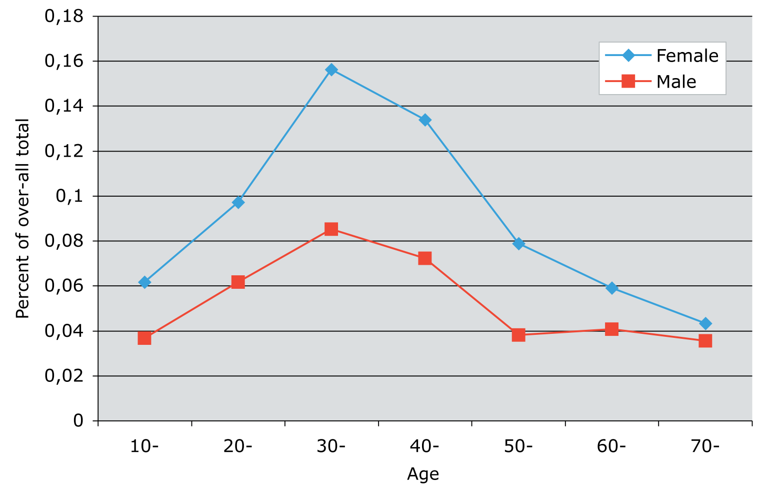


Figure 4.2. Distribution of Telsur speakers by gender and age

4.8. The Telsur interview

The original interview questionnaire was designed for the six-state pilot project area, which encompassed parts of three dialect areas and thus was written to include most of the variables that are of interest in North American English. The same form was used in the next phase of data collection in the fifteen-state area comprising the agricultural and industrial heartlands of the United States, corresponding to most people's idea of the Midwest. With the expansion of the survey to all of English-speaking North America, variants of the original inter-

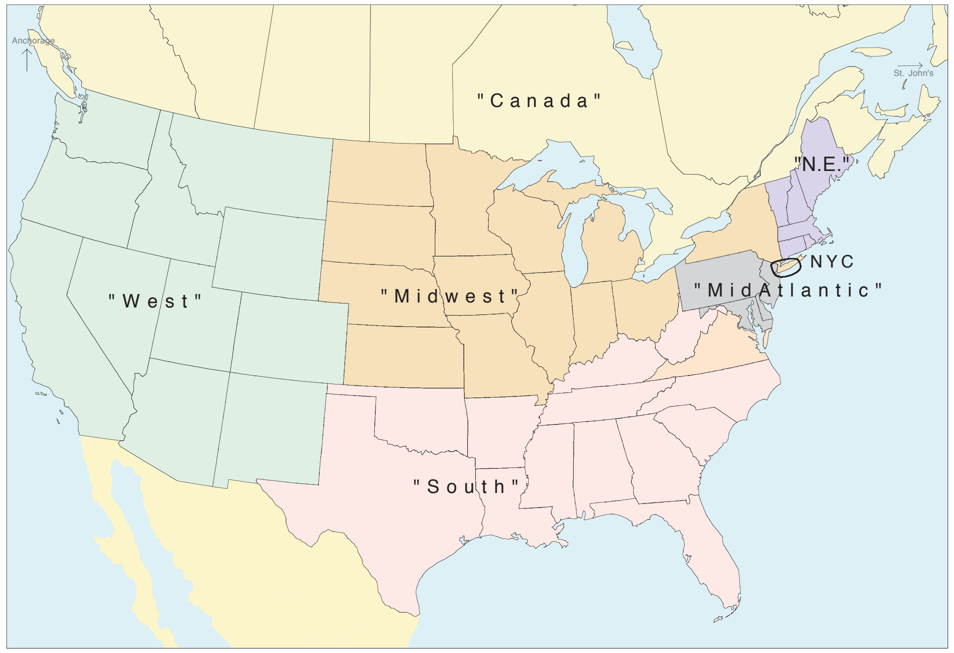


Figure 4.3. Regional variants of the Telsur interview form

9 See Chapter 11 for the distinction between dialects and regions. The region is the larger unit under which dialects are grouped.

view schedule were introduced, resulting in six forms of the questionnaire. They all share most of the same variables, but there are a number of modules which are included only in certain forms to tailor them to the different regions of North America: South, West, Mid-Atlantic, New England, Midland, and Canada. Since the dialect boundaries of Chapter 11 had not yet been established, state boundaries were used in selecting the variant forms of the interview schedule.

Following the introduction described in Section 4.5 above, which establishes that the respondent is a native of the community where she or he lives and that recording is permissible, the interview is divided into six sections.

1. *Demographic information*. Information on the native and local status of the respondent: place of birth, complete residence history, father's and mother's places of birth, and languages spoken.
2. *Spontaneous speech*. The largest portion of spontaneous speech is obtained from a discussion of recent developments in the city, the state of the downtown area, and travel outside the city. If a topic of special interest to the speaker is raised, it is pursued to the fullest extent possible. Speakers often talk about their jobs, hobbies, or other interests in this portion of the interview.
3. *Word lists*. Sequences of words that do not require reading: counting, days of the week, articles of clothing, breakfast foods, and others.
4. *Linguistic variables*. This section includes, first, *minimal pairs* in the form of judgments on rhyming (*hot*/*caught*) or 'same' versus 'different' (*dawn*/*Don*). In each case, the respondent is prompted to say words described but not pronounced by the interviewer (e.g. *What is the opposite of cold?* as the prompt for *hot*), then asked to give a judgment on contrast or identity of the pairs of sounds. The respondent is then asked to say the two words again. This procedure was designed to elicit two instances of production as well as a judgment of each contrast under study.

   Spontaneous pronunciations of crucial lexical items are obtained through the use of the *semantic differential* technique (Labov 1984), which uses questions about differences in meaning between two words, such as *cot* vs. *bunk* and *pond* vs. *pool*. Subjects put considerable effort into answering these questions, producing several highly stressed tokens of each word without attending to their pronunciation. Previous research shows that the use of the variables in the semantic differential approaches the values of spontaneous speech quite closely (Labov 1989).

   A series of grammatical variables was included. They were introduced with the following protocol: *I'd like to ask you to tell me what you think of a few sentences I'm going to read you. These are sentences that sound fine to people in some parts of the country but a little strange to people in other parts of the country. For each sentence I read you, I'd like you to tell me whether you think it sounds like something you could say yourself, or something you've heard around your area but you wouldn't say, or something you've never heard before*.

   Responses to grammatical features were coded on a three-point scale: 1 "could say yourself", 2 "heard but wouldn't say", and 3 "never heard".

   A small number of *regional vocabulary* items were included in the Telsur interview form. These are of the simple form, "What do you call ______?" where the interviewer gives a definition of the variable in question. For example, *couch*/*sofa* was elicited with the question, "what do you call a large piece of furniture that seats three people?".
5. *Demographic background*. More detailed information on the demographic background of the subject is gathered, including occupation, education and national ancestry.
6. *Continuation*. The final section was the request for the respondent to continue participation in the research by reading a word list, which is to be mailed to the speaker. This required that the speaker provide his or her name and address. A small number of speakers declined to give this information or refused to participate in this second part of the interview, and some asked for additional reassurance that they would not be subject to solicitations from salespeople or other unwanted callers. Most speakers readily agreed to the follow-up interview and greeted the interviewer as a familiar acquaintance when he or she called again.

   The interview form also contains suggested answers to questions that subjects often ask: "So what's this study all about again?"; "Why is this important?"; "Who is paying you to do this?"; "What are you going to do with the results?"; "Can I see some of your results?". See Appendix 4.2 for these suggested answers.

The duration of the Telsur interview averages about 30 to 45 minutes. The total volume of speech obtained proved to be more than we expected from the previous results of Hindle (1980). In the acoustic analysis of vowel systems, the mean number of vowel tokens was 306. Only 10 percent had fewer than 200 tokens.

4.9. The second interview

The second interview is designed to obtain more specific information on lexical distribution through the reading of a word list and more detailed information on contacts outside the community. Respondents are asked to read a full-page list of words, which is sent to them in the mail after the first interview. The word list is designed to cover the areas of variable contrast and variable lexical distribution in the speaker's region. A sample word list is given in Appendix 4.3. The second interview also goes more deeply into the patterns of travel, friendship, kinship, and communication that relate the respondent to other cities of interest.

4.10. Impressionistic coding

The first stage of analysis is the transcription of all demographic data, recording of lexical choices and judgments of syntactic constructions, and the coding of the speaker's pronunciation of diagnostic words in the formal part of the interview. Like the interview questionnaire, the impressionistic coding form is tailored to the speaker's region. For the phonological variables, the analyst records the speaker's judgments of 'same' and 'different', and then enters a fine-grained phonetic transcription of the speaker's pronunciation. Finally, the analyst codes the result in a four-cell table:

		Judged	
		Same	Different
Pronounced	Same	a	b
	Different	c	d

Cell (a) represents full merger, and cell (d) registers a clear distinction. Cell (b) is usually the result of the mistaking of orthographic differences for pronunciation differences. Cell (c) is the case of near-mergers, where speakers consistently make a difference between two sounds but do not judge them as different and do not use the difference for semantic interpretation (LYS; Milroy and Harris 1980; Harris 1985; Di Paolo and Faber 1990, 1995).

4.11. The socio-economic index

Occupation is widely viewed as the best single determiner of social class. Unlike other factors such as income and house value, it is an acceptable subject of inquiry and conversation between strangers. Ratings of occupational prestige, beginning with those published for 90 occupational titles by the National Opinion Research Council (NORC) in 1947, have been widely used for the ranking of occupations in terms of social standing.

In 1950 the Census Bureau began collecting data on income and education for incumbents of certain occupations, of which 270 were listed in 1950. Duncan (1961) addressed the need for a ranking of the social status of occupations by calculating a Socio-economic Index (SEI) – intended to mimic but not replicate the NORC occupational prestige score – for all 270 occupations listed by the Census. He accomplished this by performing a multiple regression of NORC prestige ratings on the income and educational levels for those occupations that were common to both the NORC and the Census listings and then extrapolating to occupational titles listed by the Census but not included in the NORC study.

Duncan's work has been updated, most recently in 1989. The NORC has reported prestige ratings (Nakao and Treas 1989) for the 503 occupational titles on which the Census Bureau gathered data in 1980, and they also report SEI assignments for those occupations (Nakao and Treas 1992), using the methods developed by Duncan, with adjustments made for current levels of educational attainment and income. In the assessment of speakers for the Atlas, it was observed that the SEI has the advantage of taking into account not only the prestige assigned to occupational titles by a sample of raters but also the objective and additional important factors of income and education associated with the respective occupations. Therefore, the calculated SEI scores are used to rank the Atlas speakers, rather than the raw Occupational Prestige scores.

Problems in carrying out the task of assigning an SEI to each speaker stem mainly from two sources: inadequate data elicited from the speaker and difficulty in matching the speaker's occupation to one of the 503 occupations in the NORC/Census list. Some speakers, queried about their occupations, give answers such as "I work for Raytheon" or "I work in an office". The interviewer did not always pursue the subject in order to determine an appropriate occupational title for the speaker. Women who report themselves as homemakers are appropriately assigned the SEI corresponding to their husbands' jobs, but often that information was not obtained. High school and junior high school students are assigned the SEI corresponding to the family's breadwinner's occupation, so the interviewer had to be careful to elicit this information. College undergraduates and graduate students are a more difficult problem: they cannot properly be assigned the SEI associated with their family's breadwinner, but it is incorrect to assign them to an occupation which they have not yet entered, associated with their field of study. When clear information on occupation is obtained, it is still often difficult to decide how the information given by the speaker best matches the occupational titles listed by the NORC survey. For all speakers where an SEI assignment is made, the Census category number is also recorded, so that the assignment can be reviewed and revised if necessary.

Appendix 4.1. Zones of influence, Central Cities, and UA populations

	Zone	Zone pop.	UA pop. 1990	Per cent in UA	Zone abbrev.	Zone area (sq miles)
Alabama	Birmingham	2,395,674	621,703	25	Br	24,978
	Mobile	772,068	301,197	39	Mb	11,820
	Montgomery	735,752	210,060	28	Mt	12,996
Alaska	Anchorage	550,043	221,745	40	An	152,040
Arizona	Phoenix	2,754,669	2,006,568	72	Ph	91,983
	Tuscon	910,559	579,155	63	Tu	22,016
Arkansas	Little Rock	2,031,485	305,498	15	LR	47,361
California	Bakersfield	543,477	302,823	55	Bk	8,149
	Fresno	1,183,272	453,186	38	Fr	15,859
	Los Angeles	12,557,743	11,402,955	90	LA	26,142
	Modesto	597,381	231,045	38	Mo	5,767
	Riverside-SanBrndino	2,588,793	1,169,839	45	RSB	27,408
	Sacramento	2,043,240	1,097,313	53	Sa	27,520
	San Diego	2,607,319	2,348,106	90	SD	8,760
	San Francisco	5,871,470	3,629,864	61	SF	34,545
	San Jose	1,764,008	1,434,803	81	SJ	3,143
Colorado	Colorado Springs	441,755	353,026	79	CS	4,227
	Denver	3,199,682	1,517,803	47	Dn	173,268
Connecticut	Bridgeport	827,645	414,254	50	Br	665
	Hartford	1,655,252	546,074	32	Hr	3,722
	New Haven	804,219	451,486	56	NH	629
Delaware	Wilmington	737,515	450,080	61	Wl	2,424
District of Colum.	WashingtonDC	4,976,573	3,363,047	67	DC	15,522
Florida	Ft. Lauderdale	1,255,488	1,238,109	98	FL	1,220
	Jacksonville	1,420,761	738,593	51	Jc	14,673
	Miami	2,613,305	1,914,689	73	Mm	7,321
	Orlando	2,113,451	887,968	42	Or	7,630
	Pensacola	531,720	253,717	47	Pn	4,529
	Tallahassee	608,901	156,072	25	Tl	11,145
	Tampa	3,622,316	1,708,966	47	Tm	14,652
	West Palm Beach	1,177,580	795,033	67	WPB	5,955
Georgia	Atlanta	4,773,058	2,157,344	45	At	31,669
	Augusta	526,695	286,205	54	Ag	7,119
	ColumbusGA	462,445	220,651	47	CGA	6,632
	Savannah	620,623	198,609	32	Sv	9,287
Hawaii	Honolulu	1,108,229	632,498	57	Hn	6,443
Idaho	Boise	809,096	168,056	20	Bs	67,564
Illinois-Iowa	Quad Cities	556,615	264,181	47	QC	5,397
Illinois	Chicago	9,262,154	6,793,132	73	Ch	21,396
	Peoria	603,433	242,547	40	Pe	7,923
	Rockford	450,746	207,693	46	Ro	3943
Indiana	Evansville	631,670	182,908	28	Ev	9,285
	Fort Wayne	763,258	248,686	32	FW	6,190
	Indianapolis	2,893,819	914,426	31	In	19,217
	South Bend	817,583	237,481	29	SB	4,196
Iowa	Des Moines	2,364,603	293,446	12	DM	51,275
Kansas	Wichita	1,242,284	338,562	27	Wi	60,722
Kentucky	Lexington	1,277,067	221,116	17	Lx	16,186

	Zone	Zone pop.	UA pop. 1990	Per cent in UA	Zone abbrev.	Zone area (sq miles)
	Louisville	2,085,014	755,013	36	Ls	21,678
Louisiana	Baton Rouge	1,250,108	365,647	29	BR	12,136
	New Orleans	1,843,595	1,040,300	56	NO	11,328
	Shreveport	1,001,158	256,727	25	Sh	19,883
Maine	Bangor	453,541	61,374	13	Bn	24,965
	PortlandME	774,387	120,271	15	PME	8,299
Maryland	Baltimore	2,620,641	1,890,518	72	Ba	5,720
Massachusetts	Boston	4,879,886	2,774,717	56	Bo	5,943
	Springfield	812,322	532,341	65	Sp	2,853
	Worcester	709,705	315,698	44	Wr	1,581
Michigan	Ann Arbor	282,937	221,766	78	AA	725
	Detroit	6,552,441	3,697,424	56	Dt	42,232
	Flint	574,997	326,452	56	Fl	1,850
	Grand Rapids	1,024,815	436,033	42	GR	6,177
	Lansing	432,674	265,151	61	Ln	1,713
Minnesota	Duluth	389,042	122,945	31	Du	22,643
	Minneapolis	4,407,548	2,079,255	47	Mn	74,436
Mississippi	Jackson	1,524,375	289,199	18	Jk	29,231
Missouri	Kansas City	2,794,595	1,275,083	45	KC	39,830
	SpringfieldMO	590,008	159,594	27	SMO	14,637
	St. Louis	4,161,434	1,946,047	46	SL	44,618
Montana	Billings	374,142	88,206	23	Bl	87,675
	Great Falls	278,941	63,531	22	GF	56,766
	Missoula	212,007	57,006	26	Ms	24,580
Nebraska	Lincoln	309,515	192,578	62	Ln	5,976
	Omaha	1,464,098	544,273	37	Om	77,519
Nevada	Las Vegas	764,359	697,078	91	LV	40,499
	Reno	440,792	213,835	48	Rn	71,091
New Hampshire	Manchester	723,764	115,105	15	Mn	7,172
New Jersey	Trenton	325,824	298,939	91	Tr	228
New Mexico	Albuquerque	1,159,298	496,833	42	Aq	87,355
New York	Albany	1,220,151	509,196	41	Al	11,308
	Binghamton	525,354	159,059	30	Bn	6,610
	Buffalo	1,638,215	953,867	58	Bf	8,593
	New York	17,647,736	16,044,493	90	NY	11,103
	Rochester	1,238,165	620,214	50	Rc	5,486
	Syracuse	1,617,775	388,411	24	Sy	15,,638
North Carolina	Asheville	524,471	110,658	21	As	6,434
	Charlotte	2,044,904	455,386	22	Ct	11,312
	Durham	400,368	205,439	51	Dr	2,355
	Fayetteville	620,915	241,291	38	Fy	5,814
	Greensboro-/Wnstn-Salem	1,442,014	379,022	26	Gr	8,400
	Raleigh	1,846,799	305,820	16	Rl	15,555
North Dakota	Bismarck	172,140	66,607	38	Bk	26,662
	Fargo	420,712	121,351	28	Fr	28,910
	Minot	139,742	34,544	24	Mi	19,251
Ohio	Akron	791,885	527,780	66	Ak	1,908
	Canton	494,281	244,637	49	Cn	1,964
	Cincinnati	1,980,761	1,212,260	61	Ci	6,854
	Cleveland	2,104,587	1,677,554	79	Cl	3,156
	Columbus	2,410,609	944,744	39	COH	15,137

	Zone	Zone pop.	UA pop. 1990	Per cent in UA	Zone abbrev.	Zone area (sq miles)
	Dayton	1,173,945	613,314	52	Dy	4,009
	Lorain-Elyria	404,145	224,007	55	LE	1,271
	Toledo	1,097,126	489,469	44	Tl	5,463
	Youngstown-Warren	697,141	361,366	51	YW	1,960
Oklahoma	Oklahoma City	2,045,951	784,367	38	OC	54,309
	Tulsa	1,232,648	475,044	38	Tu	15,328
Oregon	Portland-Vancouver	3,183,569	1,171,834	36	PV	93,817
Pennsylvania	A'town-Bthlm-Easton	1,271,505	410,244	32	ABE	3,743
	Erie	466,172	177,661	38	Er	3,427
	Harrisburg	1,394,937	293,442	21	Hr	6,736
	Philadelphia	5,802,466	4,222,377	72	Ph	6,322
	Pittsburgh	3,911,581	1,680,112	42	Pt	19,466
	SCollege-Williamsprt	320,804	118,946	37	SCW	4,397
	Scranton/Wilkes-Barre	684,514	388,610	56	SWB	3,476
Rhode Island	Providence	1,003,464	845,725	84	Pr	1,207
South Carolina	Charleston	624,369	393,302	62	CSC	5,733
	Columbia	1,266,203	328,148	25	Cl	12,743
	Greenville	1,015,409	248,525	24	Gv	5,771
South Dakota	Aberdeen	88,260	24,927	28	Ab	16,987
	Rapid City	227,134	61,077	26	RC	42,434
	Sioux Falls	430,693	100,851	23	SF	27,441
Tennessee	Chattanooga	747,891	296,882	39	Cg	7,171
	Knoxville	1,441,478	303,713	21	Kn	11,,822
	Memphis	2,190,209	825,425	37	Me	28,362
	Nashville	1,701,163	573,154	33	Nv	17,659
Texas	Amarillo-Lubbock	858,350	345,913	40	AL	52,346
	Austin	1,190,558	563,025	47	Au	11,921
	Corpus Christi	470,406	269,878	57	CC	10,617
	Dallas-Ft. Worth	6,363,453	3,198,199	50	DFW	107,873
	El Paso	897,938	571,079	63	EP	39,242
	Houston	5,358,382	2,902,449	54	Ho	42,248
	San Antonio	2,575,411	1,128,966	43	SA	44,801
Utah	Ogden	200,343	259,148	129	Og	6,970
	Provo-Orem	269,407	220,560	81	PO	5,538
	Salt Lake City	1,265,185	789,720	62	SL	69,100
Vermont	Burlington	369,128	86,873	23	Bl	6,221
	Rutland	157,785	18,230	11	Ru	2,717
Virginia	Norfolk	1,701,413	1,323,039	77	Nr	9,155
	Richmond	1,439,553	590,352	41	Rc	14,713
	Roanoke	934,433	178,384	19	Rn	11,268
Washington	Seattle	3,727,330	1,743,796	46	Se	35,857
	Spokane	1,006,349	278,939	27	Sk	50,644
West Virginia	CharlestonWV	1,063,487	393,302	36	CWV	16,337
	Huntington-Ashland	431,583	169,323	39	HA	4,405
Wisconsin	Madison	823,218	244,335	29	Md	10,747
	Milwaukee	3,627,343	1,226,060	33	Ml	33,105
Totals	Count	145				
	Sum	248,709,873				
	Average	1,715,241				

Appendix 4.2. Sample interview form

A TELEPHONE SURVEY OF SOUND CHANGE
IN PROGRESS IN NORTH AMERICAN ENGLISH
Linguistics Laboratory, University of Pennsylvania

– MID-ATLANTIC VERSION –

0. Approach

Hi, my name is ____. I'm calling from the University Pennsylvania in Philadelphia. We're doing research on communication between people from different parts of the country, so we're looking for people who grew up in one place to help us by telling us a little about how people say things in your area. Did you grow up in ____? *If yes*: Can you take a few minutes now to answer some questions?

(*If speaker is hesitant* People across the country are talking to each other more and more, and at the same time we know that local accents are getting more different, in spite of the fact that we all watch the same TV programs. We want to find out how people talk in each region of the country and whether local ways of talking are changing in any way.)

In order to be able to keep track of everything you can tell us, I need to be able to make a tape recording of this conversation. Is that all right with you? (*If informant is hesitant*: I can assure you that this information is used only by our research group for our reports about general trends in American English, and no information identifying individuals is ever released. *If still hesitant*: If we come to a question you don't think you want to answer, just tell me and we'll skip it. I don't think you'll have a problem with any of the questions I'm going to ask you.)

Turn tape recorder on and tell informant you have done so.

1. Residential and language background

Confirm place of birth: Now, were you actually born in ____?
Full residence history and approximate ages in each location.
Where mother born.
Where father born.
Languages spoken in family while growing up.
Second language learning.

2. Conversation
2.1. Communication experience and travel

– Have you noticed that people in different parts of the country talk differently from yourself? What sort of differences have you noticed?
– Have you ever had a problem understanding people in other parts of the country because of their accent or because of different words they used?
– Where have you travelled?

2.2. Local color

– What's your town like? Would you say it's a nice place to live?
– What do most people do for a living in your area?
– Are there any big local industries?
– Is the economy doing OK?
– Have there been lay-offs in your area?
– Are people moving in or moving out?
– Are there lots of new houses going up?
– What do you do for fun on the weekends?
– What sports teams do you support?
– What newspapers do you read?
– What other cities do you go to for recreation or shopping?
(*Pick 2 or 3 largest cities in vicinity and explore the choice between them for different activities.*)

2.3. Downtown

– Does your city have a good downtown section?
– Are businesses moving in or out of downtown?
– Are there still some big department stores downtown?
– Are there any new buildings downtown?
– Do people hang out downtown after 5:00 on a weekday?
– Are there things to do downtown?
– Is it safe to walk around downtown at night?
– Can you find parking downtown? Is it expensive?
– Is the city doing anything to make people want to go downtown?
– Do you shop downtown or at the malls? Why?

3. Word lists

Now I'm going to ask you to say a few things for me that will help us with our study.

(a) First of all I'd like you to count for me from 1 to 10.
(b) And would you please say the days of the week?
(c) And now could you please list as many articles of clothing as you can think of.
If necessary, elicit:
– PANTS: what's another word for slacks?
– COAT: what's another word for jacket? (longer, dressier)
– HAT/CAP: what would you wear on your head?
– BOOTS: what does a construction worker or a cowboy wear on his feet?
(d) And now could please tell me what sort of things people around your area eat for breakfast, especially if they go out for a big breakfast on the weekend?
If necessary, elicit:
– EGGS: What are omelettes made of?
– BACON/SAUSAGE/HAM: What meats do people eat with eggs?
– TOAST: What do you put butter or jam on?
– COFFEE/TEA: What do people drink with breakfast?
Are there any special local foods or dishes that your area is known for?
(e) And finally could you list as many farm animals as you can think of?
If necessary, elicit:
– DUCK(S): what (other) kinds of bird might you find on a farm?

4. Formal elicitation of linguistic variables

Now I need you to say certain words, but I don't want to say them first because that might influence the way you say them. So I'll ask you questions that get you to say the words and then we'll talk about whether certain words sound the same or different to you. OK? (It's not a test or anything; it's just a way of getting you to say certain words. I'll give you as many clues as you need.)

4.1. (o – oh)

(a) If a mother deer is called a doe, what would you call a baby deer? [FAWN]
(b) What's another word for sunrise, or for the first part of the day when the sun's just coming up? [DAWN]
(c) Do those words rhyme? (Could you use them to rhyme in a poem?)
(d) Can you think of any boy's names that rhyme with those words? [DON, RON, JOHN?]

If necessary, elicit:
– DON: What's the first name of Walt Disney's famous duck?
What's short for that?
(e) Does that name sound the same as the word for *sunrise* you just said? (If someone said those two words to you over the phone, could you tell them apart?)
(f) Can you say them again for me? (*If necessary*: which one was first?)
(g) What's another boy's name that starts with D and ends with N? [DAN]

(a) What's the past tense of *catch*? (Like if today I catch the ball, yesterday I ...?) [CAUGHT]
(b) What's the opposite of *cold*? [HOT]
(c) Do those words rhyme?
(d) Can you say them for me one more time?

(a) What's the opposite of *shorter* (if you're talking about the height of people)? [TALLER]
(b) How much money do four quarters make? [DOLLAR]
(c) Do those words rhyme?
(d) Can you say them for me one more time?

(a) What's the opposite of *off*? [ON]
(b) What's the opposite of *up*? [DOWN]

4.2. Semantic differentials (1)

Now I have a few questions about the meanings of different words. Tell me, in your opinion,
(b) What's the difference between a HOME and a HOUSE?
(d) What's the difference between a DECK and a PORCH?
(e) What's the difference between to SIT and to SET?

4.3. Lexicon

(a) What's the general term you use for a carbonated beverage in your area? [POP, SODA, COKE, etc.] (*If unsure*: if you were going to buy a can of Coke or Pepsi or Sprite out of a machine, what would you call the machine?)
(b) What do you call it when you prepare meat outside over a charcoal fire in the summertime? [GRILL(ING) (OUT), BARBECUE, COOKOUT]
(c) Do grilling and barbecuing mean the same thing? *If no*: what's the difference? [SAUCE]
(d) *If not already answered:* What kinds of things would you barbecue? Grill?
(e) What do you call a large piece of furniture that seats three people? [COUCH, SOFA, etc.]
(f) What do you call the top part of a house, that keeps the rain out? [ROOF]

4.4. (i – e/_N)

(a) What would you use to sign a check with? [PEN]
(b) What would you use to fasten a cloth diaper? (A safety ...) [PIN]
(c) Do those words sound the same to you?
(d) Say them again for me and tell me which one's which.

(*If* pin *and* pen *are close or the same*:
(a) If you gave a book to Mary you'd say I gave it to *her*; if you gave it to John you'd say I gave it to ... [HIM]
(b) What do you call the bottom part of a dress where it's folded up and sewn in place? [HEM].
(c) Do those words sound the same to you?
(d) Say them again for me and tell me which one's which.)

4.5. (tense ~ lax contrasts before /l/)

(a) What's the opposite of *empty*? [FULL]
(b) What's another word for an idiot or a stupid person? (Begins with F as in Frank). [FOOL]
(c) Do those words sound the same to you?
(d) Say them again for me and tell me which one's which.

(*If* full *and* fool *are close or the same*:
(a) What's a place where you go swimming in the backyard? [POOL]
(b) What's the opposite of *push*? [PULL]
(c) Do those words sound the same to you?
(d) Say them again for me and tell me which one's which.)

(a) What's a word for a little mountain? [HILL]
(b) What do you call the back part of the bottom of your foot? [HEEL]
(c) Do those words sound the same to you?
(d) Say them again for me and tell me which one's which.

(*If* hill *and* heel *are close or the same*:
(a) What's a word for the skin of an orange? [PEEL]
(b) What's the little thing you swallow when you take aspirin? [PILL]
(c) Do those words sound the same to you?
(d) Say them again for me and tell me which one's which.)

4.6. (oh – ow/_r)

(a) What kind of animal runs in the Kentucky Derby (what does a cowboy ride)? [HORSE]
(b) What do you call the way you feel when your throat is kind of scratchy and sore so you can't talk very well? [HOARSE]
(c) Do those words sound the same to you?
(d) Say them again for me and tell me which one's which.

(*If* horse *and* hoarse *are close or distinct*:
(a) What do you call the first part of the day, before noon? [MORNING]
(b) When someone is grieving because somebody close to them has just died, you say they're in ... [MOURNING].
(c) Do those words sound the same to you?
(d) Say them again for me and tell me which one's which.)

4.7. (æ/_g, d) – Semantic differentials (2)

(a) What's the difference for you in meaning between a BAG and a SACK?
(b) What's the difference between a LABEL and a TAG?
(c) What's the difference between a BAD person and an EVIL person?
(d) What's the difference between being UNHAPPY and being SAD?

4.8. Aspirated glides – (hw, hj)

(a) What's a great big animal like a fish except it's a mammal (lives in the ocean and spouts water)? [WHALE]
(b) What do you call a sound like a siren or a baby's cry, also starts with W? [WAIL]
(c) Do those words sound the same to you?
(d) Say them again for me and tell me which one's which.

(a) If someone can laugh at a good joke, you say he has a good sense of ... [HUMOR]
(b) What's a word that means very, very big, or enormous, starts with H? [HUGE]

4.9. (ey – e – æ/_rV)

(a) In the nursery rhyme, who's the girl who had a little lamb? [MARY]
(b) What's a word that means happy, that people say when they greet one another at Christmas? [MERRY]
(c) Do those words sound the same to you?
(d) Say them again for me and tell me which one's which.
(e) When a man gets down on one knee and pops the question to the woman he loves, what does he say? Will you ... [MARRY]
(f) Does that sound like the word people say with Christmas?
(g) Say those two again and tell me which one's which.

4.10. (uw – juw/[+cor]_)

(a) If you're getting married, what do you say when you're asked if you take the other person to be your wife or husband? [DO]
(b) What do you call the moisture that's on the grass in the early morning? [DEW]
(c) Do those words sound the same to you?
(d) Say them again for me and tell me which one's which.

4.11. Southern Shift items

(a) What's a hot drink you might put milk, sugar or lemon in? [TEA]
(b) What's a small, round green vegetable that comes in a pod? [PEA]
(c) What do 24 hours make (what are there seven of in a week)? [DAY]
(d) What's the letter in the alphabet after J? [K]

4.13. *r*-lessness module

(a) What's the past-tense of *fight*? [FOUGHT]
(b) What do you call a military outpost, like in the Old West, with wooden walls and towers? [FORT]
(c) Do those words sound the same to you?
(d) Say them again for me and tell me which one's which.)

(*If* fought *and* fort *are close or the same*:
(a) What's the sound a lion makes? [ROAR]
(b) How do you describe meat or vegetables before they've been cooked? [RAW]
(c) Do those words sound the same to you?
(d) Say them again for me and tell me which one's which.)

(a) What's the organ in the body that pumps blood? [HEART]
(b) What's the opposite of *cold*? [HOT]
(c) Do those words sound the same to you?
(d) Say them again for me and tell me which one's which.

(*If* heart *and* hot *are close or the same*:
(a) What's the shortest nickname for *Robert*? [BOB]
(b) What's a nickname for *Barbara*? [BARB]
(c) Do those words sound the same to you?
(d) Say them again for me and tell me which one's which.)

5. Syntactic variables

Now I just have one more section of language questions for you. In this section I'd like to ask you to tell me what you think of a few sentences I'm going to read you. These are sentences that sound fine to people in some parts of the country but a little strange to people in other parts of the country. For each sentence I read you, I'd like you to tell me whether you think it sounds like something you could say yourself, or something you've heard around your area but you wouldn't say, or something you've never heard before. OK? So here's the first one:

(a) What if there were crumbs on the kitchen floor and someone said, "The floor needs swept"?
(b) What if a mother said to her child, "Your hair needs cut"?
(c) What if you were looking at the price of a new car and someone said, "Boy, cars are sure expensive anymore!"?
(d) What if someone said, "It's real hard to find a good job anymore"?
(e) What if someone said, "I used to watch football, but anymore I watch baseball"?
(f) What if someone asked you, "I'm going to the store; d'you wanna come with?"
(g) What if someone asked, "Do you want for me to go downtown today?"
(h) What if someone asked, "Would you like for me to pick up some milk on the way home?"

6. Personal history/demographic data

Those are all the language questions I have for you. Now I just need to ask you a couple more things so that we can place you properly in our sample.

(a) What year were you born?
(b) Where did you go to high school?
(c) What were the main racial and ethnic groups in your school? (*approx. %, if appropriate*)
(d) What's your own family's background in terms of national ancestry? (→ *conversation*?)
(e) What is/was your father's occupation? Your mother's? (→ *conversation*?)
(f) Did you take any schooling beyond high school? What, where?
(g) What's your occupation? (→ *conversation*?)
– Do you enjoy your job?
– What exactly does it involve?
– So tell me, since you're an expert in this, I've always wondered . . .?
– *etc., as appropriate*.

7. Continuing contact

There's just one other thing I'd like to ask you to do. As you can tell, we try to get everybody we talk to to say certain words and the easiest and quickest way to do that is to mail out a list of words that people can read back to us over the phone, which takes about five minutes. If I mailed you a wordlist and then called you back in a couple of weeks, do you think you could spare five minutes to read me the list over the phone? *If yes*: Great, then I'll just need to get your name and address so I can send you the list. ... What would be a good time to get hold of you?

Well, once again, my name is ____, and I'm at the University of Pennsylvania in Philadelphia, and I'd like to thank you very much for the time you've taken to do this interview. You've really been a big help!

8. Answers to closing questions

Q: So what's this study all about again?
A: This is a survey of changes in the way American English is spoken across the country. We're interested in finding out what changes are going on in different regions and how fast they're progressing. For instance, one of the things I was asking you about was how you said words like *hot* and *caught*, or *sock* and *talk*. This is one of the major differences between the way people talk in different parts of the country. Most people in the West say those words the same, as do people in Canada and in a couple of other areas (Pittsburgh and Boston), whereas people in the South, the Midwest and the East mostly say them different. We want to know where the borders are between these areas and whether they are

shifting: our research suggests that the area where people say *hot* and *caught* the same may be slowly expanding.

Q: Why is this important?
A: It's important for several reasons. First, it's important to linguists who want find out more about the way language changes. (Like how did the English language evolve from Old English to the language of Shakespeare to the language of today, and why do Americans talk differently from British people?) Second, it's important to people who study dialects, because while major European countries like Britain, France, and Germany have national maps of linguistic variation the U.S. does not. Our project is the first attempt to study differences in the sounds of regional speech across the whole country. Third, it's important in developing more effective teaching methods, either in teaching English to adults or in teaching reading and spelling to children. (These strategies need to be sensitive to dialect variation, such as whether or not children will make a difference between *pin* and *pen*.) Fourth, it's important to the speech technology industry, because if computers are going to be taught how to understand human language, they have to be able to cope with different dialects. (Example: a computer at the phone company that needs to understand callers from one area who say *Don* and *Dawn* differently and callers from another area who say them the same.) We can provide some of the information that the computer designers need to create effective speech recognition technologies.

Q: Who is paying you to do this?
A: Our work is supported by a combination of public and private sector funding. We have grants from the National Science Foundation and the National Endowment for the Humanities with matching funds from a telecommunications technology company called Bell-Northern Research.

Q: What are you going to do with the results?
A: Eventually, we're working towards the publication of an atlas of American English, which will include a series of maps showing how people talk in different parts of the country. In the meantime, we'll be publishing papers on various aspects of our research in academic journals and making presentations at conferences.

Q: Can I see some of your results?
A: Certainly. I'd be happy to send you a couple of maps showing some of our results so far.

Appendix 4.3. Sample word list

The following word list is in analytic form – that is, words are grouped according to the phonemes that are being studied or the sets of phonemes or allophones under examination. The word list that is mailed to subjects is a randomized list of these words with no such structure.

The sample list in this appendix is prepared for subjects from the Mid-Atlantic dialect region. Sections modified or introducted for this geographic region are indicated with a dotted border, with words of particular interest in red.

The Mid-Atlantic word list includes an expanded list of short-*a* words for tracing the intricate pattern of the short-*a* split into /æ/ and /æh/. It also includes an extended section on contrasts before intervocalic /r/, examining the contrast between *furry* and *ferry*, *hurry* and *merry*, as well as other vowels. There is an elaborated section on contrasts between *moor* and *more*, *lure* and *lore*, which are merged for most speakers in this area. Words with /ay/ before voiced and voiceless finals are focused on, since a rapid increase in "Canadian raising" before voiceless consonants has been discovered. The lists of /aw/ words is expanded, to trace the strong fronting and raising of the nucleus of that phoneme. Back

vowels before /l/ are included, to establish the contrast between the back position of these words and the strong fronting of others. (*Pal* and *Hal* are included since in this area, these words are often homonymous with *Powell* and *howl* and, with /l/-vocalization, with *pow* and *how*.) A special list of words with two /r/s is added to trace the pattern, specific to this area, of r-vocalization in dissimilating environments, though /r/ in codas is normally constricted.

Telsur WL PA

					Distinctions	Incidence
/æ/	**/o, ah, oh/**	**/ay, aw, oy/**	**/iy, ey, uw, ow/**	**before /l/**	**/uwr, owr/**	**/ohg, og/**
batch	block	ice	bee	tool	moor	fog
cat	bomb	sight	see	fool	more	log
bat	calm	fight	Kay	bowl	lure	smog
mat	palm	eyes	say	goal	lore	clog
cap	pajama	side	bay	cold	boor	job
sat	father	tie	go	old	bore	dog
sad	pa	file	hoe	pal*		cog
cab	paw	fire	do*	Hal*	**/ohr, ɔhr, ahr/**	frog
bad	cot	time			four	bog
badge	caught	sign			for	hog
mad	Don	my			far	flog
bad	Dawn		**/uw, iw/**		oar	log
glad		out	do*		or	goggles
black	**/e/**	about	dew		are	soggy
bag	get	mountain	stew			toggle
laugh	bet	loud	goof			
staff	bed	mouse	tooth			**/or, ohr/**
math	leg	house	toot			tomorrow
bath	beg	down	hoop		**/eyr, er, ær/**	sorry
ask	egg	downtown	shoot		Mary	orange
cash	step	now	noose		merry	horrible
hash	set				marry	forest
man					ferry	borrow
ant	aspirin		**/Vg/**		furry	
aunt	after		fish		hairy	**/wo, woh/**
ham	asterisk		bush		hurry	watch
camera	alas		vision	**Dissimilating**		wash
Janet	adze		measure	Charlie		water
planet	tin can			sorcerer	**/iyr, ir/**	walrus
began	I can			forward	nearer	Washington
thing	ran			ordinary	mirror	
sing	swam	**Unstressed**	**/_lC/**	quarter		**/uw, u/**
sang	planning	**vowels**	film	extraordinary		roof
pal*	classics	parted	milk	corner		coop
Hal*	classify	rabbit		order		route
alley	Lassie	Mexico				room
Alice	Annie				**/uw, iw/**	root
personality	gas				do*	coupon
	math				dew*	

*Appears twice in analytical table

5. Methods of acoustic analysis

The *Atlas of North American English* [ANAE] presents two principal kinds of data on the vowels of North American English: the presence or absence of phonemic distinctions between vowels, and the precise place of articulation of vowels in phonological space. The data on mergers and splits come mainly from participants' productions and perceptions of word pairs, which are coded as 'different', 'close', or 'the same', by means of auditory impressionistic analysis (Chapter 4). The data on place of articulation, and on the operation of chain shifts affecting the articulation of whole sets of vowels, come from acoustic analysis. Acoustic analysis also serves to clarify cases of merger or split where auditory impressionistic analysis is not decisive. This chapter describes the methods of acoustic analysis used for ANAE.

5.1. The philosophy of measurement involved

The Telsur project and its product, ANAE, were driven by a philosophy of measurement that requires greater accuracy and also greater efficiency than is normally demanded in laboratory research. For much experimental work on categorization, discrimination, habituation, etc., margins of error of ±50 Hz are often satisfactory, and are usually obtained by measuring vowels at the mid-point of the resonant portion, or averaging over the whole nucleus. The close study of variation across dialects and age groups within dialects needs finer resolution, both in the location of the central tendency of formants and in locating the point in time of measurement. Methods for obtaining this increased accuracy are discussed below.

The goal of the Telsur project was to represent the ongoing sound changes in the urbanized areas of North America, and the project interviewed 805 persons, of whom 762 were ultimately selected as satisfying Telsur criteria for local speakers. The goal of the acoustic measurement program was to measure the vowel systems of as many of these subjects as possible and, at the same time, obtain a complete and accurate inventory of the phonemes and allophones involved in sound change. This meant raising the number of vowels measured from the 150 characteristic of the early studies of Labov, Yaeger & Steiner [LYS] to a typical level of 300, or in some cases much more. In the final analysis, 439 speakers and 134,000 vowels were measured. This entire data bank of measured formants is available to users of the Atlas on the accompanying CD.

This increase in the volume and accuracy of the data was in part the result of the efficiency and accuracy of the CSL system used for LPC measurement. It was also the result of decisions made early in the project to collect for the great majority of vowels a single F1/F2 measurement as the best indication of the central tendency of each nucleus. In the interests of describing the widest possible range of communities and sound changes, measurements of F3, F0, duration, intensity, and bandwidth were not collected. As noted below, a great deal of supplementary information is contained in the Plotnik vowel files that are available to ANAE users. The field registering lexical information contains special codes indicating the presence, absence and direction of glides; stylistic context; observations of the analyst on marked auditory qualities of the signal, number of poles used in measurement, and other information bearing on the reliability of the signal.

Much of the time spent on measurement consists of locating the words of interest and storing these segments. More than one member of our research staff has projected a program for automatic location, segmentation, and measurement of vowel nuclei, but so far, all such attempts have led to an increase in gross error rates of several orders of magnitude. At present, we find there is no effective substitute for the careful examination and measurement of the formant trajectories of each individual vowel token by an analyst relying on both auditory and visual information, double-checking the computer's analysis against auditory impressions. More recent software programs like Praat reduce the time required for segmentation, but the same combinaton of auditory and visual inspection is necessary to reduce gross errors.

The discussion that follows assumes a basic knowledge of acoustic phonetics. This chapter will be principally concerned with issues surrounding the selection of a single point of measurement that best represents the central tendency of a vowel. Readers who need to review basic principles of sound spectrography and vowel formant identification are referred to an introductory phonetics textbook such as Ladefoged (1993).

5.2. Equipment

All of the Telsur interviews were conducted over the telephone and recorded by means of a telephone signal splitting device, first one sold by Radio Shack and later a Hybrid Coupler made by Gentner Communications Corporation. The early interviews were recorded on analog reel-to-reel tape using a Nagra IV, a Nagra E, or a Tandberg Model 9021. The later interviews were recorded on digital cassette tapes (DAT) using SONY TCD-D8 DAT recorders.

All acoustic analysis was carried out with the Computerized Speech Lab (CSL) program developed by Kay Elemetrics. The version used was 4300B, running in DOS. The interview tapes were digitized at a sampling rate of 11,000 Hz using the CSL digitization hardware and software.

The use of the telephone was an essential element of the Telsur method, permitting the collection of speech samples from across North America over a period of a few years without incurring the long delays and high costs of sending field workers to every city in North America. This benefit did not come without a cost. The telephone line limits the frequency range of the transmitted signal to about 300 to 3,000 Hz, and it also significantly reduces the dynamic range. Still, the signal is satisfactory for conversation all over the world. The quality of sound obtained by recording from the telephone line is clearly not comparable to that obtained in face-to-face interviews recorded with a high-quality microphone. However, in the vast majority of cases, the sound quality of the digitized speech signals was found to be high enough to permit acoustic analysis with a satisfactory degree of confidence and reliability. The signals were often accompanied by varying levels of background or mechanical noise, yet spectrograms made from these signals usually produced clearly interpretable formant structures.

5.3. Acoustic analysis of telephone interviews compared to face-to-face interviews

The study of language change and variation in Philadelphia utilized a series of 60 telephone interviews to obtain a geographically random sample of the city (Hindle 1980). Comparisons of these recordings with recordings of face-to-face interviews are reported in Labov 1994: Ch. 5. Telephone recordings were shorter and more formal than the face-to-face neighborhood recordings and obtained results that were less advanced in the direction of the sound changes being studied. To the extent that this finding applies to the data of the Telsur survey, the findings on the extent of sound changes in progress may be understated.

The Philadelphia study found the most significant differences in measurements of the high vowels, which were lower in the telephone recordings by 30–50 Hz. For the Telsur survey, a face-to-face interview was conducted with one speaker who had been interviewed by telephone, a 32-year-old man in Cedar Rapids, Iowa. This study confirmed the previous finding that telephone recordings registered lower values for F1. The mean difference between telephone recording and face-to-face recording values for F1 was 41 Hz. Insofar as this tendency is general, it will not affect the results of the analysis, since all comparisons are made across telephone interviews, and the normalization routine discussed in Section 5.6 will compensate for any skewing from one telephone handset to another. There are two exceptional cases to be noted. For /e/ before nasals, telephone recordings showed higher F1 values. Thus raising of /e/ in this environment is apt to be understated by the effect of telephone recording. However, the major sound change affecting this allophone is the merger of /i/ and /e/ before nasals, which is traced through minimal pair judgments rather than acoustic measurement (Chapter 9).

The largest differences in the comparisons made between telephone and direct recording are found in /iy/, where F1 was lower and F2 higher in telephone recordings. Lowering and backing of the nucleus of /iy/ is a defining feature of the third stage of the Southern Shift, so the bias of telephone recording will understate the extent of that sound change. The bias will be most important when face-to-face recordings are compared directly to telephone recordings without normalization, where we can expect face-to-face recording to show stronger movement in this third stage.

5.4. Selection of tokens for analysis

Segmentation. The words containing the target vowels were extracted from 20-second sections of digitized speech and stored in CSL's .NSP format in a directory established for each speaker. They were of four types, each representing a different style of speech (see Chapter 4 for the structure of the Telsur interview):

1. elicited minimal pairs (e.g. *cot* and *caught*; *pin* and *pen*);
2. elicited semantic differential items (e.g. *unhappy* and *sad*; *pond* and *pool*);
3. elicited word lists (e.g. counting from 1 to 10; days of the week; breakfast foods);
4. spontaneous speech (e.g. responses to demographic questions and discussion of issues of local interest, such as the state of downtown).

In the spontaneous speech category, only fully stressed tokens, bearing the primary stress of a phrase as well as primary syllable-stress within the word, were selected for analysis. This was to ensure that automatic processes of vowel reduction and centralization in non-primary stress environments would not interfere with the analysis of regional patterns and that each token studied would provide an opportunity to observe the maximum extent of the sound changes under study.

Given that much of the data came from spontaneous speech, it was not possible to obtain an identical set of data from each speaker. The selection of tokens for analysis was constrained by the set of words that occurred in 20–30 minutes of conversation. Within this constraint, the analyst aimed at segmenting a similar balance of vowels and allophones for each speaker. As a general principle, each vowel phoneme or allophone was represented by no fewer than three tokens. In most cases, five to ten tokens of each vowel and allophone were collected. Collection of the most frequently occurring allophones was limited to approximately ten tokens, in order to prevent skewing of the representation of the speaker's vowel space by an over-representation of one or two vowels. By these methods, approximately 300 tokens were selected for each speaker. Some speakers had as few as 200 tokens, where conversation was limited, or low signal quality prevented the analysis of parts of the interview. Others had 400 to 500 tokens, where sound quality was good and conversation lengthy. The total number of measurements for 439 speakers was 134,000, an average of 305 tokens per speaker.

5.5. Selection of points of measurement

Once tokens from a speaker's interview had been digitized and saved as .NSP files, each token was called up in turn for spectrographic and linear predictive coding (LPC) analysis. The bandwidth of the spectrograms was 500 Hz, and the LPC analysis was computed at either 8, 10, 12, or 16 poles, depending on the strength of the signal. Where formants appeared to be missing, the number of poles was increased; where there were too many formants, the number was decreased.

While it is possible to measure many different aspects of vowel articulation using a spectrogram, Telsur accepted the findings of DeLattre et al. (1952), Cooper et al. (1952), and Peterson and Barney (1952), that the quality of most English vowels can be adequately represented by the frequency of the their first and second formants, reflecting their height and advancement, respectively. Duration, rounding, nasality, pitch, tone, and laryngeal tension can also play an important role in vowel quality, but LYS demonstrated that a plot of F1 against F2 illustrates the most salient regional and social differences in the pronunciation of the vowels of North American English, including both vowel shifts and differences in phonemic inventory.

The general principle followed by Telsur is that no means of instrumental analysis can be considered reliable without some degree of auditory confirmation. LPC analysis is more precise than auditory impressions in some respects, but it is also subject to errors much greater than those found with auditory analysis, particularly when an incorrect number of formants is identified. Analysts continually use their knowledge of acoustic–auditory relations in deciding whether an appropriate number of formants has been located and in choosing the correct point in the time series for measurement (see below). Nevertheless, it is not possible for the analyst to recognize some gross errors until the analysis is completed and the entire vowel system is projected. For each of the 439 speakers analyzed acoustically, the F1/F2 plots produced by Plotnik (see below) were closely compared with auditory impressions. Two types of measured values were examined most closely. Outliers from the main distribution were re-played and compared to samples from the main distribution. They were accepted as valid tokens only if the auditory impressions differed in ways comparable to the measured differences. Secondly, special attention was given to cases where vowels from different word classes showed the same F1/F2 values. (In such cases, word class assignment is typically disambiguated by an offglide.) Though in most cases these were valid indications of merger, there are configurations where differences are heard that do not correspond to F1/F2 differences, indicating the limitations of the two-formant axes in defining vowel timbre.[1]

There are many possible approaches to the measurement of F1 and F2. A series of paired measurements taken at every pitch period would provide a wealth of detail on every movement of the tongue over the course of the vowel, including the nature of opening and closing transitions, and of on-glides and off-glides. While it is easy to plot an array of sequential measurements of a single vowel, plotting 300 such trajectories for a single speaker would obscure any pattern and preclude the goal of describing the vowel systems of North America. Moreover, inter-speaker comparisons, the central concern of dialectological or sociolinguistic research, are not feasible with trajectories, since precise points of comparison would be difficult to establish and quantitative analysis is problematic. For these reasons, the Telsur project followed the practice of LYS in representing the central tendency of each vowel with a single pair of F1/F2 values. The best choice of a single point of measurement therefore became the central methodological issue in the acoustic analysis that underlies the Atlas.

One approach to the representation of a vowel with a single measurement of F1 and F2 would be to take an average of the frequency of these formants over the whole course of the vowel's nucleus. While this technique has the advantage of reducing the likelihood of erroneous measurements, it runs the risk of missing important information about details of vowel articulation that can distinguish one region or speaker from another. Where a vowel's nucleus is characterized by a steady state in both formants, a nuclear average would seem adequate, as long as it did not include pre- or post-nuclear transitional values. However, many vowels involve a clear point of inflection in one or both formants at a specific point in the nucleus. A point of inflection indicates the moment when the tongue stops its movement away from an initial transition into the vocalic nucleus and begins moving away from the nucleus, either into a glide (in the case of a diphthong) or toward the position required for the next segment. As such, it is also the best representation of the vowel's overall quality, and gives a more accurate portrayal of the extent to which a speaker participates in a sound change than a nuclear average. Listeners appear to be sensitive to such points of inflection, perhaps because they are the best indication of the vowel's target.

The identification of points of inflection depends on an analysis of the central tendency of each vowel – the main trajectory of the tongue during its articulation. The central tendency of most short vowels and many long upgliding vowels is a downward movement of the tongue into the nucleus, followed by a rise out of the nucleus into the glide or following segment. The acoustic reflection of this fall and rise is a rise and fall in F1, with a maximal value of F1 representing the lowest point reached by the tongue. Vowels displaying this tendency were therefore measured at the point where F1 reached its maximal value. F2 was then measured at the same point, since measuring it at any other point would suggest a vowel quality that did not in fact occur.

The major exception to the principle of using the F1 maximum as a point of measurement occurs with those vowels whose central tendency is not so much a lowering and raising of the tongue as a movement of the tongue towards and then away from the front or rear periphery of the vowel space; these are ingliding vowels. In these cases, a point of inflection in F2, indicating maximum displacement toward the front or back periphery, was used as the point of measurement, with F1 measured at the corresponding point. Vowels whose tendency was movement toward and away from the front periphery were measured at their F2 maxima; those moving toward and away from the rear periphery were measured at their F2 minima.

In North American English, ingliding vowels typically arise in two situations. The first type comprises both historically long and ingliding vowels, like /æh/ and /oh/ in the Mid-Atlantic region, and originally short vowels that have been tensed and raised along the peripheral track, like /æ/ in the Northern Cities Shift, and /e/ and /i/ in the Southern Shift. The second case is that of high upgliding vowels followed by liquids (*fear*, *pool*). The liquids are articulated in mid-central position and therefore have some of the same characteristics as central inglides. Depending on the height of the nucleus and inglide of ingliding vowels, the maximum value of F1 may in fact occur in the glide rather than in the nucleus. A point of inflection in F2 rather than the F1 maximum is therefore the best measure of their nuclear quality. The trajectory of F2 was also used in some cases to identify a more precise point of measurement within a steady-state in F1, especially when a point of inflection in F2 appeared to indicate the maximal distance from consonantal transitions on either side of the vowel.

The most obvious inadequacy of single-point nuclear measurement is its failure to indicate the presence and quality of offglides. While some offglides are purely phonetic, having no contrastive function, others have phonemic status and play an essential role in distinguishing one vowel from another, as in the contrast between /ay/ and /aw/ in many English dialects. Moreover, while many of the most striking differences between English dialects involve variation in the position of the nucleus, others – including some of the best known – involve variation in the presence and quality of glides. The monophthongization of /ay/ in the Southern United States is the most obvious example, but subsequent chapters will reveal several other cases in which glides are as important as nuclei – in a few cases more important – in the differentiation of North American English dialects. Despite the importance of glides, in most cases it was found that the presence or absence and quality of glides could be effectively indicated with a code included in the comments attached to the measurements of nuclear quality, and that an actual measurement of the glide target was not necessary. These codes were used where the nature of the glide deviated from the norm for the vowel class or dialect in question, as when an upgliding vowel was monophthongal or a short vowel had developed an inglide. They were also used where the presence of a glide was one of the local features under study, as with the monophthongization of /ay/ in the South, or of /aw/ in Pittsburgh, or the development of a back upglide in Southern pronunciations of /oh/.

Though the normal practice was not to measure the endpoint of glides, the vowel files do include several thousand such measurements.[2] Glide measurements were made particularly for back glides that are shifted frontwards,[3] the midpoints and endpoints of "Southern breaking",[4] and the "Northern breaking" of short-*a* into two morae of equal length.[5]

1 In such residual cases, the normal course is to consider additional measurements of duration, F0, F3, or bandwidths, but the use of these well-known parameters has not in general proved useful in accounting for anomalies in F1/F2 measurements.

2 In the vowel files provided with the accompanying ANAE CD, this coding appears in curly brackets following the word identification. The codes {f,b,i,m} represent front upgliding, back upgliding, ingliding and monophthongal vowels respectively. {s} represents shortened monophthongs, {br} the second half of a broken /æ/. The notation {g} is used whenever the measurement represents the endpoint of a glide.

3 Chapter 12 notes that "The 7036 Telsur records of /uw/ include 42 tokens where such a fronted upglide was noted by the analyst."

4 Often referred to as the Southern drawl; see Chapter 18.

5 Chapter 13 presents a detailed analysis of this phenomenon, which includes the 1,025 measurements of the second half of such tokens.

5.6. Format and content of vowel files

Log files of the vowel analysis conducted using CSL were produced, facilitated by macros written for the Telsur implementation. These log files were transformed into the six-field format used by the Plotnik program, which produces the displays of vowel systems in this volume. These 439 files are found in the **Telsur/pln** folder on the ANAE CD.

The input format for PLOTNIK is a comma-delimited text file which may be read with a text editor like Word, or a spreadsheet like Excel, saving the data as text with comma delimiters between items (Excel's CSV format). The file begins with the following format:

line	
1	Thelma M., 31, Birmingham, AL TS 341
2	560,6.992571
3	480,1808,,1.1118,1,slip {i}
4	539,1531,,1.1121,1,fib2 {g} -5-
5	364,2188,,1.1121,1,fib2 {i} -5-
6	378,2246,,1.14264,1,kidney2 {i}
7	451,2173,,1.16123,1,mixed2 -- 8p
8	524,2173,,1.16123,1,mixed -- 8p; hi pitch; F1 from spectrogram"
..	....

The first line is a **header** with information on the speaker's name, age, place of origin and an identifying number.[6] The second line gives the number of vowels measured (number of tokens) and the group log mean for normalization. The third and all following lines contain the tokens themselves. Each token consists of six items separated by a comma.

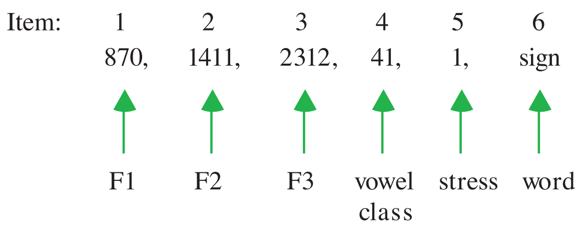


Figure 5.1. Format of data token

The first three items are integral formant measurements in Hertz; F3 is blank in the Telsur files.

The fourth item is the vowel class, a number or letter code for the structural category of which the particular token is an instance. These numerical codes, based on the subsystems of the initial position in Chapter 2, are explained in detail in the documentation for the ANAE CD.

The fifth item in the string is reserved for impressionistic ratings of **Stress,** with values of 1 (primary), 2 (secondary), or 3 (unstressed). This is always 1 in Telsur files.

The sixth item is a descriptive comment. It begins with the standard orthographic representation of the word in which the vowel token occurs, and also contains information on the presence or absence of a glide along with its direction, contextual style, and observations of the analyst on any unusual auditory or acoustic aspects of the signal. The sixth item might read:

bad {i} -4- 10p; interp. F2.

This indicates that the word being analyzed is *bad*; that there was an inglide after the nucleus; that the contextual style was 4, the semantic differential (see Chapter 4); that the analysis was done at 10 poles, rather than the 12 poles that was the default filter order for this speaker; and that the measurement of F2 was interpolated between two neighboring LPC points, because the F2 point corresponding in time to the desired F1 point was missing. The majority of entries are not this complex, and contain no more than the numerical and orthographic identification of the token.

5.7. Normalization

An essential feature of all ANAE analyses and comparisons of vowel systems is normalization, the adjustment of all vowel systems to a common framework that eliminates differences in acoustic realization that are due to differences in vocal tract length. Studies such as Peterson and Barney 1952 illustrate the fact that men, women, and children have very different physical realizations of vowels that sound "the same" to a listener. The task of normalization is to find a mathematical function that does the same work as the normalizing ear of the listener, compensating for the physical differences in articulatory systems. At the same time, we must preserve those differences in phonetic realization that are actually present in the speech community; the sound changes that ANAE is designed to study may be realized as actual differences between the speech of men, women, and children.

Although several studies have shown that the relationship between men's, women's, and children's vowel systems is not exactly linear, several linear functions give a good approximation. One of these is the log-mean normalization explored by Nearey (1977). Labov (1994) reports the studies of four normalization methods by the Philadelphia project on language change and variation. Of the various methods tested, the log-mean normalization was most effective in eliminating male–female differences due to vocal tract length and preserving the social stratification of stigmatized variables that had been established by auditory impressions.

The log-mean normalization is a uniform scaling factor based on the geometric mean of all formants for all speakers.

$$G = \frac{\sum_{k=1}^{p}\left(\sum_{j=1}^{m}\left(\sum_{i=1}^{n}\ln(F_{i,j,k})\right)\right)}{m * \sum_{i=1}^{p} n_i}$$

Here p is the number of speakers measured; m is the number of formants, which for the Telsur data is 2; and n is the number of tokens measured for a given speaker. To normalize any given speaker, the group log mean G is subtracted from the individual log mean S for that speaker:

$$S = \frac{\sum_{j=}^{m}\left(\sum_{i=1}^{n}\ln\left(F_{i,j}\right)\right)}{m * n}$$

6 More complete identifying information is found on the Telsur/Master.wks spreadsheet under the TS number.

The anti-log of this difference is the **uniform scaling** factor F for that individual.

$$F = \exp(G - S)$$

For a man, the scaling factor F will be a number greater than 1, and his system will be expanded; for a woman, F will be less than 1, and the system will be contracted. The end result is a series of vowel systems that can be superimposed on a single grid, where differences in the means of different vowels display the course of the sound change in progress.

In the course of the Telsur project, the parameter G was successively updated as the number of subjects increased. Beyond n = 345, no significant change in G was found, and the group log mean was kept at the figure calculated for these 345 subjects, G = 6.896874.

Unnormalized Telsur files have the extension .plt; normalized files are identified with the extension .pln.

For a recent view and comparison of methods of normalization, see Adank 2003.

5.8. Analyzing and displaying vowel systems with the Plotnik program

Plotnik is a program developed at the University of Pennsylvania Linguistics Laboratory by W. Labov for the display and analysis of complex vowel systems in English and other languages. The vowel charts found in Chapters 12–20 of ANAE are outputs of the Plotnik program, which is included on the ANAE CD along with a tutorial, and internal and external documentation. At present it is compatible only with Macintosh operating systems, and is supplied in both OS 9 and OS X versions.

Plotnik normally takes as input a Telsur file with the extension .plt or .pln. The program then displays all vowel tokens, tokens for a single vowel or any subset, with or without means or median values displayed. The program automatically codes each token for environmental features, reading from the orthographic representation. A single keystroke will display any of the subsystems of the initial position of Chapter 2. Function keys highlight vowels before nasals, liquids, before voiceless consonants, or in final position.

Plotnik calculates and displays means and standard deviations for all or some vowels, and for any two vowel means, it calculates a t-test of the statistical significance of the difference between any two vowel means. The program operates upon any subset defined by environment, style or stress. Endpoints of glides may be plotted and connected with their nuclei.

For the rapid analysis of a given subset of vowels across the entire population being studied, Plotnik will open new files and plot only the last set of vowels examined. This permits a survey of a given phonological feature for many individual speakers.

Specific configurations that are labeled and equipped with a legend may be saved and retrieved.

6. The construction of isoglosses

6.1. Criteria for selection

Dialect geography has traditionally been concerned with the search for a principled basis for dividing dialects and drawing the boundaries (or isoglosses) between them (Bloomfield 1933; Petyt 1980; Chambers and Trudgill 1980; Kretzschmar 1992). This section concerns one aspect of this problem: the criteria used to select the particular variables or boundaries that will serve as the basis for establishing dialects. The following section will deal with methods of defining the spatial location of these boundaries once the criteria have been established.

All dialect geography begins with the search for geographic differentiation. Perhaps the most important consideration in selecting a parameter for dialect classification is the degree of spatial differentiation it displays. Any examination of candidates for dialect markers must reject those that appear to be randomly distributed in space in favor of those with the greatest regional differentiation, no matter how particular or general they are.

Given a certain degree of geographic differentiation, what kinds of linguistic differences provide the best evidence for defining dialects? No one linguistic criterion can be considered optimal. In North American English, the major choice is between phonological boundaries and lexical boundaries, where the lexical boundary may mark alternative terms for the same referent (*darning needle* vs. *mosquito hawk* for "dragonfly") or the choice of a particular phoneme in a word (/aw/ vs. /uw/ in *route*).[1] The regional vocabulary of North American English includes a very large number of words and phrases, first presented in Kurath's *Word Geography* (1949), and assembled systematically in DARE (1985–). Much of this vocabulary is closely linked to settlement history and helps to relate dialects to the earlier shifts of population that are responsible for the patterns we observe today. Some lexical isoglosses bundle together, reflecting the joint history of the users of the language. However, the selection of particular regional words to define boundaries has been criticized as arbitrary (Kretzschmar 1992) and it is sometimes asserted that if all regional vocabulary were plotted on a single map, no geographic pattern at all would emerge. As a result, those who define dialect boundaries on the basis of lexicon have been modest in their claims for the relative priority or the discreteness of these boundaries.[2]

The Atlas of North American English is largely based upon phonological materials,[3] which have several advantages over lexical items in the search for clearly defined dialect regions. They do not suffer obsolescence and they are of high frequency in the stream of speech. Most importantly, they are drawn from a relatively small, closed set of features that are closely linked by the functional economy of the system (Martinet 1955), so that a change in one element of the system frequently is followed by a change in another. Regional dialects emerge clearly when some or all of the boundary patterns are superimposed, since many of them are tightly clustered.[4] These structural variables are of three types:

1. Differences in phonemic inventory that are the result of splits and mergers
2. Differences in the membership of a subsystem that are the result of shortenings, lengthenings, and the deletion and addition of glides
3. Differences in the position of phonemes or allophones within a subsystem that are a response to asymmetries created by (2)

All three of these are involved in the chain shifts discussed in Chapter 3. The discussion of the principal dialect areas of North America in Chapter 11 will begin with type (1), splits and mergers, since these sound changes will provide the basic motivation and rationale for the changes of type (2) and (3) that follow. However, the isoglosses created by ongoing mergers will not be used to define the major regional dialects, since they are driven by Herzog's principle to expand across previously established frontiers. In fact, one merger that played a central initiating role in the massive fronting of back vowels across all of North America has now expanded to cover almost the entire continent (the merger of /iw/ and /uw/, Map 8.3).

The low back merger of /o/ and /oh/ in *cot* and *caught,* etc. covers more than half of the North American territory. The differentiation of the major dialect regions of North America (Chapter 11) does not however begin with the expansion of this merger, but rather with three distinct bases for resistance to it. These types of resistance are associated with sound changes that involve dialect differences of types (2) and (3). The resulting isoglosses form tightly linked bundles separating dialects in which the expansion of a sound change in one area is blocked by the expansion of sound change in the other area, moving in an opposite direction.

On the whole, the isogloss bundles that emerge from this procedure coincide well with the isoglosses drawn on the basis of regional vocabulary, reinforcing our confidence that the settlement history of North America continues to influence the development of the language. Our confidence in the social and linguistic reality of these boundaries is reinforced by the tight bundling or nesting of isoglosses, as well as the consistency and homogeneity of the dialect regions defined by sound changes in progress.

The initial procedure establishes the outer boundary of a dialect area. Once the defining sound changes are recognized, one can also isolate core areas in which the changes are most advanced and peripheral areas where the sound changes are incipient. The isoglosses so constructed have a dynamic character, which can be related to the evidence from real and apparent time studies.

6.2. Drawing isoglosses

Every dialect geographer yearns for an automatic method for drawing dialect boundaries which would insulate this procedure from the preconceived notions

1 The choice is more limited in North American English than in other languages since there are only a few geographic boundaries based on morphological, syntactic, or semantic alternations.
2 See the quotation from Carver (1987) at the beginning of Chapter 11.
3 A few phonological items are lexically specified. The alternation of /o/ and /oh/ in the single word *on* will play an important role in the description of the Northern Cities Shift in Chapter 14.
4 See the coincidence of isoglosses in Maps 14.9 and 14.11 and the principal components diagrams of Section 11.4.

of the analyst. No satisfactory program has yet been written. Yet ANAE has introduced a reasonable degree of systematicity into the delineation of dialect boundaries, following the steps outlined below.

The following definitions and procedures relate to a map of points distributed in a two-dimensional geographic space, where each point represents the linguistic system of a given speaker, and each group of points represents the linguistic systems of a locally defined speech community. A dialect area or region is defined by an *isogloss* that represents the outer limit of the communities that share a given linguistic feature. If a point on the map where the feature is marked as present is a *hit*, and one where it is absent a *miss*, the isogloss is drawn as the outer limit of the area in which hits predominate over misses. Such an isogloss may be a closed polygon or a simple line dividing a territory into two parts, but it always has an *inside* (the side with the greater proportion of hits) and an *outside* (the side with the greater proportion of misses).[5] The task of drawing an optimal isogloss has five stages.

1. Selecting a linguistic feature that will be used to classify and define a regional dialect
2. Specifying a binary division of that feature[6] or a combination of binary features[7]
3. Drawing an isogloss for that division of the feature, using the procedures to be described below
4. Measuring the *consistency* and *homogeneity* of the isogloss by the measures to be discussed below
5. Recycling through steps 1-4 to find the definition of the feature that maximizes consistency or homogeneity

The motivation behind the decision of step 1 has been discussed above. Step 2 begins an iterative process, which may begin with any arbitrary decision. Step 3 uses the following procedure:

The isogloss is drawn as a set of nodes connected by straight lines[8] which maximizes the proportion of inside hits to outside hits under the following constraints:

a. All contiguous groups (communities) that consist of more than 50 percent hits are included in the isogloss. Contiguity is defined as a spatial relation that does not require the addition of more than two nodes to the isogloss for inclusion.
b. The isogloss may be extended to include any group with 50 percent hits (transitional groups) if no more than one additional node is required.
c. Groups with less than 50 percent hits are contained within the isogloss only if they are entirely surrounded by groups with hits.

Figure 6.1 illustrates these constraints. The blue polygon surrounds all contiguous groups of 100 percent hits, and the green additions include the transitional groups. The speech communities represented by groups b and c are included within the isogloss. For group b, one node is moved and no additional node is required; for group c, only one additional node is needed. Groups of two with one hit and one miss are typical of the transitional communities we can expect to find along a boundary, since the Telsur design calls for two subjects for the majority of urbanized areas (Chapter 4).

In Figure 6.1, the red additions to the isogloss are not made. Group e has 100 percent hits, but is not included since six additional nodes would be required. The red line surrounding group e is illustrative of extreme extensions that constraint (a) is designed to correct. An unconstrained polygon might include every hit within the isogloss, but such gerrymandering would create unrealistic configurations that defy any explanation in terms of settlement history, communication patterns or linguistic diffusion. The same constraint operates to exclude the addition of the transitional group f, which would require two additional nodes, and thus remains outside of the isogloss.[9]

The isogloss of Figure 1 then includes two misses, groups g and h, which are entirely surrounded by hits, and excludes one hit, group i, which is entirely surrounded by misses.

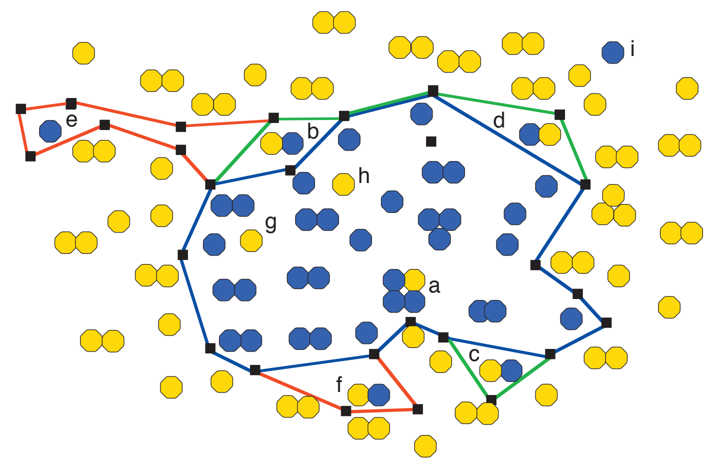


Figure 6.1. Constraints on isogloss construction. Blue: inclusion of groups with more than 50% hits; green: inclusion of transitional groups; red: non-inclusion due to topographic complexity. a: inclusion of group with 75% hits. b, c: inclusion of transitional group with no additional node; d: inclusion of transitional group with one additional node; e non-inclusion of 100% group requiring six additional nodes; f non-inclusion of transitional group requiring two additional nodes; g, h inside misses: groups with less than 50% hits contained within the isogloss; i outside hit: group with 100% hits outside of the isogloss.

Step 4 evaluates the isoglosses drawn by step 3. It takes into account two different desiderata of isoglosses. First, we want the area defined to be as uniform as possible: the proportion of hits to misses should be maximized. Second, we want as high a proportion of hits as possible to be located within the isogloss. This is a measure of how consistently the isogloss defines the distribution of hits. The two measures that are to be maximized are therefore:

Homogeneity = total hits within the isogloss/total speakers within the isogloss
Consistency = total hits within the isogloss/total hits

5 If an inside and outside cannot be so defined, the distribution is random and the isogloss is discarded.
6 The feature may be inherently binary, like the presence or absence of a glide, or it may be a binary division of a continuous quantitative scale, such as the second formant value of /aw/.
7 In our procedures, all combinations will be conjunctive (*and* ...) rather than disjunctive (*or* ...)
8 In map production the lines are then smoothed with a spline algorithm of the Mapinfo program used to draw the maps, so that the nodes are not visible.
9 If a change is spreading by the "cascade" model (Trudgill 1974; Callery 1975), one might expect to find discontinuous patterns. In that case, the points e, i would each be the center of a new distribution. See the maps of Trudgill (1974) and Chambers and Trudgill (1980) to see how the method used here can be used to trace hierarchical movement from the largest to the next largest city.

A third measure, *Leakage*, will be defined as the complement of consistency, the proportion of hits out of all points outside the isogloss. Though we would want this measure to be minimized, it is not considered a criterial feature in the iteration of step 5.

Why two measures?

For several reasons, it is not desirable to define optimal isoglosses by a single criterion. Homogeneity applies to a region: it is a measure of how much variation exists within the region defined by the isogloss. Consistency is a property of a linguistic variable: it is a measure of how strongly the variable is concentrated within a given region. Different stages of the process of dialect differentiation will show different values on these two measures. A given region may have optimal conditions for a given sound change, which may affect almost all speakers. This is the case with the Canadian Shift, involving a retraction of /e/ and /æ/ (Map 11.7); it is especially favored in Canada because the low back merger that triggers the shift takes place well to the back of the vowel space for almost everyone. Homogeneity for the Canadian Shift isogloss, which stops at the Canadian border, is .84 (21 of the 25 speakers within the isogloss). But the same process takes place occasionally throughout other areas of low back merger in the U.S., so that consistency for the Canadian isogloss is only .34. Outside of Canada, the instances of this phenomenon are scattered throughout a much larger population, and leakage is only .10. Homogeneity is the crucial measure for the dynamics of the Canadian vowel system.

On the other hand, a feature may be highly characteristic of a region, in that it is rarely used outside of it, even when it competes with other possibilities within that region. Thus the term *coke* for "carbonated beverage" is a marked feature of the South and rarely used outside of the South in this sense, though other terms like *soda*, *soft drink*, *pop* occur within the Southern region (Chapter 21). Consistency is high (.81) but not everybody uses it: homogeneity is low (.49).

In general, linguistic features that have taken on a marked regional character will show high consistency but not necessarily high homogeneity. Linguistic changes that are driven by unidirectional principles will eventually attain high homogeneity within a given region, but since they are rarely confined within that region, they will show low consistency. In order to achieve reasonable consistency, it may be necessary to create a conjunctive definition that excludes other inconsistent processes. Thus the Inland North (Chapters 11, 14) is defined by the approximation of the second formants of /e/ and /o/ (a difference less than 375 Hz). This condition achieves as it stands a homogeneity in the Inland North of .87. A consistency of .62 is achieved only by adding the condition that /r/ is not vocalized, /æ/ is not split, and /ay/ does not suffer glide deletion. This eliminates those speakers who satisfy the first condition in New England, the Mid-Atlantic States, and the South.

In a few cases, homogeneity and consistency are both maximal, as in the definition of the South as the area of glide deletion of /ay/ before obstruents, with .90 homogeneity and .99 consistency.

Recycling

The optimization of homogeneity or consistency in step 5 may proceed in two different ways. One way is to specify a new binary division of a feature under Step 2. This may be a change in the frequency threshhold of a feature defined as a hit (a percentage of monophthongization of /ay/ required to define the South), or it may involve adjusting the environment in which that feature is located (glide deletion of /ay/ before obstruents instead of glide deletion of /ay/ in general). The net result may be an increase in the number of inside hits or a reduction of outside hits and inside misses with a net gain in homogeneity and/or consistency. Since the analysis of vowel systems is largely based on the measurement of formant values in a continuous space, many of these adjustments will involve a binary cut along the F1 or F2 dimension, as, for example, the criterion for the fronting of /uw/ after coronals that the second formant be greater than 1900 Hz. One may adjust this value to maximize either homogeneity or consistency.

The second possibility for improving these measures is to recycle through step 1, as in the case of the Inland North above: an additional feature is selected to be combined with the first in a conjunctive definition of the isogloss. This may reduce the number of hits and increase the number of misses within the isogloss, since there will be more requirements for each point to satisfy, but will also reduce the number of hits outside the isogloss. If the reduction of outside hits is greater than the reduction of inside hits, the net result will be an isogloss with greater homogeneity or consistency.

It must be recognized that some dialect regions are more diffuse than others. This is the expected situation for regions that have been formed more recently as the result of population shift from several dialect areas, as in the West. We would therefore expect to find more complex definitions for their isoglosses and lower criterial values. Given the high mobility of American populations, one might think that this state would be characteristic of all dialects. The most surprising finding of this Atlas, perhaps even more surprising than the prevalence of ongoing change, is the high degree of homogeneity of dialect regions throughout the continent.

6.3. Isogloss relations

Isoglosses are not isolated features of a dialect map, but may be related to other isoglosses in three distinct ways: bundling, complementation, and nesting.

Bundling. The bundling of isoglosses is the degree of coincidence among isoglosses that are defined by separate features (as opposed to the combination of features in defining a single isogloss). Such bundles have long been considered a major criterion in the selection of isoglosses to define major and minor dialect areas (Kurath 1949). They also play a major role in the search for the explanation of isogloss location. Structural relations among the isoglosses in a bundle may account for their coincidence and indicate that the individual isoglosses may have expanded across a territory together because they are structurally linked. Such connections will play a major role in the chapters dealing with the mechanism of chain shifts. Conversely, a lack of structural connection among isoglosses in a bundle may be used to argue for their dependence on settlement history. Bundles of this kind may provide evidence for the earlier history of a language which is no longer apparent in structurally independent isoglosses that have expanded across the territory together. In any case, the clarity of the argument will depend upon the simplicity of the definition of each individual isogloss concerned.

Complementation. The complementation of isoglosses is the degree to which they do not overlap, defining mutually exclusive dialect areas. Chapter 11, which deals with an overall classification of North American dialects, presents a set of complementary dialect boundaries that cover almost the entire continent. It is not to be expected that dialects will be entirely complementary, or that all locations will be clearly included in one dialect region or another. The nature of ongoing linguistic change predicts that some communities located in the peripheral areas surrounding dialect regions will escape classification. Our maps of North America show a number of such points, communities that are not included within any isogloss (Map 11.13), a situation to be resolved by future studies.

Nesting. A third relation among isoglosses is *nesting*. Isoglosses are nested when the spatial distribution of one feature is contained entirely within that of another, establishing an implicational relationship. This is a common situation when isoglosses are defined by the percent occurrence of a given feature. In the South, the isogloss for communities with at least 50 percent back upglides with /oh/ will obviously form an area nested within the isogloss for communities with at least 20 percent upglides. This could of course be transformed into a complementary relationship by defining the first as 50 to 100 percent and the second as 20 to 49 percent, but the nested formulation expresses the relationship of the two areas in a more direct and informative way. A more important kind of nesting relationship emerges when the nested items represent qualitatively different stages of a chain shift. Thus the third stage of the Southern Shift is nested within the second stage which is nested within the first stage (Maps 11.4, 18.5, 18.6).

Part B Mergers and contrasts

7. The restoration of post-vocalic /r/

The weakening of English /r/ seems to have its beginning in the seventeenth century, when the trilled apical consonant gave way to the humped or retroflex consonant that is general today in most English dialects (Jesperson 1949: 13.2). The tendency for some post-vocalic /r/ to be vocalized before /s/ has been traced in fifteenth- to eighteenth-century spellings by Wyld (1936: 298–299), as in the Cely papers' example of *passell* for 'parcel', and in such surviving colloquial forms as *bust*, *fust*, *cussed* for 'burst', 'first', 'cursed'. The general vocalization of post-vocalic /r/ is an eighteenth-century phenomenon. In 1775 Walker used *ar* to register broad *a* in *aunt* and *haunch*. The first general recognition of a dialect with consistent *r*-vocalization is found in Walker's 1791 dictionary, where he reported that London speech consistently realized 'bar', 'bard', 'card' as *baa*, *baad*, *caad*, etc.

It seems clear that the default value in the seventeenth and eighteenth century for North American dialects was consistent *r*-pronunciation. The areas of *r*-vocalization in the eastern United States are centered about the major cities of Boston, Providence, New York, Richmond, Charleston, Savannah, and Atlanta. This is documented most clearly in Map 151 (*dollar*) and Map 156 (*door*) of PEAS. Around each of the *r*-less cities there is found a roughly convex area of *r*-vocalization with a radius of about 75 miles.[1]

The basic vernacular of New York City was consistently *r*-less in the nineteenth century and the first half of the twentieth. *r*-less pronunciation, as a characteristic of British Received Pronunciation, was also taught as a model of correct, international English by schools of speech, acting, and elocution in the United States up to the end of World War II. It was the standard model for most radio announcers and used as a high prestige form by Franklin Roosevelt.

r-pronunciation was examined in some detail in the sociolinguistic study of New York City (Labov 1966). The variable (r) is defined as tautosyllabic (or coda) /r/. This excludes intervocalic /r/, which is never vocalized in the Northern white community, and word-final /r/ before a vowel-initial word, which is vocalized at a much lower rate. The result was a fine-grained stratification in the use of constricted [r] in formal styles, but in casual style a sharp division between (younger) upper middle class speakers and everyone else. There is some evidence of variable *r*-pronunciation in New York City before World War II which may have provided the raw material for the norm of constricted /r/ (Frank 1948), but a uniform shift to a positive evaluation of *r*-pronunciation was found for all New Yorkers born after 1923 (Labov 1966: Ch. 11). Parallel shifts towards an *r*-pronouncing norm can be observed in Boston.[2] Recent re-studies of New York City speech show that a consistent pattern of *r*-vocalization characterizes the spontaneous speech of all but the upper middle class and the upper class. *r*-pronunciation is primarily a feature of formal speech: a superposed dialect, with a rate of increase of about 1.5 percent a year (Fowler 1986; Labov 1994: 83–87). Feagin (1987) reported a more radical shift to *r*-pronunciation across three generations in Anniston, Alabama.

The Telsur interview did not inquire directly into *r*-pronunciation. Given the high frequency of this variable, it was evident from the first ten tokens of (r) if the speaker was consistently *r*-pronouncing. Not surprisingly, the great majority of Telsur speakers displayed consistent *r*-pronunciation, including many in traditional *r*-vocalizing regions. If any variation was noted, the next 20 tokens of coda /r/ as defined above were rated and the percentage of vocalization was calculated. The results are shown on Map 7.1.

The dark blue isoglosses on Map 7.1 indicate those areas of the eastern United States in which some degree of *r*-vocalization was reported in PEAS in 1961 (Map 151 for *father,* Map 156 for *door*). The colors of the circles and stars indicate the use of (r) by Telsur speakers. Yellow symbols show speakers with consistent *r*-pronunciation. Green indicates infrequent vocalization of /r/ (1–49%), light blue indicates predominant vocalization (50–90%) and dark blue consistent vocalization (91–100%).

The blue and green symbols on Map 7.1 are confined to the *r*-less areas of PEAS, with the exception of points in the Gulf states that were not covered by PEAS. In Eastern New England and New York City, *r*-vocalization is still strongly represented, though variable. There are only two speakers who show 100 percent *r*-lessness. At the same time, only one speaker in these two regions is consistently *r*-pronouncing.[3]

The Telsur interviews contain many sections that focus attention on speech to one degree or another, ranging from the semantic differential to elicitation of minimal pairs. Dividing the data for four New York speakers into those that are marked for (relatively) formal styles and all other, we find that the rate of *r*-pronunciation is 56% for formal styles, and 25% for other. This is consistent with the view that emerged from the more detailed study of 1966, that *r*-pronunciation is chiefly a marker of formal speech in New York City.

The expansion of /r/ in the South

The development of /r/ is quite different in the South. *r*-pronunciation has swept through the region in all styles of speech, so that younger white speakers are consistently *r*-ful. The majority of the circles are yellow: 136 out of 157. The stars on the right-hand side of the groups for New Orleans, Jackson, Birmingham, Atlanta, Columbia, and Durham represent the African-American speakers for whom *r*-vocalization appears to be stable: only three out of 22 are consistently *r*-pronouncing.

Table 7.1 shows the results of a regression analysis of (r) for these 179 Southern speakers. The negative coefficient for age indicates that each older generation is about 14 percent lower in *r*-constriction, a strong effect in apparent time.[4]

1 New York City is an exception here; the *r*-less area surrounding the city is confined to New York and its immediate neighbors, Jersey City and Newark. This geographic constriction of the NYC dialect is characteristic of the dialect as a whole.

2 W. Labov conducted an informal replication of the New York City department store study in Filene's in Boston in 1986, with similar results.

3 The points in western Massachusetts and Connecticut that fall near or within the *r*-less isogloss were quite variable in the PEAS data and do not sharply define the Eastern New England area.

4 There is not enough variation in the African-American community to show such an age trend, though one of the two *r*-ful speakers is a 16-year-old girl.

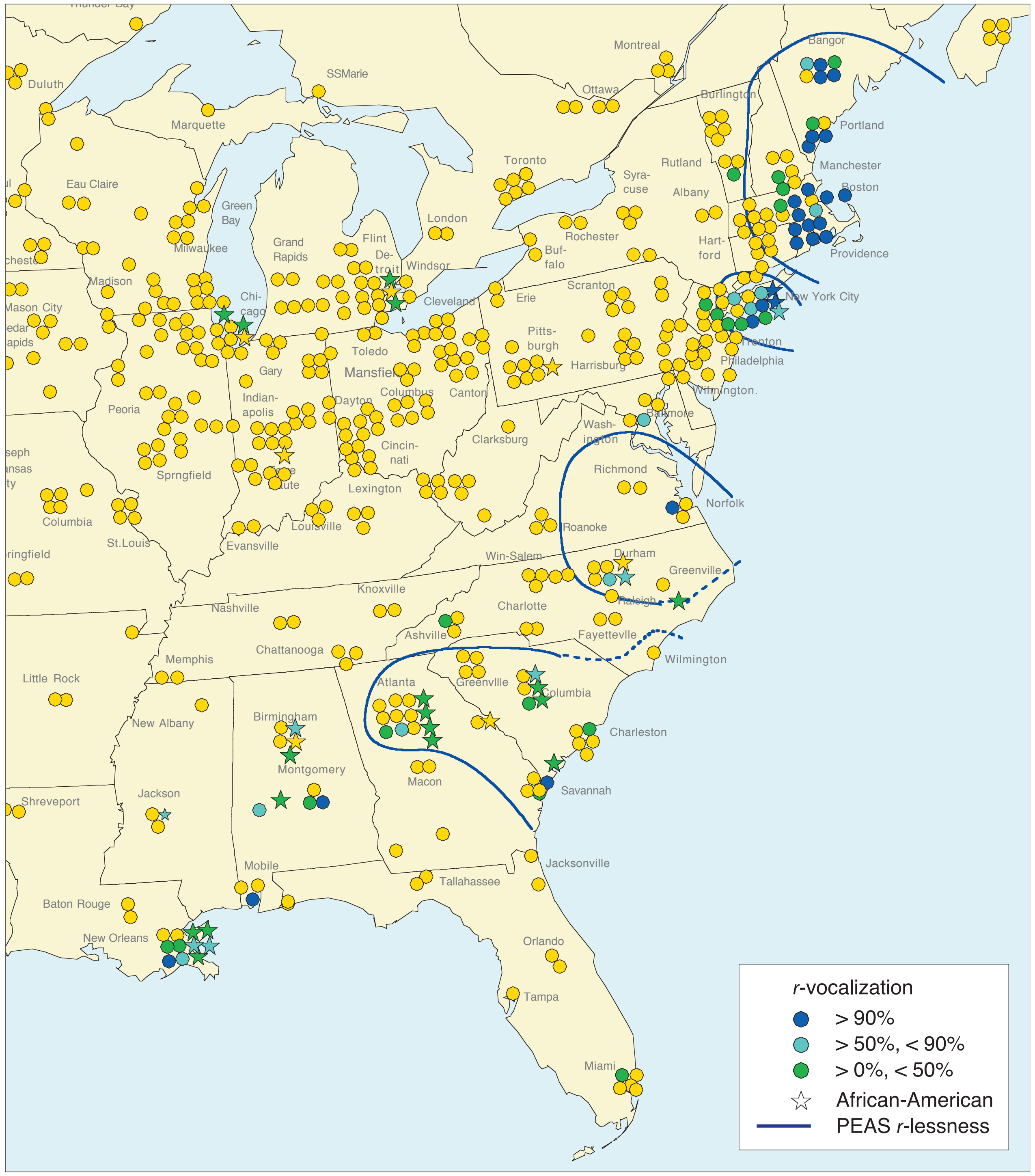
These figures conform to the view of rapid generational change in the use of /r/ that Feagin (1987) first reported in Anniston, Alabama. It appears to be a change from above: the higher the educational level, the more *r*-ful the speaker, though this is a much smaller effect than age. The last row shows the largest effect, all other things being equal, African-American ethnicity lowers the frequency of *r*-constriction by 32 percent.

Table 7.1. Regression analysis of *r*-constriction in formerly *r*-less areas

	South		NYC and ENE	
Variable	Coefficient	Probability	Coefficient	Probability
Constant	97	≤ 0.0001	72	≤0.0001
Age * 25	–14	≤ 0.0001	–	n.s.
Education * 4	6	0.0034	–	n.s.
African-American	–32	≤ 0.0001	–	n.s.
N	179		41	

The right-hand side of Table 7.1 shows a comparable regression analysis of the other *r*-less areas, Eastern New England and New York City. For two of the three independent variables, it is not surprising that there is no significant effect, as a consequence of the small numbers of speakers in those categories; only three of the 41 subjects are upper middle class, and only three are African-American. But there is an even distribution of age from 14 to 80 among these 41 subjects and no significant effect of age is found. As noted above Labov 1966 found a change from above in New York City that began at the end of World War II, and the studies repeated in real time have confirmed the results (Fowler 1986; MacDonald 1984). However, the change in New York City is primarily a change in the norms of careful speech. The small rate of increase of 1.5 percent a year reported above is largely due to the behavior of the younger upper middle class speakers. For others, *r*-constriction shows an increase only in careful styles, and this tendency is greatest in middle-aged rather than younger speakers. From all indications, Eastern New England shows a similar pattern.

This striking difference between the mode of restoration of /r/ in the South and the route followed in the North does not have any obvious linguistic explanation, and requires a further examination of the social and cultural matrix in which /r/ is restored. Chapters 11 and 18 will show that the central or defining region of Southern English has shifted from the coastal area to the Appalachian area, which was always an *r*-pronouncing region.



Map 7.1. r-vocalization in the eastern United States

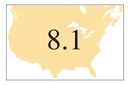
In the middle of the twentieth century, *r*-less speech was found in all of the major cities of the eastern U.S. except for Philadelphia. In the ANAE data, vocalized /r/ is still to be found in the area of Eastern New England, centered around Boston and Providence, and in New York City, but the great majority of Southerners (except for African-Americans) are now using consonantal /r/ consistently. Stars (of any color) represent African-American speakers.

8. Nearly completed mergers

This chapter deals with distinctions once general in North American English phonological systems, but which are now rapidly disappearing. For most regions of the continent, these distinctions are no longer recognized; they are found only in a few conservative relic areas. They represent the logical extension of the general principle that mergers expand at the expense of distinctions.

8.1. The merger of /hw/ and /w/

The distinction preserved in spelling between *which* and *witch*, *whale* and *wail*, is a direct inheritance of the stable OE distinction between /hw/ and /w/. The *hw*-spelling was reversed to *wh-* in the thirteenth century, but there is no reason to believe that the articulation of the voiceless biliabial glide underwent any change at that time. According to Jespersen (1949), the first observer to report a weakening of /hw/ was Jones, who wrote in 1791, "*what*, *when*, etc., sounded *wat*, *wen*, etc. by some". But Minkova (2004) traces the merger to the thirteenth century, using evidence from alliteration in late Old English poetry, variable spellings in the *Middle English Dictionary (*Kurath et al. 1952–2001), and the *Linguistic Atlas of Late Medieval English* (McIntosh et al. 1986). It remains unclear how the distinction was later restored so consistently in the educated speech of the sixteenth and seventeenth centuries (MacMahon 1998), only to disappear completely in the same London dialect that underwent the vocalization of post-vocalic /r/ (Chapter 7). From that point forward, the merger of /hw/ and /w/ was embedded in Received Pronunciation as London influence spread throughout southern England, though the distinction was maintained vigorously in Northumberland and Scotland.



The contrast between /hw/ and /w/ was generally preserved in the early formation of American dialects. The areas where the merger was prevalent in PEAS are generally centered around the eastern cities that looked to London as a cultural center. The blue isogloss on Map 8.1 shows the areas where PEAS registered the loss of the distinction, drawn from Map 174 of PEAS with data on three /hw/ words: *wheel*, *whinny*, *whip*. There are four discontinuous areas where the loss of /h/ was the rule in the 1930s and 1940s: (1) a portion of Maine around the city of Portland; (2) the city of Boston; (3) a mid-Atlantic region that includes New York City, the Hudson Valley, eastern Pennsylvania, Philadelphia, Wilmington, Baltimore, and the Delmarva peninsula; and (4) a narrow strip along the southeast coast including Charleston and Savannah. The rest of the eastern United States maintained the opposition.

The symbols of Map 8.1 show the state of the distinction in the minimal pair *whale* ~ *wail* for the ANAE respondents.[1] The great majority treat this pair as 'the same' in both production and distinction (yellow circles, N = 511). A small number are 'the same' in production or perception but not both (green circles, N = 20). For another small number, these pairs were not 'the same', but were 'close' in either production or perception (orange circles, N = 15). A somewhat larger group retained the distinction firmly in both production and perception (red circles, N = 67).

Map 8.1 shows that the status of the /hw/ ~ /w/ distinction in North America has been reversed in the past half-century. In the middle of the twentieth century, only a few coastal areas showed the merger. At the end of the century, only a few areas show the distinction.

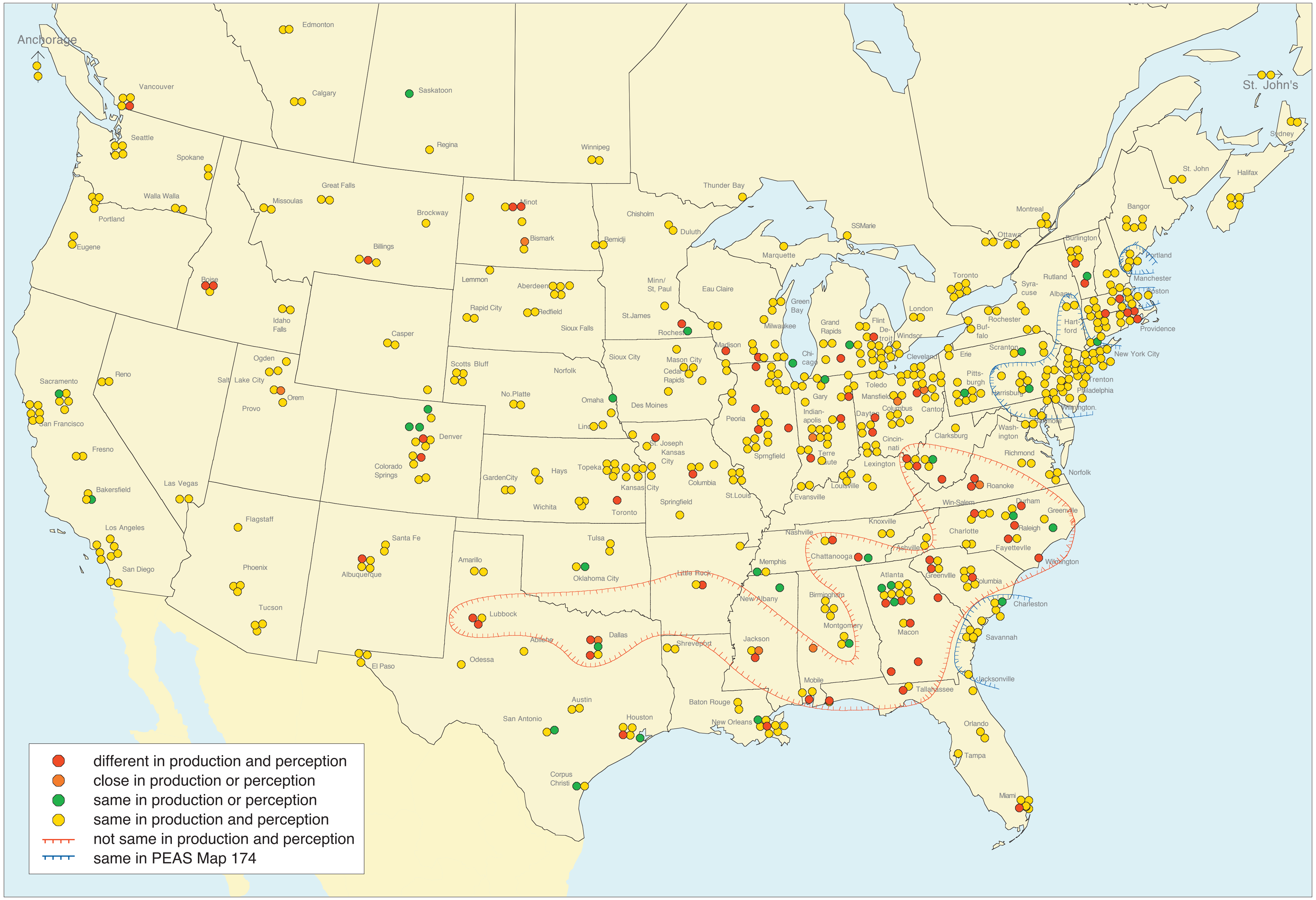
In the areas shown to be merged in PEAS, we now find only yellow circles, linking the present study reliably with the 1961 report. The distinction has largely disappeared in the North. Only the cities of Rutland, Vermont and Providence, Rhode Island show a preponderance of speakers who retain any trace of the distinction. The South, however, shows a fairly sizeable area with a relatively high frequency of retention. The red oriented isogloss is the outer limit of all those speakers who did not have *whale* and *wail* the same in both perception and production. This is not the full South as defined in Chapters 11 and 18, but a southeastern portion along with an extended belt of inland cities reaching to central Texas. As noted above, the majority are not the transitional or marginal cases; the red circles predominate, except in Atlanta. The homogeneity of this area (with respect to any trace of the distinction) is reasonably high, at .60, but consistency is extremely low, at .19. This reflects the fact that there are a large number of speakers who retain the distinction, scattered through the North and the West, who do not form any consistent geographic pattern. In the West, only two cities show a majority of red circles: Boise, Idaho and Minot, North Dakota. One can assume that scattered remnants of the distinction are to be found with speakers elsewhere, but from all indications it will soon be extinct outside of the South.

8.2. The merger of /ohr/ and /ɔhr/

Middle English long open **o** before /r/ was originally [ɔ]; in the course of the Great Vowel Shift it followed the upward path to [o:]. It was then identified by most orthoepists with the long high close [o:] in *no*, *nose*, etc.; but as Jespersen notes (1949: 13.351), it never developed the back upglide of the main /ow/ group. This vowel appeared in *hoarse*, *fort*, *mourning*, *four*, *ore*, *oar*, etc. It was opposed to the reflexes of short open **o** before /r/ in *horse*, *fork*, *for*, *morning*, *or*, etc., which had a shorter, lower vowel that remained [ɔ]. This distinction was preserved in conservative forms of Received Pronunciation in Britain well into the twentieth century, but has been lost in the current speech of southern England.

In the United States, the distinction was originally as consistent as the /hw/ ~ /w/ distinction. The distribution was complicated by the shift of a number of short-*o* words with initial labials into the long **o** category, with the result that spelling is no longer a guide to the phoneme classes. We will refer to the two classes as /ohr/ and /ɔhr/. Kenyon and Knott (1953) list all words in the /ohr/ class with both [o] and [ɔ], while words in the current /ɔhr/ class are listed only with [ɔ]. Thus we have:

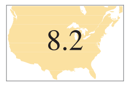
1 The query on this distinction was not pursued in most areas of the North and West, so data for this variable is shown for only 306 of the 762 subjects.



Map 8.1. The merger of /hw/ and /w/

In the middle of the twentieth century, the distinction between /hw/ and /w/ in *whale* vs. *wail*, *which* vs. *witch*, etc. was maintained by most American speakers, with the exception of southern Maine; Boston; the Mid-Atlantic area, including Hudson Valley; and the Savannah–Charleston coastal region. In the ANAE data, the distinction is made only by a scattering of speakers, mainly concentrated in the Southern states.

/ohr/	/ɔhr/
hoarse	horse
four, fore	for, forty
shore	short
mourning	morning
oar, ore	or
lore	lord
port	storm
porch	fork
sports	sorts



Map 44 of PEAS delineates the areas where speakers pronounce *four* and *forty* with the same or different vowels. It shows that most of the Eastern Seaboard – the North and the South – maintained at that time a solid distinction. The merger prevailed only in the north Midland, an area not dissimilar from the main area where the /hw/ ~ /w/ distinction was originally merged. The area of merger in PEAS is shown by the oriented blue isoglosses on Map 8.2. It includes New York City and the Hudson Valley, all of Pennsylvania except for the northern tier of counties, most of Maryland, and the mid-Atlantic cities of Philadelphia, Wilmington, and Baltimore.

The Telsur survey investigated two minimal pairs for the /ohr/ ~ /ɔhr/ contrast: *hoarse* ~ *horse* and *mourning* ~ *morning*. The colored symbols on Map 8.2 show the state of this distinction among Telsur subjects.[2] The great majority of speakers show merger in both production and perception (yellow circles, N = 520). Only a handful show a clear distinction in both production and perception (red circles, N = 26). While about the same number show a complete merger as for /hw/ ~ /w/, the number who show a clear distinction in both perception and production is much smaller (26 as against 67 for /wh/ ~ /w/). A greater number are rated by the analyst as 'close' in production (orange circles, N = 41). The difference between the two variables clearly reflects the phonetic differences involved. The devoicing of /w/ is perceived as an all-or-none effect, while the two back vowels are located in a continuous phonological space and all degrees of separation or overlap are possible. It follows that in the course of the merger, both speakers and analysts will perceive more cases of an approximation ('close'). Nevertheless, it seems clear from Map 8.2 that the merger of /ohr/ and /ɔhr/ is proceeding at a rapid rate.

Again, a close correspondence is shown with the PEAS records: there are only merged speakers (yellow circles) within the blue isoglosses indicating a merger in the earlier study. As the general principles of merger predict, there are no reversals but only expansion of the merger. The red oriented isoglosses delimit those areas where a majority register less than complete merger. More consistent survivals appear in northeastern New England than in Map 8.1, but the areas of the South that retain traces of the distinction are much more restricted.

The small South Midland area of unmerged speakers on Map 8.2 includes St. Louis. This reflects the retention of the traditional merger of /ahr/ and /ɔhr/ in St. Louis, where *are* and *or* merge in sharp contrast with *ore; far* and *for* are identified in low back position as against upper-mid back *four*. In Dallas, four of the six subjects showed evidence of the /ohr/ ~ /ɔhr/ distinction. (See the discussion of the /ahr/ ~ /ɔhr/ merger below.)

The evidence from the 439 Telsur subjects whose data was analyzed acoustically reinforces the view that the distinction of /ohr/ and /ɔhr/ is rapidly disappearing. Acoustic plots of the speakers represented by red circles in Map 8.2 do not usually show a clear separation of the two categories. Figure 8.1 is a view of the vowel system of a speaker from Providence (expanded to double scale) that reflects the earlier state of the opposition. The highest and backest vowels in the array are /ohr/: *porch*, *four*, *sport*, *Portugal*. In lower mid position are the /ɔhr/ words *short*, *corporate*, *normal*, *horse*, *important*, *York*. Between the two means, in the area of overlap, we find a mixture. The table shows that the two mean values are significantly distinct, particularly in the F1 dimension. Yet such statistical separation is not the mark of a healthy phonemic opposition. There is no overlap at all between /ahr/ and /ɔhr/ in the system of this Providence speaker.

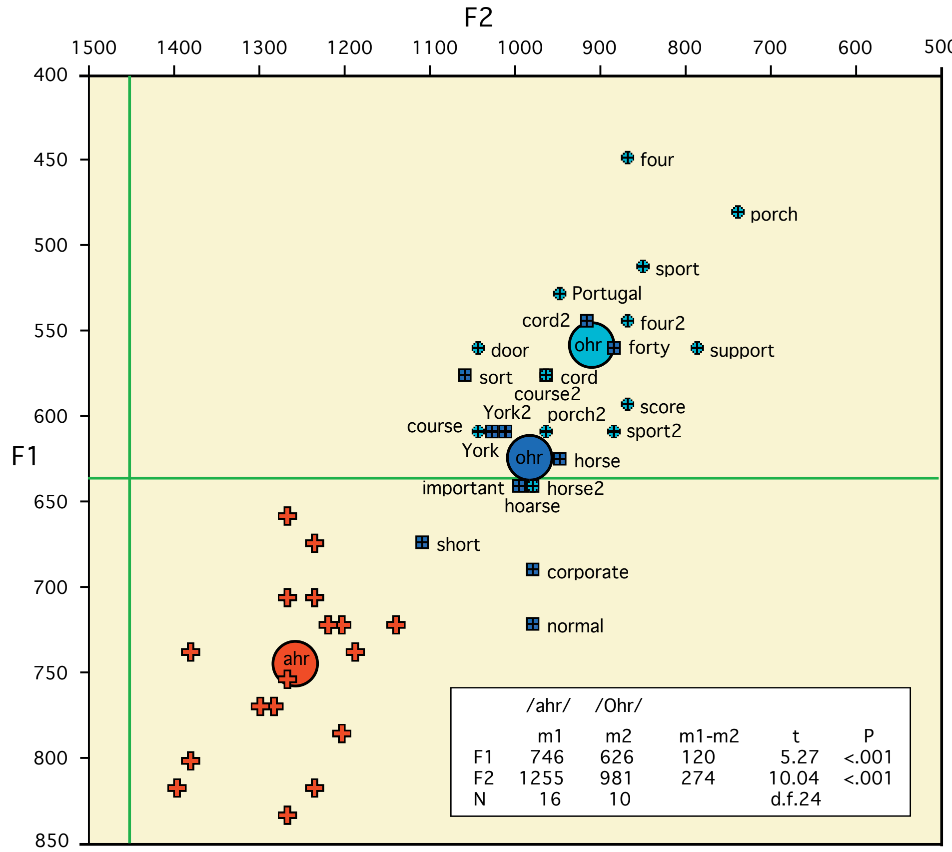


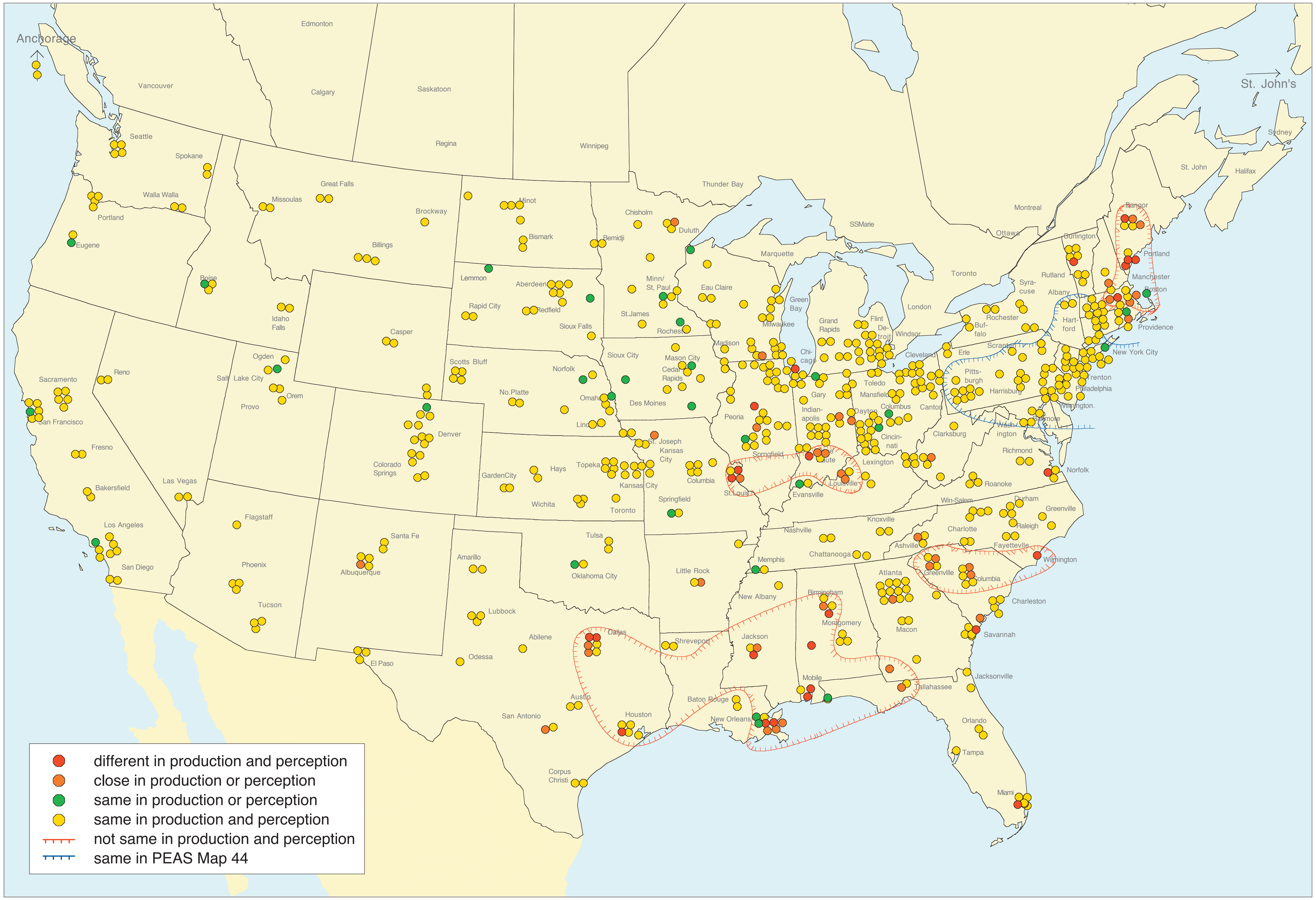
Figure 8.1. Back vowels before /r/ in the vowel system of Alex S., 42, Providence, RI, TS 474. Double scale. /ɔhr/ labeled as /Ohr/

8.3. The merger of /ahr/ and /ɔhr/

Labov, Yaeger, and Steiner (1972) describe the relations of /ahr/, /ɔhr/, and /ohr/ in the Southwestern United States, where the normal situation is for the second and third in the series to be merged. Indeed, Map 8.2 shows a solid array of yellow circles in the West, where /ohr/ and /ɔhr/ have uniformly fallen together. In central Texas, it is not uncommon to find speakers with the first two phonemes merged, so that *are* and *or* are homonyms in low central position, remote from upper mid back *ore*.[3] The merger of /ahr/ and /ɔhr/ is widely reported for the Salt Lake City dialect, where it is represented as a reversal in popular stereotypes with the fixed phrase, "Put the harse in the born". In both Texas and Utah, the

2 Several of the regional Telsur forms omitted this contrast from their queries, so data is available for only 645 of the 762 subjects. No data is shown for Canada, where the distinction has never been recorded.

3 In the trajectory from the Southwest to central Texas, LYS found that speakers in Sonoma, Texas were the only ones to show the three back vowels before /r/ distinct.



Map 8.2. The merger of /ohr/ and /ɔhr/

In the middle of the twentieth century, the distinction between /ohr/ and /ɔhr in *four* vs. *for*, *hoarse* vs. *horse*, etc. was maintained by most American speakers, with the exception of the Midland area, centered around Philadelphia, the Mid-Atlantic area, New York, and the Hudson Valley. In the ANAE data, this distinction is made only by a scattering of speakers in Eastern New England, southern Illinois and Indiana, and the Gulf States.

merger takes place in low position, but the traditional dialect of St. Louis features a merger of /ahr/ and /ɔhr/ in lower mid back position.

This distinction was investigated in the Telsur survey with minimal pair *card* ~ *cord*. If this pair was 'close' or 'the same', the subject was asked about the minimal pair *barn* and *born*.[4] Of all 762 Telsur subjects, only 29 showed any deviation from the norm that /ahr/ and /ɔhr / are different in both production and perception. These speakers are scattered about the United States with no particular concentration in the North, South or West, except for one city, St. Louis. Here three of the four Telsur subjects showed evidence of the /ahr/ ~ /ɔhr / merger. Only the youngest distinguished this pair clearly. The St. Louis speakers show the progress of the merger:

	Age	Judged	Pronounced
Judy H.	57	same	same
Martin H.	58	same	close
Joyce H.	53	close	close
Rose M.	38	different	different

Figure 8.2 shows an expanded view of the three vowels in the system of Judy H. The /ahr/ and /ɔhr/ distributions are clearly merged in mid back position, with identical means and an even admixture of the two categories in a globular dispersion. The /ohr/ vowels are higher and backer, with F1 200 Hz lower and F2 300

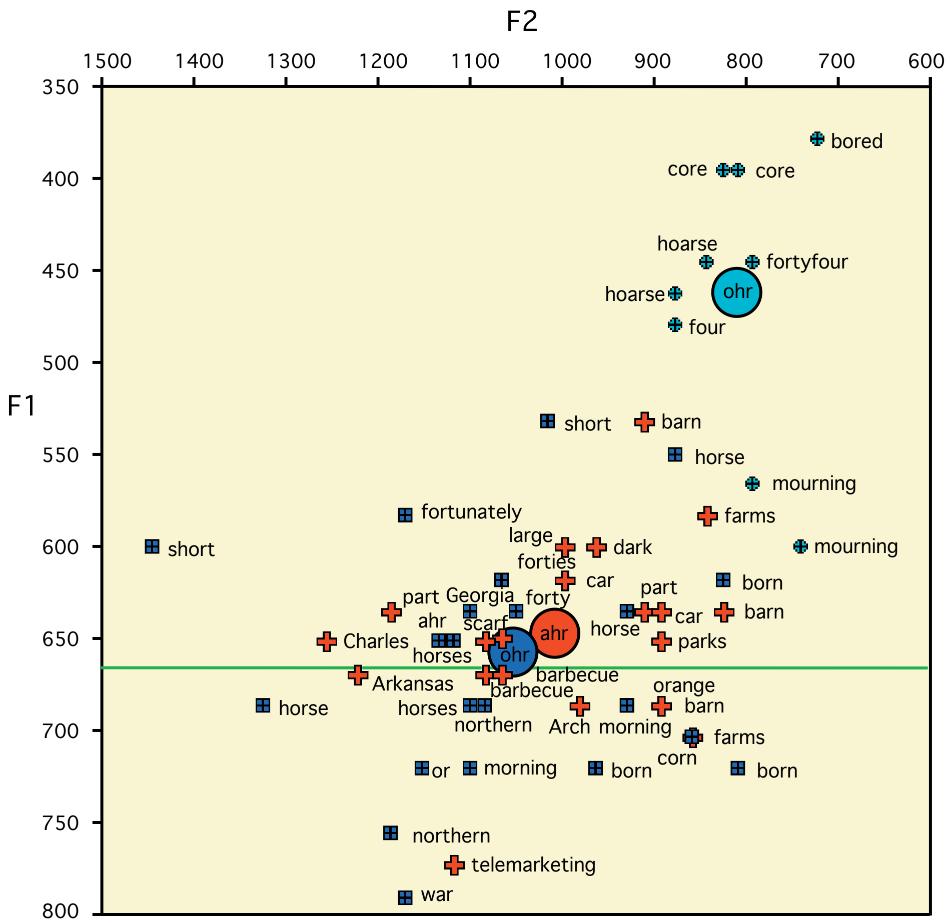


Figure 8.2. Back vowels before /r/ in the vowel system of Judy H., 57, St. Louis, MO, TS 109. Double scale. /ɔhr/ labeled as /Ohr/

Hz lower. The main /ohr/ group with *hoarse* and *four* is tightly clustered about the mean. The *four* of *forty-four* is widely separated from the vowel of *fortunately*, *forties*, and *forty*, which are intermixed with *part*, *car* and *dark*.[5] It appears that the clear separation of /ohr/ and /ɔhr/ in current North American English occurs only when /ɔhr/ is merged with /ahr/. This pattern may still be found in many speakers in Utah and Texas, as in St. Louis, even though the small Telsur sample did not select them.

8.4. The merger of /iw/ and /uw/

The word class labeled /iw/ in the initial position of ANAE is the reflex of Middle English /iu/, which was derived from a large variety of sources (Jespersen 1949: 3.8).

(1) OE **iw** as in *Tiwesdæg* 'Tuesday'
(2) OE **e:ow** as in *e:ow*, 'you'
(3) French **iu** as in *riule* 'rule'
(4) French unstressed **e+u** as in *seur* 'sure'
(5) French **u** as in *rude*
(6) French **ui** as in *fruit*
(7) French **iv** as in OF *sivre* → M.E. *sewe* 'sue'

In modern English, these seven were joined by an eighth, which was distinct in Middle English

(8) OE **e:a** as in *de:aw* 'dew'

Although some scholars believe that this vowel was once equivalent to French front rounded [ü], Jespersen argues that it was consistently a rising diphthong /ju/, which in terms of our notation is /juw/. The /j/ glide was generally maintained after labials and velars (except in Norfolk and a few other sites in England). In North America, the glide has been variable after apicals. In many cities, it became a marker of refined speech and varied according to the preceding context: the probability of a /y/ glide is greatest after /t/ in *tune*, etc. and least after /l/ and /r/ in *lewd* and *rude* (where it is also frequently deleted in British English).

The status of vowels after palatal consonants is not always clear. The co-articulatory effect of initial palatals with /uw/ as in *choose* may be strong enough to eliminate the difference between this /uw/ and /iw/ after palatals in *juice*, *chew*, etc.

Map 33 of PEAS shows the diphthong /iu/ after labials (in *music*) as well as after apicals (in *dues* and *tube*), but only in New England. Map 164 of PEAS focuses on the word *new*. It shows consistent /u/ (ANAE /uw/) in the Midland, an alternation of /u/ and /iu/ in the North, and consistent /ju/ in the South. Map 165 of PEAS is a similar display for *Tuesday*, which differs primarily in showing a palatal affricate in the South, alternating with /tju/.

The situation has changed radically in the half-century since the LAMSAS data were gathered. First, the initial /j/ glide has disappeared: the Telsur interviews show no trace of it in the North or the South. Secondly, almost all North American dialects have undergone massive fronting of the nucleus of /uw/, especially after coronals; this is the topic of Chapter 12. In the areas where the front-

4 These pairs were not used in the Canadian Telsur procedures.
5 *Mourning* is much lower, but slightly backer than the other vowels. It may have joined the /ahr ~ ɔhr/ category for this speaker.

ing of /uw/ is most advanced – Philadelphia, Pittsburgh, and the Inland South – the nucleus of /uw/ is in non-peripheral front position. Although this phoneme still belongs to the historical word class /uw/, its nucleus is often unrounded and there would seem to be little room for a distinction between /iw/ in *dew*, *tune* and /uw/ in *do*, *too*. Nevertheless, we find the distinction is sometimes maintained even when all /uw/ vowels are fronted.

Figure 8.3 shows a consistent distinction between /iw/ and /uw/ in the vowel system of Lillian S., 58, of Colquitt Georgia. The /iw/ class represented by *Tuesday* and *dew* is concentrated at an F2 of 2400 Hz, while the large group of /uw/ words after coronals – *do*, *two shoe* – is focused around an F2 of 2000 Hz. In this extremely advanced system, even the /uw/ words after non-coronals – *group*, *roof*, *food*, *movement* – are front of the 1550 Hz center of the normalized system. More striking still is the extension of moderate fronting to vowels before /l/, an environment that resists fronting in other regions of North America; one token of *school* has reached the center of the vowel space.

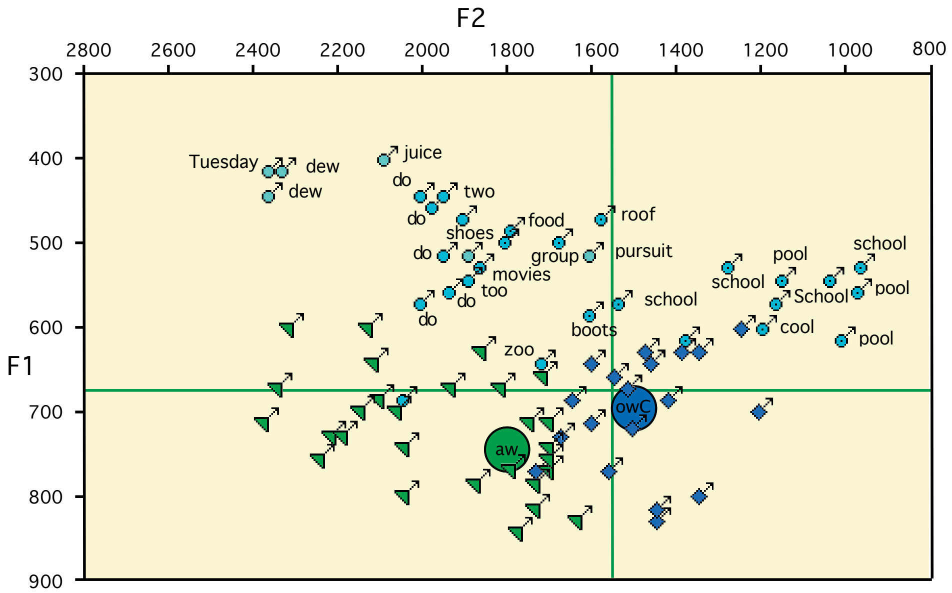
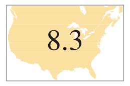


Figure 8.3. Back upgliding vowels of Lillian S., 58, Colquitt, GA



The Telsur survey inquired into the status of the contrast between /iw/ and /uw/ through the minimal pair *dew* ~ *do*. Although there were a few scattered subjects in the North who showed an acoustic distinction between the two word classes, acknowledgment of a distinction in the minimal pair test was basically confined to the South. Map 8.3 shows the various degrees of recognition of the contrast in the Southern region, using the same categories as in Maps 8.1 and 8.2. The red circles represent speakers who showed the contrast in both production and perception (N = 30); the orange circles are speakers for whom the contrast is judged 'close' in perception and/or production (N = 9); and the green circles indicate those for whom the contrast was missing in either production or perception but not both (N = 24). The predominant pattern is complete merger in production and perception (N = 226).

There are only two areas in the South where the contrast still predominates, and in both it is the concentration of speakers with a firm contrast (red circles) that delineates the geographic pattern. One area is in central North Carolina, and the other is in the Gulf States – southern Georgia, Alabama, Mississippi. There is a scattering of points in central Texas, but they are not coherent enough to outline a geographic area.

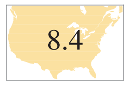
The purple isoglosses in Map 8.3 are superimposed from the study of the acoustic patterns of 439 Telsur subjects who constitute the main data base for Chapters 11 to 20. They outline areas where the F2 distinction between /iw/ and /uw/ is strong enough to be evaluated statistically at p < .05. The purple isogloss is the area where half or more of the speakers in a community display this type of difference. There is a high degee of coincidence with the red isogloss in North Carolina.

The distinction between /iw/ and /uw/ is maintained primarily in North Carolina, but it is still represented to a lesser degree in the lower Gulf states. The earlier opposition of /juw/ and /uw/ after coronals has disappeared. We do not know the extent to which this was transformed into a contrast between /iw/ and /uw/ when the /j/ glide disappeared, as indicated in the Kenyon and Knott notation of /iu/ for *dew*, *tune*, etc. However, the /iw/ ~ /uw/ opposition is not maintained by the great majority of North American speakers.

8.5. Merger before intervocalic /r/

The vowel classes before intervocalic /r/ are presented in Figure 2.5, showing the initial position for vowels before intervocalic /r/. As is pointed out in that chapter, the contrast between long and short high and mid vowels is still maintained in initial position, so that the vowel of *Mary* is associated with the /ey/ of *mate*, the vowel of *merry* with the /e/ of *met* and the vowel of *marry* with /æ/ of *mat*.

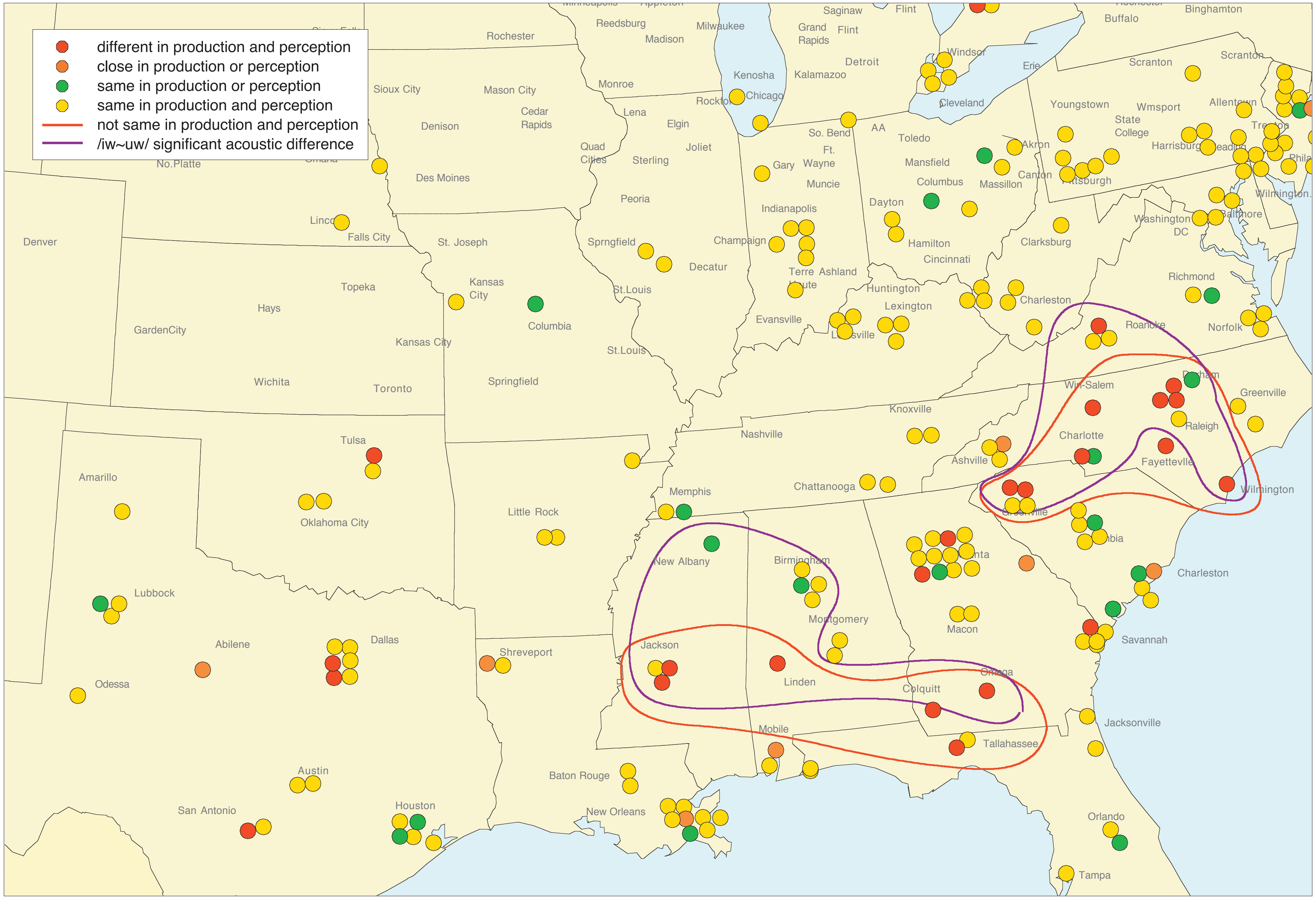
Maps 49 to 51 of PEAS show that in the mid-twentieth century, a very large part of the Eastern United States maintained a difference between *Mary*, *cherry*, and *marry*. The vowel of *marry* appears as /æ/ in most of the eastern United States, except for western New England (and a few points in southern Maine and New Hampshire, western New York, and West Virginia). The vowel of *Mary* maintains its upper mid quality in most of the North and the South, with the Midland and eastern New York State showing a short vowel. In the intervening period, the two mergers have progressed almost as far as the three preceding cases.



Map 8.4 presents the data differently from the previous three maps, since two oppositions are involved; it looks at production rather than perception.[6] The great majority of symbols are blue circles, indicating the merger of both pairs. The red circles represent the speakers who have both distinctions firmly in place. They are concentrated in two areas: southeastern New England and a Mid-Atlantic region including New York and Philadelphia, but not the rest of the Mid-Atlantic area to the south. A third major type is shown by the green symbols: *Mary* merged with *merry*, but *marry* distinct. In the South, one can observe a wide distribution of these green symbols, they also characterize Montreal in Canada. The rest of the continent is dominated by a uniform distribution of blue symbols, representing speakers with both mergers.

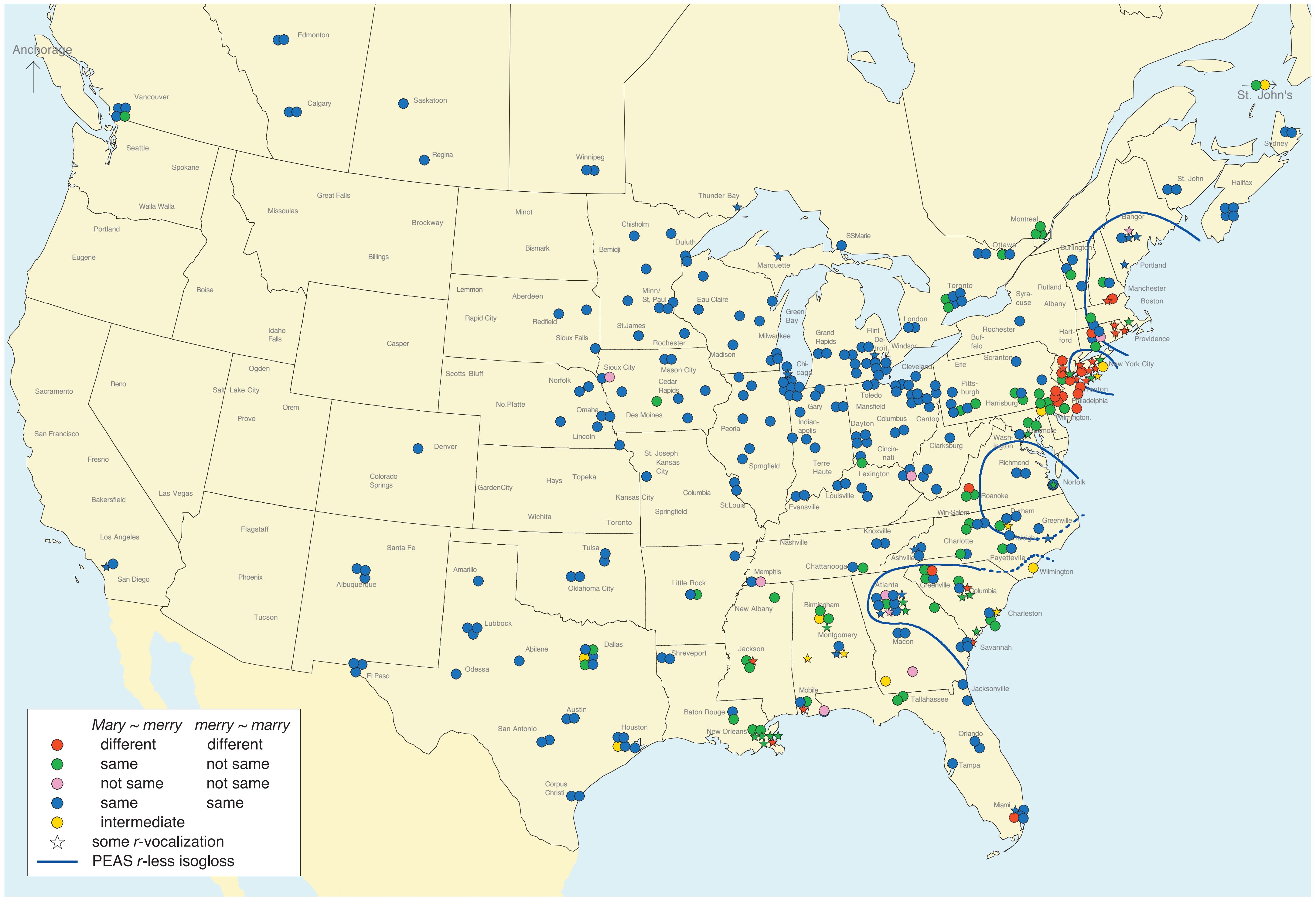
The belt of red symbols in the Philadelphia area is the result of a slightly more complex phenomenon than we find in the rest of North America. While /ey/, /e/, and /æ/ are distinct before intervocalic /r/, /e/ is not independent of /ʌ/ in that position. Philadelphia shows a centralization of /e/ before intervocalic /r/ in words such as *very*, *terrible*, *Merion* as well as *merry* and *ferry*. The vowels of *ferry* and *furry*, *merry* and *Murray* are distinct for about one third of Philadelphia speakers, totally merged for another third, and in a state of near-merger for the remainder. In the near-merger condition, speakers produce a consistent, statistically significant difference between the two classes, sometimes with no overlap,

6 This query was not pursued in most areas of the West and Midwest, so that data is shown for only 398 of the 762 subjects.



Map 8.3. The merger of /iw/ and /uw/

This contrast of *dew* vs. *do*, *lute* vs. *loot*, etc. was once maintained after coronal consonants by speakers who had lost the /y/ glide in *dew*, *new*, *tune*, etc. It is disappearing rapidly. It is found today only in a minority of speakers in the South, concentrated in central North Carolina and the lower Gulf States.



Map 8.4. The merger of /ey, e, æ/ before intervocalic /r/

The great majority of North Americans pronounce *Mary*, *merry*, and *marry* as the same. A contrast of all three is maintained in the Mid-Atlantic states. *Merry* and *marry* are kept apart by a fair number of speakers in New England and the South as well as in Montreal, Quebec.

but they label the two as ‘the same’ in minimal pair tests and fail to discriminate them in commutation tests (Labov, Karan, and Miller 1991).

The merger of the low and mid-front vowels before intervocalic /r/ is not an isolated phenomenon. The tense and lax high front vowels are also widely merged among younger speakers in pairs like *nearer* and *mirror*, *spear it* and *spirit*. It seems clear that the erosion of contrast before intervocalic /r/ continues the trend towards *r*-constriction discussed in Chapter 7. In *r*-less dialects, intervocalic /r/ normally forms the onset of the second syllable, while in *r*-ful dialects it is ambisyllabic and exerts a strong influence on the preceding vowel. Map 8.4 shows speakers with some degree of *r*-lessness as stars. It is evident that there are very few star symbols that are blue; that is, vocalizaton of coda /r/ is associated with retention of the contrast before intervocalic /r/.

9. North American mergers in progress

9.1. The low back merger

The vowel inventories of the dialects of North American English differ in many ways. Most of these differences concern the loss or maintenance of contrasts in restricted environments, before liquids or nasals. The major unconditioned merger is the loss of contrast between the short-*o* class of *got*, *rock*, *top*, etc., and long open-*o* in *law*, *talk*, *caught*, etc. Before presenting the geographic extent of the merger, it will be necessary to examine the history and composition of these two classes and introduce several other word classes involved in the merger.

The short-*o* class. The phoneme labeled /o/ in the subsystem of short vowels in the initial position of Chapter 2 is a broadly distributed set of common words. It descends historically from M.E. short **o** which is for the most part a continuation of O.E. short **o** (*hop*, *god*, *dog*, *pot*, *cock*, *on*), with only a few shortenings from O.E. **o:** (*soft*). Some M.E. **o** words are direct borrowings from French. In addition, a small set of words with original **a** was rounded after /w/ to merge variably with the short-*o* class: *watch*, *wallet*, *want*, *wander*, etc.[1] As the first two columns of Table 9.1 show, short-*o* is represented before all but two consonants, /v/ and /zh/ (Jespersen 1949: 90–91).[2]

The long open-*o* class. In contrast, the long open-*o* class has a highly skewed distribution that reflects the complex and irregular history of its composition. Present-day long open-*o* is primarily the result of monophthongization of **au** in *law*, *fault*, *talk*, *hawk*, *caught* (Jespersen 1949: 311ff). This M.E. **au** was in turn derived from a wide variety of sources: O.E. **aw** (*thaw*, *straw*, *claw*); O.E. **ag** (*maw*, *saw*, *draw*); O.E. **ah,** broken to **eah** (*fought*, *taught*); O.F. **a + u** in the next syllable (*brown*, *pawn*), M.E. **av** (*hawk*, *laundry*); O.F. **au** (*applaud*, *fraud*, *because*); O.F. **am, an** (*lawn*, *spawn*). In addition, some long open-*o* is descended form O.E. **oht** (*thought*, *daughter*, *brought*). Despite this variety of historical origins, the environments in which **au** occurs are quite limited. As shown in the examples just given, and in the third column of Table 9.1, **au** occurs principally before /t, d, k, z, n, l/ and finally.

The column "o → oh" of Table 9.1 shows the set of short-open-*o* words that have shifted to /oh/ before voiceless fricatives and back nasals.[3] These are limited to specific phonetic contexts: voiceless fricatives and (back) nasals. Lexical variation is characteristic of this entire set, and is particularly marked in the case of short-*o* before /g/. Here *dog* is the most commonly found shifted to the /oh/ class, with extensive dialect variation in other words before /g/: *fog*, *log*, *hog*, *frog*, etc. The lengthening process occurred by lexical diffusion, so that uncommon words (like *Goth*, *toff*, or (*ping*)*pong* were frequently unaffected. The process was also sensitive to prosodic constraints, so that polysyllables such as *hospital*, *toggle* and *soggy* remain in the lax class for most speakers.

Though the tensing of short /o/ is phonetically conditioned, the phonetic environments selected were limited by the phonological contrasts that already existed. It occurred primarily in those phonetic environments that were not represented in the /oh/ set. To the extent that the tensing of short /o/ was regularly conditioned by phonetic factors, it did not increase the degree of contrast between /o/ and /oh/. It did obscure the orthographic basis for the contrast. Moreover, the contrast between the majority of frequent forms that were tensed and the minority of infrequent forms that were laxed added to the lexical contrast that maintained /o/ and /oh/ as separate phonemes.

Table 9.1. Distribution of open-*o* classes in North American English by following segment. Words entered in each column are representative of common words; parenthesized forms are small or marginal word classes

	o	o → oh	*oh*
p	hop		
t	hot		caught
/č/	Scotch		(debauch)
k	lock		hawk
b	hob		(daub, bauble)
d	hod		(sawed)
ǰ	lodge		
g	log	dog	(auger, augment, augur, August)
f	(toff)	off	
s	hospital	loss	(sauce, exhaust, caustic)
/θ/	(Goth)	cloth	
/š/	(Gosh)		
v			
z	positive		clause, hawser
/ð/	bother		
/ž/			(nausea, nauseous)
m	bomb		
n	don	(on)	haunt
ŋ	(Kong)	song	
l	doll		all
#			law

The highly skewed distribution of /oh/, a product of its historical formation, must be considered one of the factors in its unstable relation to /o/. The unpredictability of the /oh/ distribution after /o/ tensing is a second such factor.[4] As a result, the relation between /o/ and /oh/ has undergone a variety of changes:

1. Merger of /o/ with /oh/
2. Unrounding of /o/ to /a/ with subsequent increase of the qualitative difference between /o/ and /oh/ by
   a. fronting of /o/ to low central position (the Inland North)
   b. raising of /oh/ to mid or high back position (Mid-Atlantic States)
3. Development of a back upglide for /oh/ (the South).

1 But not before velars, where /æ/ is retained (*whack*, *wagon*, *wax*, *waggle*, etc.).
2 In British English, *of* retains a rounded vowel when fully stressed, but not in North American English.
3 This occurred generally in southern England and became embedded in earlier RP, but it has now been generally reversed in RP. It is now principally a characteristic of North American English.
4 It can also be pointed out that /oh/ is frequently ignored in phonics texts, partly as the result of the fact that there is no single spelling pattern that serves as a cue for readers

Chapter 11 discusses the regional differentiation of these three processes as the basis for a classification of North American dialects. This chapter is concerned with the geographic distribution and mechanism of the merger. It will also deal with the relation of /o/ and /oh/ to the /ah/ class in *father*, *ma*, *spa*, and the larger "foreign a" class.

Map 9.1 shows the distribution of the complete merger. The Telsur survey regularly elicited the contrast before /t/ in *hot* and *caught*, before /k/ in *sock* and *talk*, before /n/ in *Don* and *dawn*, and before /l/ in *dollar* and *caller*. The green symbols represent speakers for whom /o/ and /oh/ are identical before all these allophones in both production and perception; that is, the speaker judged them to be 'the same' and the analyst heard the productions as 'the same'. The green isogloss outlines the areas of merger: Canada, the West, Eastern New England, and western Pennsylvania. The western Pennsylvania merger, now extending through West Virgina to Lexington, Kentucky, must be shown as a separate area from the Canadian merger on the other side of Lake Erie, since joining the two within a single isogloss would imply a continuity of speech across the water. In fact, where Canadian and American speech communities face each other on either end of Lake Erie, a Canadian merger is starkly opposed to an American distinction (Boberg 2000). By contrast, along the 49th parallel between the western halves of Canada and the United States, two large areas of merger are in direct contact, allowing them to be included within a single isogloss. The low back merger does not define any one dialect region but embraces several of the regions to be defined in Chapter 11, including roughly half of the geographic territory that the Atlas covers. The parameters of this isogloss are shown in Table 9.2. Homogeneity is only moderately high, since the change is still in progress, particularly in the West. The consistency parameter is much higher, indicating that the isogloss succeeds in containing a very large part of the merger, or conversely, that resistance to the merger is strongly motivated in the areas outside the isogloss (by factors to be discussed in Chapter 11).

9.1

Table 9.2. Isogloss parameters for the low back merger

	Total merged	Total within isogloss	Merged within isogloss	Merged outside isogloss	Homogeneity	Consistency	Leakage
/o/ ~ /oh/	169	235	145	24	0.62	0.86	0.09
__nasals only	68		24	44			

The low back merger is favored in syllables closed by nasal consonants.[5] On Map 9.1, red circles represent the speakers for whom the merger takes place before nasals only. It is clear that the merger is more advanced before nasals than in any other environment. At the same time, there is no evidence of a different geographic pattern for the merger before nasals: the red circles outside of the green isogloss are scattered throughout the South and the Midland. The 24 additional points within the isogloss make the merged region appear more homogeneous, but the 44 points outside of the isogloss are not concentrated in any way.

Age differentials within the Telsur sample permit a study of change in apparent time. The Telsur ratings of minimal pair tests are 0 for 'the same', 1 for 'close' and 2 for 'different'. Adding values for production and perception yields a scale from 0 to 4 where 0 indicates no distinction at all ('the same' in both production and perception) and 4 indicates a complete distinction ('different' in both production and perception). Table 9.3 shows a sizeable age coefficient for the continent as a whole of 0.43. For each 25 years of age, the merger can be expected to advance .43 units on the four-point scale. Naturally, this movement in apparent time is not uniform throughout the continent. Rather, it reflects the status of the merger in each region as complete, in progress, or absent. The rest of Table 9.3 shows the advance of the merger in nine dialect regions of North America (as defined in Chapter 11). The regions are listed in the ascending order of the regression constant, so that the areas with the most complete merger are listed first, and succeeding listings correspond to increasing resistance to the merger. Four regions show significant age coefficients, all in the direction of increasing merger (younger speakers have lower values). Two of these areas, Eastern New England and the West, are within the low back merger isogloss. The merger appears still to be progressing towards completion in both regions. Two, the South and the Midland, are outside the isogloss, where the shift towards merger may represent a change from 'different' to 'close'.

Table 9.3. Age coefficients for the low back merger by region. Contrast scale is defined by 0 for complete merger and 4 for complete distinction.

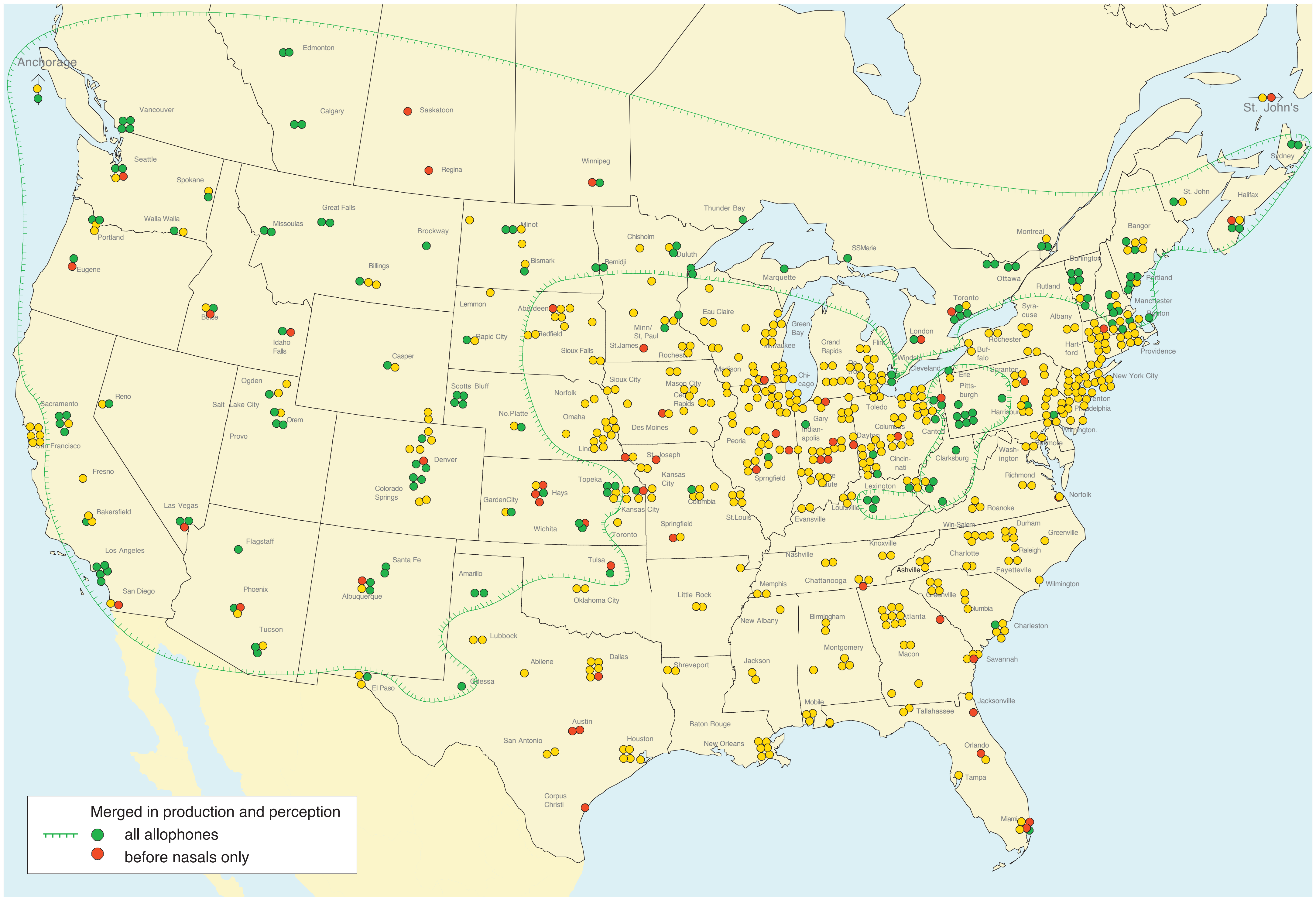
	Constant	Age * 25 yrs	Prob.
All regions	1.35	0.43	.02
Western Pennsylvania	–0.28		
Eastern New England	–0.07	0.63	.03
West	0.21	0.30	.03
Canada	0.54		
Midland	1.38	0.33	.02
South	1.60	0.65	<.0001
North	1.90		
Inland North	3.31		
Mid–Atlantic	3.39		

As Chapter 11 will show, the resistance of the North and the Mid-Atlantic areas to the merger is largely based on the presence of chain shifts that maintain the separation of /o/ and /oh/. Map 9.2 adds the designation of speakers for whom there is no trace of the low back merger: all /o/ vs. /oh/ words were judged to be distinct in both production and perception (blue circles). These speakers are concentrated in three areas, which are defined by the results of acoustic measurements drawn from Chapters 11 and 14:

9.2

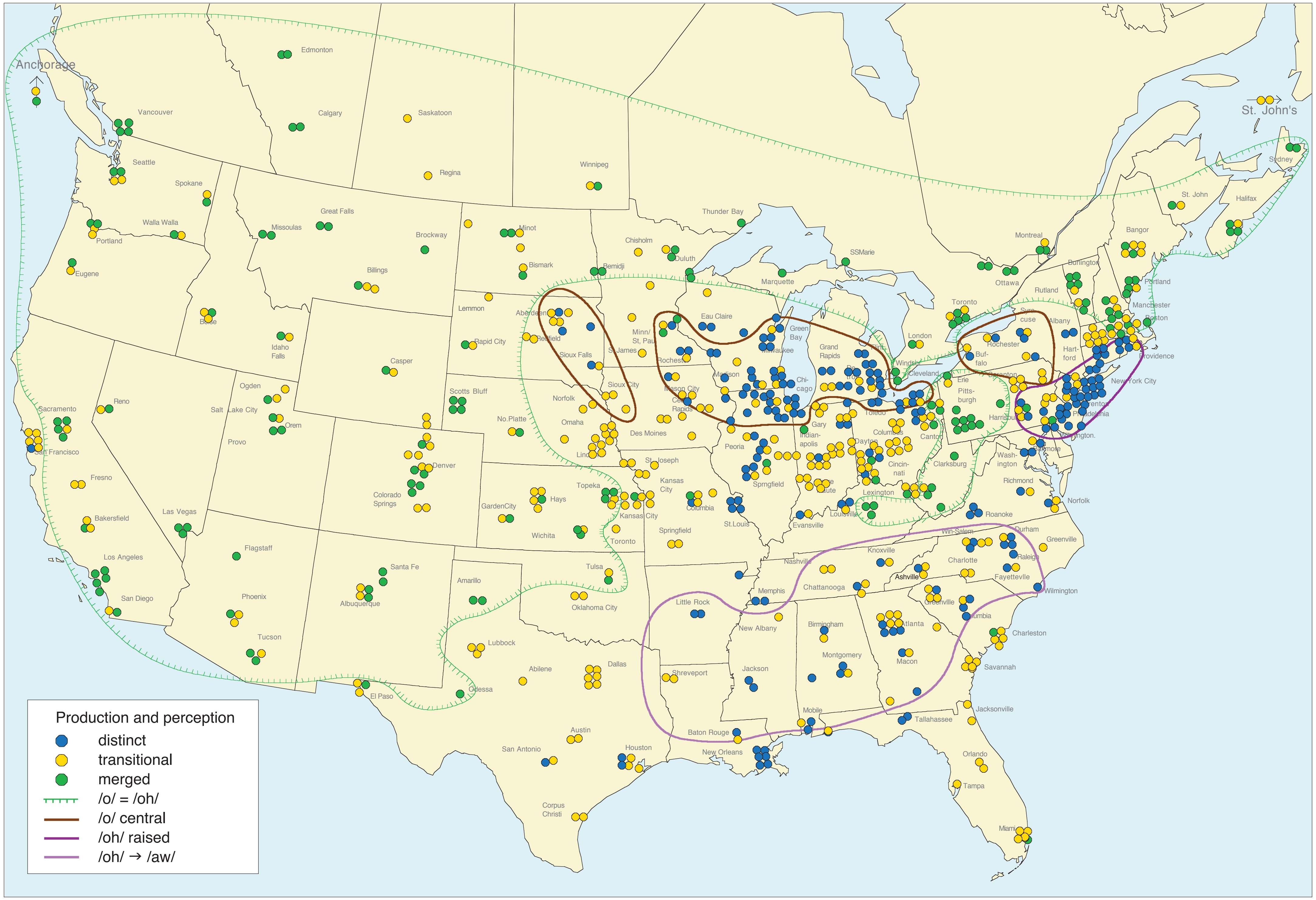
1. The Inland North, including western New York, the area around the Great Lakes, and, less consistently, a narrow corridor running down from Chicago to St. Louis (Chapter 14). In this region, the separation of /o/ and /oh/ is maintained by the fronting of /o/. The blue circles are seen to be contained within the brown isogloss, which identifies the regions where the majority of speakers have fronted /o/ (greater than 1450 Hz).[6]
2. The Mid-Atlantic area, extending from Providence to New York City, Philadelphia, Wilmington, and Baltimore. In this area, defined by a purple isogloss, the low back merger is inhibited by the raising of /oh/ to mid and high back position (F1 < 700 Hz).
3. The South. In most of the South, /o/ and /oh/ both show the same low back rounded nucleus, but /oh/ is distinguished from /o/ by the presence of a back upglide. Frequently, the nucleus of /oh/ is fronted and unrounded, so that /oh/ effectively shifts to the back upgliding subsystem, becoming a new /aw/ back of the older Southern /aw/, which has fronted to /æw/ (see Chapter 18). The

5 Essentially /n/, since /oh/ does not occur before labials and rarely before oral velars.
6 The brown isogloss does not extend to the St. Louis corridor, since only two of the four St. Louis speakers satisfy this criterion, and none of the subjects is located in the corridor.



Map 9.1. The low back merger

The merger of /o/ and /oh/ in *cot* vs. *caught, Don* vs. *dawn*, *sock* vs. *talk*, is characteristic of a very large part of the geographic terrain of North America. The green symbol, showing a complete merger for all such pairs, is the dominant type in Canada, the West, Eastern New England, and western Pennsylvania. The merger tends to occur first before nasal consonants, as in *Don* vs. *dawn*. The red symbols indicate Telsur speakers who have the merger only in that environment. However, the outer limit of merger before nasals is no different from the general isogloss, represented by the oriented green line.



Map 9.2. Resistance to the low back merger

This map focuses on the regions that show the most complete resistance to the low back merger. All three areas are of course outside of the oriented green line that outlines the region where the merger is dominant. The light brown isogloss shows the area of the Inland North where /o/ is strongly fronted and consequently remains distinct from /oh/. The purple isogloss identifies the strip along the Atlantic Coast from Providence down to Baltimore, where /o/ and /oh/ are kept distinct by the opposite sound shift, the raising of /oh/. The magenta isogloss outlines that region of the South where the two sets of words are kept distinct by the back upglide on /oh/. This region is the most susceptible to the merger wherever the back upglide is beginning to disappear. All other areas outside of the green isogloss may be considered transitional. The Midland in particular is dominated by the yellow symbols that identify speakers for whom the pairs are 'close' in production and/or perception.

concentration of blue symbols in the South is not as great as in the other areas. Map 9.1 shows there is virtually no complete merger in the South, but there are a dozen red circles indicating merger before nasals. Feagin 1993 first observed a low back merger in Alabama with the loss of the back upglide among some younger speakers, and there is other evidence of sporadic merger in the South.

Progress of the low back merger by region

The geographic boundaries of the low back merger are not used to define the regional dialects of North American English, since they tend to expand beyond the boundaries first established by settlement history and beyond the limits of the systematic chain shifting that are used to define regional dialects in Chapter 11. Nevertheless, there is a high degree of differentiation by regional dialects, and while the status of the low back vowels is not sufficient on its own to identify uniquely any of the dialects established in Chapter 11, each of these dialects is unified with respect to the status of the low back merger.

We can compare the results of the minimal pair tests across the regions established in Chapter 11 on the basis of acoustic measurement. In Figure 9.1 the vertical axis represents the overall response to the five minimal pairs contrasting /o/ and /oh/, where *same* means 'same' for all allophones, *different* means 'different' for all allophones, and *transitional* stands for any other pattern of response. The regions are ordered by frequency of 'same' responses (dark blue line), ranging from 0 percent for New York City on the left to 87 percent for Canada on the right. For the three dialects on the left (NYC, Inland North, and Mid-Atlantic) there is almost no trace of the merger. For the middle dialects (South, Midland, North outside of the Inland North, and Eastern New England) the frequency of *same* response ranges from 16 to 50 percent. For the three dialects on the right (West, western Pennsylvania, and Canada) the merger strongly predominates.

The yellow line indicating the percent of *different* responses is naturally the converse of the dark blue line, but is somewhat more categorical. The three dialects which most strongly maintain the distinction are more clearly separated from the others, and on the right, Eastern New England joins the merged dialects in showing 0 percent *different* responses.

The percent of *transitional* responses peaks sharply in the Midland, as the yellow symbols of Map 9.2 indicate.

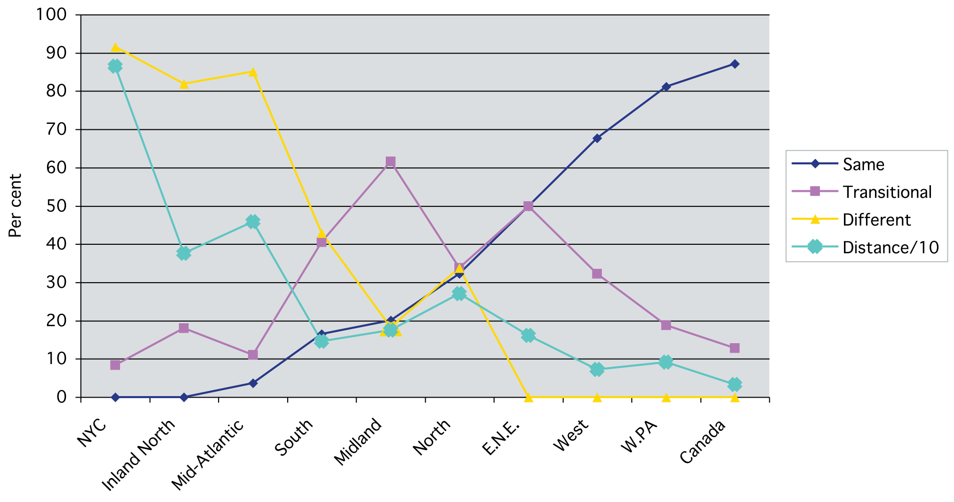


Figure 9.1. Perception of /o ~ oh/ minimal pairs by region compared to acoustic distance

The light blue line registers the Cartesian distance in Hertz between the means of /o/ and /oh/ on the F1/F2 plane, with the additional modification that if /o/ is higher or backer than /oh/, the value is set to 0. This distance ranges from 865 to 0; divided by 10, it can be superimposed on the percent values of Figure 9.1. New York City shows the highest value, a consequence of the extreme raising of /oh/, but all three unmerged regions show a substantially greater distance between /o/ and /oh/ than the other regions. The three regions on the right are the only ones for which the distance value is less than 10.

Figure 9.2 shows the corresponding values for production. The distance figures remain the same, while the percentages now indicate the analyst's judgment of the speaker's pronunciation of the minimal pairs. The results are almost identical. This indicates that the speaker's judgments are not heavily affected by any tendency towards correction of a stigmatized form or exaggeration of a prestige norm.[7] Like other mergers, the fusion of /o/ and /oh/ takes place below the level of social awareness and is normally not the focus of sociolinguistic evaluation.

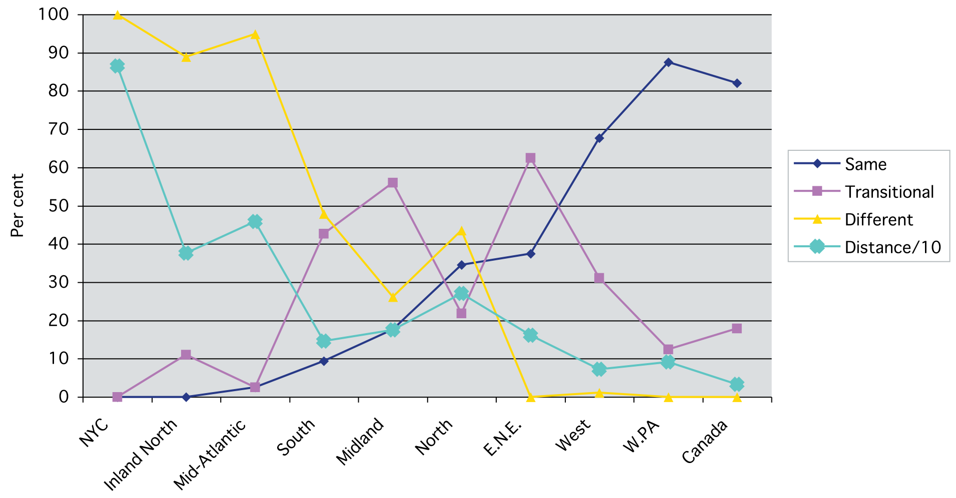
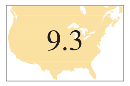


Figure 9.2. Production of /o ~ oh/ minimal pairs by region compared to acoustic distance

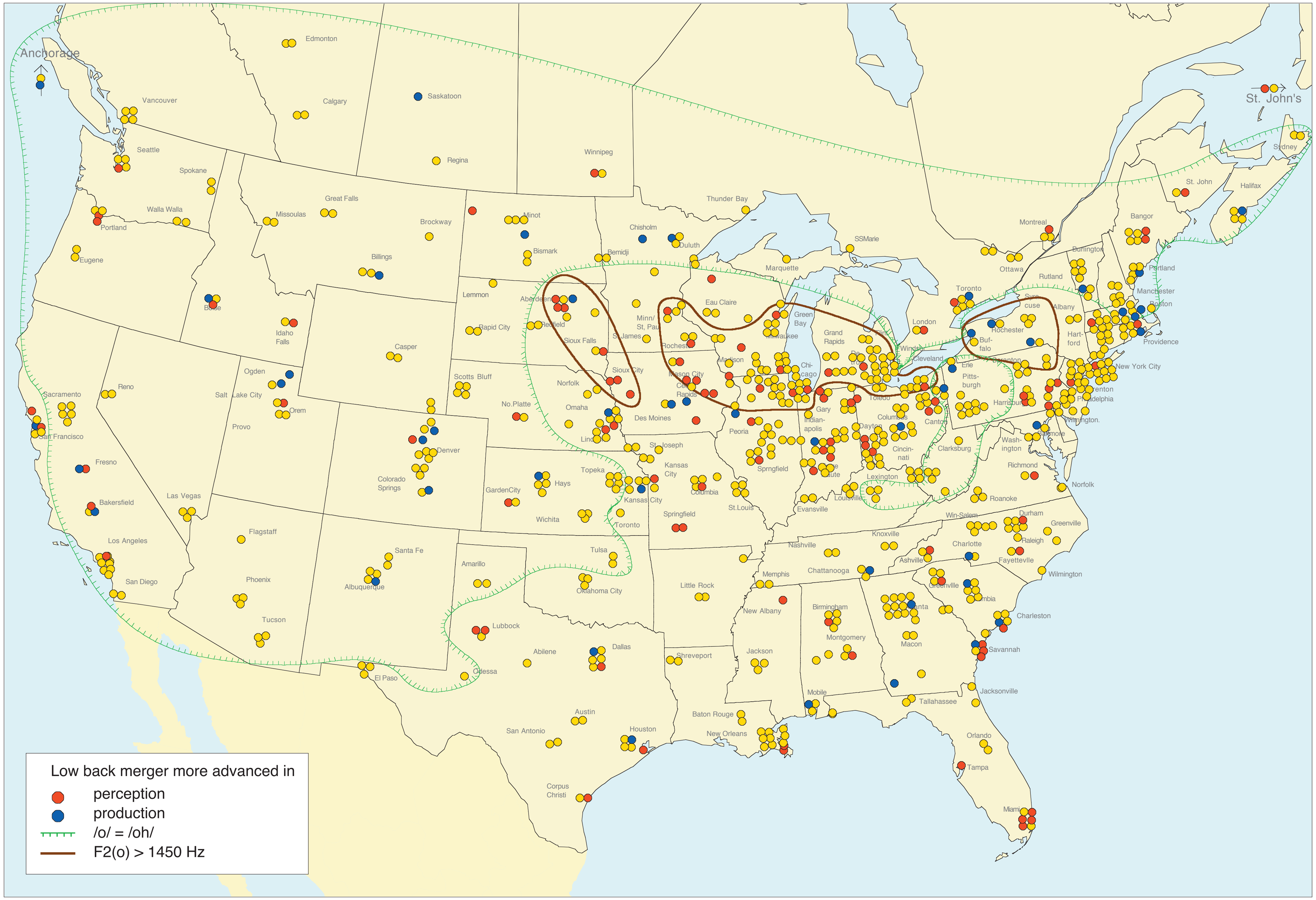


The study of sound changes in progress show that the relations of production and perception are not in general symmetrical. In the majority of cases, the change occurs earlier in perception than in production (Di Paolo 1988; Di Paolo and Faber 1990; Herold 1990). Map 9.3 identifies all asymmetrical cases. The red symbols identify speakers for whom the low back merger is more advanced in perception than production ('same' in perception and 'close' in production, 'close' in perception and 'different' in production, or 'same' in perception and 'different' in production). The blue symbols identify speakers with the reverse asymmetry, where production runs ahead of perception. On the whole, the Telsur data conform to expectations: there are a total of 109 subjects for whom the merger is more advanced in perception and only 51 where the reverse is true.

Table 9.4 shows that the situation is radically different for speakers within the area of low back merger and those in areas where the distinction is predominant. Inside the low back merger area, there is no difference; one type is as likely as the other. Outside of that area, the ratio is 3:1 in favor of perception.

This difference between the two areas may be interpreted as confirmation of the mechanism of merger suggested by Herold (1990): that the loss of phonemic

7 Occasional differences between spontaneous speech production and minimal pairs do occur. Compare the case of Bill Peters in Duncannon, Pennsylvania, whose speech showed a clear distinction but minimal pairs indicated merger in both production and perception (LYS: 235).



Map 9.3. The relative advance of production and perception in the low back merger

In general, mergers tend to occur in perception earlier than in production. The red symbols designate speakers for whom the low back merger is more advanced in their judgments on 'same' or 'different' than in their actual production of the minimal pairs. There are also blue symbols indicating the opposite situation, about half as many as the red symbols. The brown isogloss identifies those areas of the Inland North where /o/ is strongly fronted. The two westward portions show more red than blue symbols; the opposite tendency is found in New York State.

contrast actually represents a gain of information rather than a loss of information. Herold proposed that the merger spreads when speakers of the unmerged, two-phoneme dialect find that the distinction they produce and expect to hear is not reliable when communicating with speakers of the merged, one-phoneme dialect. In response, they stop relying on the difference in sound for the interpretation of meaning, relying instead on context for disambiguation, like merged speakers. Because this strategy reduces misunderstandings, it can be argued that the diffusion of the merger can be seen as a gain of information rather than a loss. Herold's analysis was supported by a study of natural misunderstandings in oral communication, where 23 out of 24 recorded misunderstandings involving confusion of the vowels /o/ and /oh/ were on the part of two-phoneme rather than one-phoneme speakers (Labov 1994: 325).

Table 9.4. Distribution of asymmetrical low back merger reports within and outside the low back merger area

	Total subjects	Perception > production	Production > perception
All subjects	741	105	51
Inside low back merger isogloss	208	20	23
Outside low back merger isogloss	528	85	28

The asymmetrical speakers of Map 9.3 are a subset of the larger group of 'transitional' speakers for whom /o/ and /oh/ are neither completely merged nor completely distinct. Map 9.2 displays these 'transitional' speakers with yellow symbols. They are heavily concentrated in certain areas: San Francisco, where, unlike the rest of Caliornia, the merger is not yet complete; Texas, where there have been regular reports of the merger in progress (Bailey 1991); the metropolis of Atlanta and all the marginal areas of the South (Charleston, Florida); western Massachusetts; and eastern Pennsylvania, where Herold (1990) made a close study of the merger in steel and mining towns dominated by heavy East European immigration. But the largest area that is primarily transitional is found in the Midland area south of the North/Midland boundary (see Chapter 11). If we exclude the St. Louis corridor running down I-55 from Chicago to St. Louis, there is a solid belt of yellow symbols from the eastern edge of the western /o/ ~ /oh/ merger all the way to eastern Ohio and the western edge of the western Pennsylvania merger area. This is in sharp contrast to the areas of resistance to the merger: the North and the Mid-Atlantic regions.

The Telsur project examined two Midland cities in greater detail than was the norm for the study; these were Indianapolis and Columbus. Though only seven Indianapolis and six Columbus speakers are displayed on the maps in this chapter, a total of 14 from Indianapolis and 15 from Columbus were interviewed. Figure 9.3 shows the low back merger responses of Indianapolis and Columbus by age and sex, permitting a closer view of the transition. In Indianapolis, the only speakers with a clear distinction are two members of the oldest group (over 40), and the only one with a total merger is a teenage girl. Indianapolis shows a relatively rapid transition across these narrow age ranges.[8] A similar pattern of rapid merger over three generations of speakers was found by Boberg and Strassel (1995) to be operating in Cincinnati.

The Columbus subjects cover a wider age range but show a more uniform situation: all speakers are transitional. Only one produced a clear difference in one mode, and she was the oldest of the group. Ten of the 15 subjects were judged to have pronounced all allophones as 'close' and they themselves judged them to be 'close'. The other four were mixed. As in Indianapolis, no clear sex differences emerge. Table 9.5 breaks down the data into responses for the four allophones. The most advanced allophone is clearly before nasals, where 8 of the 21 responses indicated complete merger; the most conservative is plainly before velar /k/, where 50 percent were completely distinct.

The relation of perception to production in these transitional cities matches the conclusions drawn from Map 9.3. The responses in which perception shows a greater tendency to merger than production outweigh the reverse situation by a ratio of almost 4 to 1 (38 to 10).

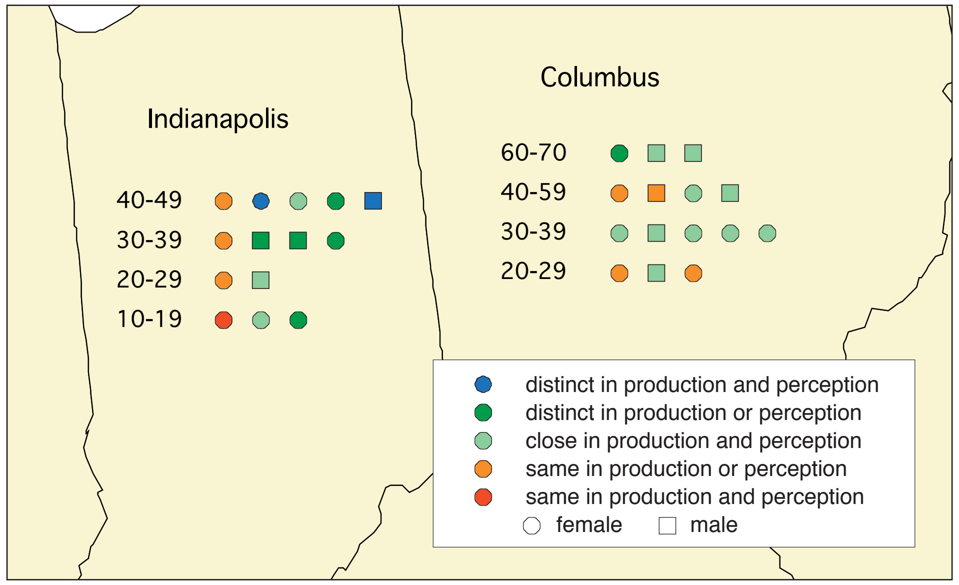


Figure 9.3. The low back merger in Indianapolis and Columbus

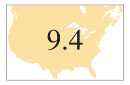
Table 9.5. Distribution of minimal pair responses for allophones of /o/ and /oh/ in Indianapolis and Columbus

Production	Perception	on_ohn	ot_oht	ok_ohk	ol_ohl	Total	Per> Prod	Prod > Per
same	same	8	4	3	3	18		
same	close	1	2	4	4	11	11	
close	same	0	0	1	0	1		1
same	different	3	5	2	5	15	15	
different	same	1	3	1	0	5		5
close	close	0	4	1	1	6		
close	different	4	1	1	0	6	12	
different	close	0	1	0	3	4		4
different	different	4	6	13	5	28		
Total		21	26	26	21	94	38	10

There are two earlier maps available for the geographic distribution of the low back merger. LANE and LAMSAS give some information on the state of the merger in the 1930s and 1940s for the eastern United States. Since there is no direct evidence on minimal pairs or speakers' judgments, we must infer the pres-

8 Phillips 2004 reports a student project comparing the two Telsur speakers from Terre Haute with thirty speakers from Terre Haute. The overall view is that of a transitional state, with younger women (18–24) showing more 'same' judgments than older speakers (47–53), and younger women showing more tendency to merger than younger men.

ence or absence of merger by comparing phonetic data from maps that feature words belonging to the relevant classes. In regions where maps of the pronunciation of /o/ words show the same vowel quality as maps of the pronunciation of /oh/ words, we assume that the merger is present. In PEAS, Map 15 shows the pronunciation of the /o/ in *oxen*, while Maps 23 and 24 show the pronunciation of the /oh/ in *law* and *salt*, respectively. A merger can be inferred in those communities where a low back rounded vowel [ɒ] is recorded in *law* and *salt*, and either a low back or a lower mid back vowel [ɔ] is shown for *oxen*. The areas showing such a merger are indicated by the purple broken isogloss on Map 9.4, in Eastern New England and western Pennsylvania.



The first national map of any feature of American pronunciation was the by-product of a telephone survey of place names conducted by Labov in 1966. At that time, long distance telephone operators were much more locally situated than at present. The basic paradigm was to ask for the number for a name pronounced as [hæri hak], using a low central vowel for the surname. *Hawk* is a more common surname than *Hock*, and in the areas where merger was dominant, the operators would unhesitatingly search for *Harry Hawk*. The name was usually not found. The investigator then asked the operator if she had looked for *Harry* [H-A-W-K]. In the one-phoneme area, the answer was normally 'yes'; in the two-phoneme area, the normal response was 'no'. The investigator then said that he would have to look up the name in a business directory and asked the operator how she would say H-O-C-K and H-A-W-K. In the one-phoneme area, the operator would often say with surprise, "They're the same!"[9] From this evidence, the distribution of the merger was charted.

The light blue broken isogloss on Map 9.4 shows the outer limits of clear merger in the 1966 telephone survey. Since the main data for the 1966 survey were derived from the contrast of *Hock* and *Hawk*, the symbols representing Telsur data on Map 9.4 show only the degree of contrast before /k/, primarily derived from the contrast of *sock* and *talk*.[10] The oriented green isogloss is the same as that in Maps 9.1 to 9.3, but the colors of the symbols are based on the merger before /k/, which was shown above to be particularly resistant to merger.

Since neither of the previous studies included Canada, no Canadian data are shown.

In Map 9.4, the three major areas of merger group together (green, orange, red symbols), and the areas of resistance to the merger group together (dark blue symbols); there is general agreement among the isoglosses from all three studies. The purple broken isogloss from PEAS is confined to western Pennsylvania, whereas the light blue broken isogloss from the 1966 study, one or two generations later, covers considerably more territory, including central Pennsylvania to the east and northeastern Ohio to the west. The most recent data from Telsur show the further expansion of this area of merger southward into West Virginia and parts of eastern Kentucky but do not show as much eastward and westward expansion as the 1966 data.[11]

In Eastern New England, the earliest LAMSAS and LANE data extend the area of merger into southeastern New England, and in particular show merger for the city of Providence. This does not match either the 1966 data for Providence or the ANAE data, which show a consistent and clear distinction of /o/ and /oh/ for all six Providence speakers.[12] It is now clear that LANE and LAMSAS were wrong in attributing the low back merger to Providence (Moulton 1968; McDavid 1983), and that the contrast between Providence and Boston in this respect is stable. Indeed, the syllabus given in Kurath and McDavid for the educated Providence speaker shows a lower mid back vowel [ɔ] for *law*, *water*, and *dog*, and a low back vowel [ɒ] for *frost* and *log*.[13] The Telsur data suggest that the contrast is even stronger than this; the typical realization of /o/ in Providence is with a mid-central vowel, clearly distinct from mid-back /oh/.

The boundary between the western merger and the North and Midland does not show the eastward expansion that one would expect from the general principle that mergers expand at the expense of distinctions (Labov 1994: 313). On the contrary, in the Upper Midwest, the merger appears to have receded in the interval between the 1966 and the Telsur studies. In the 1966 survey, the merger extended through all of South Dakota, most of Minnesota and all of Nebraska. The ANAE data do not show the merger as far eastward. Southern Minnesota, eastern South Dakota, and much of eastern Nebraska are not included in the merged area. The data on the merger before /k/ show only one point that might have been included in the merged area, in south central Nebraska. In South Dakota, there are a few transitional cities, but a solid block of five completely unmerged cities could not by any means be included in the territory of the merger.

Although the low back merger does not show a vigorous geographic expansion, it is expanding across the age range, with younger speakers in certain regions showing higher rates of merger than older speakers. The apparent time statistics of Table 9.3 indicate that this is true in the traditional areas of merger – Eastern New England, the West, and the Midland – and also in the South. Only in Canada is the merger well enough established to show no correlation with age. The mechanism of change appears to be quite different in the areas where the merger is closer to completion – Eastern New England and the West – than in those where is it a more active process – the Midland and South. The Midland speakers show a gradual transition across age levels with an increasing number of 'close' productions and judgments among younger speakers judgments of 'the same' among the youngest (Chapter 19).

The apparent inconsistency between the progress of the merger in apparent time and the absence of vigorous spatial expansion may be explained by the strength of the structural factors that inhibit the spread of the merger to the Inland North and the Mid-Atlantic States: fronting of /o/ in the former case and raising of /oh/ in the latter. These factors appear to support a stable resistance to the merger. Chapter 11 begins the definition of North American dialects with these considerations.

9.2. Conditioned mergers

Throughout the history of English, considerable fluctuation has been noted between the short vowels **i** and **e,** not only before nasals, but also before oral consonants, particularly /s/ (Montgomery and Eble 2004). One of the most widely recognized features of Southern speech is the merger of /i/ and /e/ before anterior nasal consonants /m/ and /n/. Brown (1990) has studied the history of the merger in Tennessee in some detail (see also Guy and Ross 1992). Brown's study of the writing of civil war veterans, combined with data from LAGS and LAMSAS, shows that the merger was at a very low level during the first 60 years of the nineteenth century, but then rose steeply to 90 percent in the middle of the twentieth century. Montgomery and Eble (2004) present further evidence from late nineteenth-century North Carolina documents, a corpus of letters from planta-

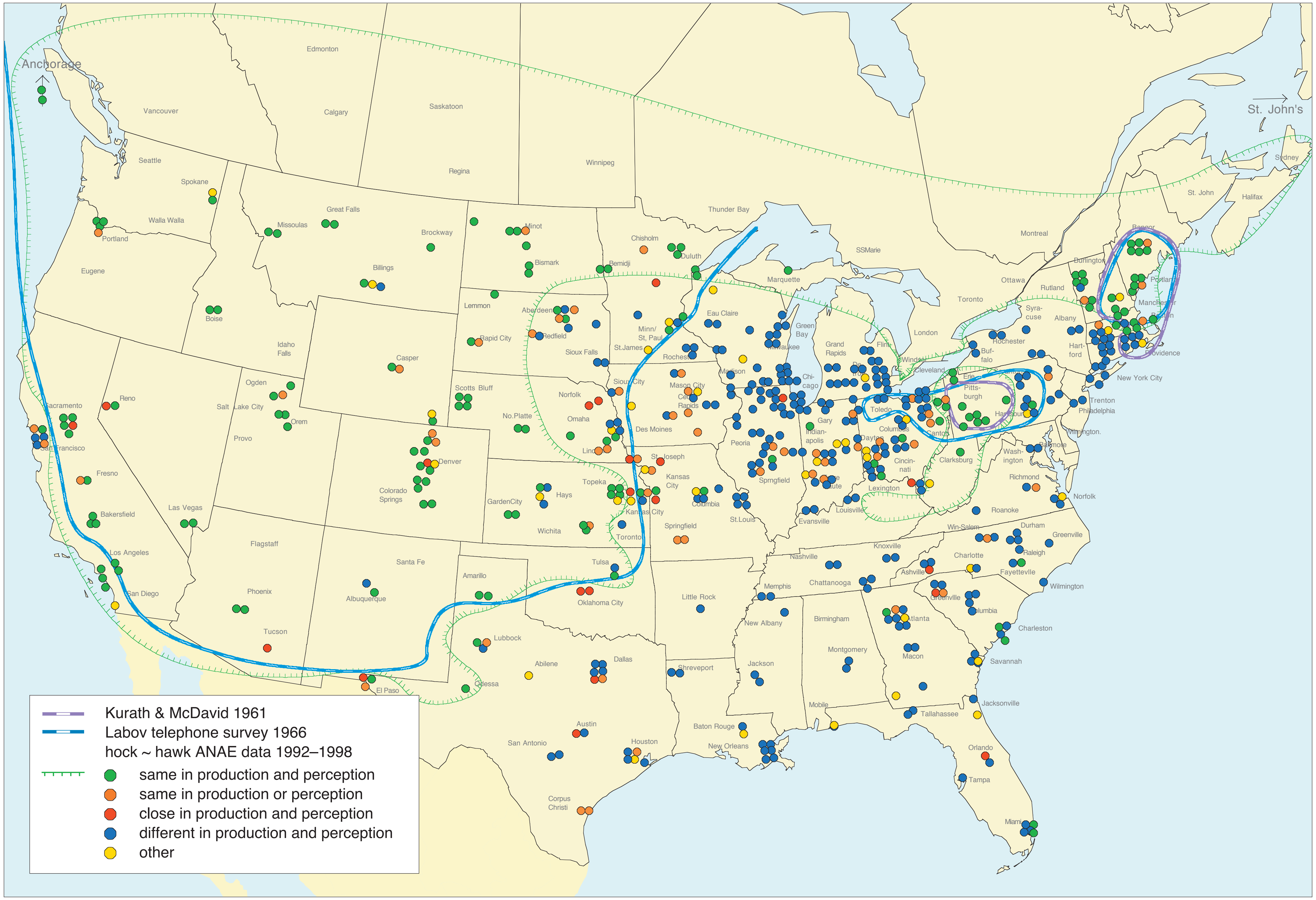
9 In that case, the investigator would say, "Where I come from, they are different" pronouncing them [hɑk] and [hɔk].

10 Data on *sock* and *talk* were not collected for some cities, so no symbols appear in certain areas.

11 The consistent merger in West Virginia is to some extent reinforced by the fact that data were not gathered on the most conservative environment, before /k/, in many cities of that region.

12 The 1966 survey had only one Providence speaker, but the ANAE data include four speakers who are different in both production and perception for all allophones and two speakers who show several 'close' judgments.

13 The only evidence for overlap is then the use of [ɒ] in *daughter*, and the variant [ɔ] for *frost*.

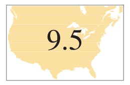


Map 9.4. The development of the low back merger from the 1930s to the end of the twentieth century

This map compares three isoglosses. The earliest record of the merger is shown by the purple isogloss, outlining the area of merger in the Linguistic Atlas of the Atlantic States in the 1930s and 1940s. The broken blue isogloss is the record of a survey of long distance telephone operators carried out by Labov in 1966. The coloring of the symbols registers responses to the minimal pair *hock* vs. *hawk* in the ANAE data of the 1990s, and the oriented green isogloss is the same as in Maps 9.1 to 9.3. The Eastern New England LANE data extends further south than the other isoglosses, but this turned out to be an error of the fieldworker. The clearest geographic movement is found in western Pennsylvania, where both the 1966 and 1990s data indicate both eastward and westward expansion, in addition to the excursion into the Appalachians. However, the Midwestern boundary of the merger does not seem to have shifted eastward.

tion overseers and letters to the Freedmen's Bureau in the 1860s from African-Americans. They find that even though the merger has expanded rapidly in recent times, it has a longer history than was previously believed. They further suggest that African-Americans have led in its development. Bailey (2004) argues for the rapid development of most features of Southern English in the second half of the nineteenth century and the beginning of the twentieth.

Map 9.5 shows the modern distribution of the merger in production and perception. The legend and symbols in Map 9.4, and the following maps in this chapter, are to be interpreted as follows:



	Production	Perception
Distinct in perception and production (blue)	different	different
Close in production or perception (green)	different	close
	close	different
	close	close
Same in perception or production (orange)	same	close or different
	close or different	same
Same in production and perception (red)	same	same

The largest part of the continent shows blue symbols – speakers who are solidly distinct in perception and production – though there are a certain number of green symbols in almost every region, indicating that the speaker perceived the pairs of words as close or pronounced them in a manner the phonetician heard as close. On the other hand, there is a high concentration of red symbols showing complete merger in the South and comparatively few orange circles for those with a merger in one mode but not the other. Table 9.6 gives the distribution of judgments for all speakers for whom we have firm data. It shows once again that the total number of cases where the merger was more advanced in production than perception is greatly in excess of the reverse, at 90 vs. 43.

Table 9.6. Distribution of pronunciation and judgments of the contrast of /i/ and /e/ before nasals

Perception	Production	N
different	different	369
different	close	35
close	different	40
different	same	2
close	close	38
same	different	20
same	close	30
close	same	6
same	same	183

The red-oriented isogloss in Map 9.5 defines the area of /in ~ en/ merger and compares it to the spatial distribution of glide deletion of /ay/ before obstruents, the definition of the South used in Chapter 11. Strong concentrations of merged speakers appear in parts of Kansas and in southern Indiana (The 'Hoosier apex'), though the intervening areas are mixed. Within the South, the two largest cities, Atlanta and Dallas, are predominantly merged. On the other hand, New Orleans has not yet submitted to this merger, except for four African-American speakers, located at the right-hand side of the cluster of New Orleans speakers (Chapter 22). Montgomery and Eble's (2004) suggestion that African-Americans have played an initiating role in the merger is consistent with Map 9.5. Not only in New Orleans, but in other Southern cities like Birmingham, Atlanta, Durham, and Columbia, African-Americans are more consistently merged than other speakers. In the North, most of the isolated instances of the merger are African-American speakers, as can be seen in New York, Detroit, Chicago.

A notable cluster of three merged speakers appears in the southern California city of Bakersfield, possibly reflecting the migration to California's Central Valley of agricultural workers from merged areas of the South during the Depression. We also observe a cluster of merged speakers in Colorado, extending northward to Scotts Bluff, Nebraska. In none of these cities is the merger more than 50 percent, so no isogloss is drawn.

The solid red isogloss indicates the region of glide deletion before obstruents which defines the South (Map 11.3), which is also the outer envelope of other Southern vowel shifts (Maps 11.4 and 11.5). It is evident that the merger of /i/ and /e/ before nasals has expanded beyond this Southern boundary.

Table 9.7 shows that the degree of homogeneity in this ongoing merger is still limited, at the same level as the unconditioned low back merger in Table 9.2. Consistency is at the same moderate level, given the many areas with a scattering of merger in the Midland and the North.

Table 9.7. Isogloss parameters for the low back merger

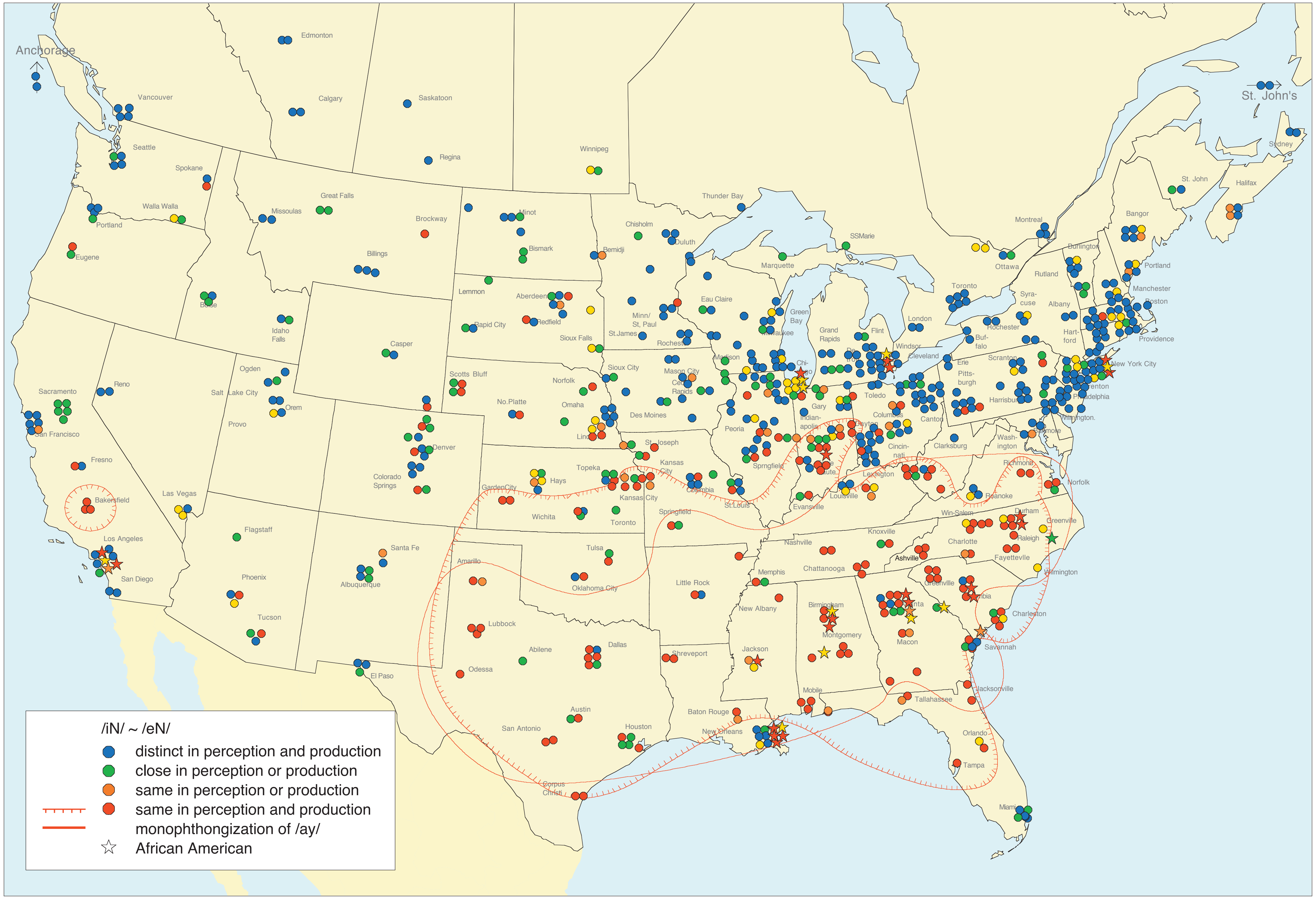
	Total merged	Total within isogloss	Merged within isogloss	Merged outside isogloss	Homo-geneity	Consis-tency	Leakage
/i/ ~ /e/ __.[+nasal]	179	182	119	60	0.65	0.66	0.23

The merger displays a strong expansion in apparent time. Table 9.8 shows an age coefficient much larger than that for the low back merger: speakers 25 years younger than the mean would be shifted 1.48 units towards zero on the four-point scale. Education is correlated inversely with the merger: the higher the education, the higher the index of contrast. It also appears that the merger is favored by men: all other things being equal, women are shifted two units upward on the 4-point scale of contrast.

Table 9.8. Regression coefficients for the merger of /i/ and /e/ before /n/. Contrast scale is defined by 0 for complete merger and 4 for complete distinction.

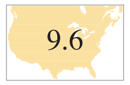
	Coefficient	Probability
Age * 25 yrs	1.48	.006
Education (years completed)	0.45	.001
Female gender	1.97	.009

The Telsur survey examined a number of mergers before /l/ which have been reported as ongoing processes in North American English. Labov, Yaeger, and Steiner (1972) found the merger of the high tense and lax vowels before /l/ in Albuquerque and Salt Lake City. Di Paolo (1988) and Di Paolo and Faber (1990) did extensive studies of these mergers in the Salt Lake City community. Bailey (1997) and Bailey et al. (1991) traced the progress of both mergers in Texas and Oklahoma. These mergers have been examined with particular attention to the asymmetry of perception and production. LYS found that for some Albuquerque speakers, the merger of /ul/ and /uwl/ was a near-merger, with consistent differences in the F2 dimension that were not easily categorized or labeled by members of the speech community. Di Paolo and Faber (1990) reported the consistent advance of perception over production, using an experimental technique in which subjects identified the nucleus of *fool* or *full* with /uw/ or /u/ not before /l/.



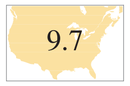
Map 9.5. The merger of /i/ and /e/ before nasals

The oriented red isogloss outlines the region where /i/ and /e/ have merged before nasal consonants in *pin* vs. *pen*, *him* vs. *hem*, etc. This well-known feature of Southern phonology is clearly expanding into the larger Southeastern region, passing beyond the solid red isogloss that defines the South by the deletion of the glide of /ay/. The expansion of this merger is particularly marked in Oklahoma, Kansas, Missouri, and southern Indiana. The city of Bakersfield in Southern California is marked by three speakers who show this merger. The scattering of instances of the merger in several Northern cities is the result of the inclusion of African-American subjects in the sample population.



Map 9.6 shows the geographic distribution of the /ul/ ~ /uwl/ merger. Only one area of geographic concentration is found that permits the construction of an isogloss, the western Pennsylvania region centered on Pittsburgh. In other areas of the Midland, the Southwest, and the South, there is a scattering of the red symbols that indicate total merger, but nowhere are they consistent enough to justify an enclosing isogloss. We can, however, distinguish these regions of variable merger from Canada, the Pacific Northwest, and New England, which are dominated by the yellow circles that designate an unmodified and consistent distinction. To emphasize the uniformity of the western Pennsylvania region, all 14 of the Pittsburgh subjects are displayed in Map 9.6 instead of the usual selection of seven. Sixteen of the 24 speakers in the larger western Pennsylvania area show a complete merger. Eleven of the 14 Pittsburgh speakers show the complete merger; the other three are 'close'. This is not a recent phenomenon; of the three oldest speakers in their sixties, two show a complete merger.

The predominance of the /ul ~ uwl/ merger in western Pennsylvania is probably connected with the high rate of vocalization of final /l/ in this area.[14] The vocalic glide that represents a former lateral is intimately involved with the nucleus and restricts the range of contrast available in that nucleus.



The Telsur survey elicits two minimal pairs to test the status of the distinction of /i/ and /iy/ before /l/: *hill* ~ *heel* and *pill* ~ *peel*. The total number of speakers who show this merger is about the same as it is for the merger of *full* and *fool*, etc., but the geographic distribution is quite different. As with /ul/ ~ /uwl/, there is a scattering of merged speakers in the West,[15] but the largest and most homogeneous group of merged speakers is found not in western Pennsylvania but in the South, as shown in Map 9.7. There is virtually no trace of the merger in western Pennsylvania, or in the Pacific Northwest, Canada, the Inland North, the Mid-Atlantic region, or New England. Within the South, the /il/ ~ /iyl/ merger is an inland phenomenon; the Gulf and Atlantic coastal areas of the South are largely unaffected. Like the Southern Shift (Maps 11.3–11.6),[16] the merger has two main centers; one in the Appalachian Mountain region and one in Texas. Its geographic coincidence with the Southern Shift is only approximate, however; in the Inland South, it extends well beyond the core territory of the Southern Shift.

Map 9.7 shows that the area of /il/ ~ /iyl/ merger extends east of the Inland South, to include all of North Carolina, and further west to Louisiana and Mississippi. In Texas, the city of Dallas is not included in the merger isogloss, since only one of the six Telsur subjects there shows a total merger.

Comparison of mergers before /l/

The two cases just considered are structurally parallel, reflecting an ongoing loss of the tense/lax distinction of the high front and high back phonemes before /l/. Table 9.9 shows a remarkable similarity in the distributions of these two processes. The extent of the mergers and their distribution across the minimal pair subtypes are virtually identical. The *r*-correlation between the two distributions is 0.9995. The rates of change in apparent time are the same. Both show a significant correlation with education: the greater the number of years of schooling finished, the greater the chances that the speaker will make a distinction. Nevertheless the geographic distribution of these two mergers is entirely disjunct.

The acoustic analysis of vowels before /l/ contributes to an understanding of the difference between these two mergers. Figure 9.4 shows the relevant vowels before /l/ for a characteristic Pittsburgh speaker, Henry K., 61.

In the front vowels, one can observe a clear differentiation of /iyl/ and /il/. Two /iyl/ tokens are in high front position, higher and fronter than the general /iyC/ mean, while the short /il/ vowels are lower and backer than the general /i/

Table 9.9. Distribution of /il/ ~ /iyl/ and /ul/ ~ /uwl/ contrasts. Contrast scale is defined as 0 for complete merger and 4 for complete distinction. Regression coefficients: * $p < .05$, ** $p < .001$, *** $p < .001$.

Perception	Production	/il/ ~ /iyl/	/ul/ ~ /uwl/
different	different	538	531
close	different	21	39
different	close	15	24
close	close	24	31
same	close	13	20
close	same	3	3
same	same	52	54
same	different	9	14
different	same	1	3
Age coefficient		1.05**	1.12**
Education coefficient		0.44***	0.27*

mean. However, there are three tokens of *steel* that are much lower and backer than the rest. These may help to explain the general stereotype of Pittsburgh speech as rhyming *still mill* for "Steel mill". However, the difference between the /il ~ iyl/ situation and /ul ~ uwl/ is evident when we examine the high back corner of Figure 9.4. The complete merger of *pool* and *pull*, *fool* and *full* in the upper back region is evident in the measurements of the tokens taken from the minimal pair tests as well as the tokens from spontaneous speech. The /ow/ class before /l/ (in *Polish*, *cold*) is merged with /uwl/ and /ul/. Finally in low back position, one can observe the clear merger of /ohl/ and /ol/, in line with the data of Map 9.1.

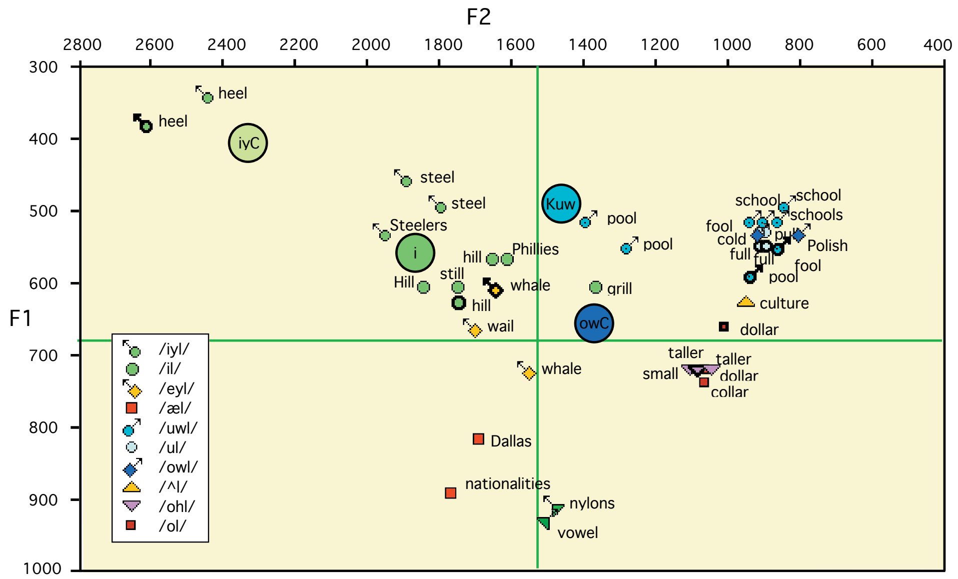
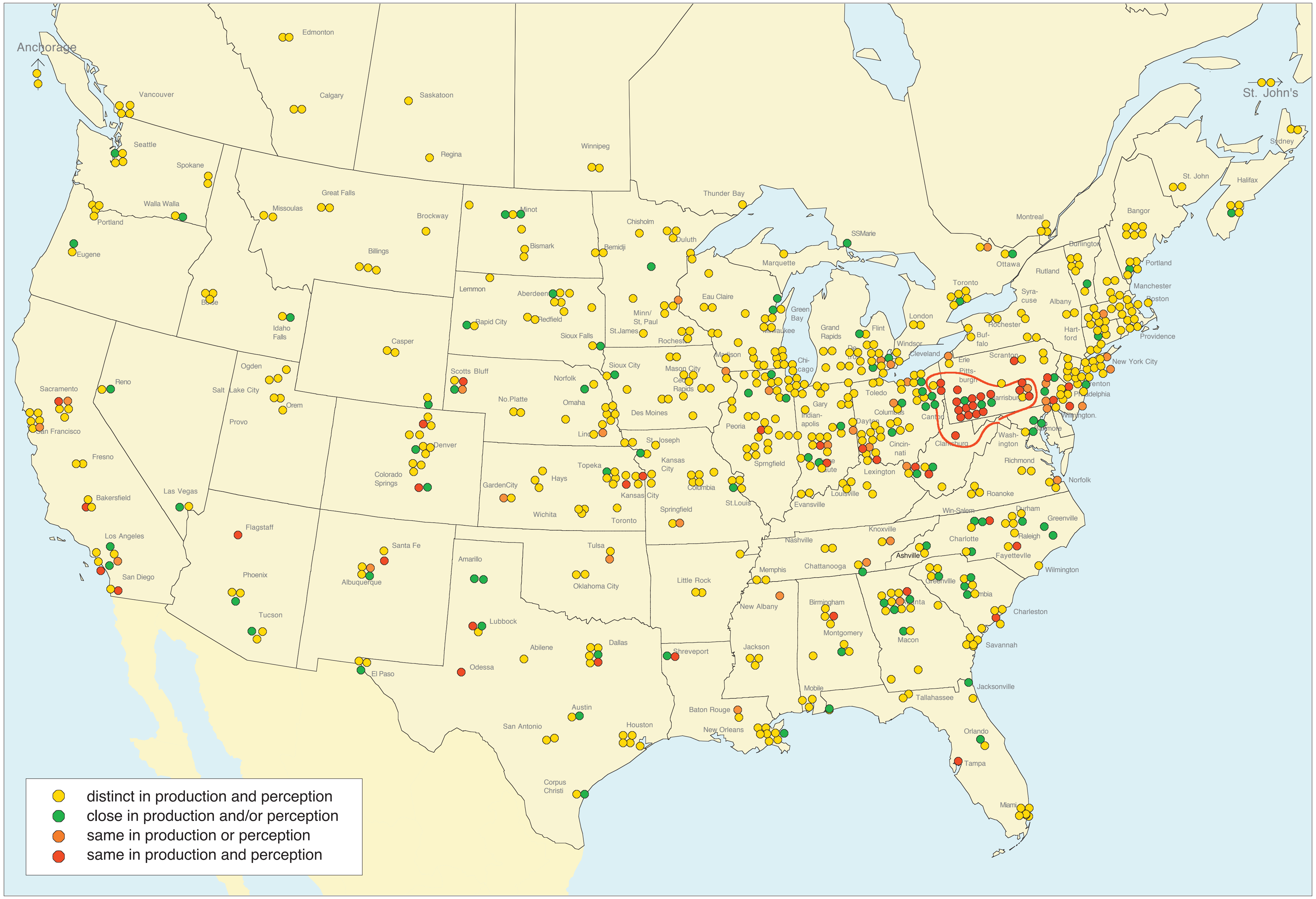


Figure 9.4. Vowels before /l/ in the system of Henry K., 61, Pittsburgh, PA, TS 544. Bold symbols indicate minimal pair elicitations.

14 For data on the vocalization of /l/ in Pennsylvania see Ash (1982).

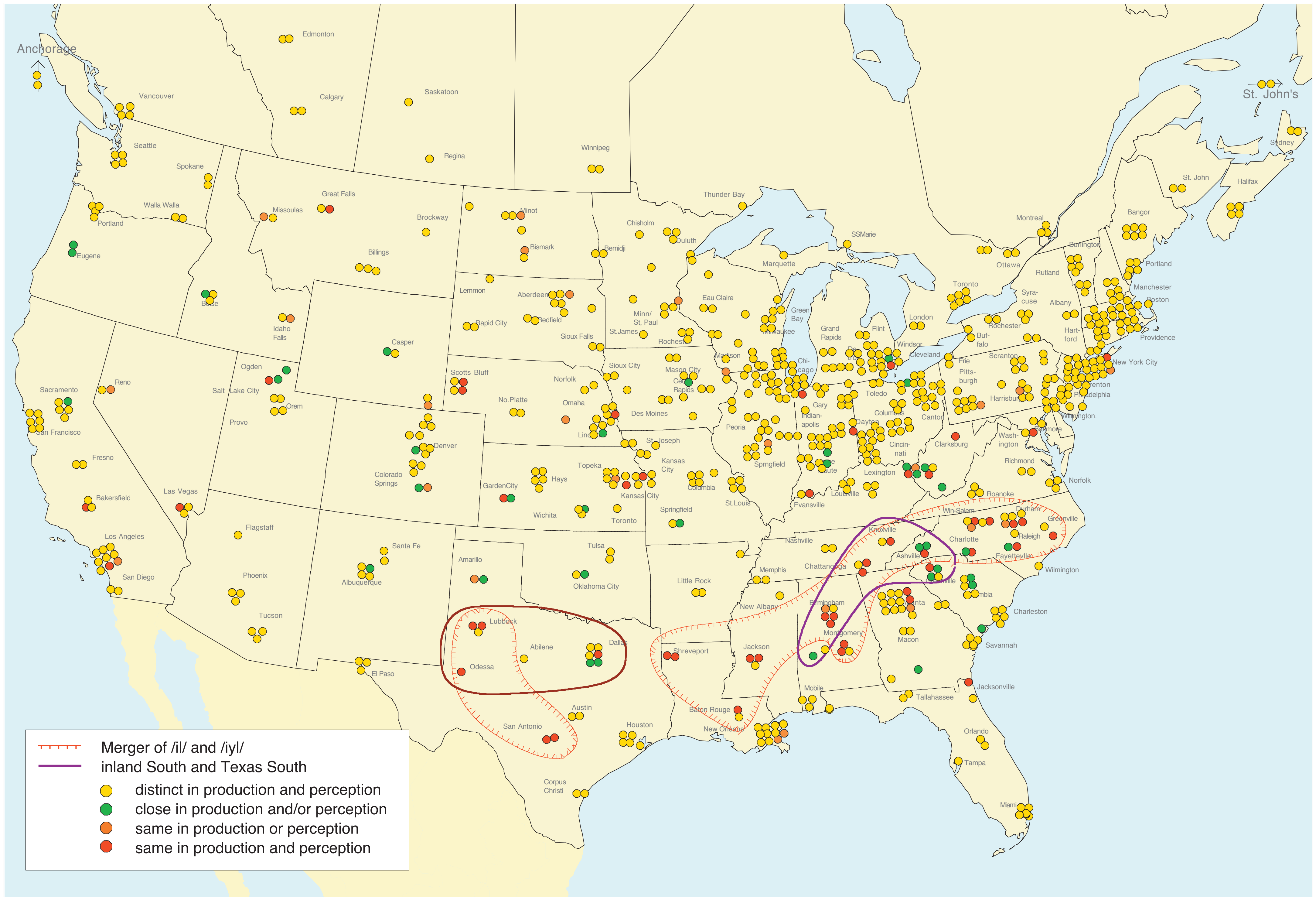
15 Some evidence of the merger appears in northern Utah, but again, the Telsur interviews fail to capture evidence for the merger in Salt Lake City. This must be considered an accident of sampling, in the light of other evidence cited for the merger in this area. Near-mergers of this type show a great deal of individual variation.

16 The feature of the Southern Shift that is most relevant to this merger is the third stage, in which short /i/ shifts to peripheral high front position, while the nucleus of /iy/ moves from that position to a lower high or upper mid nonperipheral position. This feature is more characteristic of the Inland South than the Texas South.



Map 9.6. Merger of /u/ and /uw/ before /l/

ANAE gathered systematic data on the ongoing merger of vowels before /l/. One of the most widely reported such mergers affects the distinction of *full* vs. *fool*, *pull* vs. *pool*. It is found consistently in only one region, western Pennsylvania, the area surrounding the city of Pittsburgh. However, it is found in many individuals scattered throughout the Midland and the West. It has been studied as an ongoing process in Salt Lake City, where the ANAE respondents did not happen to show it. This merger consistently favors the lax pronunciation: *fool* is pronounced like *full* rather than the other way around.



Map 9.7. Merger of /i/ and /iy/ before /l/

This map shows the areas that most frequently show the merger of the high front lax and tense vowels in *fill* vs. *feel*. The red oriented isogloss shows a very different geographic pattern from Map 9.6. The merger extends across the interior of the South, including the Inland South (purple isogloss) where the Southern Shift of front upgliding vowels is most strongly advanced. It is also found in Texas, overlapping the second region where the Southern Shift is strongest. Originally, this merger favored the vowel of *feel*, but merger with the lax vowel /i/ of *fill* is now more characteristic of younger speakers.

The contrast between the high front and high back vowels before /l/ is displayed in Table 9.10, which summarizes the minimal pair responses of all 14 Pittsburgh subjects. For /ul ~ uwl/, 11 of the 14 were 'the same' in perception and production, but no one showed this response to /il ~ iyl/. Eleven of the 14 judged /il ~ iyl/ to be 'different' in perception and production, but no one showed this response to /ul ~ uwl/. We can conclude that the stereotype of merger of /il ~ iyl/ is based only on a close approximation of some forms, and does not represent the underlying norms of the dialect in Pittsburgh.

Table 9.10. Minimal pair judgments for 14 Pittsburgh subjects. 2 = 'different'; 1 = 'close' 0 = 'same'. The first digit represents the speaker's judgment; the second represents the analyst's judgment of the speaker's production.

TS#	Name	Age	Gender	ul ~ uwl	il ~ iyl	el ~ eyl	ul ~ owl
355	Gwen S	66	F	21	22	22	
356	Cecilia S	62	F	00	22	22	
544	Henry K	61	M	00	22		
741	Effie K	44	F	00	22	22	22
732	Kacie R	39	F	00	12	12	02
738	Jordan K	38	M	00	22	22	00
737	Derek K	36	M	11	22	22	12
545	Ken K	35	M	00	22		
733	Talia R	35	F	00	22	22	22
739	Cara K	35	F	00	22	22	00
740	Nerissa K	33	F	12	01	10	11
742	Melody L	30	F	00	22	22	00
735	Scarlet C	28	F	00	22	22	01
744	Isabel P	35	F	00	01	12	01

In Figure 9.5, a speaker from Chattanooga, Tennessee illustrates the very different distribution of the front vowels before /l/ in the Inland South. The second stage of the Southern Shift (Chapters 11, 18) has reversed the relative positions for the means of /e/ and /ey/, but the third stage (the parallel reversal of /i/ and /iy/) has applied only to the extent of bringing the two nuclei together. The merger of *hill* and *heel*, *pill* and *peel* is evident in both minimal pairs and spontaneous speech. The high back vowels before /l/ remain in high back position, as expected, while the mean symbol for the allophones of /uw/ after non-coronals is fully centralized. The merger of /uwl/ and /ul/ seems evident, but it cannot be entirely accidental that three of the four tokens of /uwl/ are higher than the main group of /ul/ words. Horace P. judged *fool* and *full*, *pool* and *pull* to be 'the same', but the analyst listening to him judged his productions to be only 'close'.

Despite the acoustic difference between *fell*, *hotel* and *fail*, *sail* in Figure 9.5, the speaker judged them as 'the same'; the analyst heard them as 'close'.

One might think that Figure 9.5 also shows a similar merger of /oh/ and /o/ before /l/, but this is not the case. Every one of the /ohl/ symbols is marked with a back upglide, the major Southern mechanism for resisting the low back merger (Maps 11.2, 18.8).

Another speaker from the Inland South shows even more clearly the different status of the high front and high back vowels before /l/. Figure 9.6 displays vowels before /l/ for a 61-year-old woman from Birmingham. Here the third stage of the Southern Shift has applied more clearly to reverse the relative positions of the main allophones of /i/ and /iy/ as well as those of /e/ and /ey/. The high front vowels /iy/ and /i/ are clearly merged before /l/, again in high front position. In

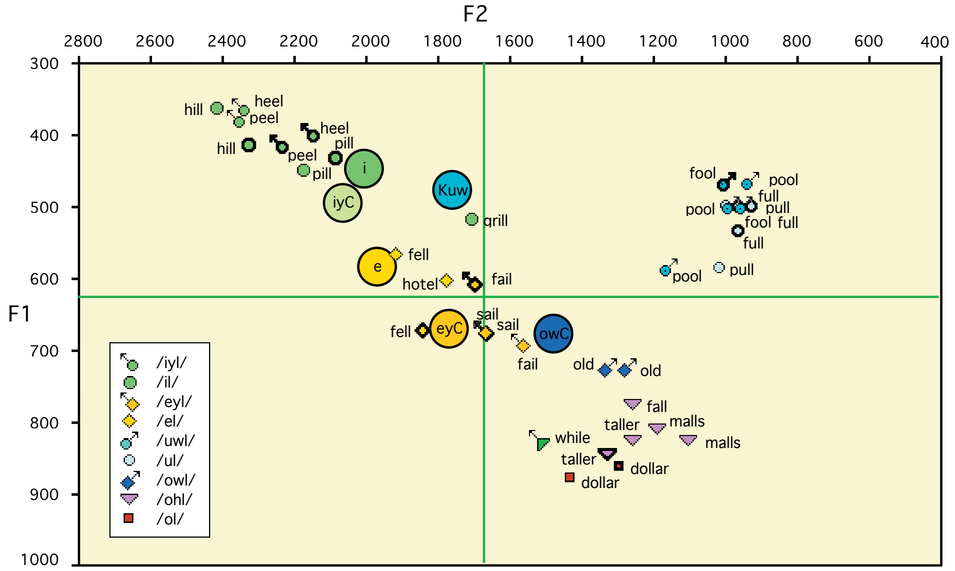


Figure 9.5. Vowels before /l/ in the system of Horace P., 43, Chattanooga, TN, TS 609. Bold symbols indicate minimal pair elicitations.

contrast, the back vowels before /l/ show no tendency at all to merge. One feature that distinguishes the South from all other regions is the fronting of back vowels before /l/. In Figure 9.6, /uw/ before /l/ is strongly fronted, in *school* as well as *pool* and *fool*, going considerably beyond the means for the vowels not before /l/. On the other hand, the short /u/ before /l/ has not fronted and remains completely distinct from /uwl/. In contrast to the situation in western Pennsylvania, there is no trace of a merger of /uwl/ and /ul/.

We can also note that the reversal of the relative positions of /e/ and /ey/ also applies to /el/ and /eyl/, so that the vowels of *fell* and *fail* are clearly differ-

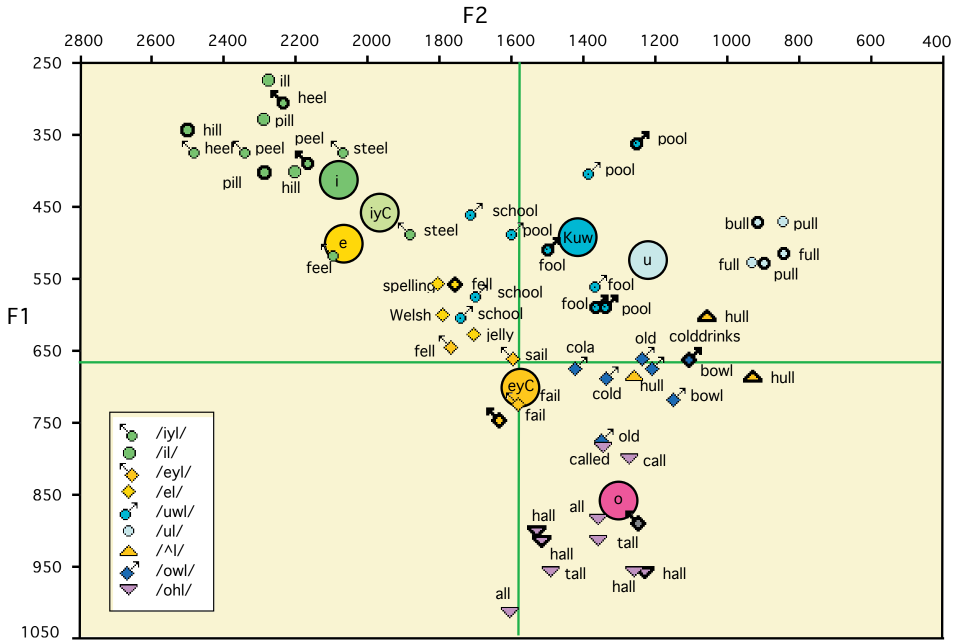


Figure 9.6. Vowels before /l/ in the system of Belle M., 61, Birmingham, AL, TS 340. Bold symbols indicate minimal pair elicitations.

entiated. The merger of /il/ and /iyl/ may be not a necessary consequence of the Southern Shift, but a separate and distinct event.

The tokens of /ohl/ in *all*, *hall*, *tall*, etc. are lower and fronter than those of /o/, almost in central position. This is a clear indication of the unrounding that accompanies the development of the back upglide, which is found in all of these words.

The final vowel diagram in this series shows vowels before /l/ for a speaker from the Texas section of the discontinuous isogloss of Map 9.7. Sheldon M. is represented by the upper right circle in the three tokens for Lubbock, Texas. He shows a merger of /il/ and /iyl/ but not in the high front peripheral position of the speakers from Chattanooga and Birmingham. The third stage of the Southern Shift has not applied to reverse the positions of /iy/ and /i/, and the merger takes place in the lax position characteristic of /i/. This is the pattern that Bailey (1997) reports for the merger in Texas. In the coding of responses to questions inserted into the Texas poll, the merger is identified by the occurrence of a lax vowel in *steel*.

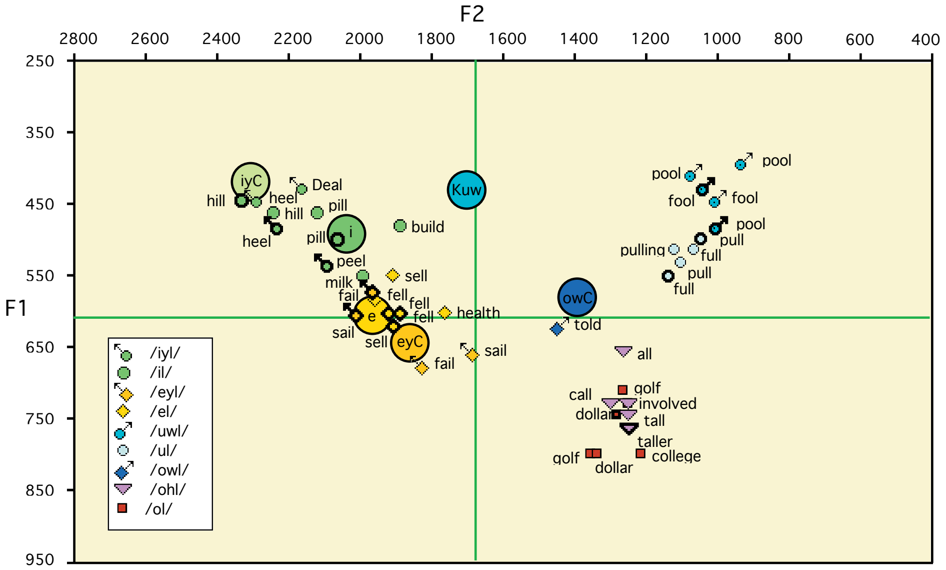


Figure 9.7. Vowels before /l/ in the system of Sheldon M., 31, Lubbock, TX, TS 542

The second stage of the Southern Shift, the reversal of the relative positions of /ey/ and /e/, can be observed in Figure 9.7. The corresponding vowels before /l/ are not reversed, but are plainly merged.

Among the back vowels of Figure 9.7, there is no trace of fronting of the tokens before /l/. The distributions of /uwl/ and /ul/ are close but non-overlapping. In the Telsur minimal pair test, Sheldon M. rated the contrast of *pool* and *pull* as 'close', and the analyst listening to his pronunciation agreed.

In low back position, considerable overlap of /ol/ and /ohl/ is observed, but it can also be noted that the highest tokens are in the /ohl/ class and the lowest in the /ol/ class. The upper right circle for Lubbock on Map 9.4 is orange, indicating a transitional state. It is in fact a near-merger. In response to each of the four minimal pairs, Sheldon M. said that it was 'the same' and the analyst judged his pronunciations as 'close'. There is no back upglide associated with /oh/.

Other mergers before /l/

In several of the vowel charts just given, one can observe a tendency for the merger of /e/ and /ey/ before /l/ in *fell* and *fail*, *sell* and *sail*. In general, this merger is closely associated with the merger of /il/ and /iyl/. There are 49 cases of merger of /il/ and /iyl/, and of these, 27, just over half, showed the /el/ ~ /eyl/ merger also. There are only seven cases of speakers with an /el/ ~ /eyl/ merger who do not have the /il/ ~ /iyl/ merger.

In the course of the study, Telsur found evidence for a number of other mergers of back vowels before /l/ codas. Figure 9.4 shows a merger of /owl/ with /uwl/ and /ul/. Minimal pairs for these contrasts were introduced in the course of the study but not consistently over the whole Telsur sample. In order of frequency of 'same' responses, these items were:

– the merger of /ul/ and /owl/ as in *bull* and *bowl*;
– the merger of /ʌl/ and /ohl/ as in *hull* and *hall*;
– the merger of /ul/ and /ʌl/ as in the rhyming pair *bull* and *hull*;
– the merger of /ʌl/ and /owl/ as in *hull* and *hole*.

The first three of these at least deserve further study.

Part C North American English vowels

10. The vowels of North American English: Maps of natural breaks in F1 and F2

Introduction

The 36 maps of this chapter will display the geographic distribution of differences in vowel quality for the 18 vowel classes defined in Chapter 2, as measured by F1 and F2 means, for the 439 Telsur subjects whose vowels have been analyzed acoustically. This chapter is designed to display geographic patterns in a uniform way with the minimum of theoretical interpretation. No isoglosses are superimposed upon the patterns that are displayed. Each map is accompanied by a brief note relating the most obvious patterns to the later chapters of the Atlas which deal with them.

The vowel means used here are calculated with the following restrictions, designed to separate allophones that are radically different from the main distribution: vowels before liquids or after glides and obstruent/liquid clusters are excluded. For the vowels /i, e, æ, aw/, tokens before nasal consonants are excluded. In addition, certain phonemes are divided into specific allophones. The class of /æN/ represents all tokens of /æ/ before nasal consonants, while /æ/ represents tokens in non-nasal environments. The class /Tuw/ represents all /uw/ tokens after coronal consonants, and /Kuw/ represents /uw/ tokens after non-coronal consonants. The final two classes, /ahr/ and /ohr/, may be considered allophones of /ah/ and /oh/. /ah/ is not mapped in this series, since the Telsur data on /ah/ is not sufficient in quantity to support a presentation comparable to that of the other vowels. The means for /ay/ do not include vowels before voiceless consonants; the difference in the height of voiced and voiceless consonants is registered in Map 10.37. A comparable map for the height differential of /aw/ is given in Map 10.38.

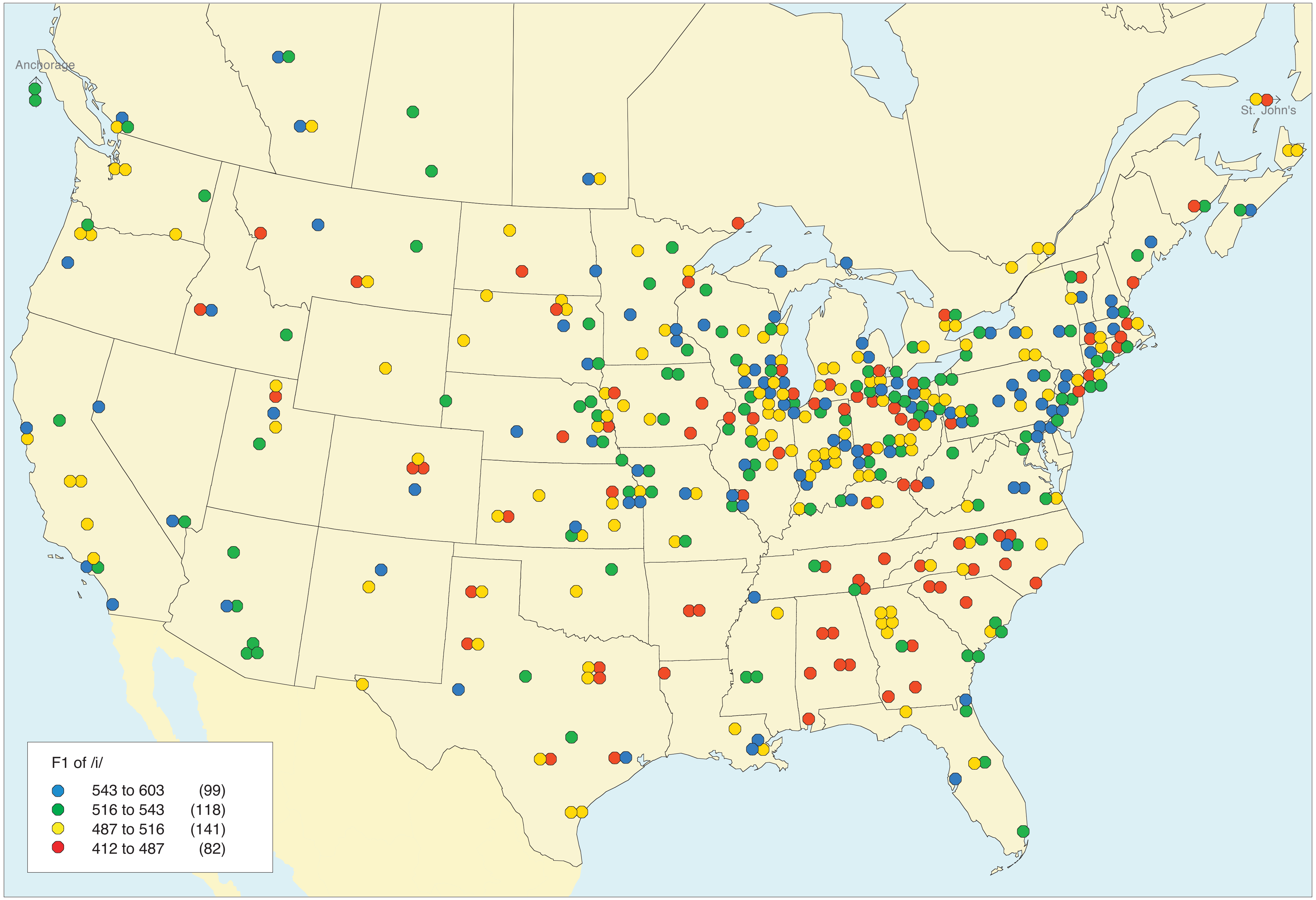
The maps will follow in pairs, one for F1 and one for F2 for each vowel. The method for displaying vowel quality differences is the same for each pair. A thematic map is created for each set of 439 values, divided into four ranges by the "Natural Break" algorithm of the Mapinfo system. As defined by Mapinfo,

> The range breaks are determined according to an algorithm such that the difference between the data values and the average of the data values is minimized on a per range basis

Four colors are used. For F1, the colors are arranged from lowest to highest in the order red, yellow, green, and blue, so that red represents the highest vowel and blue the lowest. Thus Map 10.5 for the F1 of /æ/ shows a heavy concentration of red circles in the Great Lakes region, indicating the general raising of short-*a* that is the triggering event of the Northern Cities Shift.

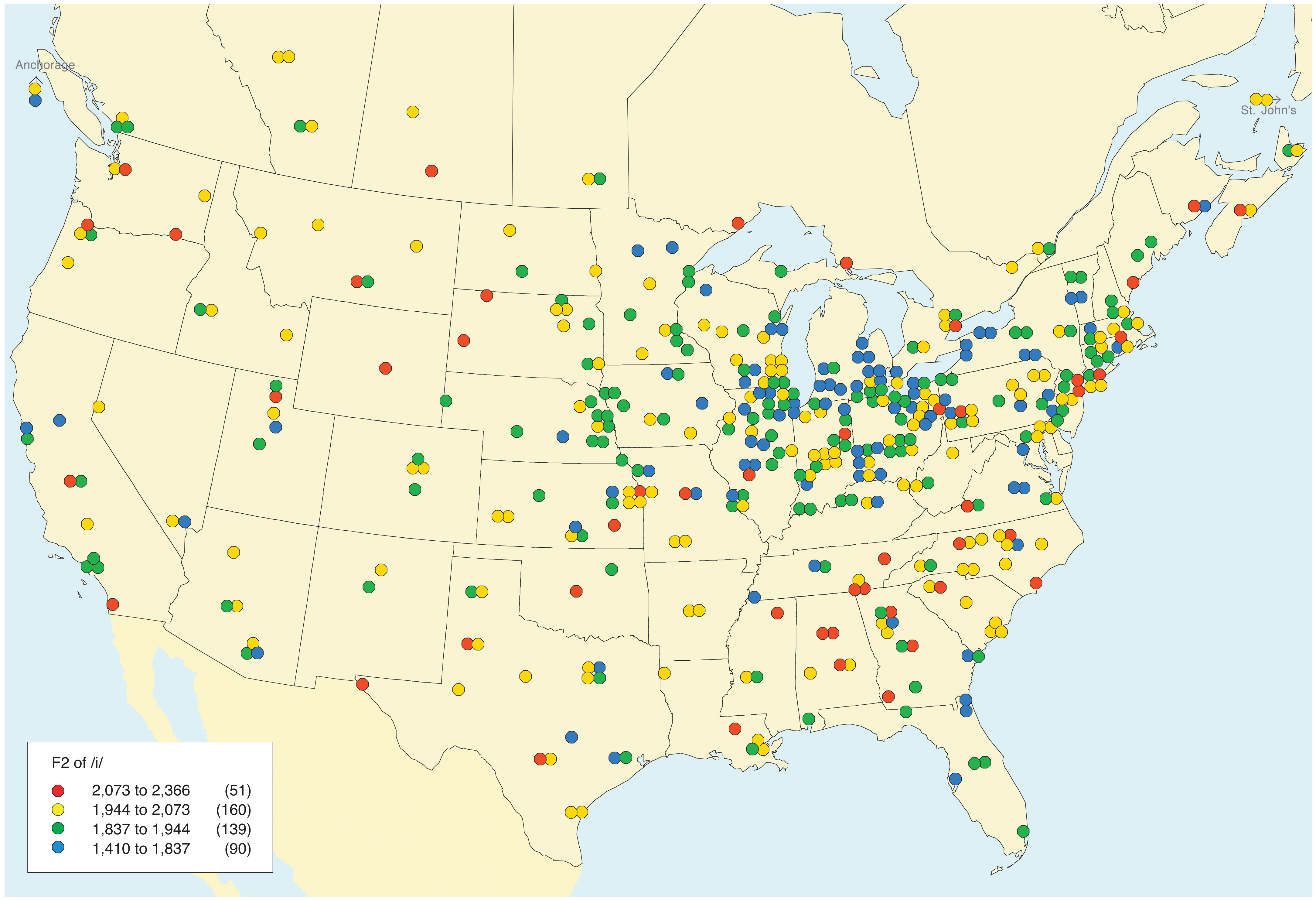
For F2, the colors are arranged from highest to lowest in the order red, yellow, green, and blue (the opposite order from F1), so that red represents the frontest vowel and blue the farthest back. Map 10.2 for the F2 of /i/, for example, shows a heavy concentration of blue symbols in the Great Lakes region, indicating the backing of /i/ that is associated with the Northern Cities Shift.

On all legends, the number of tokens are indicated in parentheses. The appendix 10.1 tabulates the ranges and numbers of speakers for all 38 maps. It should be noted that the total number of subjects submitted to the natural break algorithm is 440, rather than 439, since at this stage of the analysis one speaker was included who was afterwards found not to satisfy all requirements for a Telsur subject.



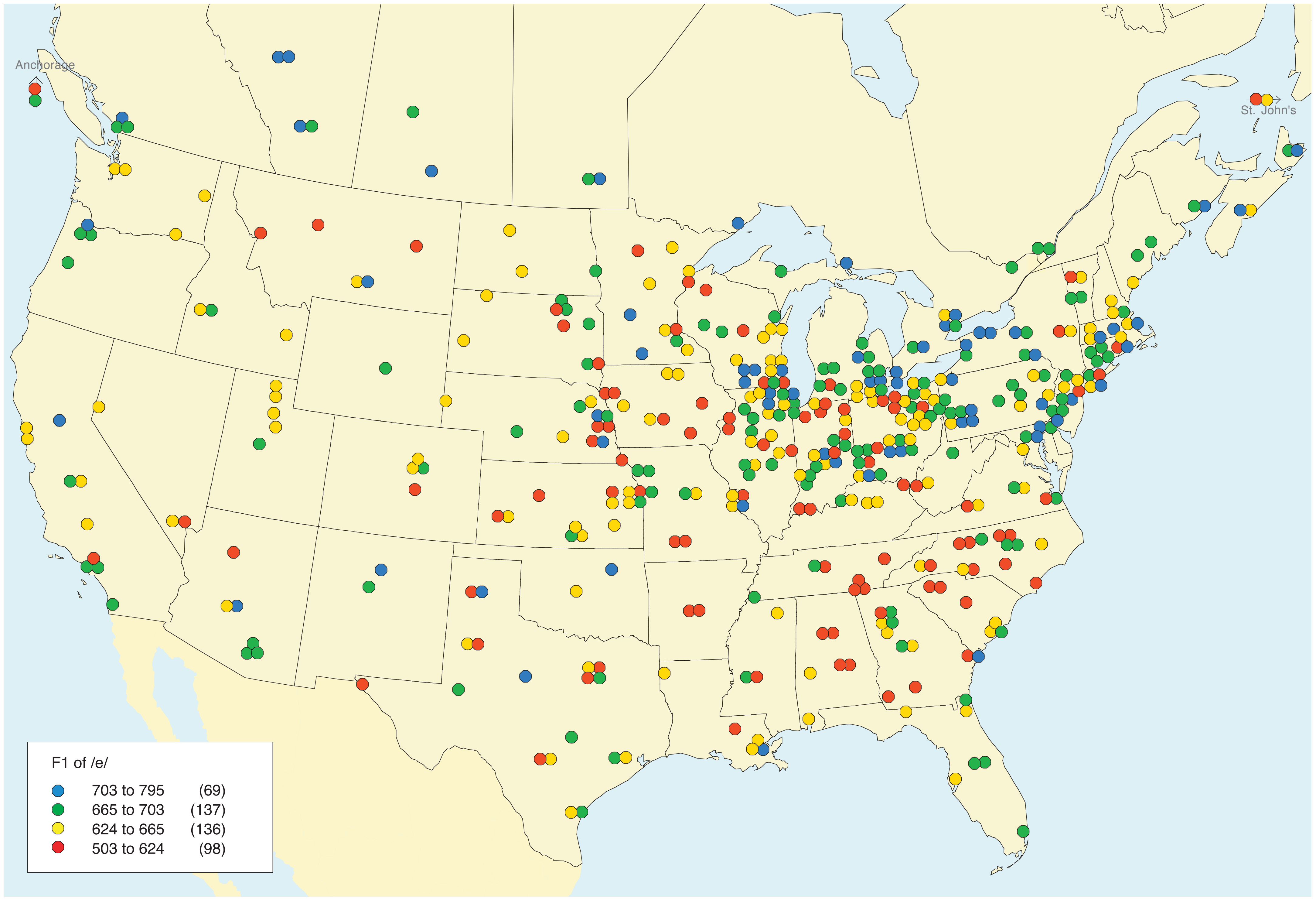
Map 10.1. The relative height (F1) of /i/ in *bit*, *hid*, etc.

No striking regional grouping by the height of /i/ is found except in the South, where the concentration of red symbols indicates a shift of /i/ to higher position. This is the third stage of the Southern Shift (Figure 11.2, Map 11.3). On the other hand, the blue circles representing relatively low /i/ are clustered in the mid-Atlantic states in a belt extending westward through the Midland.



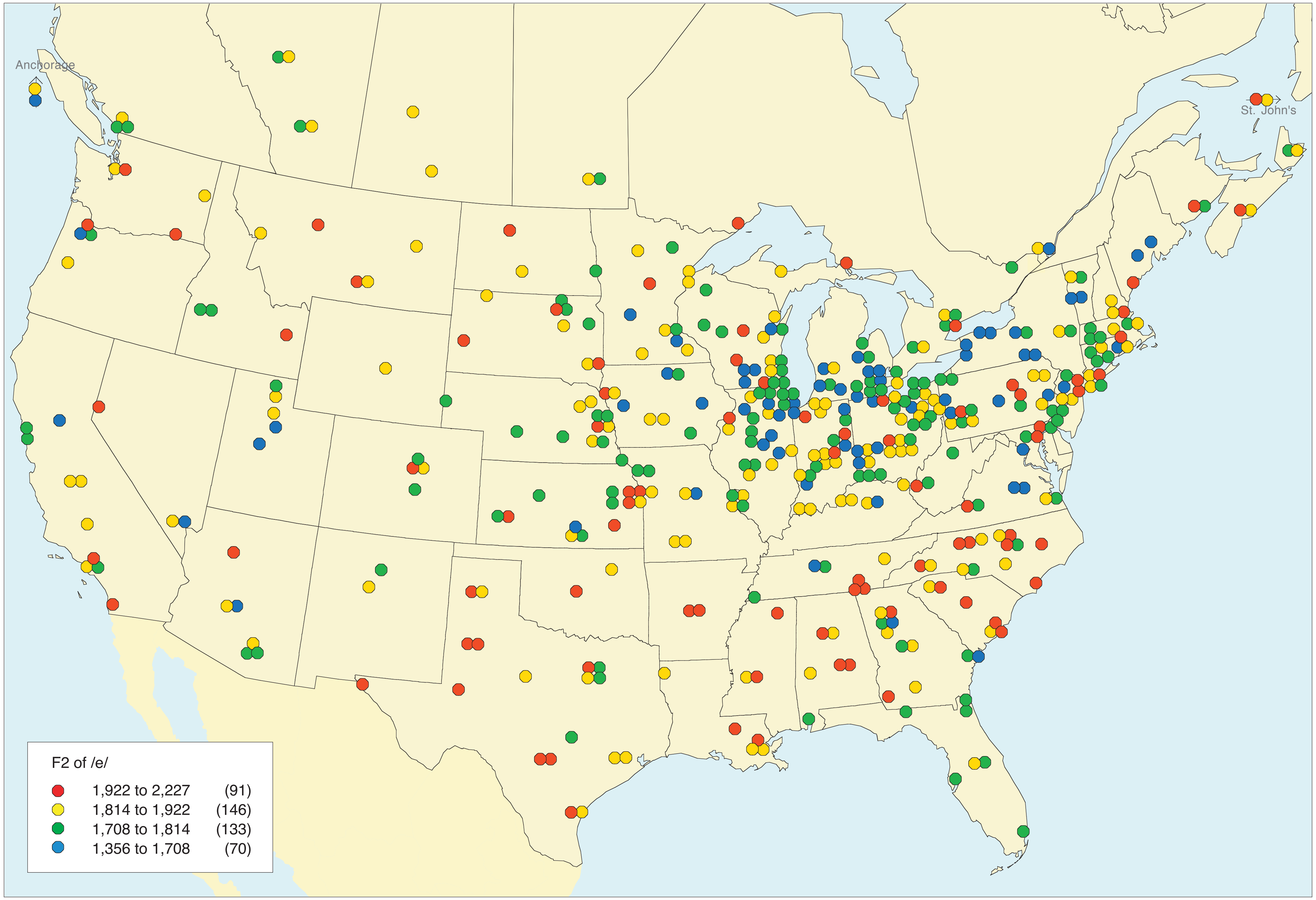
Map 10.2. The relative fronting and backing (F2) of /i/ in *bit*, *hid*, etc.

The concentration of front values of /i/ in the Inland South is parallel to that seen in Map 10.1, an integral element of the Southern shift. The heavy clustering of blue circles around the Great Lakes region registers a backing of /i/ that is closely associated with the Northern Cities Shift though not an essential part of it (Figures 14.11–12).



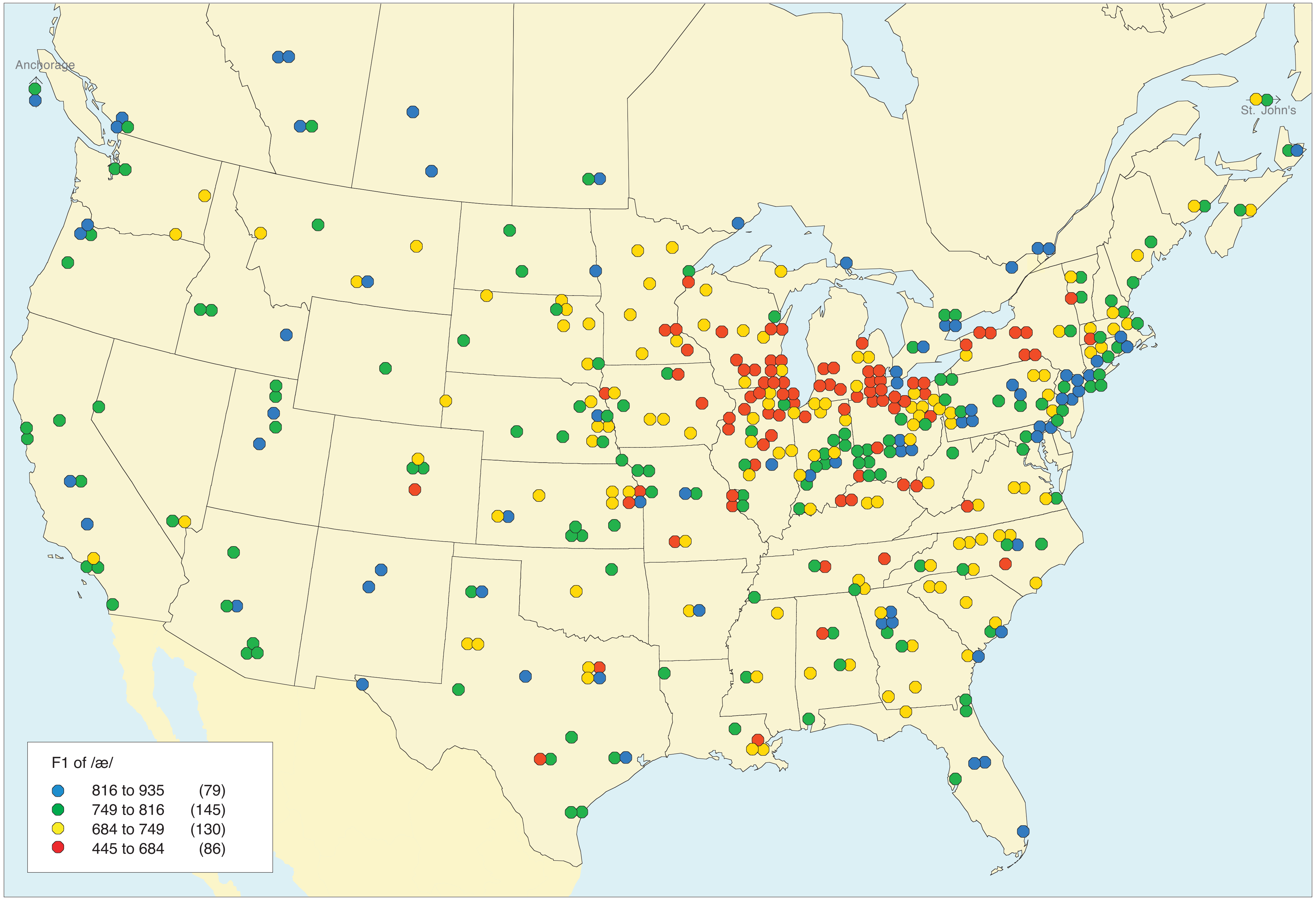
Map 10.3. The relative height (F1) of /e/ in *bet*, *bed*, etc.

The concentration of red circles in the South is similar to that of Map 10.1, but somewhat more extended. The raising of short /e/ is an element in the second stage of the Southern Shift (Figure 11.2, Map 11.3). One can also note an opposition of blue circles around the Great Lakes, representing a lowering of /e/ vs. a concentration of red and yellow symbols, representing raised /e/ in northern Indiana and Ohio. The lowering of /e/ is a relatively early stage in the Northern Cities Shift (Figures 14.11–12).



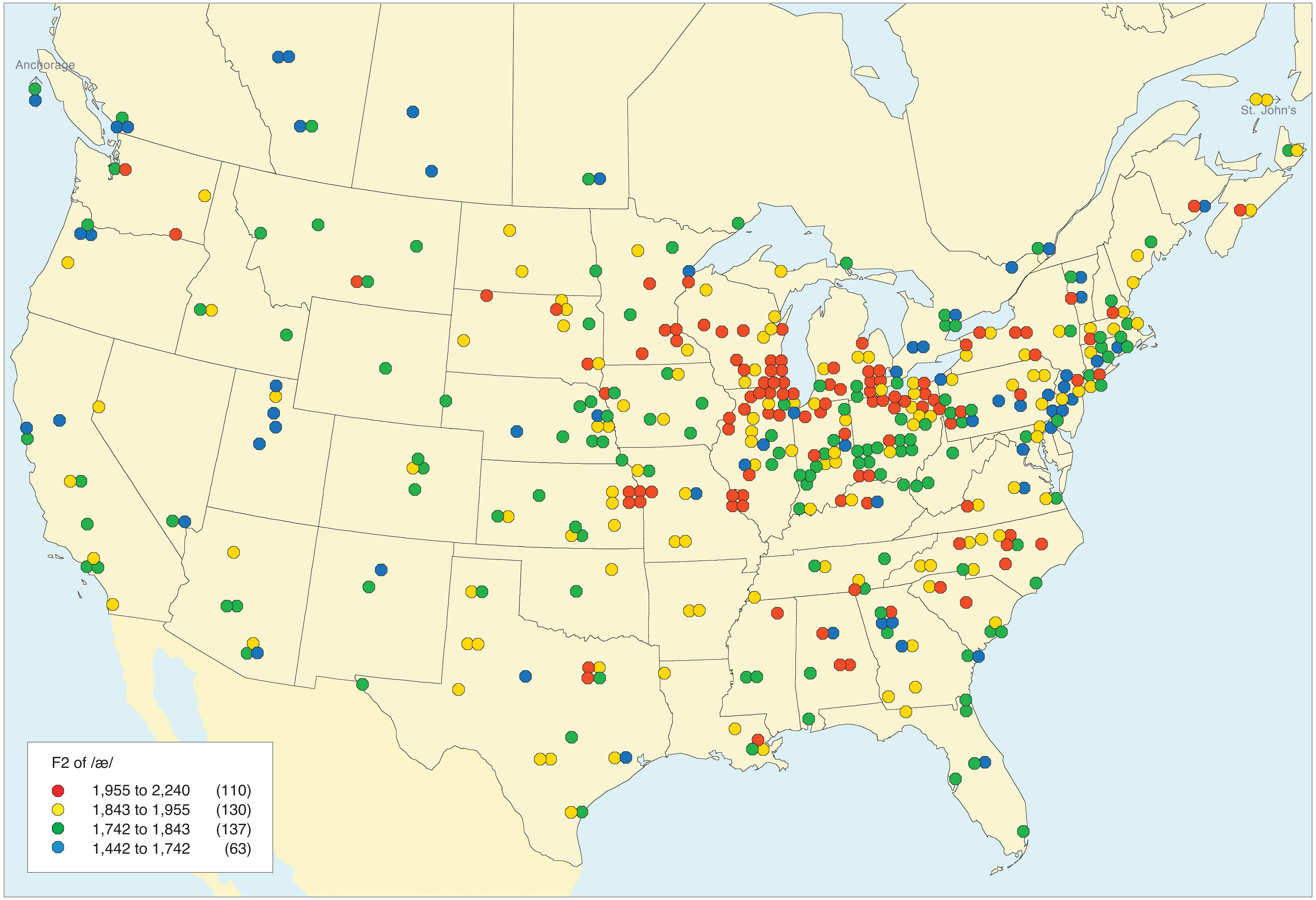
Map 10.4. The relative fronting and backing (F2) of /e/ in *bet*, *bed*, etc.

The grouping of red tokens in the Southern States is even more striking than in Maps 10.1–10.3 and extends further west into Texas. The fronting of /e/ to the peripheral track is an essential element of the second stage of the Southern Shift (Chapters 11, 18). On the other hand, the concentration of blue (and green) symbols in the Great Lakes Region is also more prominent, reflecting the backing of /e/ which is now a prominent feature of the Northern Cities Shift. The blue symbols extend to western New York State, which is an integral part of the Inland North dialect area (Chapter 14). Blue and green symbols predominate in Canada as a result of the Canadian Shift (Figure 15.1, Map 15.4).



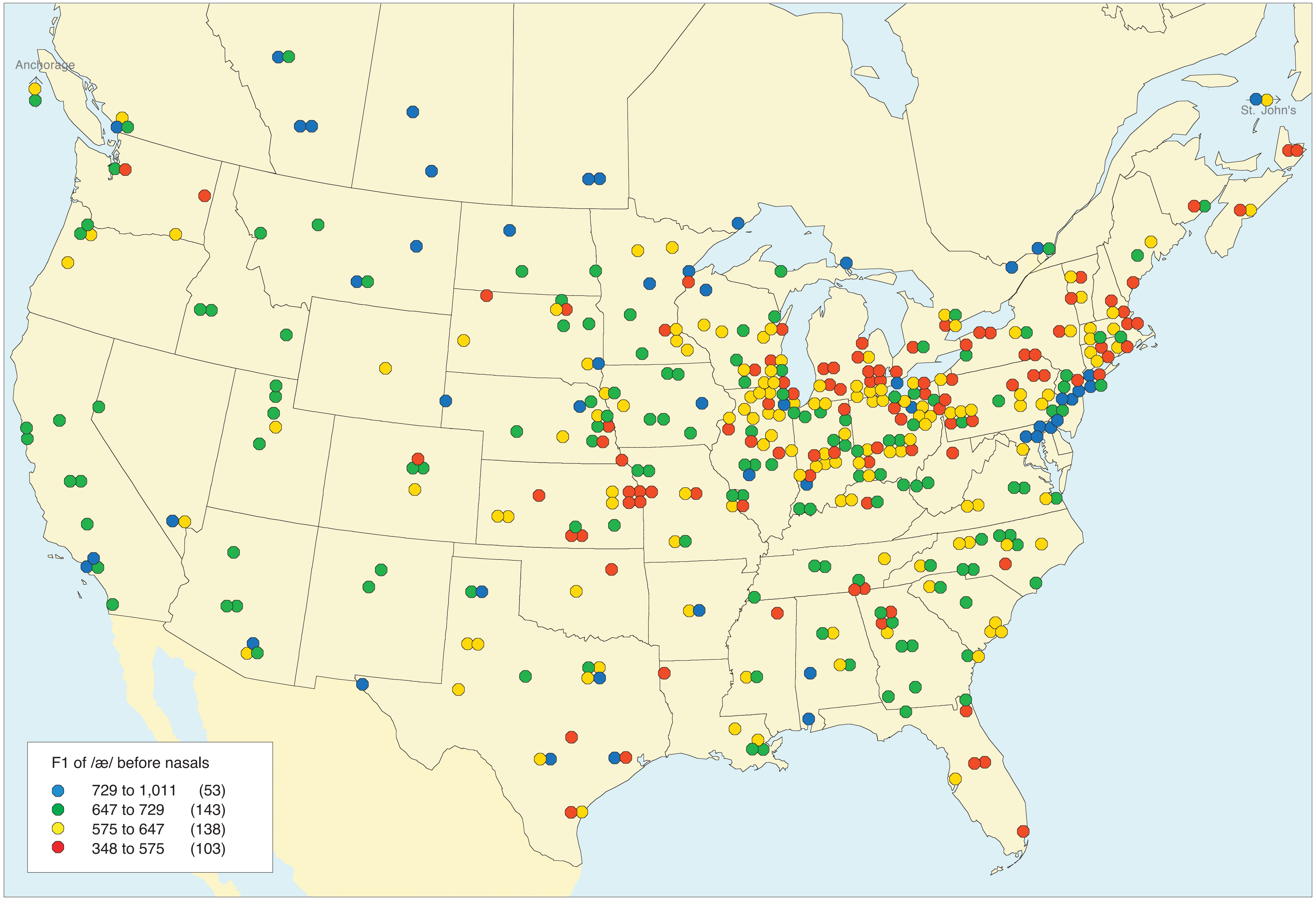
Map 10.5. The relative height of /æ/ in *bat*, *bad*, etc.

The mean values of /æ/ here do not include /æ/ before nasals in *man*, *ham*, *Spanish*, etc., since these vowels are raised in almost all areas of North America. The strong clustering of red circles defines the Inland North, extending from southeastern Wisconsin to New York State. The general raising of /æ/ is the first stage of the Northern Cities Shift (Figure 13.7, Maps 14.3 and 14.4). The heavy grouping of blue circles in the New York City and Mid-Atlantic area reflects the split of short-*a* into tense and lax phonemes in this region. This map shows the lax phoneme /æ/ for this region, which is not raised.



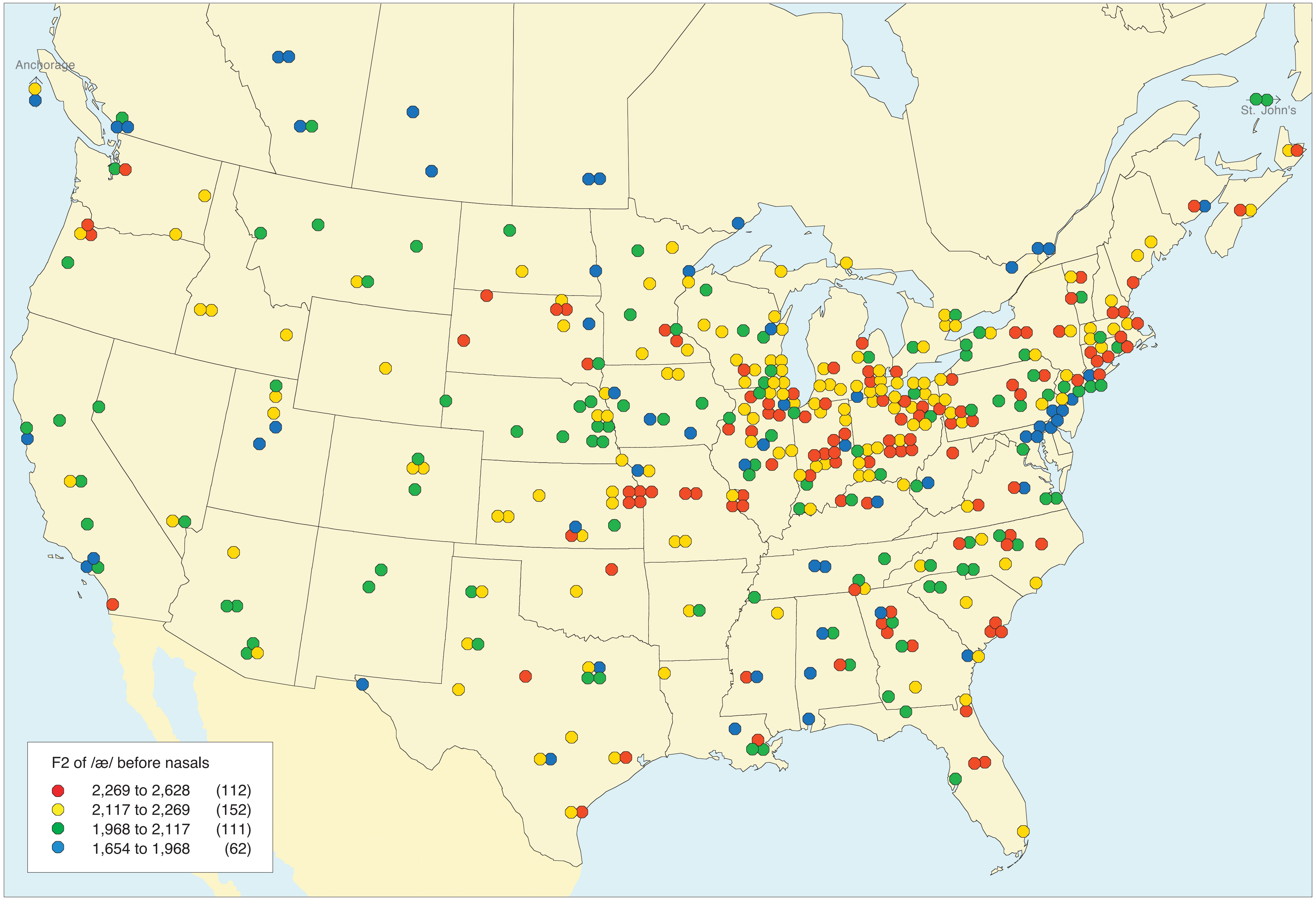
Map 10.6. The relative fronting and backing of /æ/ in *bat*, *bad*, etc.

This distribution is very similar to that of Map 10.5, since the raising of /æ/ is generally accompanied by fronting along the front peripheral track. However, the red circles indicating extreme fronting extend to St. Louis and Kansas City in a much more pronounced way than in Map 10.5. The preponderance of blue symbols in western and central Canada reflects the Canadian Shift (Figure 15.1, Map 15.4). The retraction of /æ/ is more prominent than lowering in this chain shift.



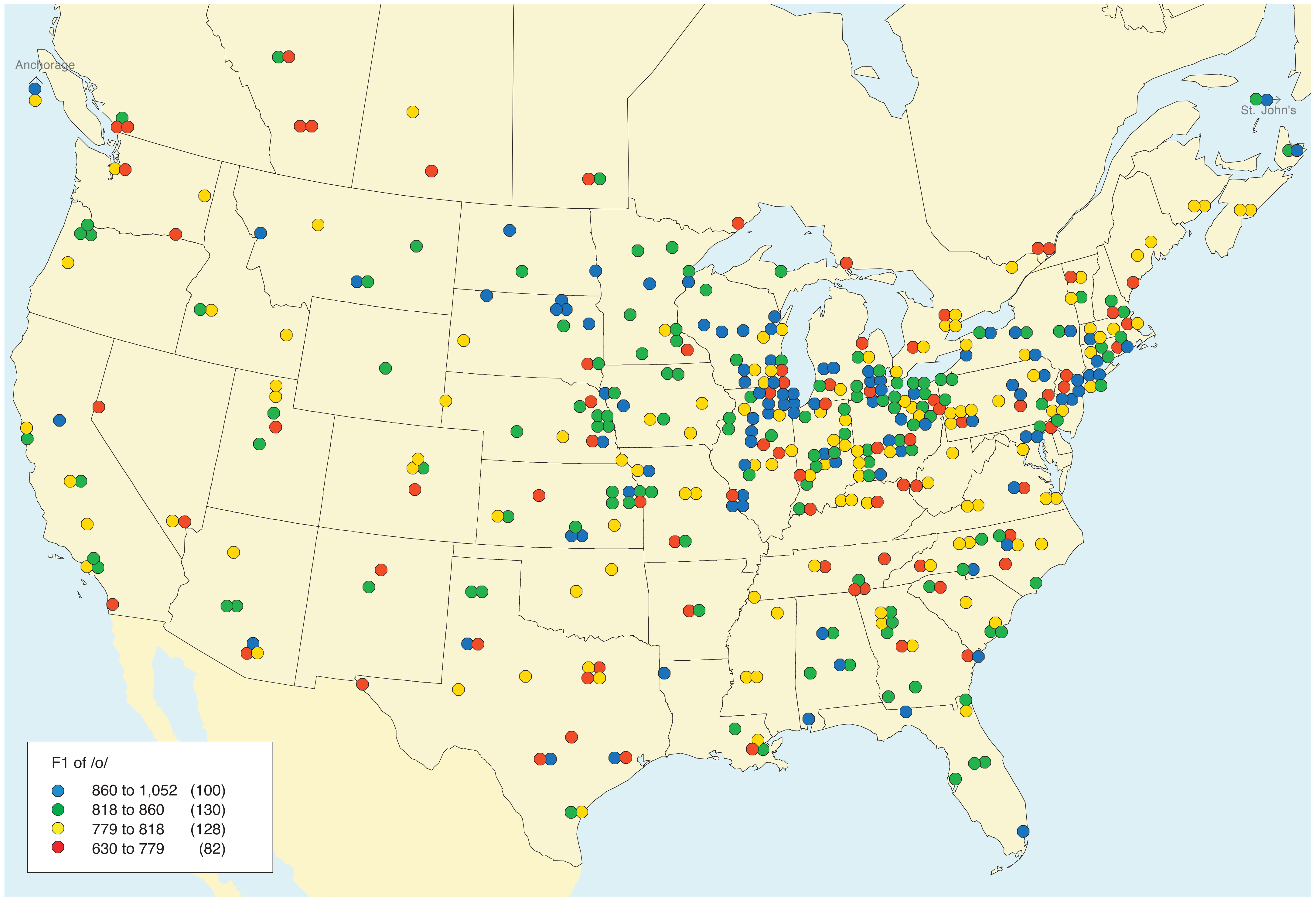
Map 10.7. The relative height of /æ/ before nasals in *man*, *ham*, *Spanish*, etc.

The clustering of red symbols in the Northern area is less concentrated than that of Map 10.5, indicating that raising of /æ/ before nasals is a more general phenomenon than raising before oral consonants (Chapter 13). Canada (excluding the Atlantic Provinces) shows almost exclusively blue symbols, indicating minimal raising in this environment. The blue circles in the Mid-Atlantic states again reflect the fact that the raised vowels are re-assigned to the tense phoneme /æh/.



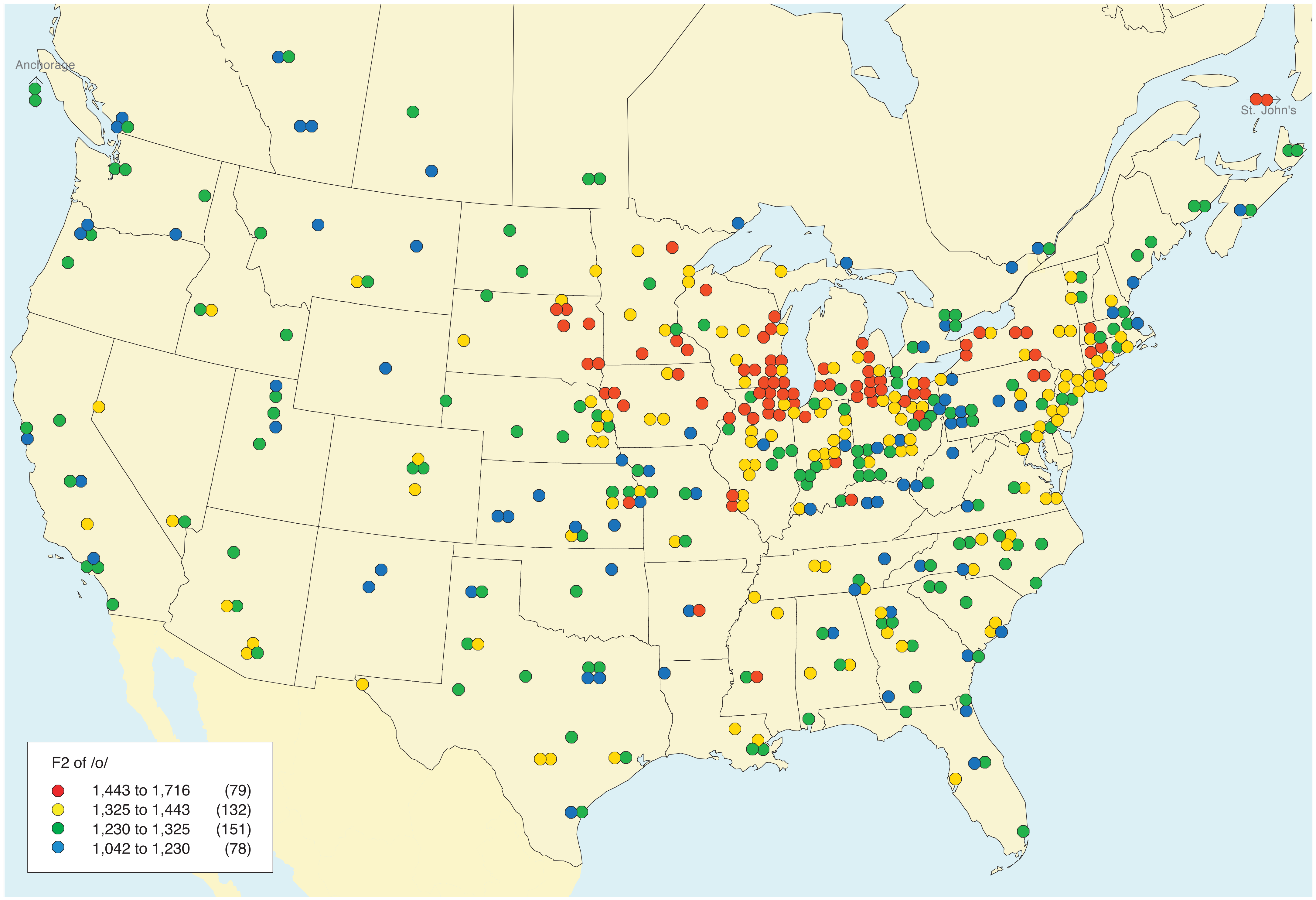
Map 10.8. The relative fronting and backing of /æ/ before nasals in *man*, *ham*, *Spanish*, etc.

The overall pattern of Map 10.8 is more diffuse than that of Maps 10.5–10.7. Red circles are well represented in New England and the Midland, where the nasal system of short-*a* raising is found (raising before all and only before nasals; see Map 13.3, Figure 13.6). Red circles are diffusely spread across the North, since the fronting of /æ/ before nasals is not as distinctive a feature of the North as is the fronting of /æ/ in general. The westward extension of red circles to St. Louis, Columbia, and Kansas City is notable, as in Map 10.6. The Canadian concentration of blue (less fronted) symbols is even more striking than in Map 10.7. The blue circles in the Mid-Atlantic states reflect the split of short-*a*. For the Mid-Atlantic states, this map shows the lax pre-nasal subclass of words like *Spanish*, not the tense subclass of words like *ham*.



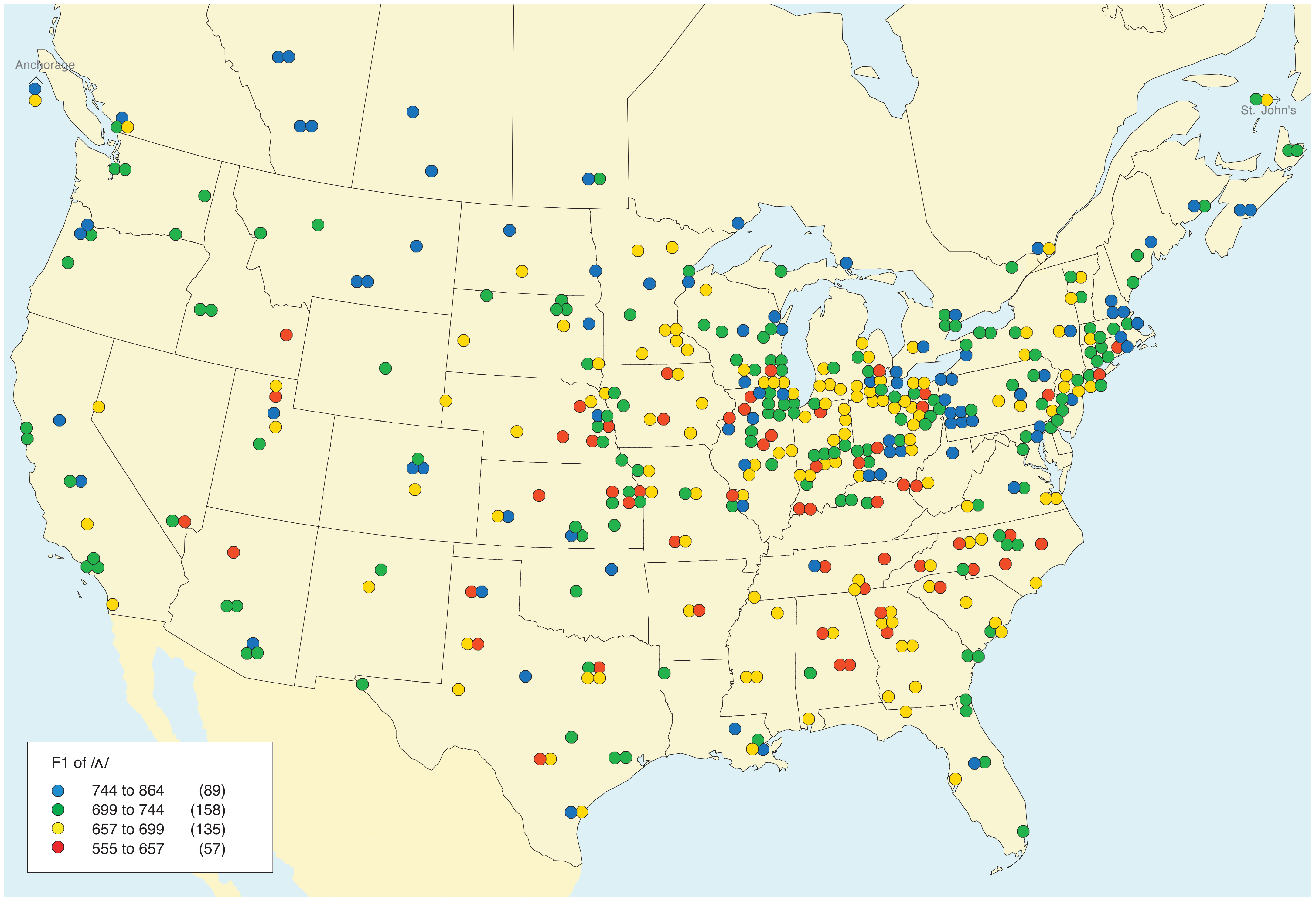
Map 10.9. The relative height of /o/ in *hot*, *god*, etc.

This map does not show a strong concentration of any one natural group, since dialect variation of /o/ tends to involve advancement rather than height. There is a tendency to find lower (blue) vowels in the North and higher vowels (red) in Canada and the West, reflecting the fact that /o/ is raised and backed when it merges with /oh/ in the low back merger (Chapter 9). On the whole, the height of /o/ is not a distinguishing trait of any dialect area.



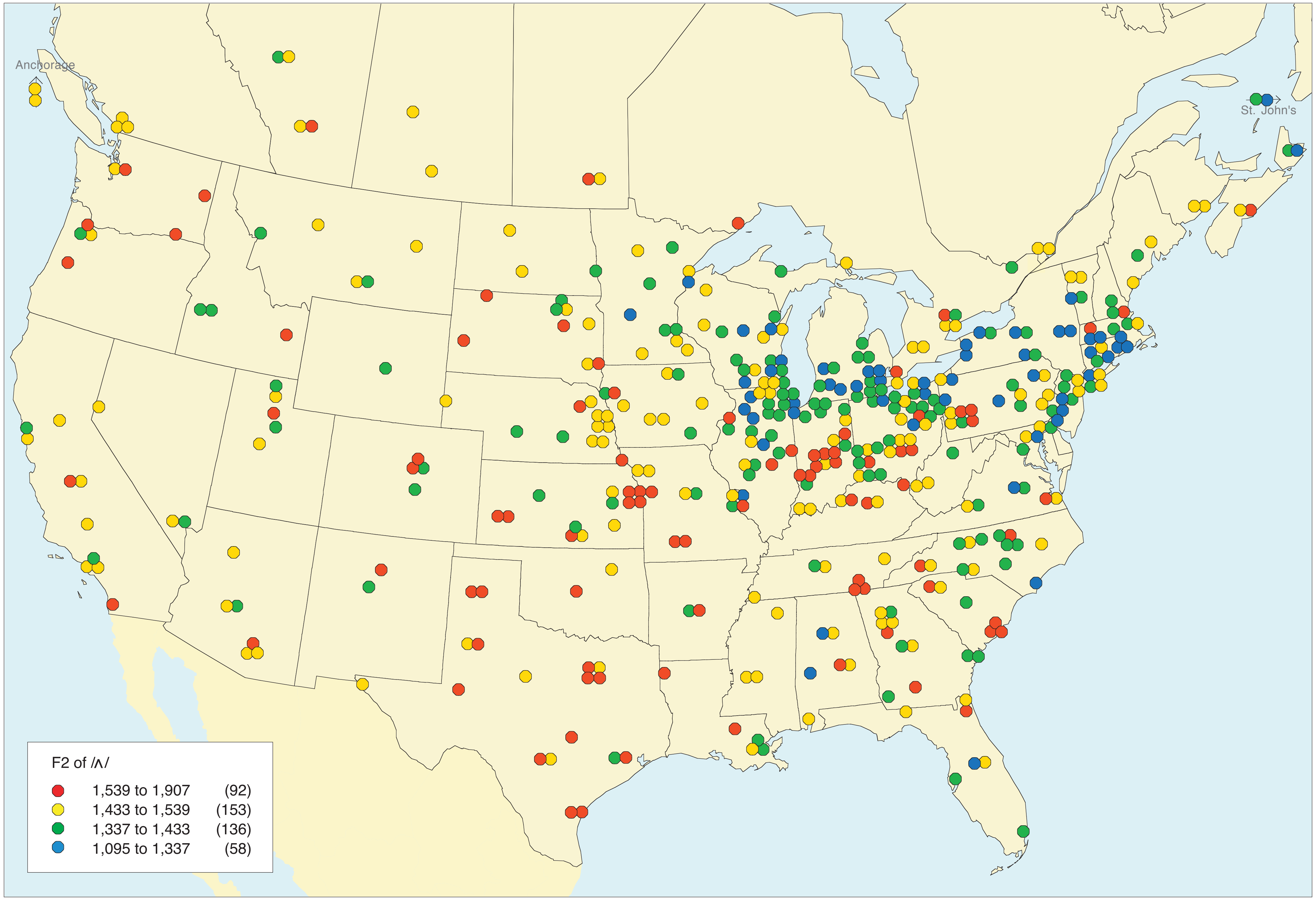
Map 10.10. The relative fronting and backing of /o/ in *hot*, *god*, etc.

The strong concentration of red symbols in the North – particularly the Great Lakes region and New York State – reflects the fronting of /o/ that forms the second stage of the Northern Cities Shift (Chapter 14). This extends further west than many other elements of the shift, reaching as far as South Dakota. Moderately front forms of /o/ (yellow circles) predominate in the Mid-Atlantic States and the Midland area of Illinois, Indiana, and Ohio. This is opposed to the predominance of blue and green in the South, West, and Canada, reflecting a low back position for this phoneme, whether or not it is merged with /oh/. St. John's, Newfoundland, is a noteworthy exception to the Canadian pattern, with a fronted /o/ comparable to that of the Inland North.



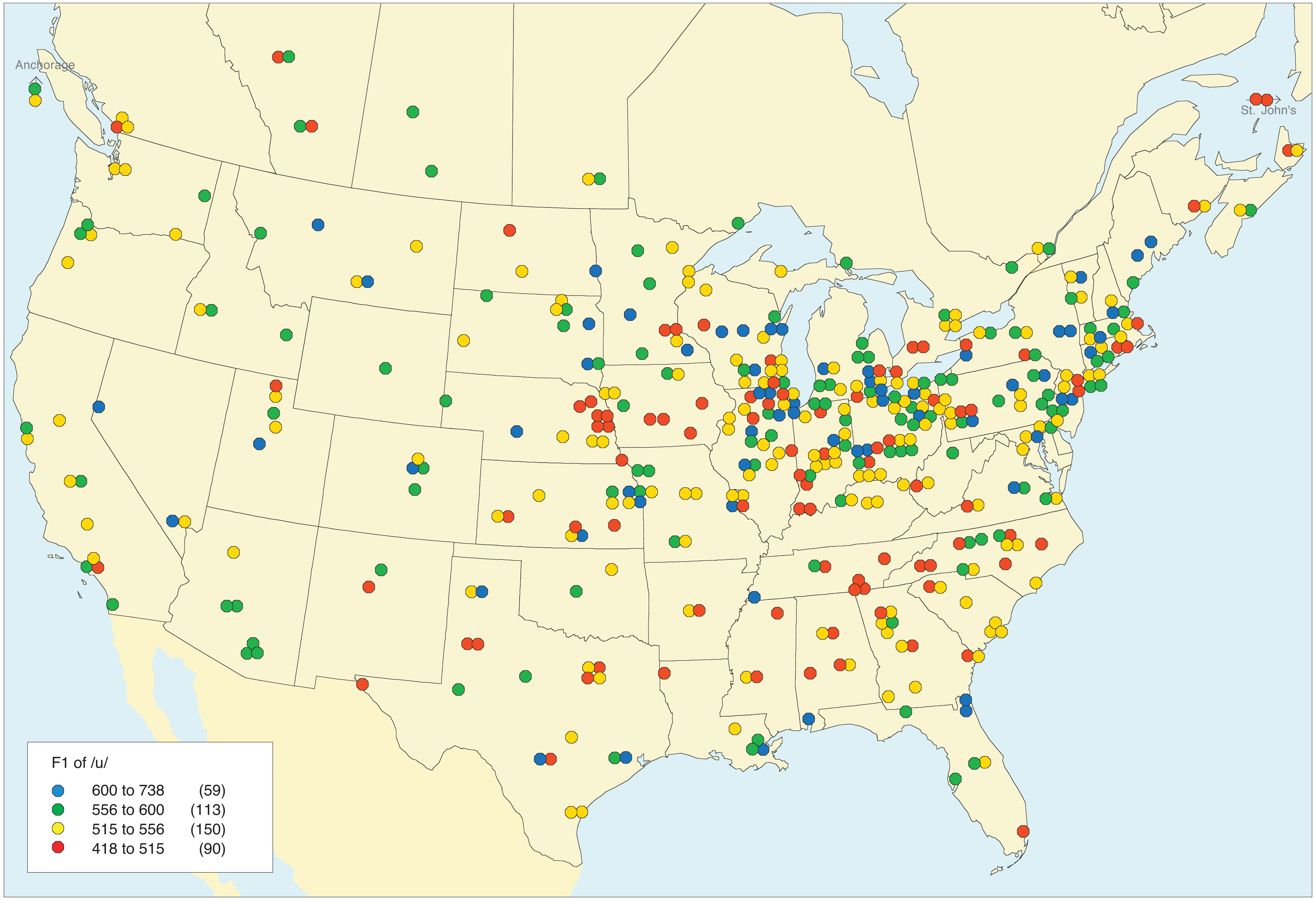
Map 10.11. The relative height of /ʌ/ in *but*, *run*, etc.

The height of /ʌ/ has not been the focus of any major dialect study so far. However, blue symbols indicating relatively low realizations of /ʌ/ are concentrated in Canada and neighboring North Central areas and in the city of Pittsburgh in Western Pennsylvania. The lowering of /ʌ/ is in fact a central feature of the Pittsburgh chain shift (Figures 19.6–19.9). There is a clear relation between the low back merger in Pittsburgh and a tendency for /ʌ/ to lower.



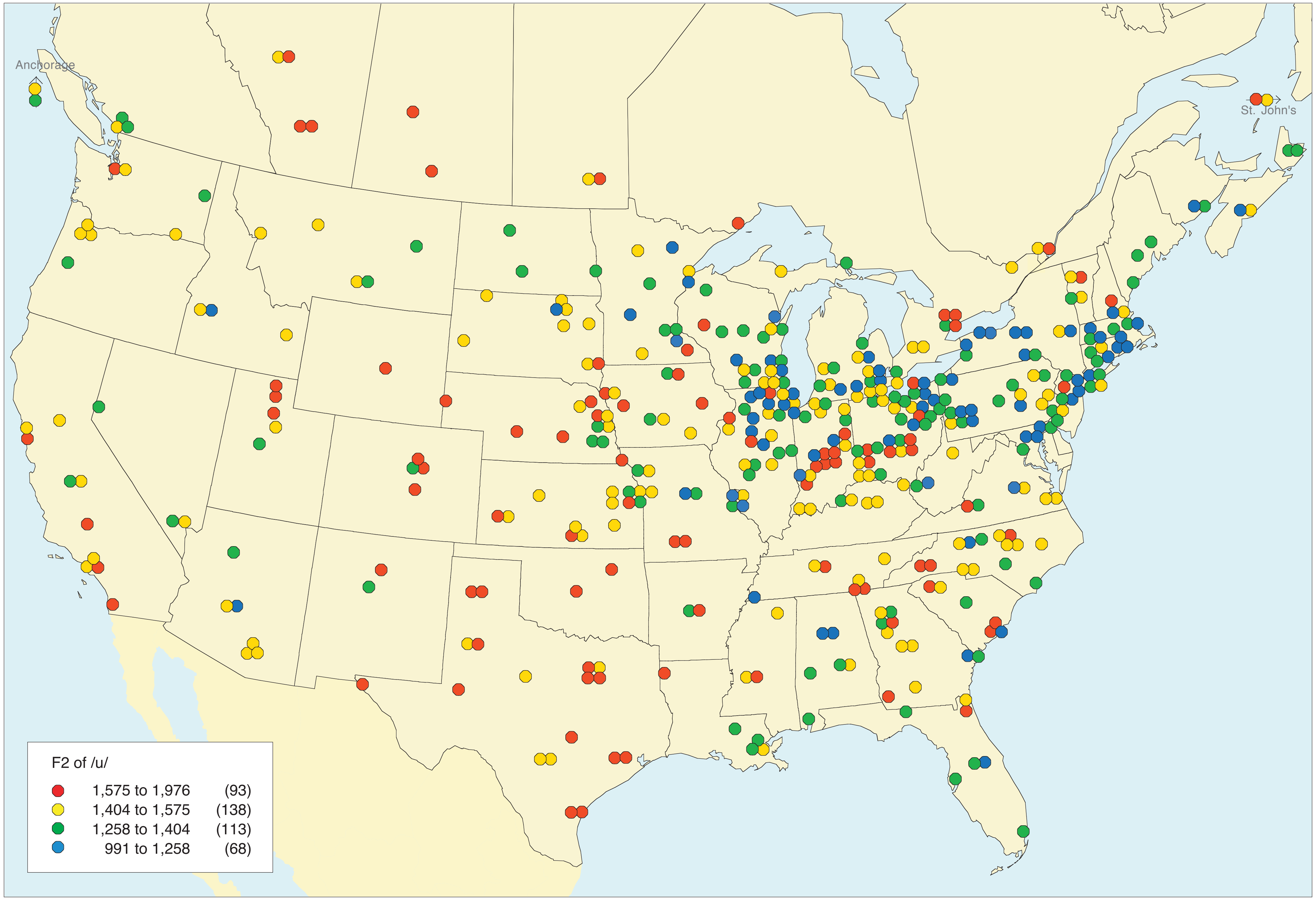
Map 10.12. The relative fronting and backing of /ʌ/ in *but*, *run*, etc.

The fronting and backing of /ʌ/ shows considerable regional diversity. The backer versions of this phoneme (blue symbols) are almost entirely confined to the Inland North, in the Great Lakes region, New York State, and southern New England. This is the most recent stage of the Northern Cities Shift (Map 14.8, Figure 14.7). On the other hand, a forward movement of /ʌ/ is a characteristic feature of the Midland and the South, indicated by the red symbols. In Canada, Cape Breton and Newfoundland are clearly distinguished by a retracted variant of /ʌ/, versus more central values elsewhere.



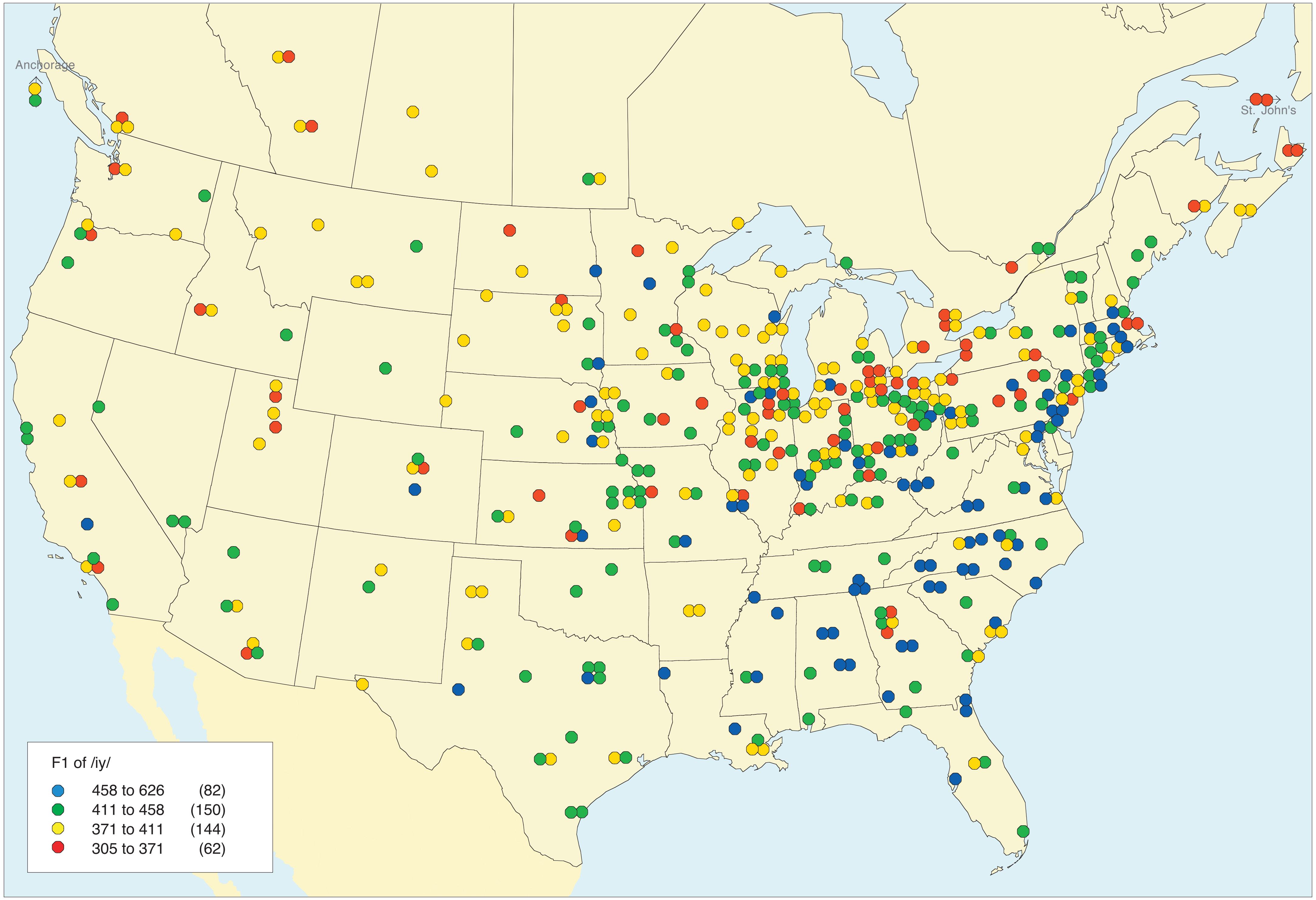
Map 10.13. The relative height of /u/ in *put*, *good*, etc.

The red circles representing relatively high realizations of /u/ are fairly well concentrated in the eastern half of the U.S. (and the Atlantic Provinces of Canada). The height of /u/ does not play a prominent part in any of the sound changes discussed in the Atlas, but is not without some regional correlates, as shown here.



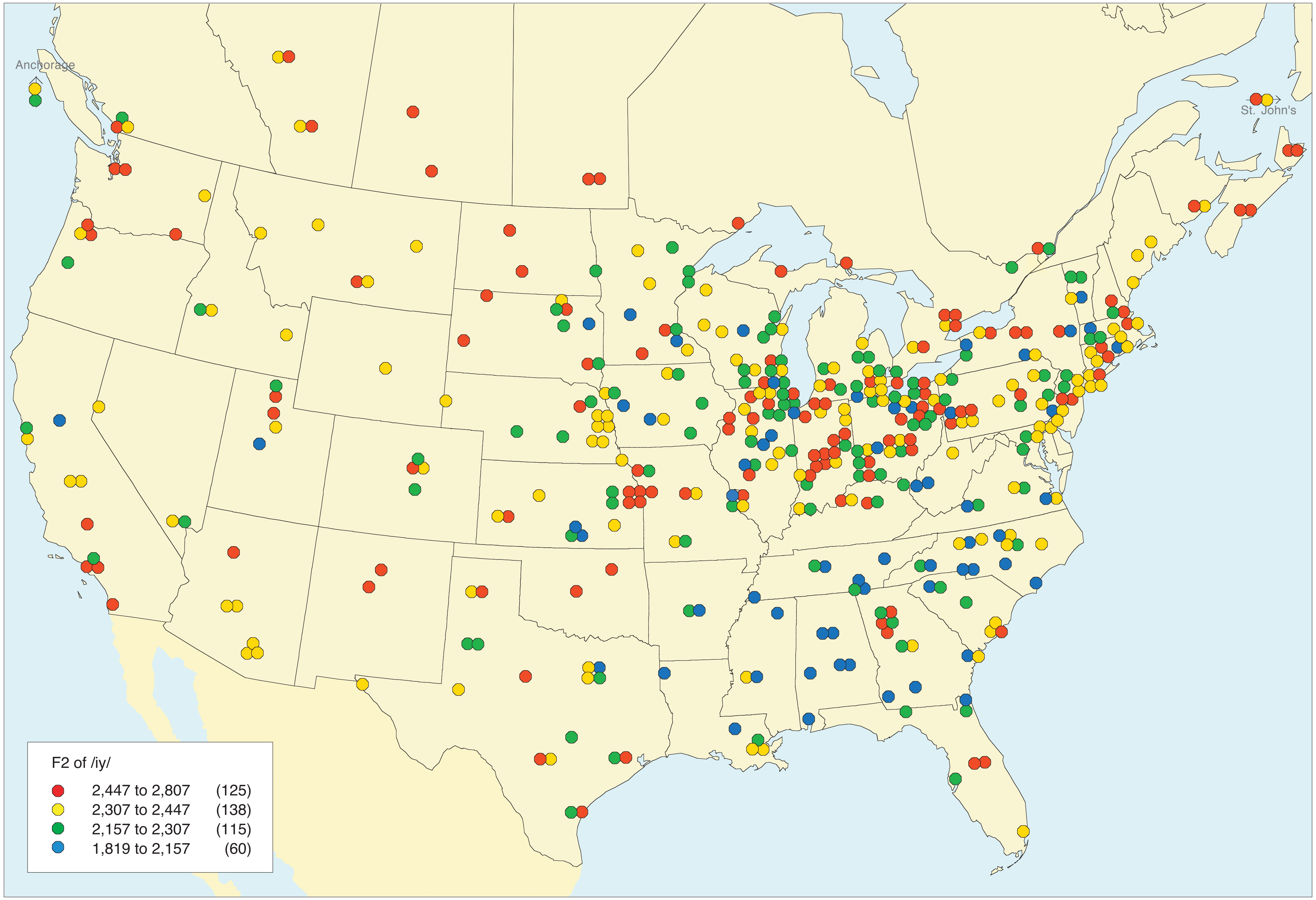
Map 10.14. The relative fronting and backing of /u/ in *put*, *good*, etc.

The blue symbols representing the backest forms of /u/ are almost entirely confined to a continuous area in the North: the Inland North, the Mid-Atlantic states, and southern New England. The red circles indicating the opposite tendency are not so heavily concentrated, but are found almost everywhere else except for the North Central and most of the Pacific Northwest areas.



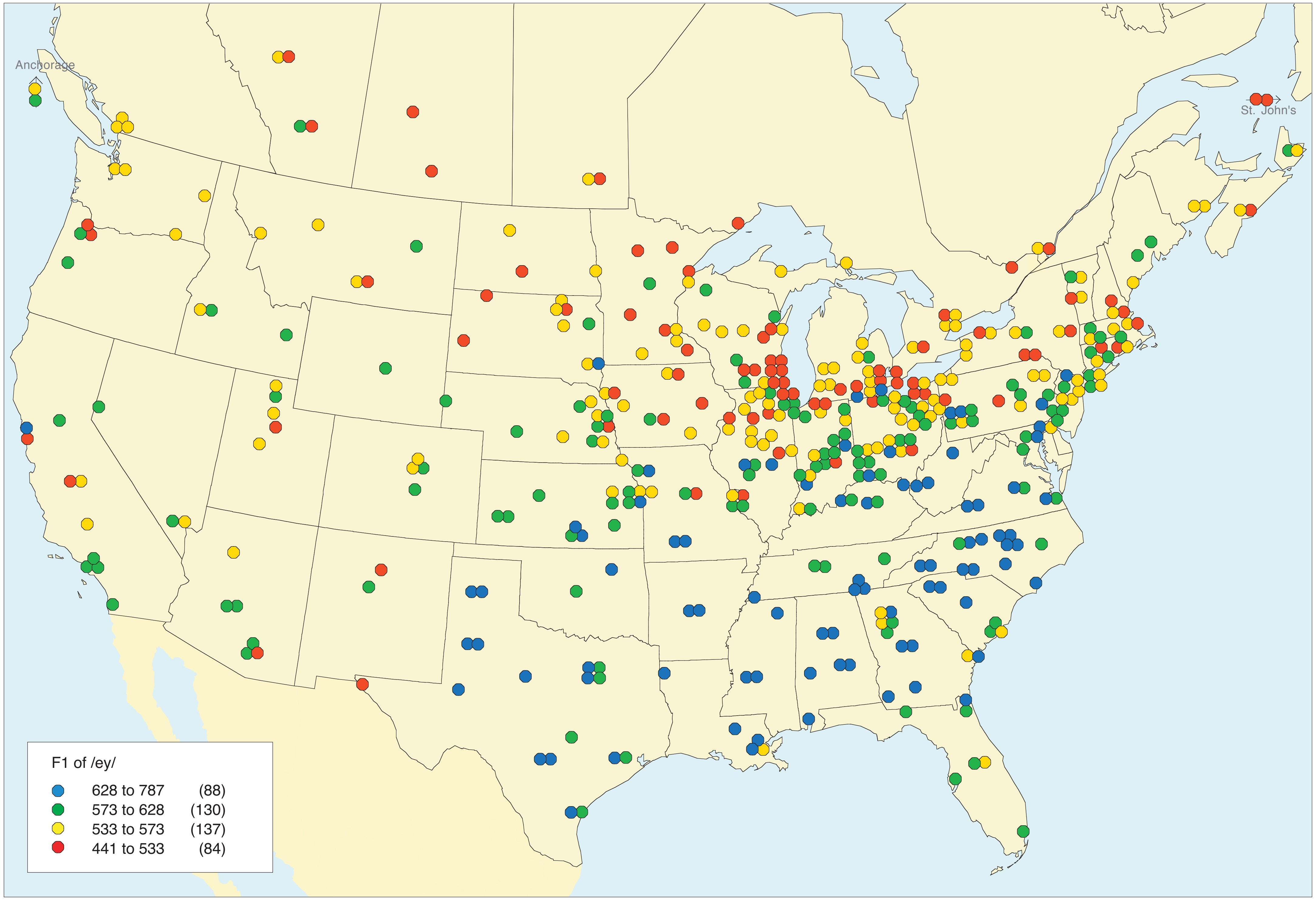
Map 10.15. The relative height of /iy/ in *seat*, *seed*, *see*, etc.

The major grouping on this map is the concentration of blue symbols in the South and the southern Mid-Atlantic region. This is a second aspect of the third stage of the Southern Shift (Figure 11.2, Map 11.3). The lowering of /iy/ along a non-peripheral track is correlated with the opposing movement of /i/ in Map 10.1. In Canada, Cape Breton and Newfoundland are distinguished by consistently high variants of /iy/.



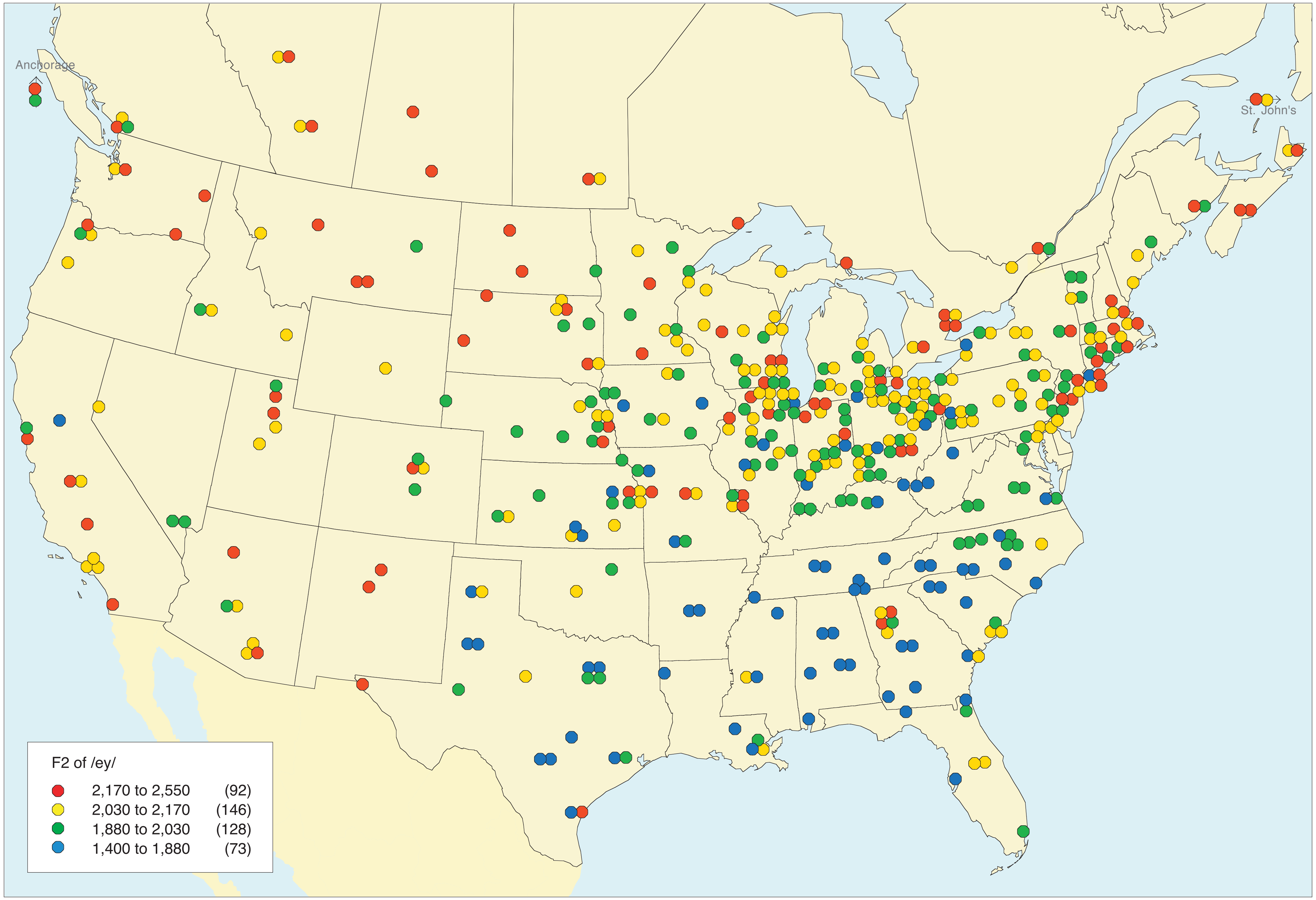
Map 10.16. The relative fronting and backing of /iy/ in *seat*, *seed*, *see*, etc.

The same clustering of blue symbols in the South can be observed here as in Map 10.15: the centralization of /iy/ accompanies its lowering along the non-peripheral track in the front vowel space. The opposite tendency – for /iy/ to occupy a peripheral front position – is signaled by red symbols, which are scattered through most other dialect areas. Canada shows almost a uniform array of red circles, with only a few exceptions.



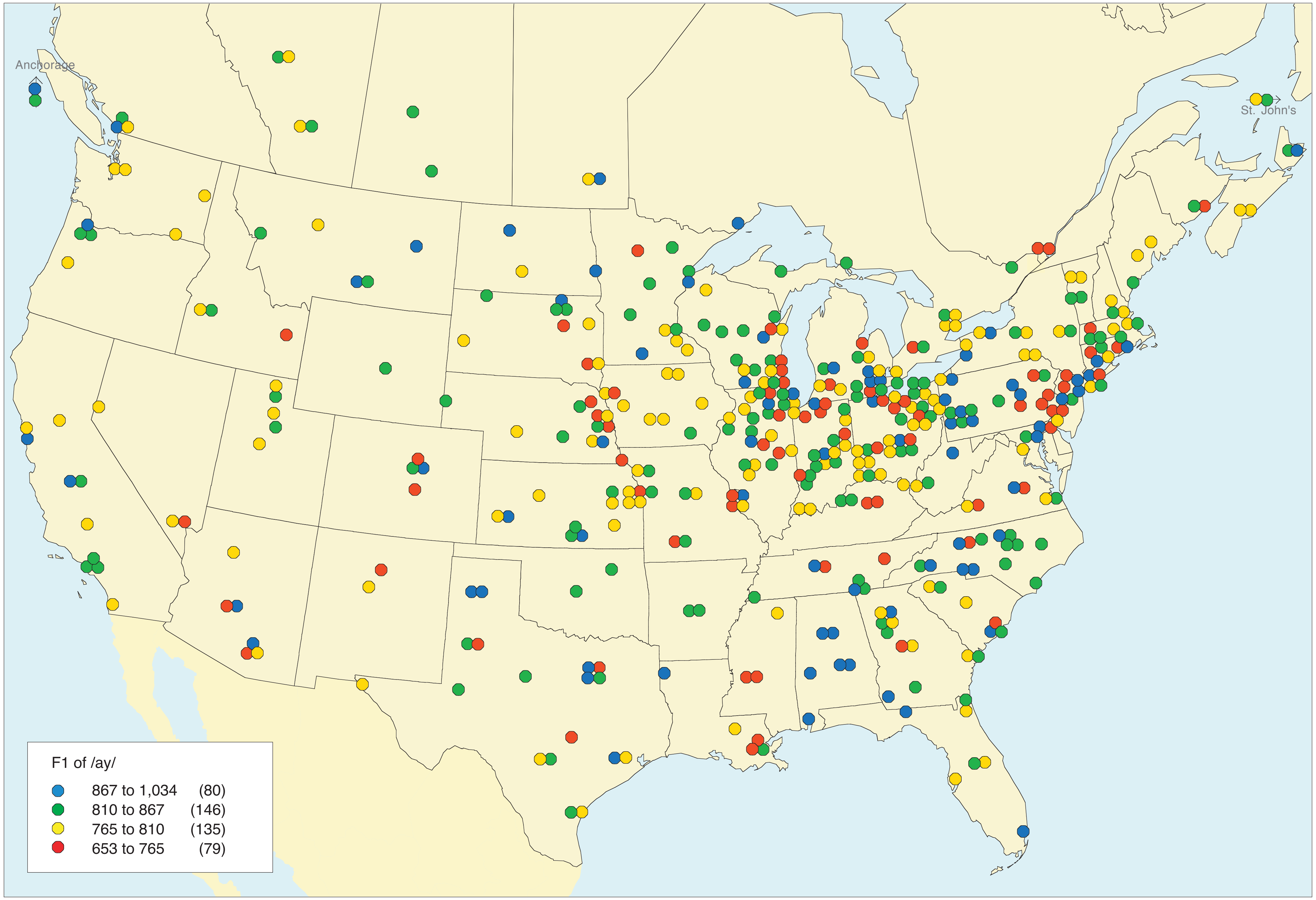
Map 10.17. The relative height of /ey/ in *bait*, *made*, *may*, etc.

This map shows a three-way regional division. Blue symbols, indicating the lowering of the nucleus of /ey/, predominate in the South, and red symbols, indicating raised /ey/, predominate in the North and Canada. In between are the intermediate yellow and green symbols, which predominate in the West, the Midland, and the Mid-Atlantic states. The low vowels in the South are an aspect of the second stage of the Southern Shift, the downward movement of /ey/ that is the counterpart of the upward movement of /e/ in Map 10.3 (see Map 11.3, Figure 11.2).



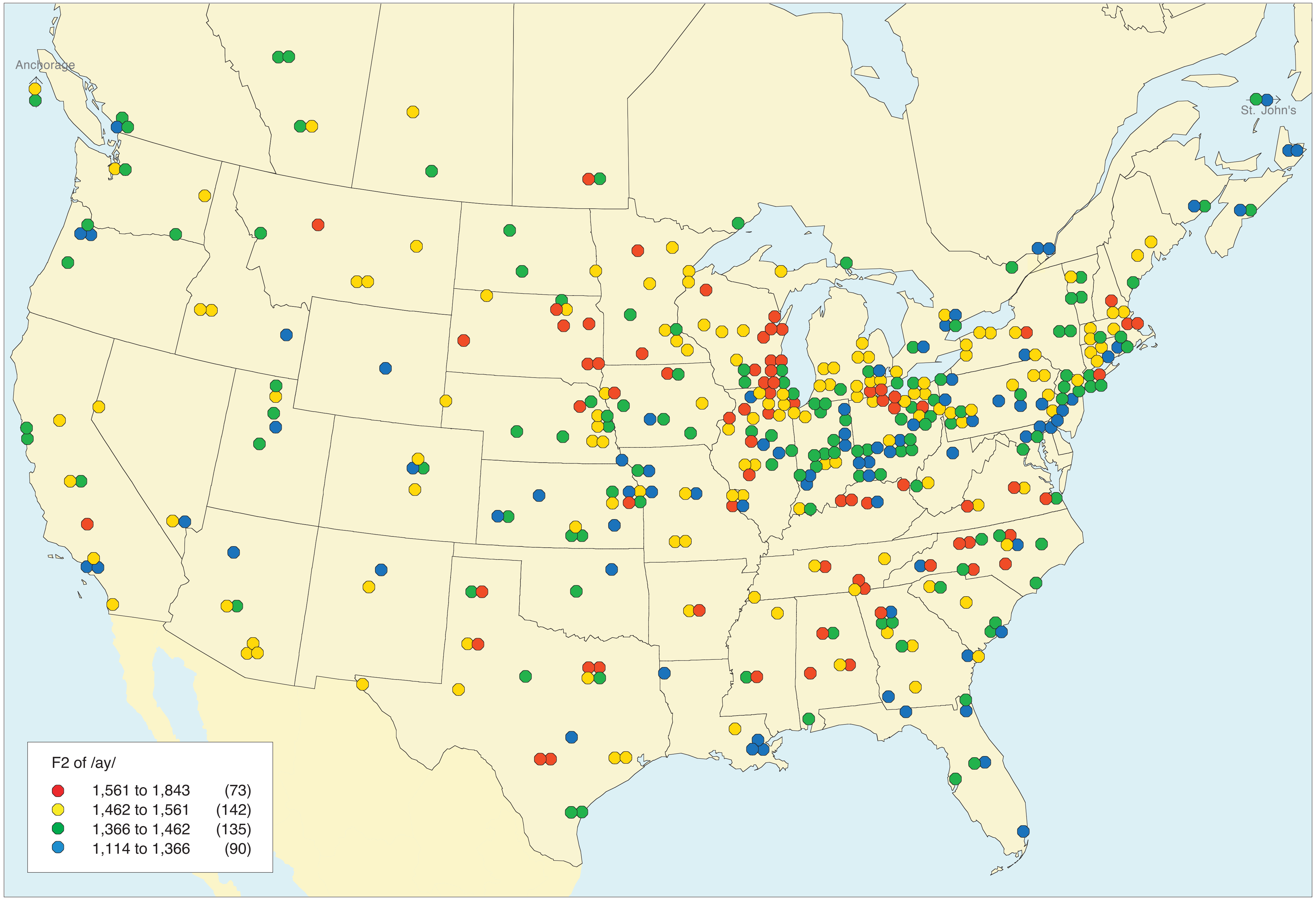
Map 10.18. The relative fronting and backing of /ey/ in *bait*, *made*, *may*, etc.

The uniform blue area in the South shows the backing of /ey/ that accompanies its lowering in Map 10.17, as /ey/ is lowered along the centralized, non-peripheral track. There is no corresponding predominance of red symbols in the Inland North, but Canada, along with much of the North Central and Pacific area, shows symbols that are almost uniformly red, indicating a peripheral realization of /ey/. The Northern Cities Shift does not extend to areas that show such extreme positions for /ey/.



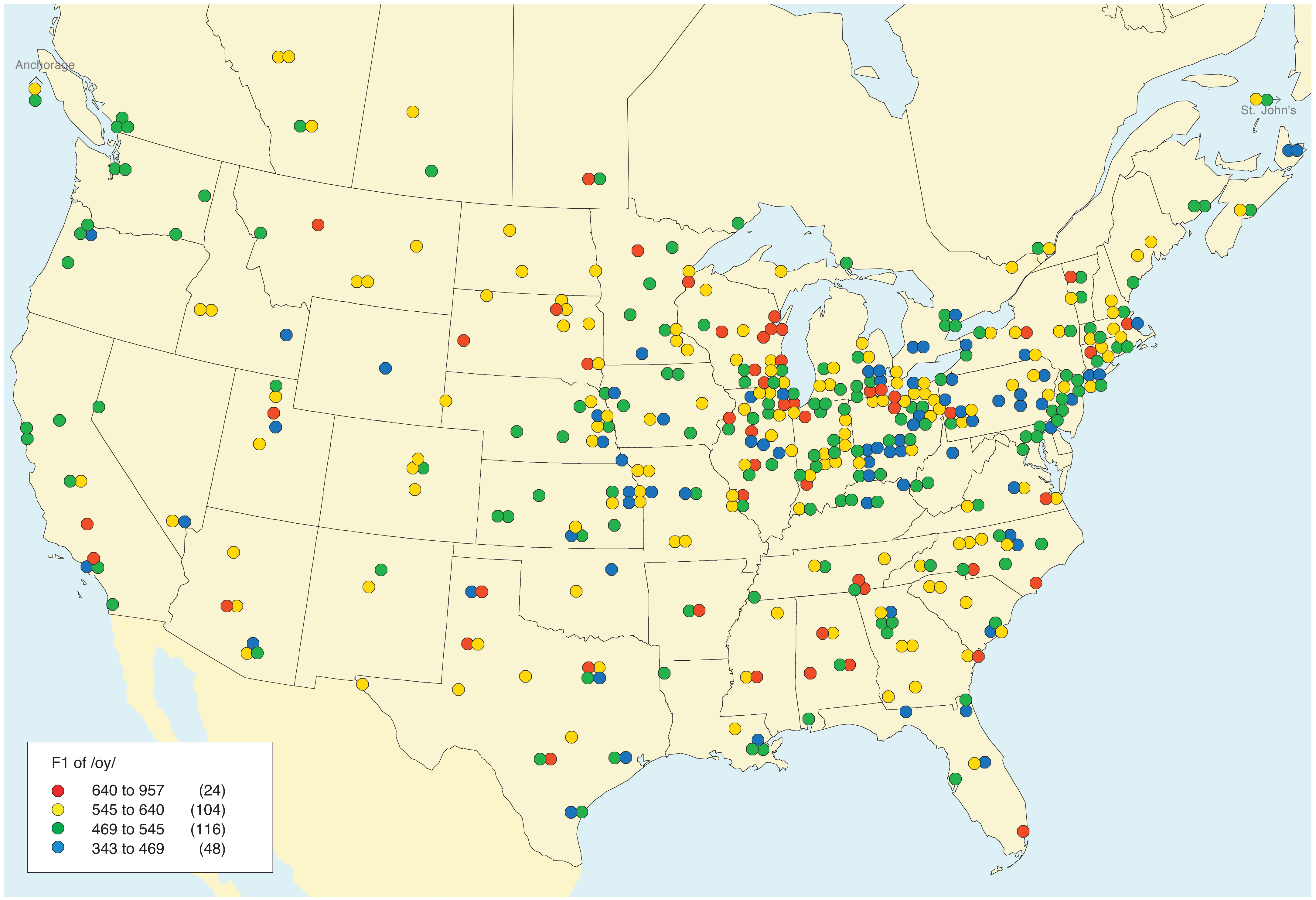
Map 10.19. The relative height of /ay/ in *wide*, *buy*, etc.

No heavy concentration of high or low realizations of /ay/ are found in this display. This map does not include /ay/ before voiceless consonants (Canadian raising), which is registered in Map 10.37. (See also Map 15.5, Figure 17.8.) A cluster of blue symbols appears throughout Alabama, indicating a low (and monophthongal) nucleus.



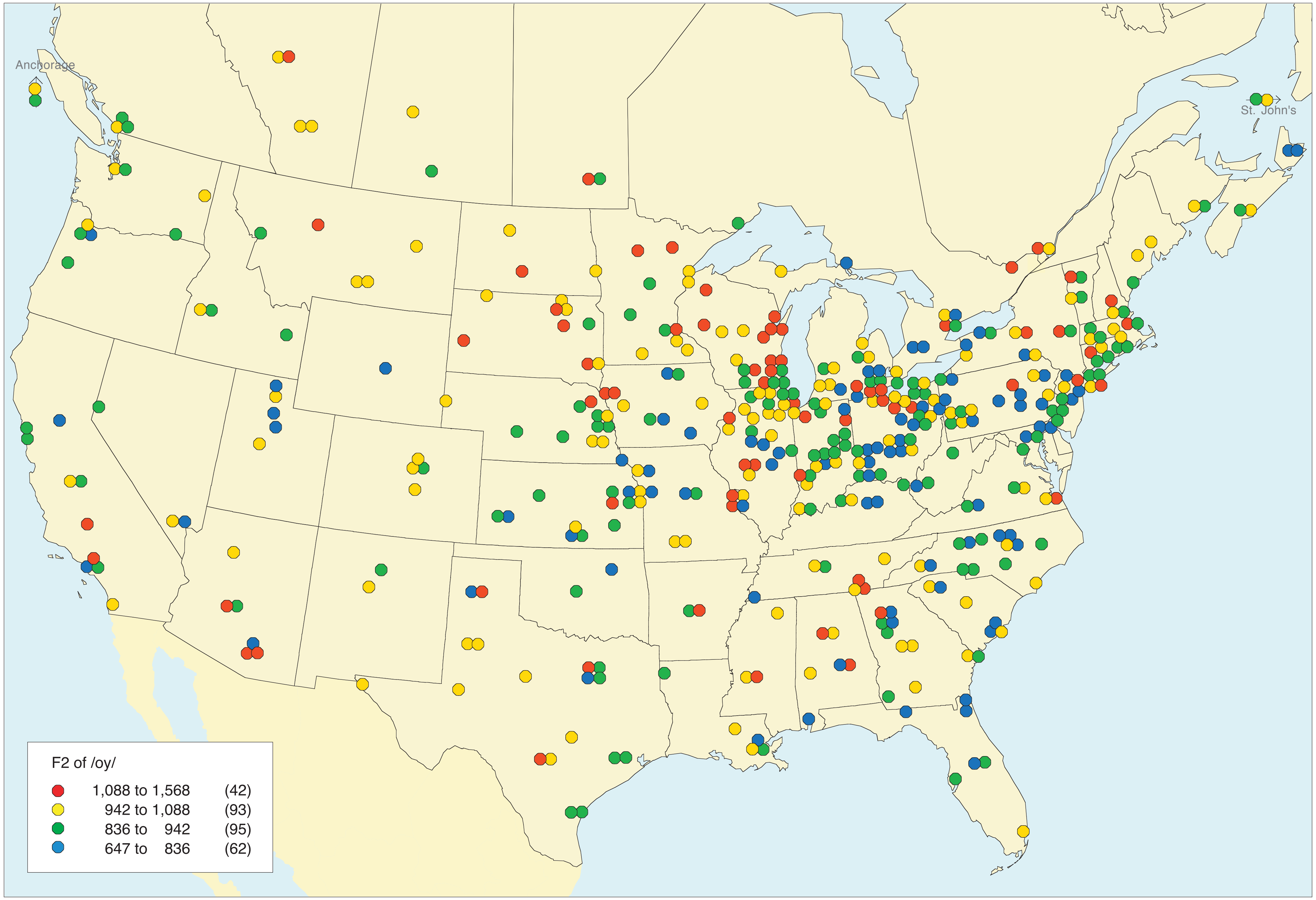
Map 10.20. The relative fronting and backing of /ay/ in *bite*, *wide*, *buy*, etc.

Deletion of the glide of /ay/ is accompanied by a slight fronting (Maps 11.3–11.4, 18.2–18.3), reflected here in the concentration of red symbols in the South. In the North, the nucleus of /ay/ moves forward in conjunction with the fronting of /o, ah/, reflected especially by a grouping of red circles in some Northern urban areas. Directly below the Great Lakes region, a broad belt of blue symbols indicates the opposite tendency in the Midland: relatively back nuclei of /ay/, which also appears in New Orleans, Montreal, and Atlantic Canada.



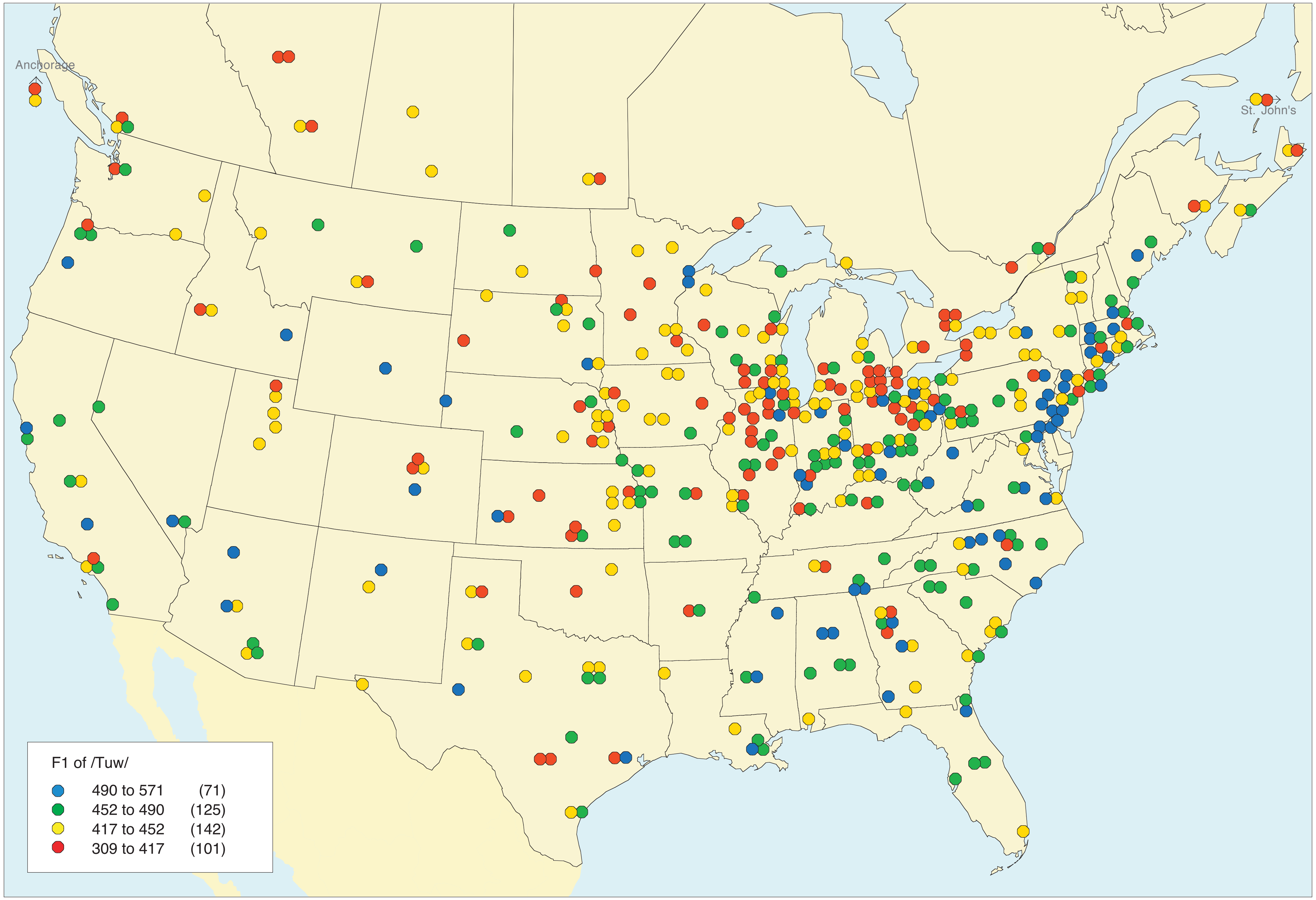
Map 10.21. The relative height of /oy/ in *voice*, *oil*, *boy*, etc.

There is no marked geographic concentration of the natural break groups apparent in Map 10.21. The phoneme /oy/ is relatively isolated and does not play a major part in the chain shifts, mergers or other sound changes traced in the chapters of the Atlas. The data are also relatively sparse: the total number of subjects who have reliable means for /oy/ is less than for any other phoneme.



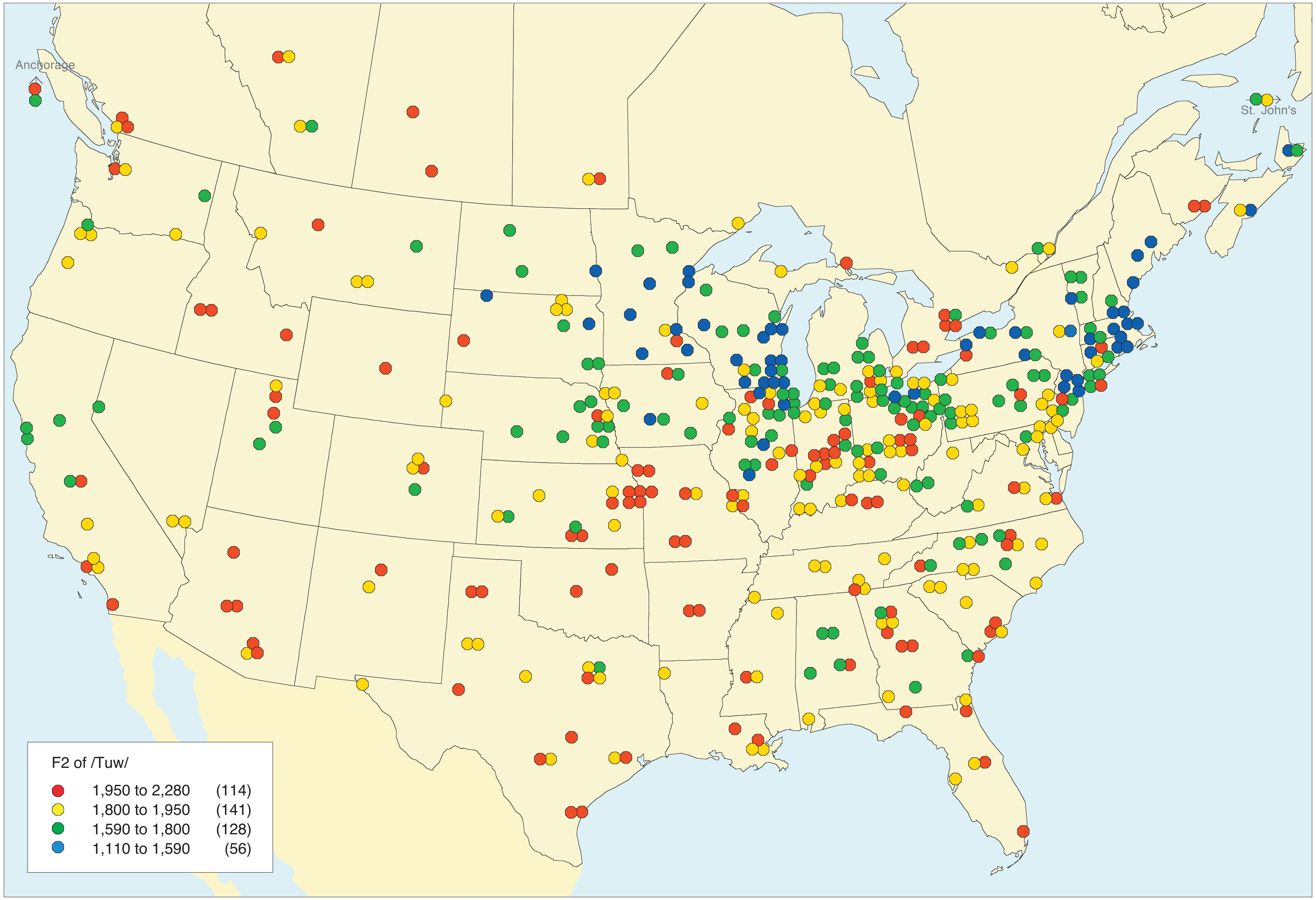
Map 10.22. The relative fronting and backing of /oy/ in *voice*, *oil*, *boy*, etc.

As in the previous map, /oy/ shows no striking geographic concentration of its relatively front and back realizations. The blue symbols, indicating relatively back realizations of this phoneme, are most strongly represented in the Midland area.



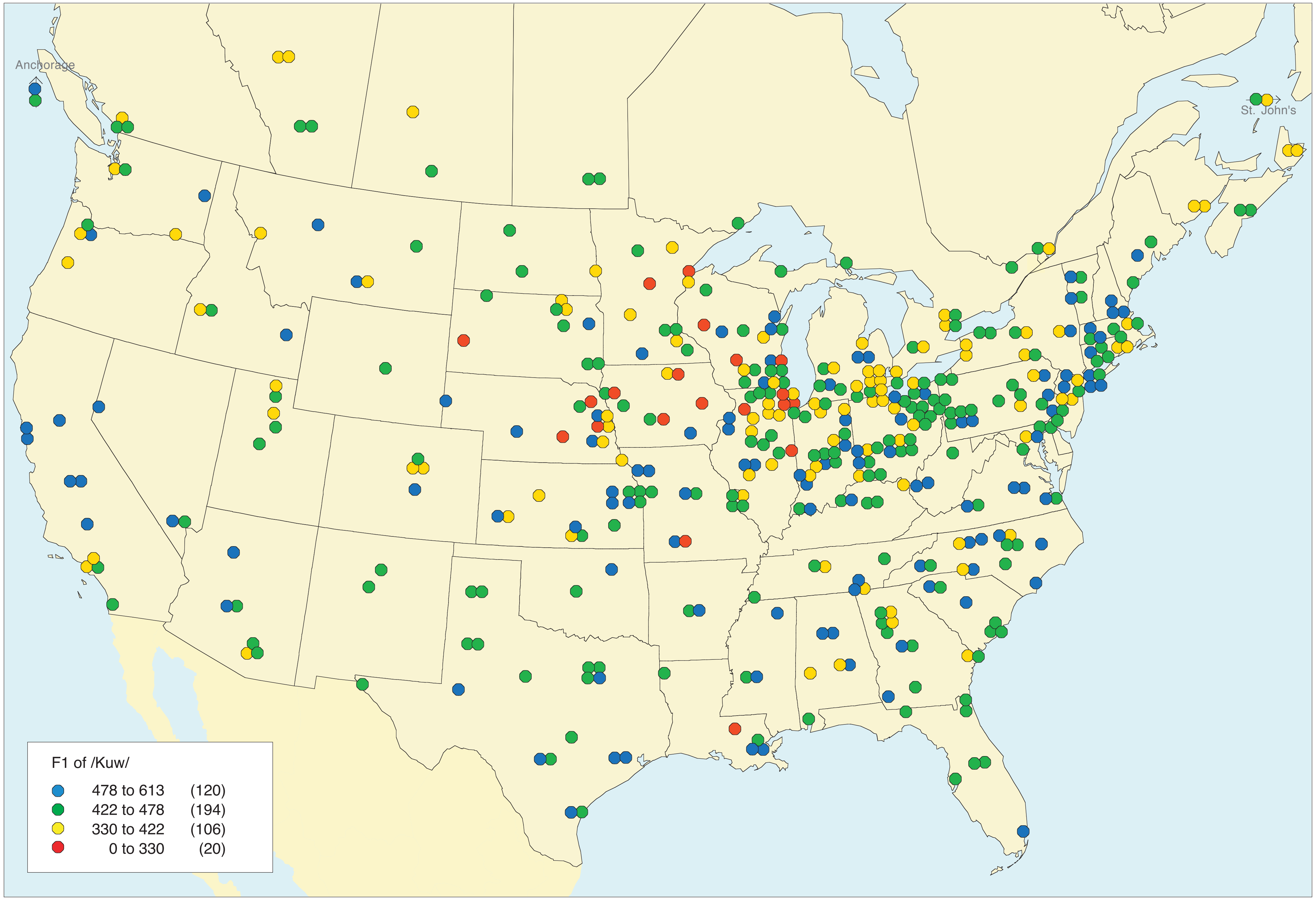
Map 10.23. The relative height of /Tuw/ in *soon*, *too*, *do*, etc.

The phoneme /uw/ is divided into two categories, /Tuw/ and /Kuw/, representing /uw/ after coronals and after non-coronals. The concentration of red symbols in the Northern area indicates that the nucleus–glide differentiation of /Tuw/ is minimal in the area of minimal fronting (see Map 10.24). The grouping of blue circles in the Mid-Atlantic region is striking and reflects the fact that /uw/ diphthongs have relatively low nuclei, with maximal distance between nucleus and glide.



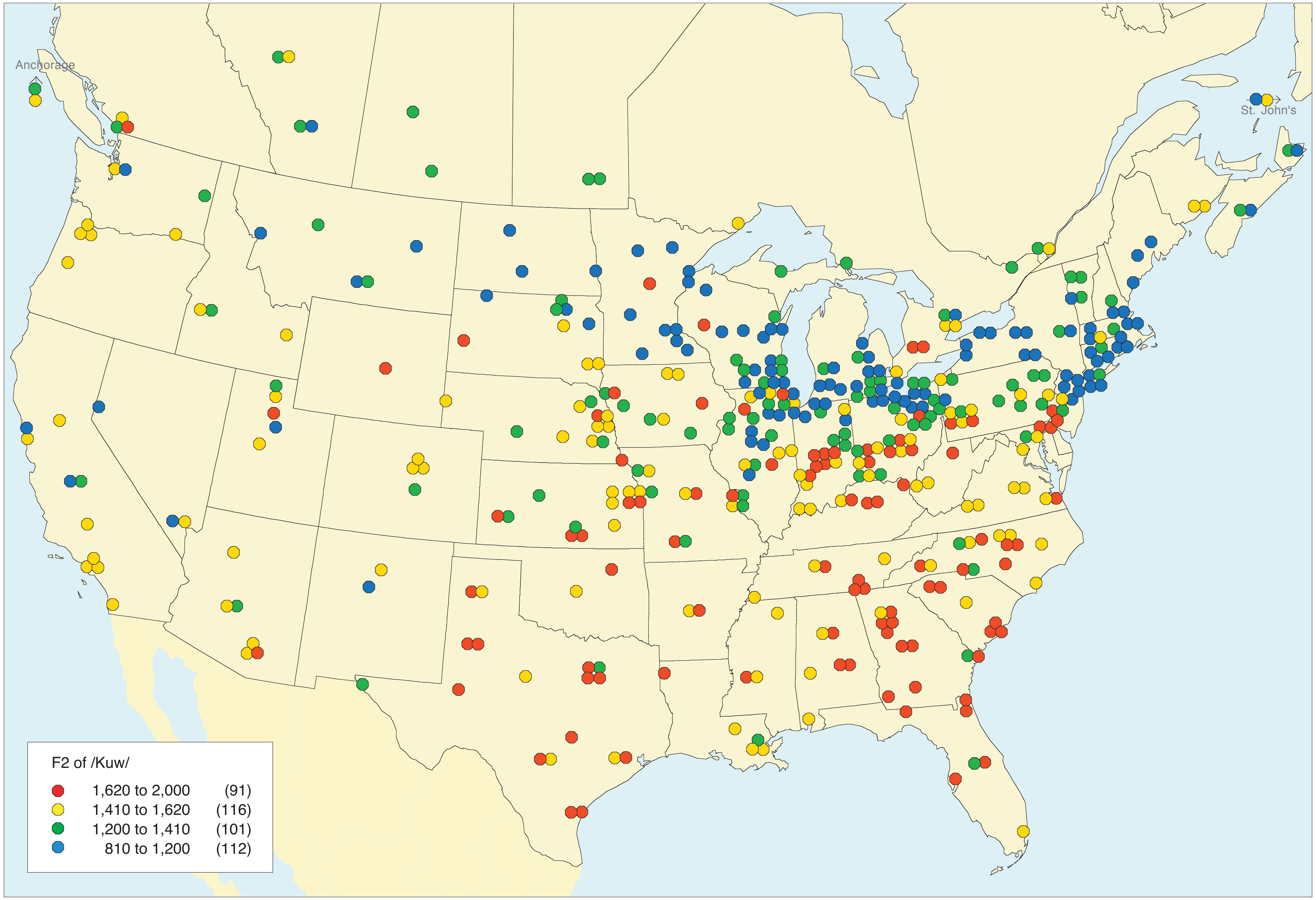
Map 10.24. The relative fronting and backing of /Tuw/ in *soon*, *too*, *do*, etc.

The fronting of /Tuw/ is the most widespread tendency across all North American dialects. As Map 10.24 indicates, resistance to this fronting is concentrated in two specific areas: the North Central states of Wisconsin and Minnesota, and a northeastern belt extending from western New York to northern New Jersey and north into New England. The rest of the North shows mostly green symbols. The red symbols indicating extreme fronting of /uw/ after coronals are found in the South and southern areas of the Midland, in the West and in Canada (Map 12.1).



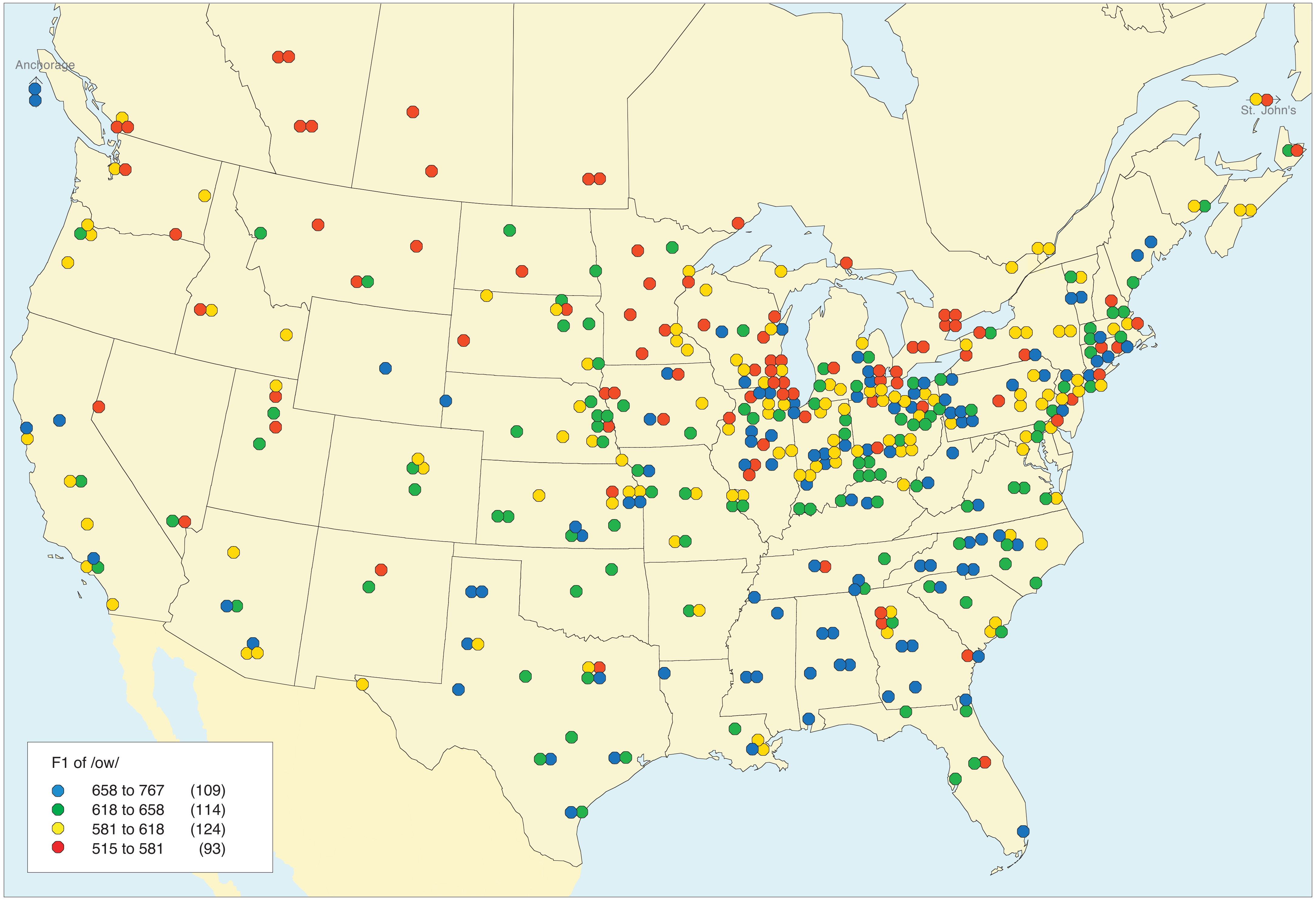
Map 10.25. The relative height of /Kuw/ in *boot*, *move*, etc.

The /Kuw/ class designates /uw/ after non-coronal consonants. The degrees of fronting of these two classes are radically different, but there is no prominent role for the relative height of either in the sound changes reviewed in ANAE. There is a small collection of relatively high /Kuw/ in the North Central States (the red symbols), which is associated with the tendency to use monophthongal /uw/ and /ow/ in that area. A concentration of blue symbols appears in California and the Southwest, indicating consistent lowering of this allophone. This does not appear for /Tuw/.



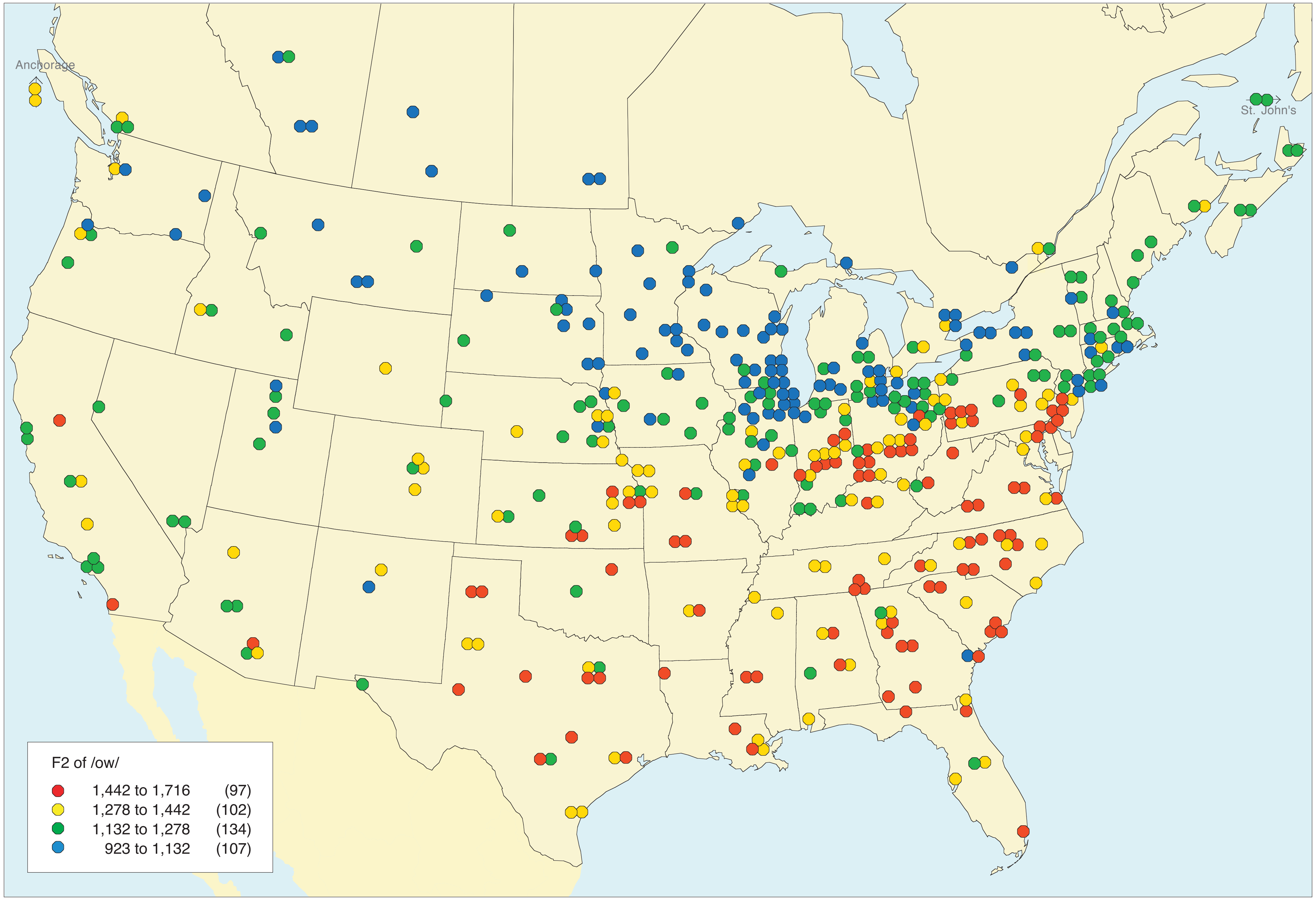
Map 10.26. The relative fronting and backing of /Kuw/ in *root*, *move*, etc.

A very striking geographic pattern emerges in Map 10.26. The fronting of /uw/ after non-coronals is characteristic of the South and the Midland, as shown by the heavy concentration of red symbols throughout those areas (Map 12.2). Resistance to the fronting process is a feature of the North, extending quite far to the West and including all of New England and Nova Scotia.



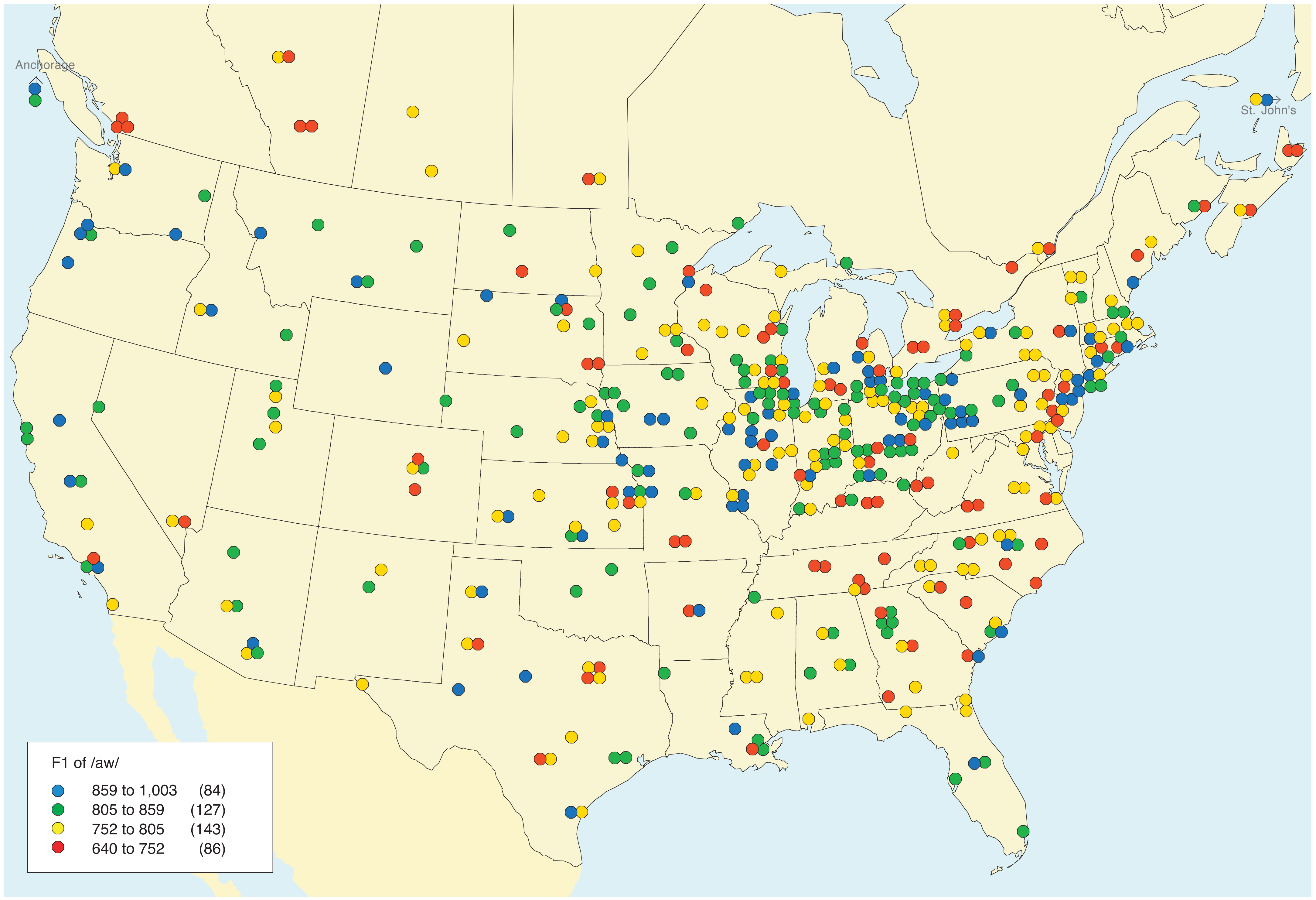
Map 10.27. The relative height of /ow/ in *boat*, *road*, *go*, etc.

This map shows much clearer geographic separation than do the preceding maps for the relative heights of /Tuw/ and /Kuw/. The blue symbols indicating relatively low vowels are concentrated in the South and the Midland, while the red symbols indicating relatively high nuclei are found in the North and Canada. The red symbols in Atlanta are one of the many indications of strong Midland influence in that Southern city.



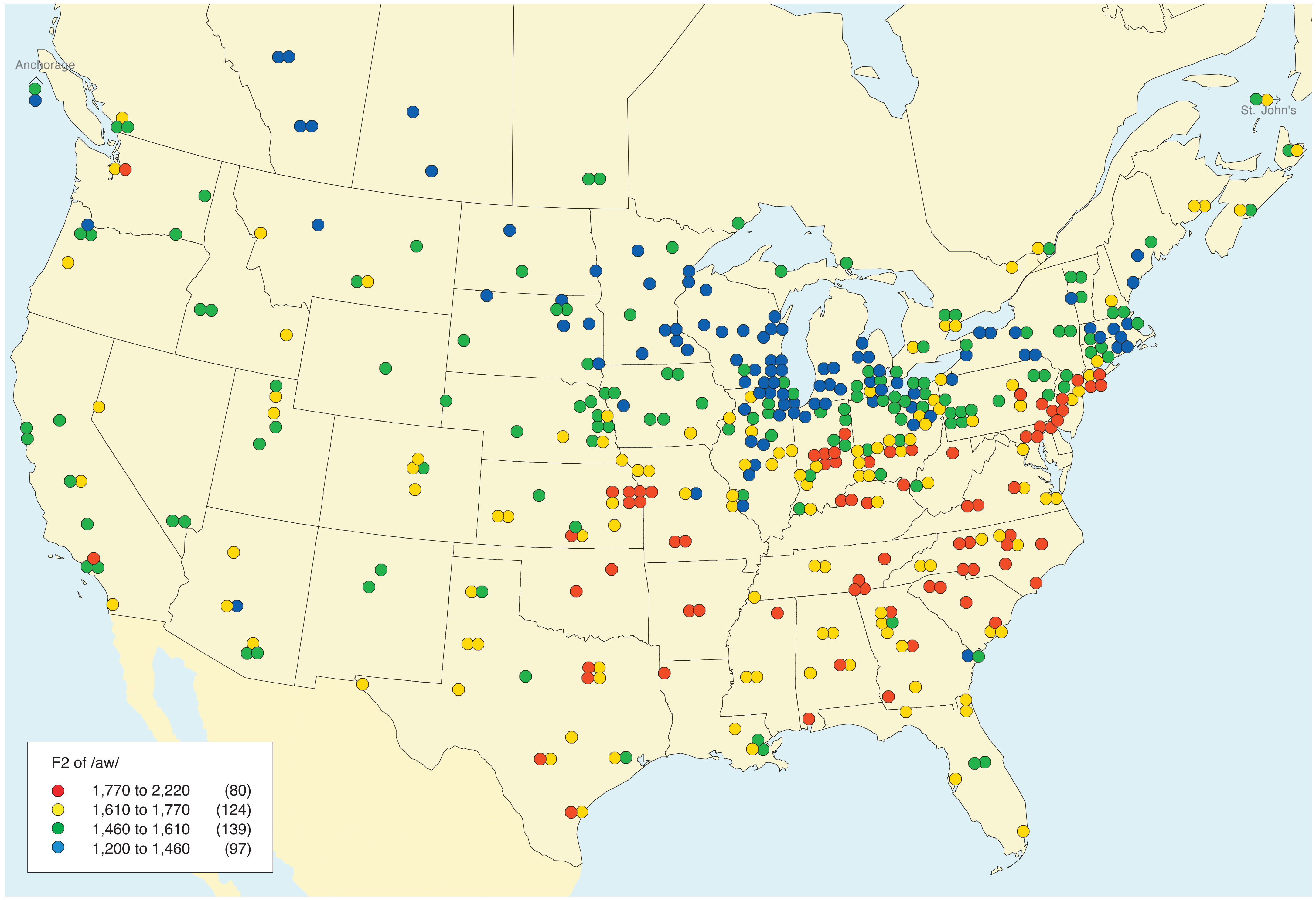
Map 10.28. The relative fronting and backing of /ow/ in *boat*, *road*, *go*, etc.

This map provides one of the clearest displays of geographic separation in this series. The fronting of /ow/ is characteristic of the South and the Midland, including the Mid-Atlantic states, but not New York City. Resistance to this fronting as shown by the blue symbols dominates the North and most of Canada. The West varies in this respect, with a gradual progression of blue to green to yellow symbols from north to south. See Chapter 12 and Map 12.3.



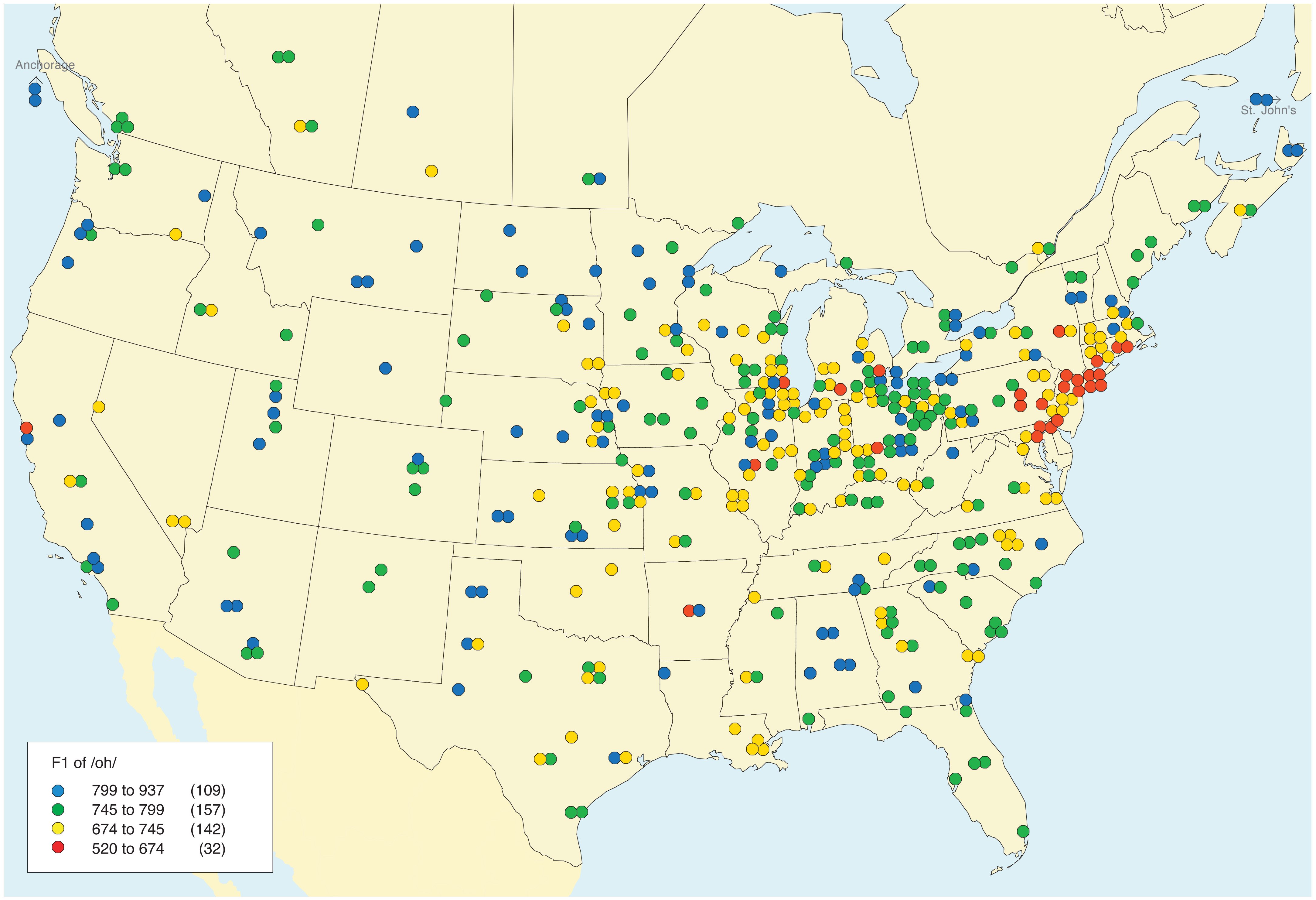
Map 10.29. The relative height of /aw/ in *out*, *loud*, *now*, etc.

This map differs from Map 10.19 in that the mean values do not include vowels before nasals, but they do include /aw/ before voiceless consonants. For the difference between the height of vowels before voiceless and voiced consonants, see Map 10.38. The concentration of red symbols in Canada is a reflection of Canadian raising, in which the nucleus of /aw/ is centralized before voiceless consonants. Red circles are also found in Philadelphia and the Inland South, where they reflect not Canadian Raising but the raising of fronted /aw/ to [eo] (Map 12.4).



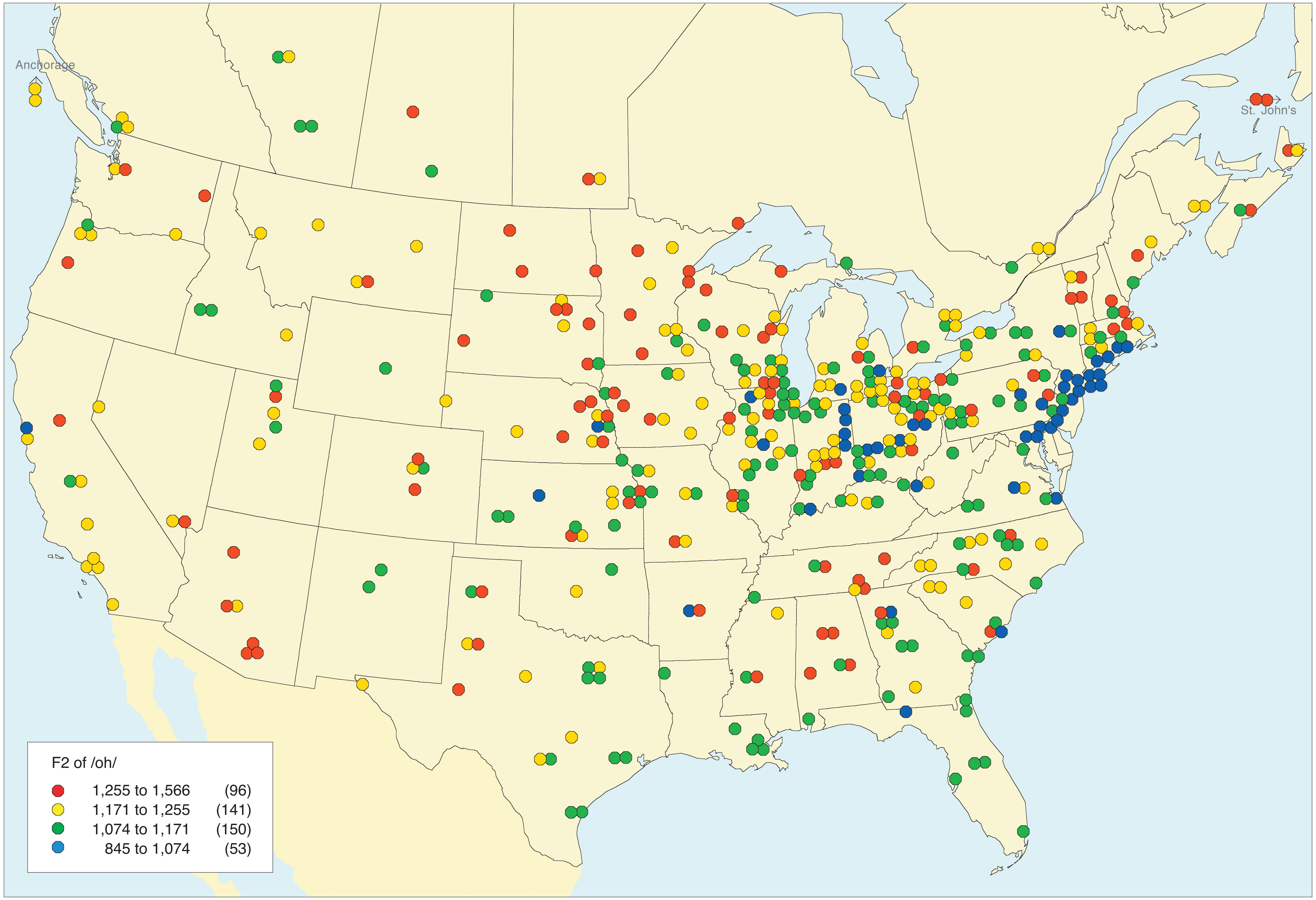
Map 10.30. The relative fronting and backing of /aw/ in *out*, *loud*, *now*, etc.

The geographic pattern seen here closely approximates the pattern of Map 10.28. There is a sharp North–Midland separation of back /aw/ vs. fronted /aw/ (Map 12.4). The Northern area of blue symbols extends westward to the North Central states and includes the prairie provinces of Canada. The region dominated by red circles, indicating strong fronting of the nucleus of /aw/, sharply delineates the South and the southern half of the Midland area, extending eastward to Philadelphia and the Mid-Atlantic states. As with short-*a*, the mean values for /aw/ do not include vowels before nasals, which are considerably fronter (and often higher) than the main body of tokens.



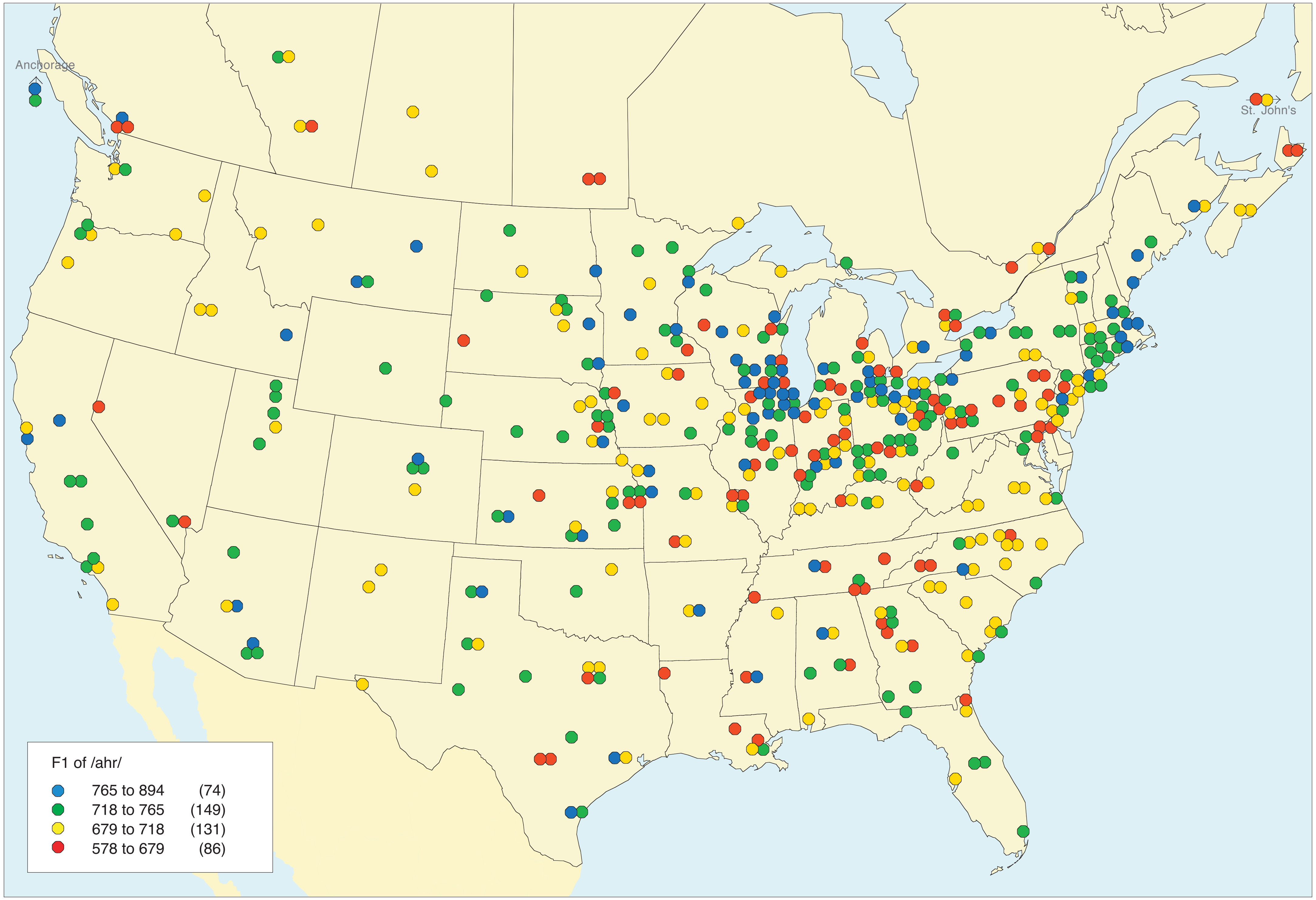
Map 10.31. The relative height of /oh/ in *caught*, *cause*, *law*, etc.

The relatively high position of /oh/ is a marked feature of a narrow band of communities on the eastern seaboard, as shown by the cluster of red circles extending from Rhode Island down to Maryland (Map 11.2, Chapter 17). For the rest of the continent, there is very little differentiation.



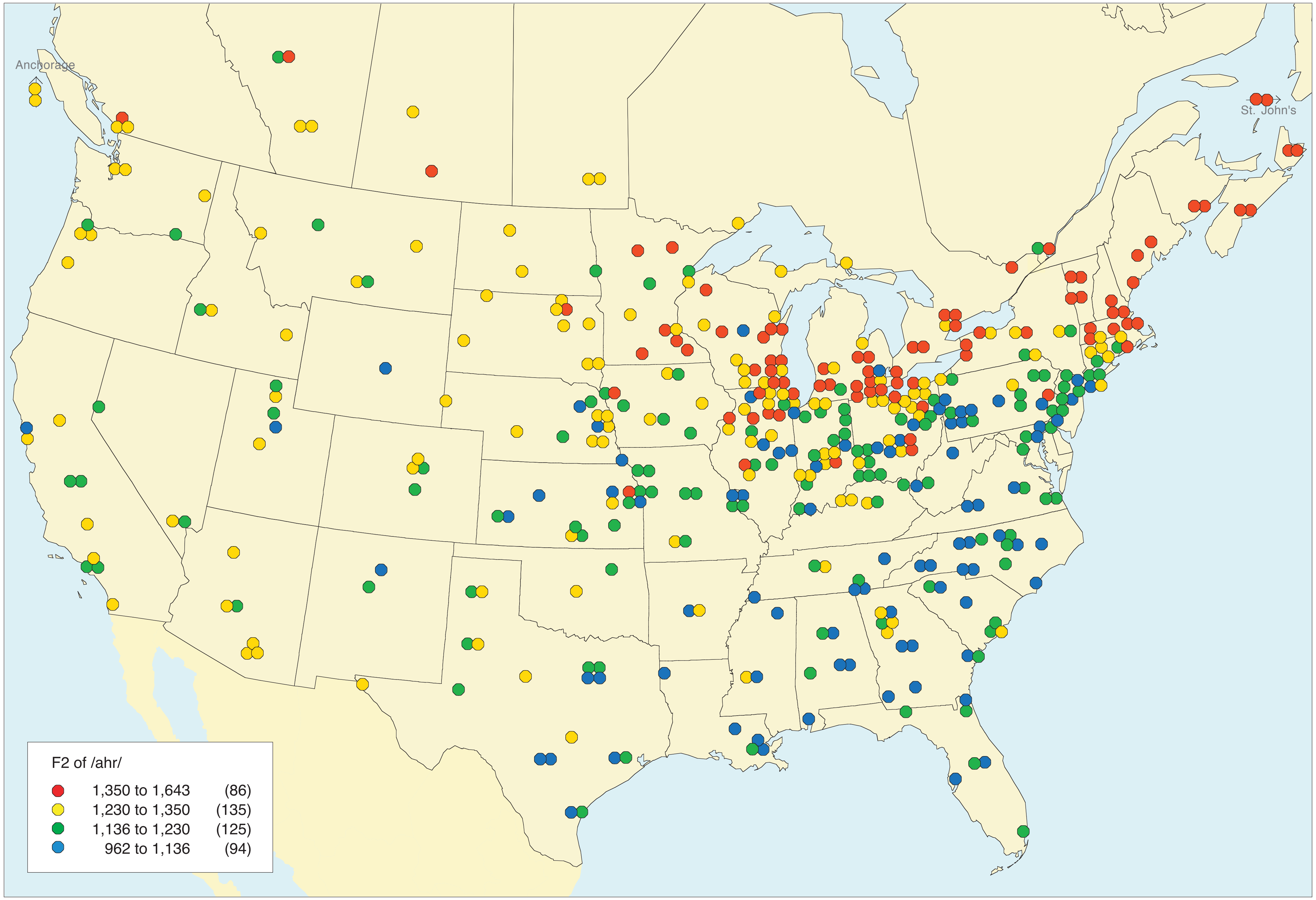
Map 10.32. The relative fronting and backing of /oh/ in *caught*, *cause*, *law*, etc.

Blue symbols, indicating back forms of /oh/, follow the same belt of communities along the Eastern conurbation, even more densely than in Map 10.31. For the rest of the continent, there is no strong geographic grouping. In a few of the areas where /o/ and /oh/ are merged, like Tucson, Arizona, and St. John's, Newfoundland, we find red symbols, indicating that the merger takes place at a relatively front position.



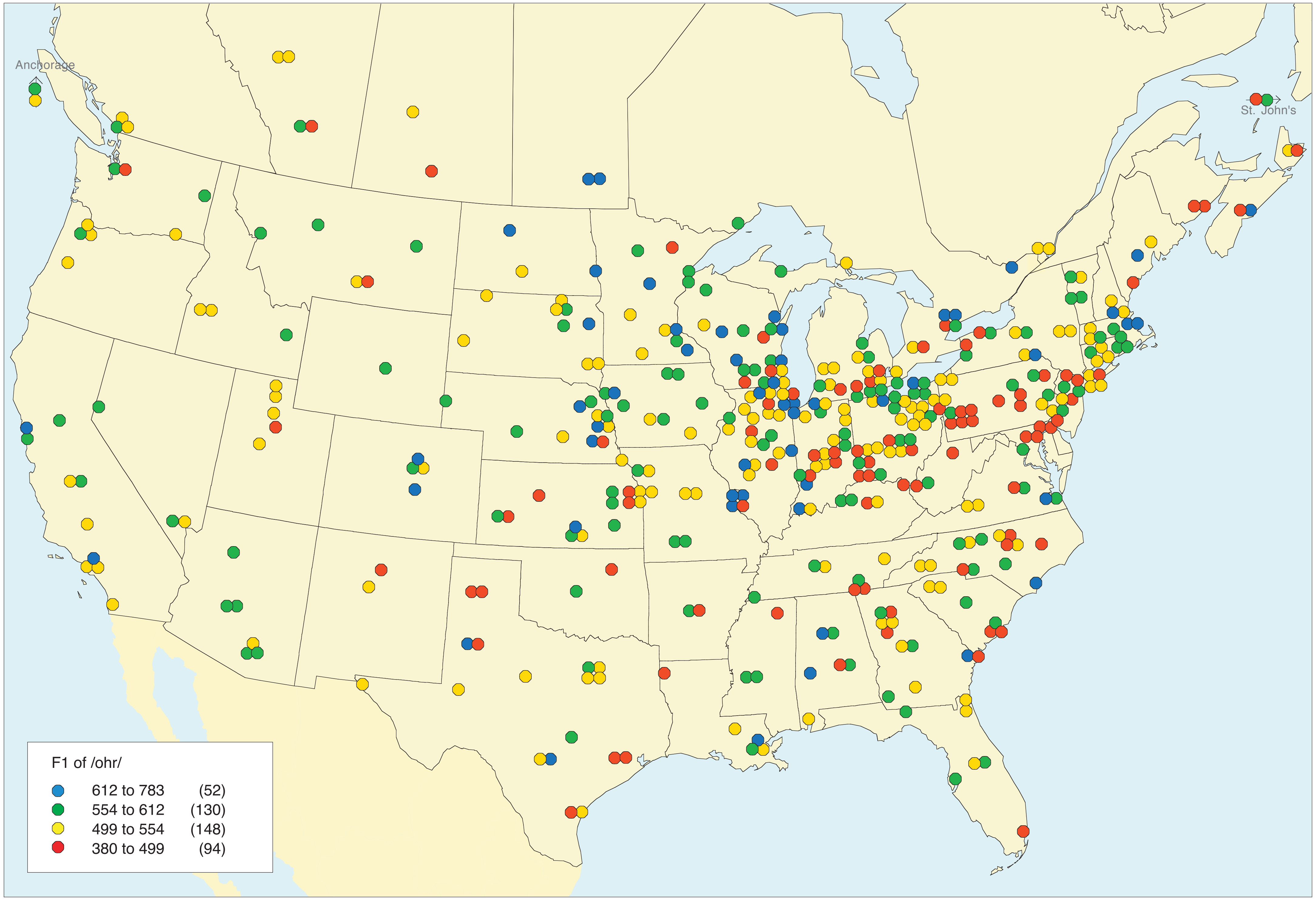
Map 10.33. The relative height of /ahr/ in *bar*, *card*, etc.

A certain degree of clustering is seen here for the blue circles, which indicates the relatively low position of this phoneme in two areas. In Eastern New England, /ahr/ is distinct from /o/ and merges with /ah/ as /r/ is vocalized; it is markedly lower in that area and in the Great Lakes region. However, the height of /ahr/ does not play as strong a role in dialect differentiation as does the fronting of this phoneme.



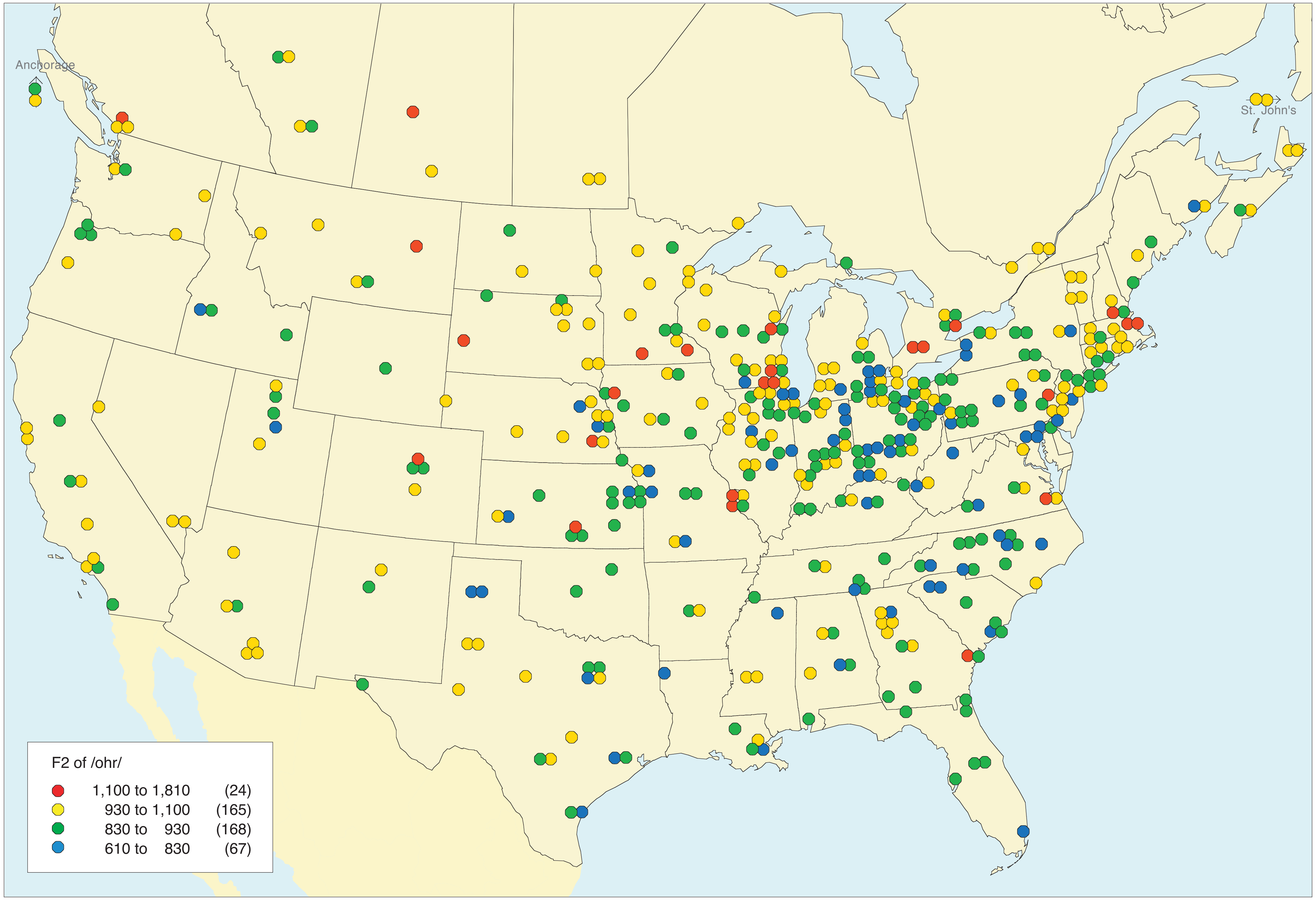
Map 10.34. The relative fronting and backing of /ahr/ in *bar*, *card*, etc.

The red circles which indicate the frontest group of /ahr/ values form a solid Northern area from Wisconsin to Maine and the Atlantic Provinces. The Eastern New England vocalization of /r/ in conjunction with the fronting of the nucleus of /ahr/ along with /ah/ is here not distinguished from the general Northern pattern. In the Midland and South, by contrast, a heavy concentration of blue tokens indicates relatively retracted variants of this phoneme. The western half of the continent shows much less differentiation of /ahr/ on the front-back dimension.



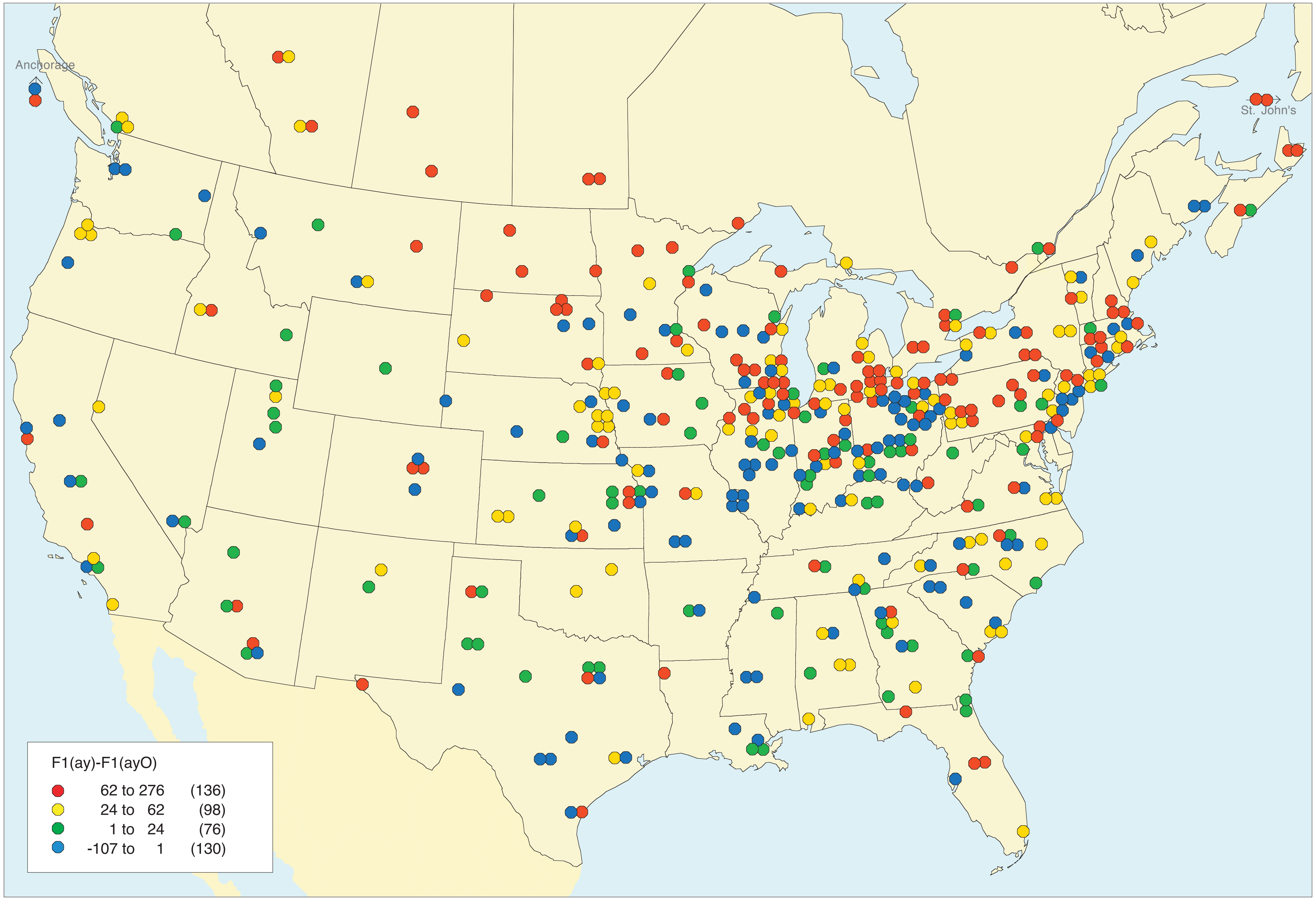
Map 10.35. The relative height of /ɔhr/ in *short*, *cord*, *for*, etc.

Relatively high forms of /ɔhr/ are found in the Mid-Atlantic states, as in Map 10.31, but the area extends westward to Pittsburgh and the southern portion of the Midland. The red circles indicating high vowels are also found throughout the South and in the Atlantic Provinces of Canada. The word class of /ohr/ in *port*, *coarse*, *four* is generally merged with this class and follows the same pattern (see Chapter 2).



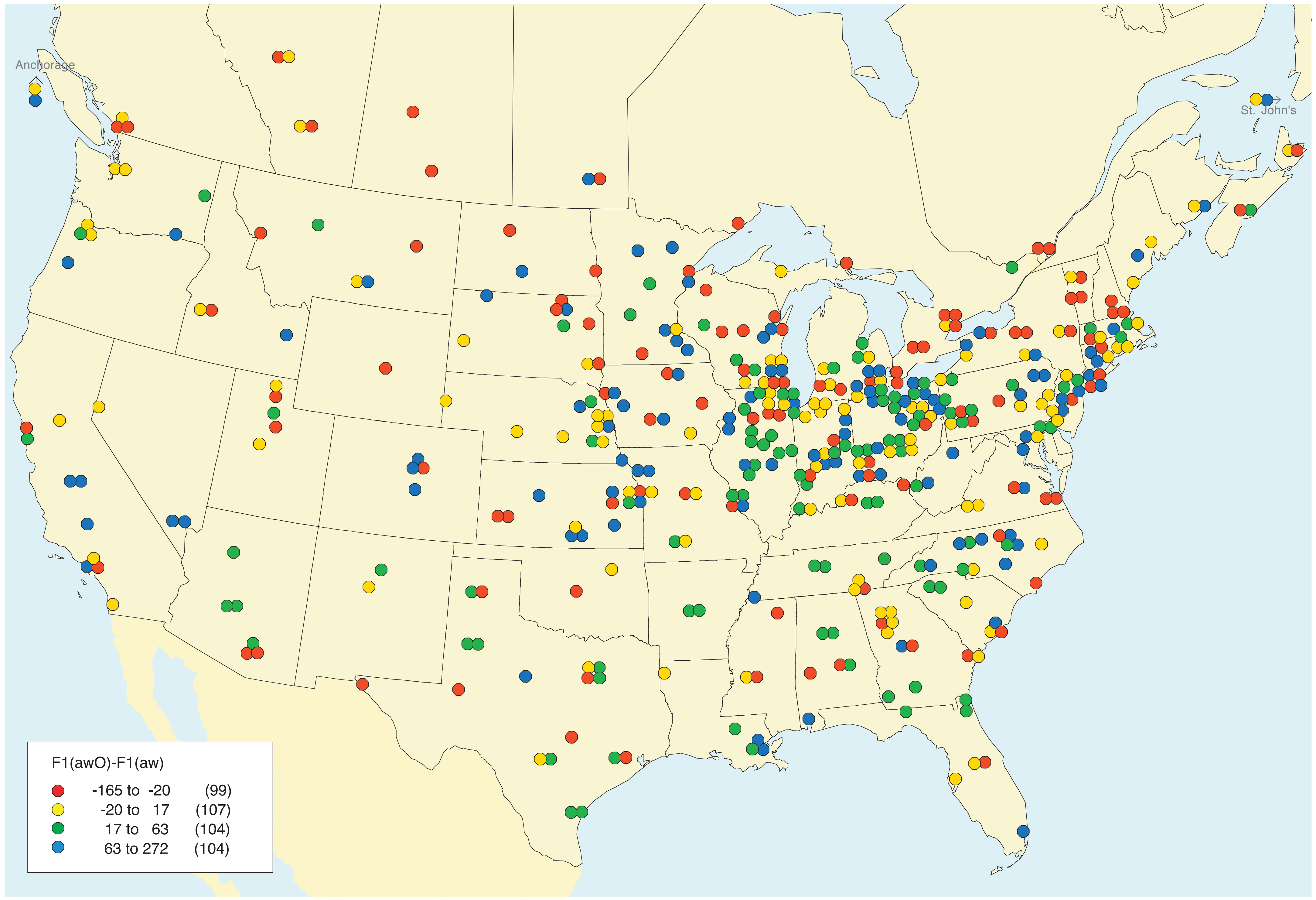
Map 10.36. The relative fronting and backing of /ohr/ in *short*, *cord*, *for*, etc.

There is only a light scattering of fronted /ohr/ indicated by red circles, as this vowel does not participate in the general fronting of the back upgliding vowels /uw, ow, aw/. The backer forms of /ohr/ are notably absent in Eastern New England, where the fronting of /ahr/ was observed in Map 10.34.



Map 10.37. Difference in height of /ay/ before voiced and voiceless consonants

Map 10.37 differs from previous maps in that it represents the difference between the F1 mean values before voiced and voiceless consonants. The red circles show the greatest difference, and the blue the smallest. Red circles are concentrated in areas where Canadian raising has traditionally been reported: Canada, Eastern New England, Philadelphia, and the North. But there is only a scattering of red circles in the Southern areas where earlier studies showed considerable raising before voiceless consonants.



Map 10.38. Difference in height of /aw/ before voiced and voiceless consonants

Map 10.38 presents the differentiation of /aw/ before voiced and voiceless consonants. The F1 of /aw/ before voiced consonants is subtracted from the F1 of /aw/ before voiceless consonants, so that the lowest numbers show the greatest degree of Canadian raising. A smaller number of speakers (99) are grouped in the red category showing a range of -20 to -165 Hz. The most consistent pattern is shown in Canada (with some exceptions in Atlantic Canada), where Canadian Raising has long been recognized. The red circles do not appear in the North with the consistency of Map 10.37, except for New York State. This map has less data than others, since some speakers did not provide tokens of both allophones.

Appendix 10.1. Summary statistics for Maps 10.1–10.38

The following table gives the natural break ranges and numbers of speakers in each range for Maps 10.1–10.38.

		First formant			Second formant		
		From	Up To	N	From	Up to	N
/i/	red	412	487	82	2,073	2,366	51
	yellow	487	516	141	1,944	2,073	160
	green	516	543	118	1,857	1,944	139
	blue	543	603	99	1,410	1,857	90
/e/	red	503	624	98	1,922	2,227	91
	yellow	624	665	136	1,814	1,922	146
	green	665	703	137	1,708	1,814	133
	blue	703	795	69	1,356	1,708	70
/æ/	red	445	684	86	1,955	2,240	91
	yellow	684	749	130	1,843	1,955	130
	green	749	816	145	1,742	1,843	137
	blue	816	935	79	1,442	1,742	63
/æN/	red	348	575	103	2,269	2,628	112
	yellow	575	647	138	2,117	2,269	152
	green	647	729	143	1,968	2,117	111
	blue	729	1,011	53	1,654	1,968	62
/o/	red	630	779	82	1,443	1,716	79
	yellow	779	818	128	1,325	543	132
	green	818	860	130	1,230	516	151
	blue	860	1,052	100	1,042	487	78
/ʌ/	red	555	657	57	1,559	1,907	92
	yellow	657	699	135	1,433	1,559	153
	green	699	744	158	1,337	1,433	136
	blue	744	864	89	1,095	1,337	58
/u/	red	418	515	90	1,575	1,976	93
	yellow	515	556	150	1,404	1,575	138
	green	556	600	113	1,258	1,404	113
	blue	600	738	59	991	1,258	58
/iy/	red	305	371	62	2,447	2,807	125
	yellow	371	411	144	2,307	2,447	138
	green	411	458	150	2,157	2,307	115
	blue	459	626	82	1,819	2,157	60
/ey/	red	441	533	84	2,170	2,550	92
	yellow	533	573	137	2,030	2,170	146
	green	573	628	130	1,880	2,030	128
	blue	628	787	88	1,400	1,880	73
/ay/	red	653	765	79	1,451	1,843	73
	yellow	765	810	135	1,462	1,451	142
	green	810	867	146	1,366	1,462	135
	blue	867	1,034	80	1,114	1,366	90

		First formant			Second formant		
		From	Up To	N	From	Up to	N
/Kuw/	red	250	330	20	1,620	2,000	91
	yellow	330	422	106	1,410	1,620	116
	green	422	478	104	1,200	1,410	101
	blue	478	613	120	810	1,200	112
/ow/	red	515	581	93	1,442	1,716	97
	yellow	581	618	124	581	1,442	124
	green	618	638	114	1,132	581	134
	blue	638	767	109	923	1,132	107
/aw/	red	640	752	85	1,770	2,220	80
	yellow	752	805	143	1,610	1,770	124
	green	805	859	127	1,460	1,610	139
	blue	859	1,003	84	1,200	1,460	97
/oh/	red	50	674	32	1,255	1,566	96
	yellow	674	745	142	1,171	1,255	141
	green	745	799	157	1,074	1,171	150
	blue	799	937	109	845	1,074	53
/ahr/	red	578	679	86	1,350	1,643	86
	yellow	679	718	131	1,230	1,350	135
	green	718	765	149	1,136	1,230	125
	blue	765	894	74	961	1,136	94
/ɔhr/	red	380	499	94	1,100	1,810	24
	yellow	499	554	148	930	1,100	165
	green	554	612	130	830	930	168
	blue	612	783	52	610	830	67
F1(ay)	red	62	276	136			
-F1(ay0)	yellow	24	62	98			
	green	1	24	76			
	blue	–107	1	130			
F1(aw)	red	272	63	99			
-F1(ay0)	yellow	63	17	104			
	green	17	–20	107			
	blue	–20	–165	99			

Part D Overviews of North American dialects

11. The dialects of North American English

11.0. Introduction

This chapter presents the basic framework for the analysis of North American English dialects. It will introduce the criteria for the major regional divisions and define within these the specific dialect configurations that are the focus of the chapters to follow. The outer boundaries of these dialects will be established. Bearing in mind that the Atlas is a study of urbanized areas, the exact location of many boundaries must await the completion of studies in small towns and rural areas.

The literature of North American dialectology exhibits considerable skepticism in regard to the location of dialect boundaries, returning repeatedly to the theme that they can only be more or less arbitrary selections from a large number of possibilities. This skepticism extends to the very notion of dialect. Carver characterizes his own construction of regional boundaries as a set of arbitrary cuts in a continuum:

> A map of language variation is merely a static representation of a phenomenon whose most salient characteristic is its fluidity. It is an almost seamless fabric covering the land. A person traveling southward from Superior, Wisconsin, to Mobile, Alabama, would be aware of the differing speech patterns but would not be able to say at what points along the route the changes occurred ... What follows, then, is not the definitive description of regional dialects of America, because such a description is impossible. It is merely one attempt to seize the linguistic river as it flowed through. (Carver 1987: 19)

One reason for this hesitancy may be that dialect classifications in North America have in the past been based on linguistically isolated lexical items (Kurath 1949; Carver 1987). Lexical isoglosses are unlikely to show close interrelations, insofar as there are no necessary structural relations among the lexical items that produce them.[1] Words are selected for study on the basis of their regional heterogeneity and their possible connection with settlement history, rather than their relations with other linguistic elements. In contrast, the dialect boundaries established in this chapter are based on the systematic study of phonological relations in the vowel system and the activation of general principles of chain shifting. One might expect a very different set of dialect boundaries to be selected. But in this chapter, and many of those to follow, there will appear a high degree of convergence between isoglosses based on regional vocabulary and the patterning of phonological isoglosses. Some major divisions will depart from those based on lexical and grammatical evidence, to a large extent the result of current changes in progress. Yet others will show a satisfying coincidence with the lexical boundaries established by the Dictionary of American Regional English [DARE] and the Linguistic Atlas studies that preceded it.

Confidence in the phonologically based dialect boundaries displayed here is not based only on coincidence with previous studies. It is founded on two types of correlation between geography and linguistic structure. In one, isoglosses for the various elements of a chain shift coincide in an isogloss bundle, the end result of a completed series of linked changes. In the other, the successive stages of a chain shift are nested one within the other, with the oldest showing the widest domain and the most recent the most restricted application, producing a display of incomplete changes in progress.

Unlike the mergers studied in Chapters 8 and 9, chain shifts require acoustic analysis for an accurate description. The data of this chapter are therefore based on the vowel systems of the 439 Telsur subjects for whom acoustic analysis is completed, a total of 134,000 measurements. Though the splits and mergers discussed in the last chapter will also play a role, the data set will be limited to these 439 subjects, so that the basis for drawing isoglosses will be comparable for all variables.

The most surprising finding of current studies of linguistic change in progress in North America is that regional dialects are becoming increasingly differentiated from each other. This increasing diversity does not apply to smaller units within the major regions. Within most of the regional boundaries, linguistic changes in progress have the effect of solidifying and developing the regional pattern. Many local dialects are indeed disappearing, but they are assimilating to larger regional patterns rather than to a national or continental model.

The output of this chapter is a classification of American dialects that will be the basis of all the chapters that follow. This classification is not an end in itself. Dialect diversity creates many practical problems, particularly for automatic speech recognition. The definition of the boundaries of North American dialects and their degree of differentiation provide the optimal framework for sampling American speech and creating the training bases for speaker-independent recognition.

The location of dialect boundaries raises many historical and theoretical issues. How did these dialects become differentiated in the first place? How do we account for the location of isoglosses, particularly those that bundle together tightly? These questions involve us with settlement history, with the interplay between structural and historical factors, and with the dynamics of spatial diffusion. Ultimately, all of these studies will be brought to bear upon our efforts to answer the perpetually challenging question: What are the causes of linguistic change? The many ongoing changes in American English that are reflected in these maps will replenish and fortify our efforts to illuminate this question.

Criteria for defining dialect regions

Chapter 10 showed clear evidence of geographic differentiation of the North American vowel system for most of the variables examined. This chapter is designed to draw the boundaries of those geographic areas on a principled basis.

1 There has been considerable discussion as to whether the original selection of vocabulary items was carried out on a principled basis (Schneider and Kretzschmar 1989; Kretzschmar 1992). Carver's emphasis on the continuous character of dialect boundaries reflects the large number of regional markers that he used to construct national dialect divisions.

It seems clear that a candidate feature for dividing an area into dialect regions should be geographically continuous and uniform. Ideally, (a) every community within a continuous region would be marked by such a feature, and (b) none of the speech communities outside the region would be marked by this feature. However, criterion (a) is not likely to apply to linguistic changes in progress. A speech community engaged in a new change in progress must include some conservative, older speakers who were not affected by the change when they were acquiring language. The traditional definition of an isogloss as the outer limit of a regional feature is consistent with the emphasis on criterion (b) rather than an insistence on (a).

One can distinguish four other criteria for candidate regional markers. (c) They should be based on variables that occur frequently, so that they can be easily identified and confirmed by repeated sampling. (d) Qualitative criteria, which do not depend on particular methods of measurement or normalization, will be preferred. (e) The ideal criterion should also display a convex shape, indicating that the feature is expanding from an originating center or still preserves evidence of such earlier expansion. (f) In keeping with the aims of the present work as developed in Chapter 1, features should be systemic, rather than isolated, reflecting relations among two or more elements of the phonological system. To sum up, the features preferred here for dialect classification are (a) consistent, (b) exclusive, (c) high frequency, (d) qualitative, (e) convex in distribution, and (f) systemic.

The criteria for the identification of dialects will draw upon the description of the initial position of North American vowels provided in Chapter 2 and the general principles of sound change presented in Chapter 3. Chapter 3 distinguished two types of systemic changes: those that alter the phonemic inventory (splits and mergers) and those that do not (chain shifts and parallel shifts). Chapters 8 and 9 reviewed a range of mergers taking place in North American English, many of them concentrated in particular geographic regions. An unconditioned merger like the fusion of /o/ and /oh/ might seem to be a good candidate for defining dialects, since it satisfies criteria (c, d, e, f) and measures up quite well on criteria (a) and (b). But the fact that mergers expand regularly at the expense of distinctions (Labov 1994: 311) means that these boundaries will often be separated from bundles of other features with which they were originally united by historical development. Thus it will appear that the merger of /i/ and /e/ before nasals is a Southern States feature, but it is not very useful in defining the southern region since it has expanded northward a considerable distance into the Midland area (see Chapters 9, 18). At the same time, the existence of splits or mergers in the low vowels has a profound effect upon the economy of the system and will play a major role in the definition of dialect regions to follow. The geographic boundaries of areas that show resistance to merger will have considerable significance for the definition of regional dialects, more than the boundaries of the completed merger.

Chain shifts, mergers, and other sound changes can be best understood by their relationship to the phonological system as a whole (Martinet 1955). Differences in inventory created by mergers or splits are therefore fundamental in the mechanism of sound change. Many of the mergers that were mapped in Chapters 8 and 9 are conditioned mergers, confined to allophones before nasals or liquids, and do not directly affect the system as a whole. By contrast, the unconditioned merger of the low back vowels presented in Chapter 9 does have an important effect on the vowel system as a whole, and the status of this merger will be one of two pivotal criteria in establishing a typology of North American vowel systems. The other pivotal factor is the status of the historical short-*a* class, which follows many radically different forms throughout the continent. The two pivot conditions have to do with the status of the low vowels as shown in (1).

(1)

Long & ingliding		Short vowels			Long & ingliding		
		i	u				
		e	ʌ				
æh	~	æ	o	~	ah	~	oh

In the initial position, there is a system of six short vowels. The short-*o* class in *got*, *sock*, *rod*, etc., rarely remains as a separate unit. In most North American dialects it is unrounded and merged with the long vowel /ah/ in *father*, *pa*, etc. When /o/ is a separate phoneme it cannot occur finally; when it merges with /ah/ the resulting category is a *free* vowel that includes words like *spa*, *pa*, etc. Only in Eastern New England does /o/ remain separate from /ah/. There it merges instead with /oh/. The greatest degree of dialect differentiation stems from the relation of the /o/ class to /oh/, regardless of whether it is merged with /ah/. The merger of /o/ with /oh/ is referred to as the *low back merger*.

The /oh/ class is one of the most irregular and skewed categories in English phonology. As discussed in Chapter 9, it was formed by the union of three conditioned processes: the vocalization of /l/ in *talk*, *stalk*, *balk*, etc.; the monophthongization of *aw* in *dawn*, *hawk*, *awful*, *bawd*, and *awe*; and the monophthongization of *au* and *ou* in *caught*, *thought*, *caul*, *maul*. The end result was a highly restricted phoneme which occurred primarily before *-t*, *-d*, *-k*, *-l*, *-n*, *-z*, and finally in *law*, *saw*, etc. In North America, short-*o* words began to migrate from the /o/ class to the /oh/ class by lexical diffusion: before /θ/ in *broth*, *moth*, *cloth*, etc., before /s/ in *loss*, *cost*, etc.; before /ŋ/ in *long*, *strong*, *song*, etc.; before /g/ in *dog*, *log*, *frog*, etc. The end result was not the original skewed distribution as it remained in British English, but a bewildering variety of dialect patterns for the occurrence of /oh/. This odd distribution may have played a role in the widespread and independent merger of /o/ and /oh/.

The long and ingliding subsystem is itself a marginal subsystem in initial position. The only sizable word-classes represented by /Vh/ phonemes are the oddly skewed /oh/ and the even more limited /ah/. The latter revolves around a few core lexical items, *father*, *calm*, *palm*, *pa*, *ma*, with a very large number of words of foreign origin spelled with *a*: *bra*, *drama*, *lager*, *macho*, *mirage*, *salami*, *spa*, etc.(Boberg 2000).[2] In *r*-less dialects the entire long and ingliding system is strengthened by additions to three other marginal ingliding classes: /ih/ in *idea* and *theater*; /eh/ in *yeah*; /uh/ in *skua*, as well as to /ah/ (*car*, *cart*) and /oh/ (*core*, *cord*). In Eastern New England, the /ah/ class is expanded by many words in the Southern British broad-*a* class: *half*, *aunt*, *pass*, *can't*, etc. When /r/ is restored (Chapter 7), this expanded long and ingliding system re-contracts to the more limited set of marginal items.

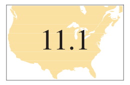
The short vowel *a* undergoes many complex phonetic shifts in North American English (Chapter 13). In one common development, it has a raised allophone before nasals and remains in low front position elsewhere. In the North, it is raised as a whole with fine-grained phonetic conditioning (Chapter 14). In the Middle Atlantic states, short-*a* undergoes a split into two categories that cannot be predicted by any simple rule. The split of short-*a* produces a skewed /æh/ class, in marginal contrast with /æ/, which occurs primarily before voiceless fricatives and nasals, roughly the same classes that effect the tensing of /o/. Like the split of /o/, the split of short-*a* produces an irregular lexical distribution with

2 In southern England, the /ah/ class is greatly augmented with words before nasal clusters and voiceless fricatives. This condition may have been the ancestor that generated of the split of short-*a* words in NYC and the Mid-Atlantic States (Ferguson 1975). In North America, the broad-*a* class is found primarily in Eastern New England, and in a few words like *vase* and *aunt*.

great dialect variation; unlike the split of /o/, it shows intricate patterns of grammatical conditioning (Chapter 13).

The dynamics of a North American vowel system therefore depend upon whether (a) the low back merger has taken place and (b) whether the short-*a* split has taken place.

11.1. The dialects of North American English



Map 11.1 presents the relationship of the two pivot points of North American English vowel structure: the low back merger and the short-*a* configuration. The green symbols show speakers for whom the merger is complete in both perception and production, and the oriented green isogloss defines the region where such speakers predominate.[3] This includes the majority of the Telsur subjects in Canada, the West, Eastern New England, and a separate area in Western Pennsylvania, with an extension down into West Virginia and Kentucky.

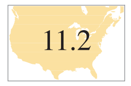
Map 11.1 also shows the regions that are most resistant to the merger, indicated by the oriented blue isogloss. The dark blue symbols represent speakers with clear distinctions in both production and perception, while the light blue symbols cases where the pairs are clearly distinct in production *or* perception. There are five such areas in Map 11.1, though in the discussion to follow they will be reduced to three. The most homogeneous concentration of blue symbols is in New York City and the Mid-Atlantic States. A second area includes a large portion of the South, with considerably more internal variation. A third group is subdivided into three areas: New York State, the large cities of the Great Lakes region,[4] and a narrow corridor running down to St. Louis. The areas outlined in blue are conservative in regard to the low back merger, as are also the core areas of the dialect in which the major chain shifts (Northern Cities Shift, Southern Shift) are actively in progress.

Following the general convention of ANAE maps, the yellow symbols are the residual class where none of the marked features are found. In this case, yellow symbols represent speakers for whom the low back merger is in a transitional state, not satisfying any of the three preceding criteria for the green and blue symbols. Such changes in the phonemic inventory alter the economy of the subsystem of short vowels, setting in motion processes of vowel shifting that account for the most salient regional differences among dialects.

The red, orange and black isoglosses on Map 11.1 display the relation between the short-*a* configurations and the low back distinction. The red isogloss represents the general raising of the short-*a* class from lower front to mid position, the outer limit of speakers whose normalized mean value for F1 of /æ/ is less than 700 Hz.[5] The consequent absence of vowels in low front position triggers the fronting of the short-*o* class in the Inland North (the Great Lakes region, New York State, and the St. Louis corridor).[6] The match between the red and the oriented blue isoglosses is quite close: the raising of short-*a* does not extend as far eastward as the blue area, though it does include a few communities farther to the west.

In the Eastern corridor – NYC and the Mid-Atlantic States – there is an even closer match between the short-*a* configuration and the low back distinction. Within the area of the short-*a* split (the black isogloss), there is a slightly smaller region outlined by an oriented blue isogloss where all of the 19 Telsur speakers show a clear distinction between /o/ and /oh/. The split into /æh/ and /æ/ insures that there will be a large representation of the short-*a* class in low front position, and there is no fronting of /o/.

The South also retains short-*a* in low front position, not through a lexical split, but through Southern breaking (interrupted orange isogloss). In the early stages of the Southern Shift, /æ/ is tensed and raised, but in the fullest development of the Southern pattern, the /æ/ syllable breaks into two distinct morae. The first mora reverses the general raising pattern, shifting down to low front position, where it effectively blocks any fronting of /o/. It is followed by a palatal upglide and then an inglide. This palatal breaking is often identified with the Southern drawl, with *pass* as [pæ:ʲəs] (Feagin 1987: Chapters 13, 18). As the map shows, the area of palatal breaking coincides with the general (though variable) resistance to the low back merger.



The presence of a low front /æ/ class in the Mid-Atlantic and Southern areas contravenes the mechanism of resistance to the low back merger found in the Inland North. Map 11.2 will develop the structural basis for resistance in these areas.

In Map 11.1, the three areas of resistance to the low back merger are seen to coincide with three different short-*a* configurations. Map 11.2 develops the logic of these alignments, following the different structural developments that insulate each dialect from the merger.

The Inland North

The first area of resistance to the low back merger is the Inland North, defined by the Northern Cities Shift [NCS] (LYS 1972; Labov 1981; Eckert 1999; Gordon 2001). The basic sequence of events follows the trajectories of Figure 11.1.[7]

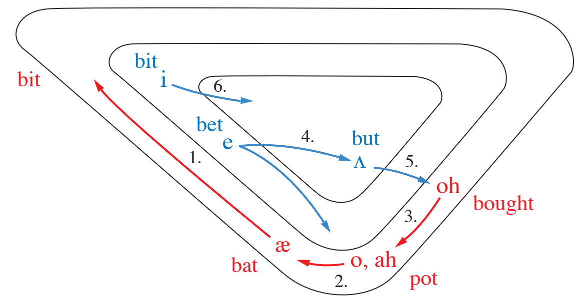


Figure 11.1. The Northern Cities Shift

The NCS was first recorded in the major cities of Detroit, Chicago, Buffalo, Rochester, and Syracuse.[8] This chain shift was triggered by the general raising of short-*a*, displayed in Maps 11.1 and 11.2 as the red isogloss, the outer limit for speakers with a mean F1 of /æ/ less than 700 Hz. The second stage is the fronting

3 This isogloss is not altered from that constructed in Chapter 9 on the basis of the minimal pairs judged and pronounced by all Telsur subjects: it fits the pattern of the 439 subjects analyzed acoustically as well as the larger number of Chapter 9.

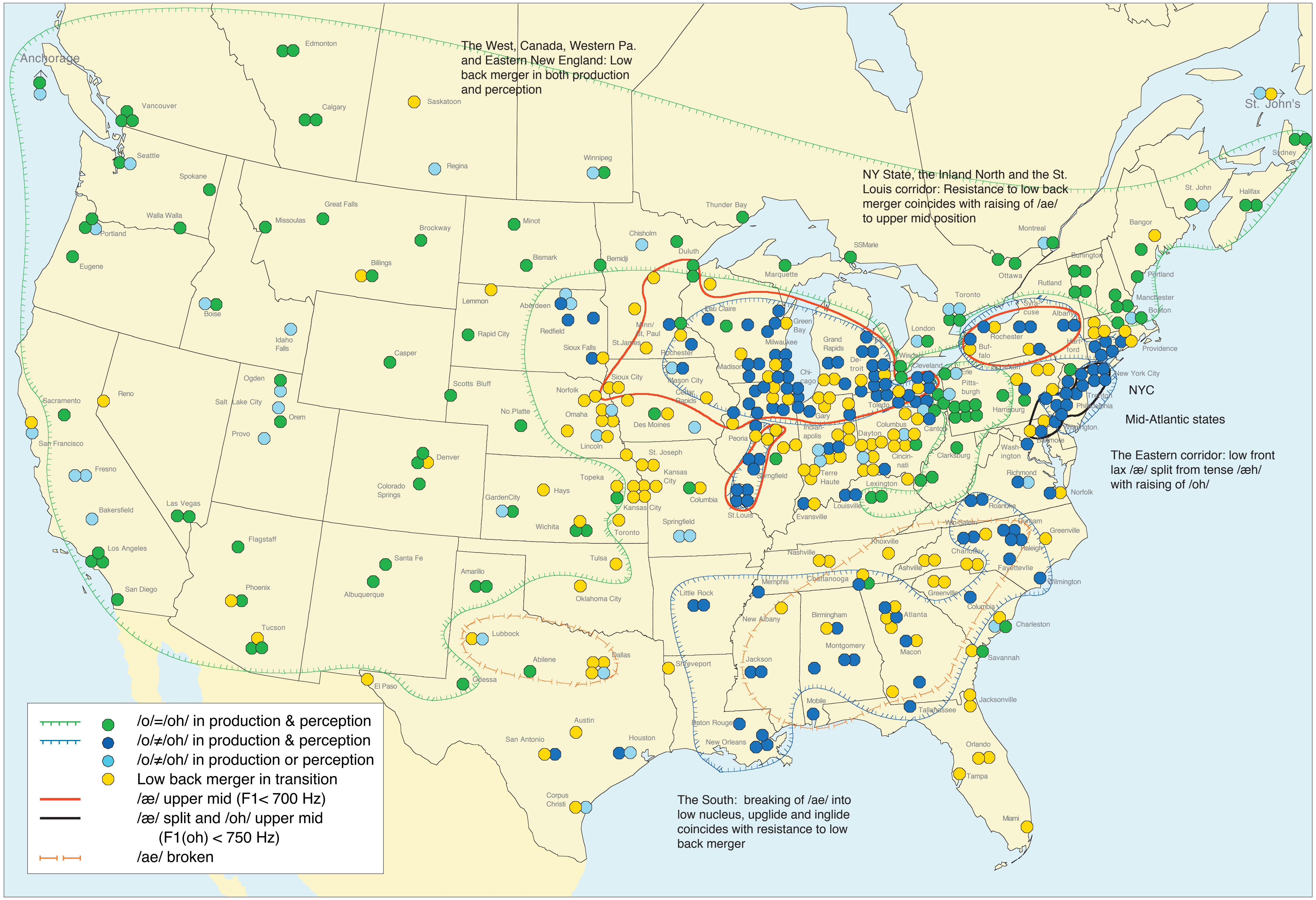
4 This Great Lakes–New York territory was once continuous but is now broken into an eastern and a western half by a shift of the dialect allegiance of the city of Erie to the Midland (Chapter 14, 19).

5 The red isogloss on Map 11.1 is also defined by the absence of any glide deletion of /ay/, excluding those speakers in the South who also have raised nuclei of /æ/. with less Southern breaking than those described below.

6 This mean value does not include vowels before nasals and so is not influenced by the general tendency for /æ/ to be raised before nasal consonants.

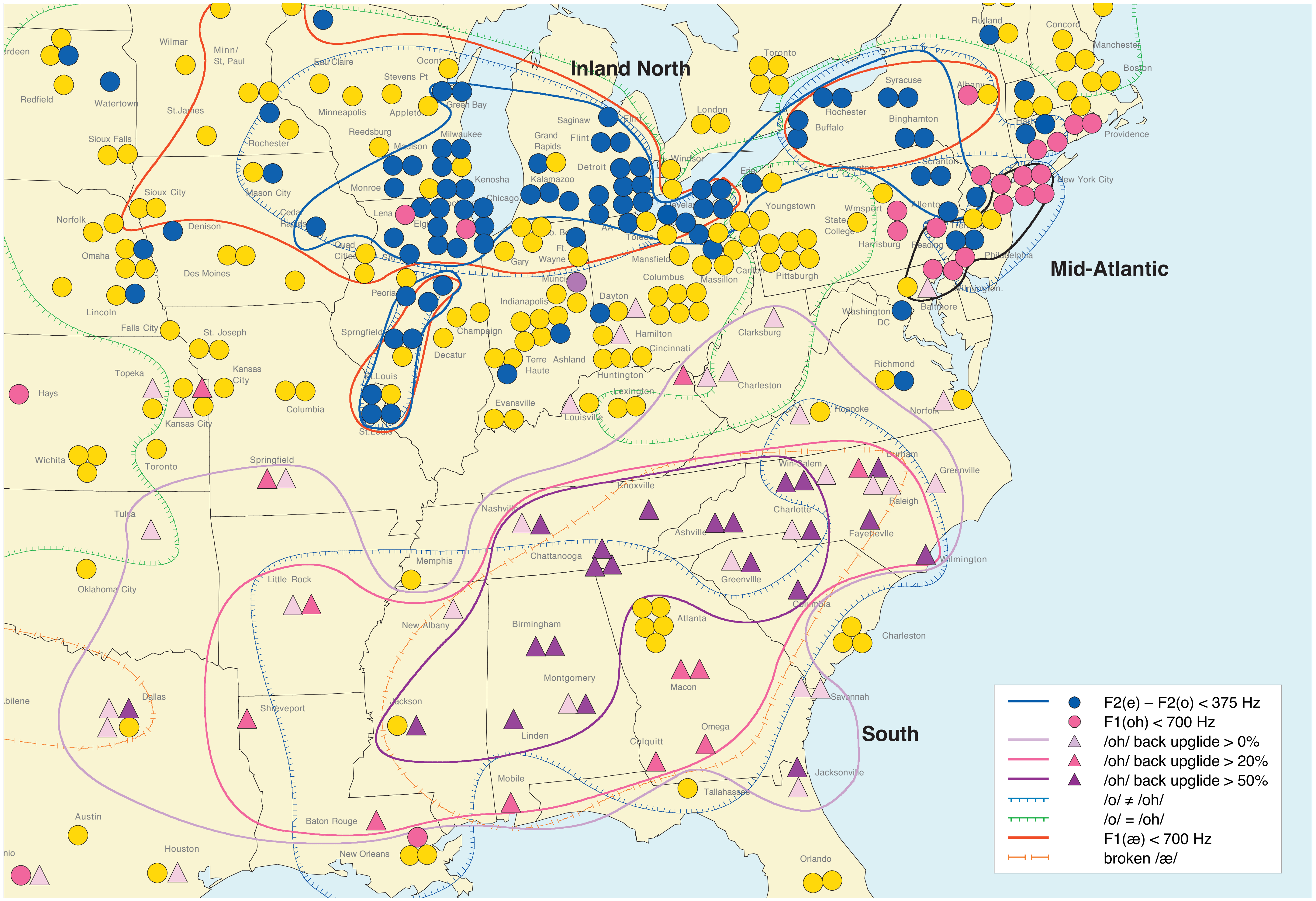
7 An earlier shift from initial position is the merger of /o/ with /ah/, which is not specific to the North.

8 Stages 1 and 2 of the NCS were first noted by Fasold (1969) in an unpublished analysis of Detroit data from Shuy, Wolfram, and Riley (1967). Stages 3 and 4 were developed in LYS (1972), including the alternative (and perhaps earlier) lowering of /e/ to overlap the former position of short-*a*. Stage 5 was first observed by Eckert (1999) in the Detroit suburbs.



Map 11.1. The geographic relation of the low back merger to short-*a* configurations

The green symbols on this initial map show the areas of complete merger of short-*o* (*cot*, *Don*) with long open *o* (*caught*, *dawn*), and the blue symbols the areas with strict separation of these two classes. Resistance to the merger in these three areas is the result of the behavior of the short-*a* class in *man*, *bad*, *that*, etc. In the Inland North, the entire short-*a* class is raised and fronted. In the Mid-Atlantic States and NYC it is split into a lax /æ/ and a tense /aeh/ class. In the South, short-*a* shows Southern breaking (the "Southern drawl").



Map 11.2. Three mechanisms for avoiding the low back merger

In each of the three areas of resistance to the low back merger, a different mechanism is operating to block the merger. The blue symbols show that in the Inland North, short-*o* in *cot*, *Don*, etc. has moved to the front, so that it is almost as front as the short-*e* class: this is part of the *Northern Cities Shift*. The magenta circles show that in the Mid-Atlantic States and NYC, the long open-*o* in *caught*, *dawn*, etc. has moved in the opposite direction, to upper mid position. In the South, neither of these shifts has taken place, but long open-*o* is distinguished by a back upglide (magenta triangles), a feature of the *Back Upglide Chain Shift*.

of the merged /o ~ ah/ class, which moves front of center with an F2 sometimes exceeding 1550 Hz (the center of the normalized system). The /oh/ class then moves down and front to approximately the position formerly occupied by /o, ah/, preserving the same margin of security. Short /e/ moves back towards /ʌ/, which in turn shifts back to the position formerly occupied by /oh/. Finally, /i/ can be seen to shift to the back (and sometimes down) in response to the movement of /e/.

A systematic measure of the progress of the NCS is obtained from the reduction of the front–back difference between /e/ and /o/. For the more conservative dialects of the Midland area, just south of the Inland North, /e/ is a front vowel with an overall F2 mean of 1825 Hz, while /o/ is a back vowel with a mean F2 less than 1300 Hz, a difference of more than 500 Hz. In the Inland North, the backing of /e/ and the fronting of /o/ gradually reduce this difference until, in the most advanced speakers, both /e/ and /o/ are central vowels with the same mean F2 (see Chapter 14 for the details of this process). This measure of the advancement of the NCS will be defined as F2(e) – F2(o) and abbreviated as ED. The Northern Cities Shift is then initially defined by the ED measure, as illustrated in Map 11.2. The criterion is a quantitative one,[9] that ED should be less than 375 Hz.[10]

On Map 11.2, the speakers satisfying the ED criterion are indicated by dark blue circles and the solid dark blue isogloss. They are concentrated in two main areas, both labeled Inland North. An eastern section in New York State includes the cities of Syracuse, Rochester, and Buffalo. A western section extends from northern Ohio, Michigan, and northern Illinois to southeastern Wisconsin, including the cities of Cleveland, Akron, Toledo, Detroit, Grand Rapids, Flint, Kalamazoo, Chicago, Rockford, Joliet, Kenosha, Milwaukee, Madison, and Green Bay. The city of Erie, in northwestern Pennsylvania, is split on the ED measure, but separates the two sections by its alignment with the Midland on all other crieria.[11] The Inland North comprises some 88,000 square miles and a population of over 34,000,000 (see Table 11.3 below). It may be defined as the region of large American cities bordering the Great Lakes, a conurbation that is comparable in size to the eastern seaboard metropolitan concentration from Boston to Washington, D.C.

Several other areas show blue symbols to indicate a concentration of speakers with this NCS feature. One is a corridor that follows Route 55 from Chicago to St. Louis, including the cities of Fairbury, Springfield, and Bloomington. Chapter 19 deals with the history of the St. Louis dialect, the erosion of its special features, and the emergence of the Northern Cities pattern that differentiates the city from the surrounding Midland area. A fourth area of concentration of low ED figures is in Western New England, including southern Vermont, western Massachusetts, and northwestern Connecticut. Chapter 14 will examine this region, exploring the possibility that it is the originating center of the Northern Cities Shift (see also Map 11.12).

There is also a scattering of dark blue symbols in the North Central states, to the west of the Inland North. This larger northern region is defined by the structural matrix out of which the NCS originated, so that a certain number of speakers can be expected to satisfy the ED criterion.

The ED line is nested within the first stage of the shift, the raising of /æ/ shown by the red isogloss. This is a geographic reflection of temporal ordering: the /æ/-raising line reaches into southeastern Minnesota, while the westernmost representatives of the NCS are Green Bay and Madison in Wisconsin. The ED line also coincides to a large extent with the line of resistance to the low back merger (the oriented blue isogloss). In the east, the ED line does not include Albany but does extend across the Pennsylvania border to Scranton. The map makes it clear that the advance of the NCS is tied to resistance to the low back merger. The mechanism which produces this effect is evident: the fronting of /o/ is an effective mechanism in relieving pressure towards the merger of /o/ and /oh/.[12]

The Mid-Atlantic States and New York City

The region encompassing the Middle Atlantic States and New York City was defined in Map 11.1 by both resistance to merger and the split short-*a* system (Chapters 13, 17). As noted above, the short-*a* split leaves the major group of short-*a* words in low front position, blocking any forward movement of /o/. The margin of security between /o/ and /oh/ is enlarged by a movement in the opposite direction, the raising of /oh/. The magenta circles in the Mid-Atlantic area on Map 11.2 designate those speakers whose mean value of F1 of /oh/ is less than 700 Hz.[13] /oh/ rises to an upper-mid or lower-high position as a long and ingliding vowel, in parallel with the movement of /æh/ in the front. The distribution of magenta circles covers the same general region as the two isoglosses carried over from Map 11.1, though it extends somewhat further north and west.[14]

This upward movement of /oh/ associates this phoneme with the Back Vowel Shift before /r/:[15]

/ahr/ → /ohr/ → /uhr/

This shift is represented in many areas of the U.S., but only in the Mid-Atlantic area does the larger /oh/ class consistently follow this upward route.[16] Detailed studies of New York and Philadelphia show that the chain shift is more advanced in Philadelphia, where all speakers have /ahr/ in lower mid back position, and the merger of /uhr/ and /ohr/ is complete for most speakers (Labov 2001). In New York City, the entire process is variable (Labov 1966).

The outer limit of the area is defined by the splitting of short-*a*, but the conditions for the split divide the area sharply into New York City vs. the Mid-Atlantic cities (Philadelphia, Reading, Wilmington, and Baltimore). It is even more sharply divided by the vocalization of postvocalic /r/, which is characteristic of the New York City vernacular but not the Mid-Atlantic cities.

A closer view of New York City and the Mid-Atlantic states will be provided in Maps 11.9 and 11.12. Chapter 17 is devoted to a detailed analysis of these two dialects, which are united by the splitting of short-*a*, the raising of /oh/ and participation in the Back Chain Shift before /r/, but differentiated by the nature of the short-*a* split, the vocalization of /r/, and the extent of fronting of back upgliding vowels (Chapter 12).

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9 The qualitative criterion of which phoneme is fronter than the other is not suitable, since only in a few most advanced speakers is /e/ actually backer than /o/.

10 This figure will be justified in Map 11.14, where it will be seen that it bundles tightly with the qualitative UD criterion, and in Chapter 14, where it will coincide with other measures of the NCS and other Northern characteristics.

11 In the records of LAMSAS, Erie shows consistently Northern patterns. It is unique among the cities of the North in shifting its linguistic allegiance from North to Midland in the period 1940–1990 (Chapter 14).

12 It is not totally inconsistent with that merger, since in at least one dialect (Newfoundland) both /o/ and /oh/ front together as a merged phoneme.

13 The selection of the magenta circles includes the stipulation that F2(e) – F2(o) > 375 Hz. The 700 Hz criterion is the same quantitative criterion that was used for the raising of /ae/. In the Mid-Atlantic area, tense /ae/ (designated /aeh/) is raised in parallel with /oh/ (Labov 1966).

14 The phonetic patterns of the New York and Philadelphia systems extend somewhat beyond the phonological pattern that is the basis of the short-*a* split.

15 The notation here assumes the nearly completed merger of /ohr/ and /ɔhr/ (Chapter 8).

16 There are a few scattered points in a global region surrounding Chicago, but this sporadic phenomenon is quite distinct from the heavy concentration in the Mid-Atlantic area.

The South

The third region of resistance to the low back merger is the South, where another mechanism comes into play. In the South generally, the nuclei of /o/ and /oh/ are much closer together than in other regions that distinguish these vowels, as indicated in Table 11.1. This table also shows that the F1 difference between the two vowels in the Mid-Atlantic region is much larger than for the other dialects. For the Inland North, the F2 mean for /o/ is much higher than for the other dialects, and the margin of security is also the greatest. The margin of security for the /o/ ~ /oh/ distinction in the South is not established by F1/F2 values but in the presence of a back upglide with /oh/.

Table 11.1. Mean formant values of /o/ and /oh/ for three regions resistant to the low back merger

	/o/		/oh/			
	F1	F2	F1	F2	F1 dif	F2 dif
South	812	1,287	763	1,177	48	110
Mid-Atlantic	845	1,343	675	1,053	170	290
Inland North	845	1,493	747	1,180	98	313

Map 11.2 shows the distribution of this Southern upglide by magenta triangles: light magenta for speakers with up to 20 percent back upglides, darker magenta for those with 20 to 50 percent back upglides, and darkest for those with more than 50 percent. The darkest magenta isogloss is clearly contained within the area of broken short-*a* as well as the area of resistance to the low back merger. This third mechanism for resistance to the low back merger will be examined in greater detail in Chapter 18.

Characteristics of the major isoglosses

Appendix 11.1 gives the isogloss parameters (Chapter 6) for each of the maps that introduces one or more dialect boundaries. The table shows the total number of speakers with the criterion feature (the marked cases), the number of Telsur subjects inside the boundary, and the number of marked subjects inside the boundary. These parameters, derived from the map, are then used to calculate the number of marked speakers outside of the boundary, homogeneity (proportion inside the boundary that are marked); consistency (proportion marked that are inside the boundary); and leakage (proportion outside the boundary with the marked feature).

The isogloss for raised /æ/ shows high homogeneity and consistency (.84, .79) and rather little leakage (.05). For the ED isogloss that defines the Inland North as a whole, the table shows a high level of homogeneity (.87), moderate consistency (.62) but slightly greater leakage (.10). Homogeneity is given for three subsections of the Inland North. Western New York State shows the highest (1.00). The transitional St. Louis corridor shows the lowest homogeneity (.78).

Under the Map 11.2 section of Appendix 11.1, parameters are also given for the back upglide isoglosses in the South. In this case, the calculations are cumulative; that is, all the speakers within the isogloss which denotes a frequency of back upglides greater than 50 percent are also contained within the isogloss which denotes a frequency of back upglides greater than 20 percent, and similarly for the isogloss which delineates a frequency of back upglides greater than zero. These three Southern isoglosses are remarkable for their high consistency and low leakage; it is generally true that Southern features are limited to the Southern region.

Map 11.2 demonstrates that the active chain shift at the core of the Northern region, triggered by the general raising of the short-*a* class, preserves the integrity of the short-*o* class. In the Mid-Atlantic states, the shift of back vowels before /r/ may be associated with the parallel raising of /oh/ and the preservation of the short-*o* class by a quite different route. The Southern treatment of the /o/ ~ /oh/ distinction is part and parcel of a third chain shift, the Back Upglide Chain Shift (Chapter 18).

The outer limits of the South and the Southern Shift

The Southern region is defined with greater clarity and precision by the outer limits of the Southern Shift, a more complex and extensive set of sound changes. The Southern Shift is triggered by the removal of /ay/ from the subsystem of front upgliding vowels: the deletion of the /y/ glide or monophthongization of /ay/, often with a slight fronting of the resulting long nucleus.[17]

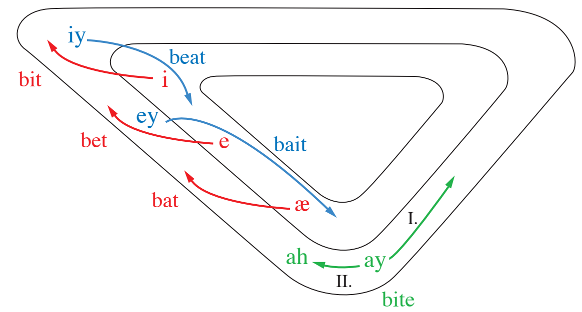
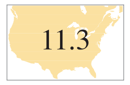


Figure 11.2. The Southern Shift

Stage 2 of the Southern Shift is the centralization and lowering of the nucleus of /ey/ along a non-peripheral track, as it moves into the phonological space that is still largely occupied by the nucleus of /ay/ after glide deletion. This is accompanied by a fronting and raising of /e/, which develops an inglide as it moves to the position formerly occupied by the nucleus of /ey/. Stage 3 of the Southern Shift is the consequent and parallel lowering of /iy/ and fronting and raising of /i/.[18] The end result is a relative reversal of the front/back locations of /ey/ and /e/, /iy/ and /i/.[19]

Defining the South: Stage 1 of the Southern Shift

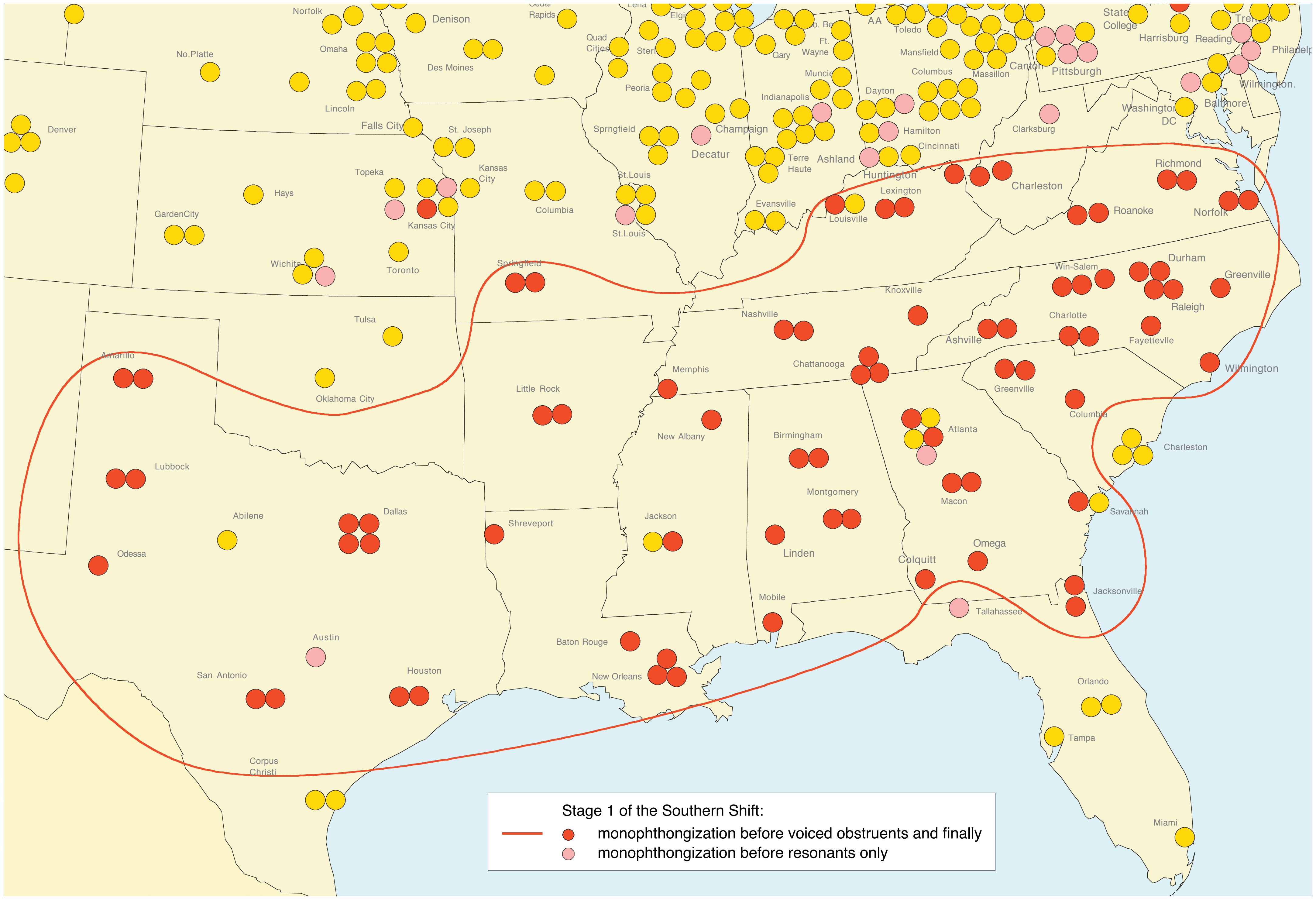


The red symbols in Map 11.3 indicate speakers who show glide deletion of /ay/ before voiced obstruents or finally, in *wide*, *wise*, *oblige*, *tiger*, *alive*, *high*, *guy*, etc. A considerable amount of glide deletion is found just north of the red isogloss, in Midland cities close to the South. However, in these communities /ay/

17 In southern England, Australia, New Zealand, South Africa, and eastern North Carolina, the triggering event, Route II on Figure 11.2, is the backing and raising of /ay/ to lower-mid or mid position, usually accompanied by an upward chain shifting of /oy/ to high position (LYS 1972; Sivertsen 1960; Mitchell and Delbridge 1965; Wolfram 1994; Trudgill 2004).

18 The relative timing of the two components of Stages 2 and 3 is not easy to determine. In PEAS, nuclei of the originally short vowels in the South are shown regularly with [ɪ´] and [ᴇ´], but as with other LAMSAS notation, it may be understood as an understatement of the phonetic situation.

19 In southern England and Australia, the short vowels shift to relatively higher and fronter positions without developing inglides. In New Zealand, /i/ moves back to high central position, forming a chain shift with /e/ as it rises to high front peripheral position



Map 11.3. Stage 1 of the Southern Shift: glide deletion of /ay/

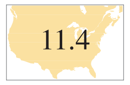
In the southern United States, ANAE shows a solidification and generalization of the major regional dialect, defined by the *Southern Shift*. The triggering event in this shift is deletion of the glide of the /ay/ phoneme in *my*, *guy*, *wide*, *wise*, etc., which then becomes a long steady state vowel (or “monophthong”). The speakers marked with red circles all show this feature; only one such case lies outside of the red isogloss that marks the outer limit of the South as a dialect area. The light red circles show some glide deletion, but only before /l, m, n, r/ (“resonants”), as in *while*, *time*, *fine*, *fire*, etc., but not finally or before voiced obstruents (stops or fricatives). The major metropolis of Atlanta shows considerable variation, one aspect of large-scale Midland and Northern immigration to that city.

glides are deleted only before resonants (nasals and liquids), in *time*, *nine*, *tire*, *mile*, etc.[20] New Orleans and Amarillo are included in the South, not on the basis of frequency of glide deletion, but on the basis of where that deletion occurs. None of the three New Orleans speakers has more than 20 percent glide deletion, but they have /ah/ in *drive* and *side*. Amarillo, in the panhandle of Texas, shows /ah/ in *five* and *satisfied*.

The red isogloss shows an extraordinary homogeneity of .90 (Appendix 11.1). Within the isogloss, 75 of the 83 speakers show glide deletion before obstruents. Much of the residual variation is found in metropolitan Atlanta. The fact that only 2 of the 5 Atlanta speakers show glide deletion before obstruents is indicative of strong influence from outside the South (Chapter 18).

The consistency of the AYM line reaches an even more remarkable level of .99 (with leakage at .003); there is only one dark red circle outside the isogloss, a single speaker in Lawrence, Kansas. The actual percentages of glide deletion for individual speakers are quite high, in many cases approaching 100 percent before voiced consonants and finally (Chapter 18). Since the AYM line is defined by glide deletion, the triggering event for the Southern Shift, it represents the most likely candidate for a structural delimitation of the outer limits of the Southern dialect region. It extends to the west further than previous definitions of the Southern dialect region (Map 11.16) and extends to all the urbanized areas in Texas except El Paso and Corpus Christi. It does not include any cities in Oklahoma, but it extends northward to include Springfield in Missouri. It then follows the Ohio River to West Virginia,[21] where Charleston is included but not Clarksburg. On the eastern seaboard, Norfolk and Charleston are excluded, and Florida is excluded except for Jacksonville.

Stages 2 and 3 of the Southern Shift



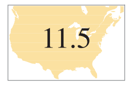
The results of Stages 2 and 3 of the Southern Shift are displayed in Map 11.4. As indicated in the legend, the light green symbols and isogloss represent the relative reversal of /ey/ and /e/: Stage 2 of the shift. In most dialects, the nucleus of /e/ is lower and backer than the nucleus of /ey/; in terms of formant measurements, the mean F1 of /e/ is higher than the mean F1 of /ey/, and the mean F2 of /e/ is lower than the mean F2 of /ey/. These relations are reversed for the speakers with green circles. The dark green circles represent speakers for whom this reversal also applies to /i/ and /iy/, which is Stage 3 of the Shift.

The temporal sequence of the Southern Shift is reflected in the geography of the isoglosses. Speakers at Stage 2 are a subset of those at Stage 1, defined by the red AYM line. Similarly, the region of Stage 3 is nested within Stage 2. Stage 2 includes most of the Southern region but does not extend to the Atlantic coast in any of the southeastern States. New Orleans and adjoining southeastern Texas are not included, nor is western Tennessee.[22] Within Texas, Dallas shows divided status for Stage 2, an indication of the weakening of the Southern vowel system in that metropolis as in Atlanta.

The Stage 3 reversal of /iy/ and /i/ appears in a much more limited region than Stage 2. It is concentrated in the Appalachian area of Knoxville and Chattanooga in eastern Tennessee, extending southward to Birmingham, Linden, and Montgomery in Alabama, and to the relatively small city of Colquitt in southwestern Georgia.[23] Stage 3 is one of the elements of Southern phonology that will be used to define the *Inland South*.

The isogloss parameters for Map 11.4 in Appendix 11.1 are in the .80 range for homogeneity and consistency, again with very little leakage, the characteristic pattern for Southern features.

The outer envelope of the Southern region is formed by the AYM line, indicating glide deletion before voiced obstruents and finally. It is generally considered that glide deletion of /ay/ before voiceless consonants – in *wipe*, *white*, *nice*, *like* – is a feature of working-class speech, and it is stigmatized socially (Feagin 1979). Though this situation holds for most regions of the South, there are areas where monophthongization is extended to all environments for all speakers. Map 11.5 superimposes this feature upon the the AYM isogloss from Map 11.3. The orange isogloss registers the minimum glide deletion before voiceless consonants, below 20 percent, and the dark brown isogloss indicates heavy use of glide deletion in this environment, above 50 percent.



Small percentages of glide deletion before voiceless consonants can be found in most parts of the South, except for southern Texas, Louisiana, and the Gulf Coast. The strong use of this feature is concentrated in the area that has already been identified as the center of the most advanced features of the Southern vowel system – the Appalachian area, in this case extending up into West Virginia. A second center of strong glide deletion appears in West Texas, where Southern breaking of /æ/ is also to be found.

Since glide deletion before voiceless consonants is a socially marked feature, we can expect a fair degree of social variation within the isogloss, and homogeneity will be somewhat lower for the two (ay0) isoglosses. Appendix 11.1 shows .68 and .72 for homogeneity. Again, high consistency (.86 and .93) and low leakage (.02, .00) are characteristic of Southern features.

Glide deletion before voiceless consonants is concentrated in just those areas where the Southern Shift is most advanced. If vowel systems were governed by features rather than by segments, one might easily envisage a system in which the Southern Shift operated only before voiced consonants, while vowels before voiceless consonants remained stable. This is not the case here: chain shifting is facilitated when the /ay/ phoneme as a whole vacates its former position (Chapter 18).

The Southern region is actually defined not by one, but by two different chain shifts. Besides the Southern Shift, the back upglide with /oh/ that is traced in Map 11.2 is linked to a second fronting.

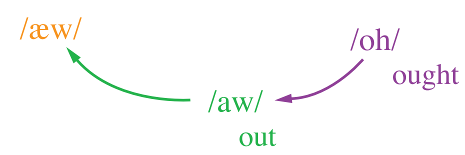
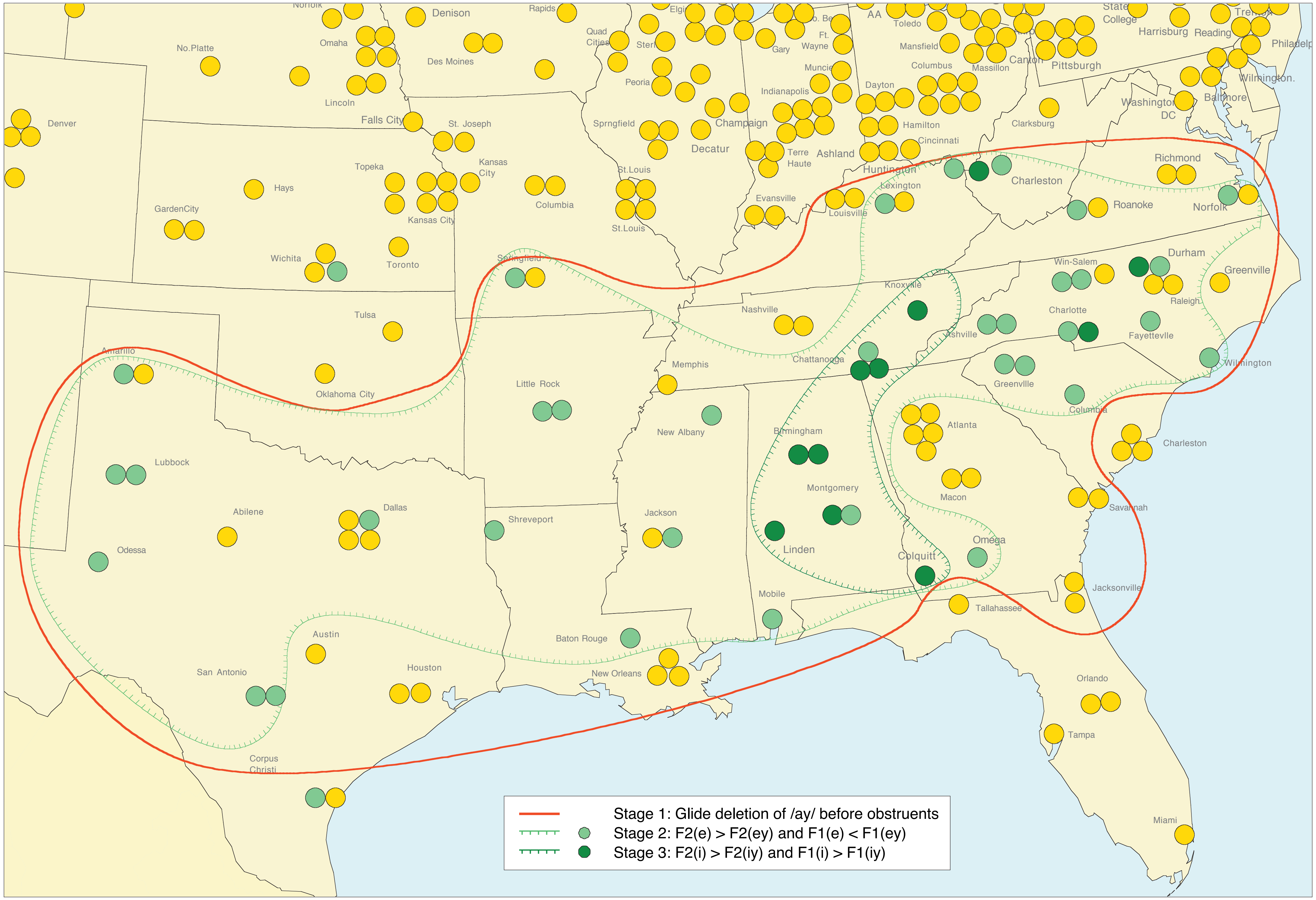


Figure 11.3. The Back Upglide shift

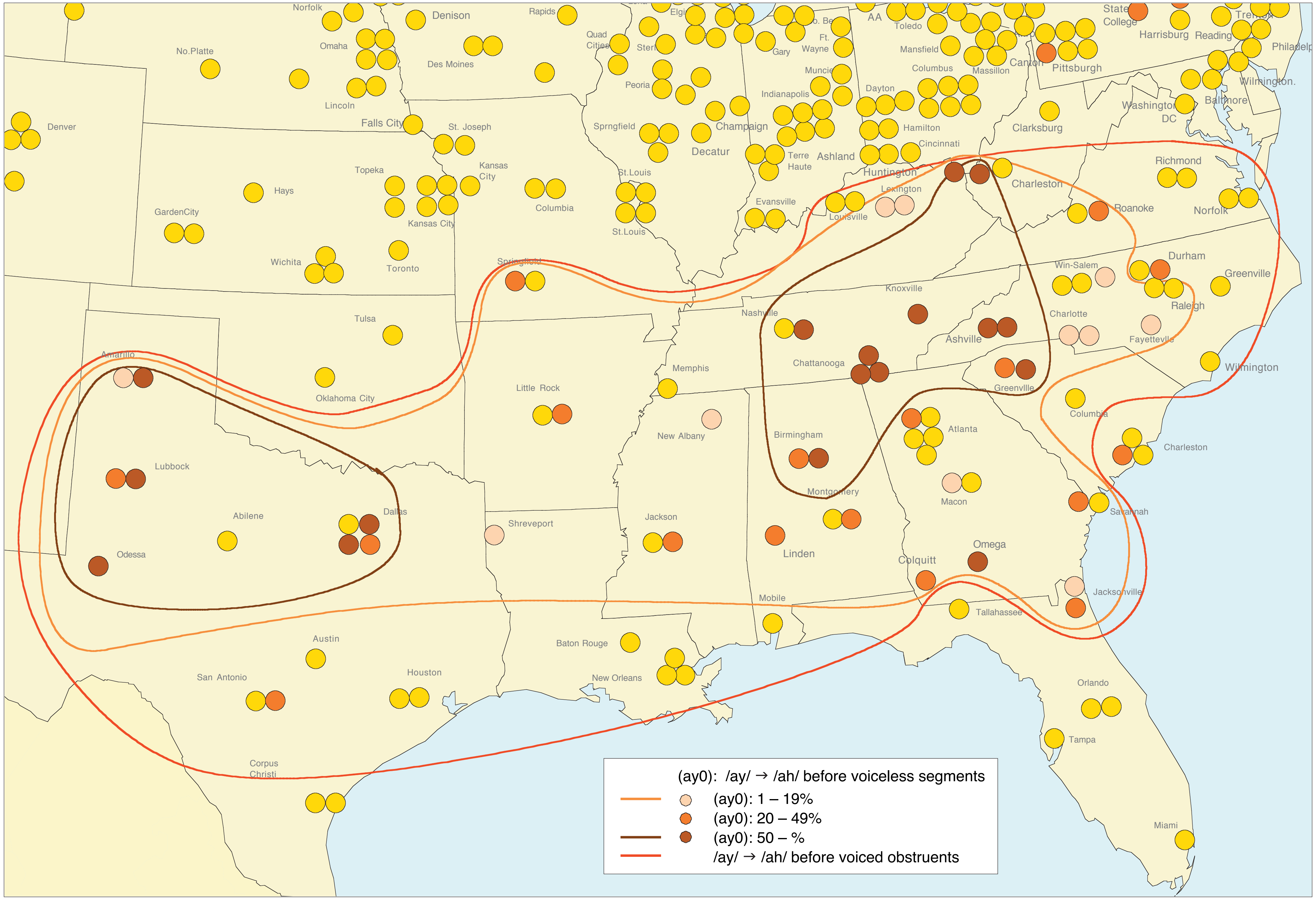
As we have seen, /oh/ has a low back rounded nucleus [ɔ], and this is retained in some forms of the Southern diphthong (e.g., *caught* as [kɔut]). However, the nucleus does not as a rule remain as a low back rounded [ɔ]. When it is accompanied by a back upglide, it normally unrounds and shifts forward. This brings the original /oh/ into the phonetic area occupied by /aw/ in the North. In the South, the nucleus of /aw/ is front of center: in conservative utterances it is [æo], but in many cases (especially before nasals) the nucleus is a front mid vowel [eo] (or

20 Within the South, there are three such speakers with glide deletion only before resonants and 21 outside. This includes three speakers in the Southwest, not shown in Map 11.3
21 Southeastern Ohio is well known to show strong Southern influence in speech patterns, but since there are no urbanized areas in this region large enough to fall into the Telsur sample, the ANAE isogloss is not informed by any data from this area.
22 But see Fridland's detailed study of Memphis, which shows that many speakers do show Stage 2 but not Stage 3 of the shift (1999).
23 Colquitt is one of the smaller communities in the Telsur sample, in an Urbanized Area of 117,000, added to obtain greater geographical representation.



Map 11.4. Stages 2 and 3 of the Southern Shift

The loss of the glide in /ay/ leads to the second and third stages of the Southern Shift. In Stage 2, the /ey/ vowel in *made*, *chase*, etc. shifts down towards the position formerly occupied by /ay/, so that Southern *raid* can be mistaken for *ride* by speakers of other dialects. At the same time, short-*e* as in *red* moves up and front to the position formerly occupied by /ey/, so that the relative position of these two word classes reverses; this is true for all speakers marked with green symbols. Stage 2 is almost as widespread as Stage 1 but does not extend to the eastern shore. Stage 3 is marked by dark green symbols; these speakers show the same type of reversal for /iy/ in *read* and /i/ in *rid*. Stage 3 is confined to Appalachia and south Georgia, the most advanced areas of the Southern Shift.



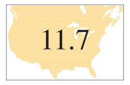
Map 11.5. Monophthongization before voiceless consonants

For most Southerners, the monophthongization or glide deletion of /ay/ presented in Map 11.3 does not include /ay/ before voiceless consonants; *nice*, *white*, *rice* keep their glides. In many areas this is a social class issue, where it is primarily working class speakers who extend this sound change to such words. This map shows that in some areas, words like *nice*, *white*, *type*, *like*, *strike* are monophthongs more than half the time (the dark brown symbols) and Stage 1 of the Southern Shift is extended to the whole vocabulary. This development of /ay0/ is concentrated in two areas: the *Inland South* in the Appalachian region, similar to the area marked for Stage 3 in Map 11.4; and central and west Texas, the *Texas South*.

[eü]). In this case, the general fronting of back vowels characteristic of the South generates a chain shift relationship.

The relative progress of these two chain shifts is encapsulated in the Southern Vowel Index. It is constructed by awarding a value of 1 for each of the nine isoglosses shown in Maps 11.3 through 11.5. Thus a speaker who is located within all isoglosses will have 3 points for the three /oh/ back upglide isoglosses on Map 11.2, 2 points for the two /ay0/ isoglosses on Map 11.5, 1 point for the monophthongization of /ay/ before voiced consonants on Map 11.3, 1 point for the reversal of /ey/ and /e/ and 1 point for the reversal of /iy/ and /i/ on Map 11.4, and 1 point for the breaking of /æ/ on Map 11.1, for a total of 9 points. Map 11.6 displays these index values for each Telsur speaker, with three levels of color coding to indicate the relative intensity of Southern features. The most advanced region, henceforth the *Inland South*, is the area where such maximum participation in the two shifts is concentrated. A second area of relatively high concentration is found in western Texas (where back upgliding is rare); this will be referred to henceforth as the *Texas South*.

Dialects within the low back merger area



Three different modes of resistance to the low back merger have been associated with chain shifts: the fronting of /o/ in the Inland North with the Northern Cities Shift; the raising of /oh/ in the Mid-Atlantic States with the Back Chain Shift before /r/; and the upglide of /oh/ in the South with the Back Upglide Shift. These chain shifts have the effect of driving the dialects involved in different directions (though in the South, the main momentum is carried by the Southern Shift, which is not directly associated with resistance to the low back merger). We will now examine the other side of the coin: dialects that have submitted to the low back merger. Map 11.7 examines three distinct dialects within the area of the low back merger, outlined by the light green oriented isogloss.

Canadian English

Canadian English has traditionally been described by the presence of the low back merger, as first displayed in Map 11.1, and by Canadian raising, the centralization of the nucleus of /ay/ and /aw/ before voiceless consonants (Joos 1942; Chambers 1973, 1989). If Canada has a distinct dialect of North American English, it must be defined by linguistic features that reliably separate Canada from three different American dialects across the international border: the West, the Inland North, and New England. The low back merger establishes such a separation only in the southern Ontario region (Boberg 2000). Though Canadian raising is certainly common in Canada, it is not consistent enough in Telsur records to define Canada as a dialect region (Chapter 15);[24] it also extends strongly into the Inland North (Chapter 14).

The definition of Canada as a dialect region will follow the same procedure as in Maps 11.1 through 11.5, identifying the chain shifts that are currently active in the area. The Canadian Shift, first described by Clarke, Elms, and Youssef (1995), is a candidate for such a definition. It is triggered by the low back merger, with /o/ in low back position as [ɒ]. The merger extends the margin of security between /æ/ and /o/; it is followed by the backing of /æ/ and the backing and lowering of /e/.

The Canadian Shift is necessarily defined by quantitative measures. On Map 11.7, backing of /o/ is defined as a mean F2 less than 1275, the backing of /ae/ is defined as a mean F2 less than 1825, and the lowering of /e/ by a mean F1 greater than 660. With these definitions in place, 21 of the Canadian cities within the dark red isogloss are selected. This view of the Canadian dialect does not include the Atlantic Provinces. No Telsur Canadian city east of Montreal shows the Canadian Shift.[25]

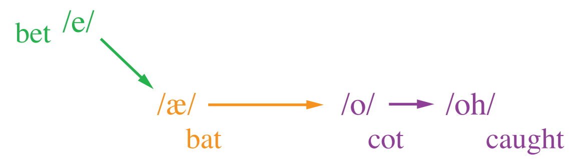


Figure 11.4. The Canadian Shift

The isogloss parameters for the Canadian Shift show high homogeneity (.84) but low consistency (.34), since the pattern extends in an irregular fashion to affect many speakers in the western United States.

Eastern New England

A second dialect that is readily distinguished within the low back merger area on Map 11.7 is Eastern New England [ENE]. It is defined jointly by the vocalization of /r/ and the low back merger. As shown in Chapter 7, vocalized /r/ in postvocalic, tautosyllabic position survives strongly in only two areas: Eastern New England and New York City (see Map 11.9).[26] The high figures for homogeneity and consistency of the ENE isogloss in Appendix 11.1 (.91, .91) reflect the specificity of the defining characteristics for Eastern New England.

Western Pennsylvania and Pittsburgh

Western Pennsylvania is a third dialect area within the low back merger region of Map 11.7. This area appears to represent an independent instantiation of the merger, since it is separated geographically from the Canadian merger by Lake Erie. The low back merger in Pittsburgh may be the result of the great influx of Polish and other Eastern European workers to the area at an earlier date, just as the more recent merger in eastern Pennsylvania was triggered by immigration to the coal-mining areas (Herold 1990).

The speech of western Pennsylvania bears some similarity to Canadian English, including the low back merger generally and the Canadian Shift (in seven of the 14 speakers). Western Pennsylvania will be more sharply distinguished from Canadian English by the fronting of /ow/, discussed in the following section.[27] In its northward extension, Western Pennsylvania now includes the city of Erie.[28] To the south, Western Pennsylvania also includes the city of Clarksburg in West

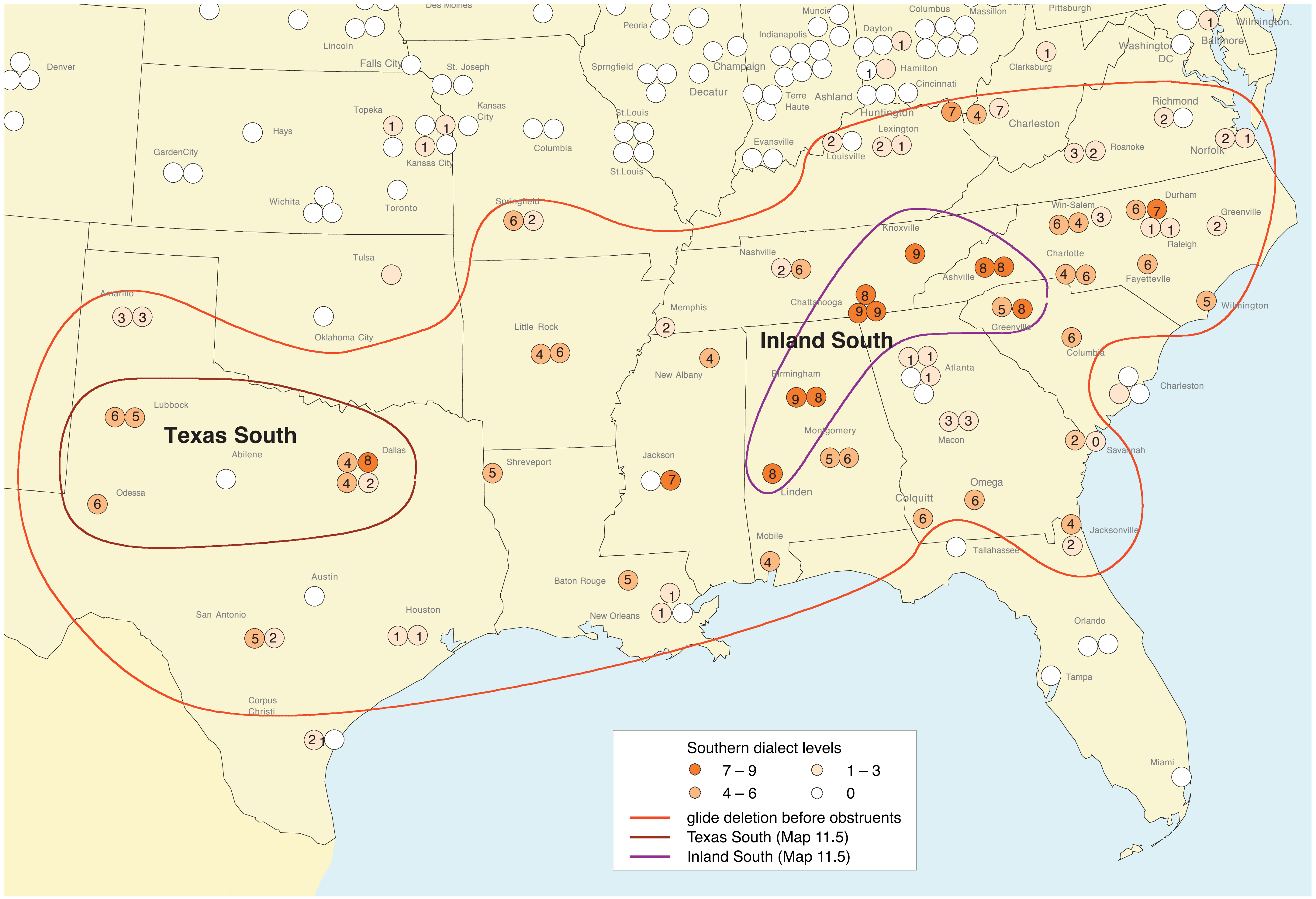
24 Compare also the report of Chambers and Hardwick (1985) that for younger speakers in Vancouver and Toronto, the centralized nucleus is being replaced by a low front nucleus, following the U.S. pattern, or by a low back rounded nucleus.

25 It should be noted that the Canadian Shift is not limited to Canada in the way that the monophthongization of /ay/ is limited to the South. In addition to the 21 Canadians, 41 Americans show the Canadian Shift. These are not concentrated in any one area, except for the central Western region, so that Appendix A shows a consistency of only .39 for the Canadian Shift.

26 The sole Telsur representative of Bangor, Maine, is shown here with the dark red representing the Canadian Shift. This speaker is not included in ENE since she did not show any vocalization of /r/.

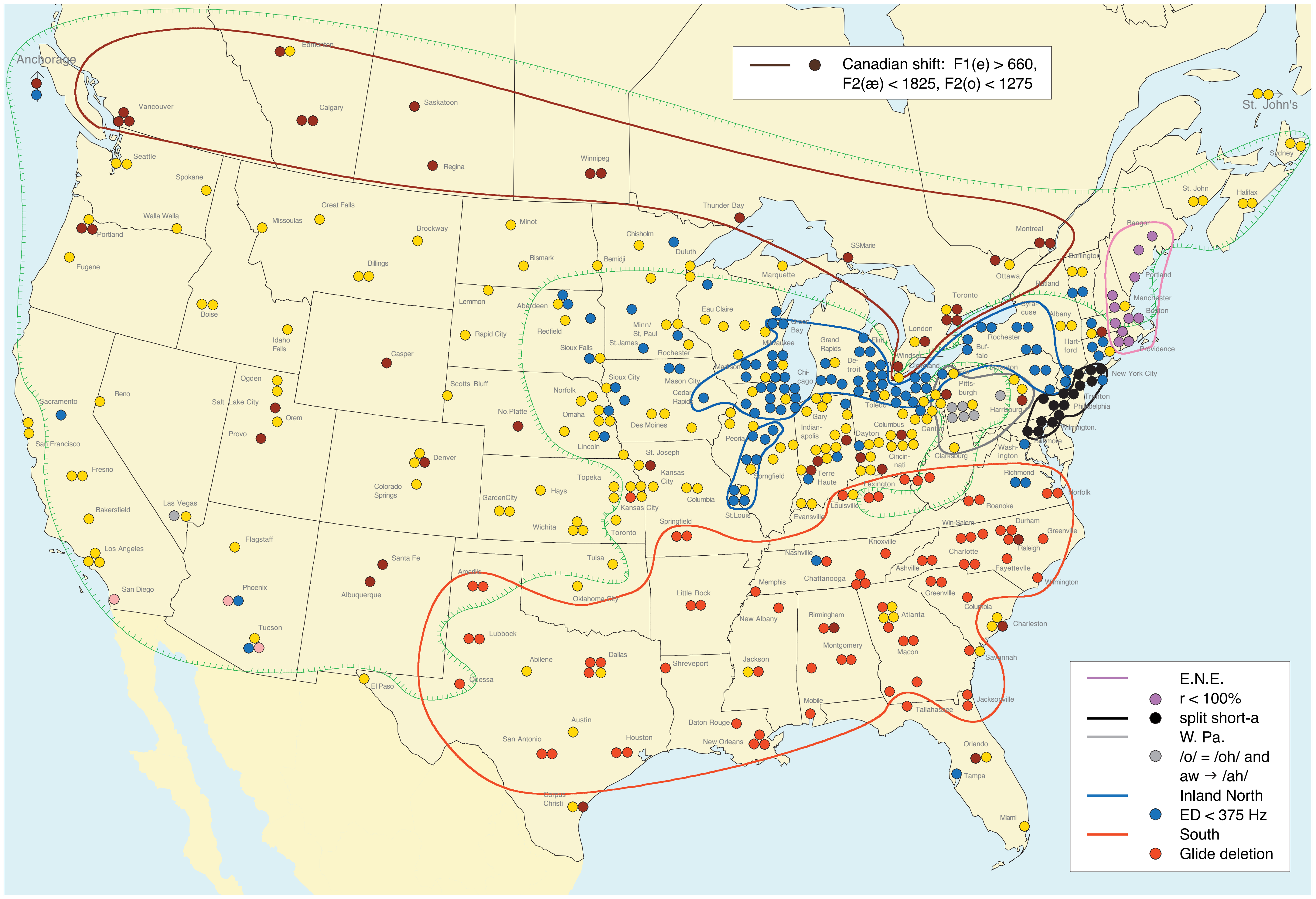
27 See Chapter 20 for a more detailed examination of Pittsburgh and the chain shifts triggered by glide deletion of /aw/.

28 See Chapter 14 for a discussion of the shift of Erie from Northern to Midland status.



Map 11.6. Structure of the South by dialect levels

The structure of the Southern dialect area is displayed by an index of Southern dialect level, which combines all of the features of Maps 11.1 to 11.5 into a nine-point scale. There is a clear concentration of speakers with high levels (7–9) in the Appalachian area defined as the *Inland South*, but also extending into central North Carolina. A group of relatively high values is found in central and West Texas, differentiating Lubbock and Odessa from other Texas cities. The largest metropolis, Dallas, shows considerable variation.



Map 11.7. Three dialects in the low back merger area: Canada, Eastern New England, and Western Pennsylvania

Canada is defined here by the *Canadian Shift*, a downward and backwards movement of the short vowels /e, æ, o/, which is triggered by the low back merger. Dark red symbols show speakers affected by this shift. Like Canada, Eastern New England shows the low back merger. It is the only such area that also shows the vocalization of post-vocalic /r/ in *car*, *card*, *board*, etc. (magenta symbols).

Western Pennsylvania is the third low back merger area defined in this map. At its center, the city of Pittsburgh is marked by the unique monophthongization of /aw/ in *down*, *town*, *house*, etc. (gray symbols), a feature shown in popular spelling as *dahntahn*.

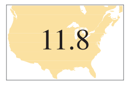
Virginia. The diffusion of the /o ~ oh/ merger to Appalachia is not limited to West Virginia, but extends to northern Kentucky as well. Aside from Clarksburg, these cities are firmly included within the Southern orbit on the basis of the monophthongization of /ay/.

On the western boundary, three speakers in Youngstown, Ohio, are also included in the Western Pennsylvania region, on the basis of the low back merger. The PEAS data does not extend to Ohio, but the 1964 telephone survey of the low back merger (Chapter 9) showed that the expansion into eastern Ohio had already taken place at that time.

At the center of the Western Pennsylvania area is the city of Pittsburgh, a speech community defined by a unique phonological feature, the deletion of the glide of /aw/.[29] A monophthongal realization of the vowel of *now*, *down*, *out* is not uncommon in southern England and is the norm in London working-class speech (Kerswill and Williams 1994; Williams and Kerswill 1999) but it is not a general characteristic of any other North American dialect. In the city of Pittsburgh, it is stereotypical of the Pittsburgh dialect, and pronunciations like "dahntahn" are well recognized as representative of Pittsburgh (Johnstone et al. 2002). A dozen Telsur speakers outside of Pittsburgh show occasional monophthongal tokens of /aw/, but these are only in the most favored environments, before liquids (*hour*, *towel*) or in unstressed function words (*out*, *about*). The gray circles on Map 11.9 indicate deletion of the glide of /aw/ before obstruents for five of the six Pittsburgh speakers shown here. Further structural configurations that are the consequences of this sound change are developed in the more detailed treatment of Pittsburgh in Chapter 20.

Defining the outer limits of the North

The outer limit of the Southern region was established by the outer limit of the glide deletion of /ay/, the preconditon for the Southern Shift. The next task is to define the outer limits of the North as the area harboring the preconditions for the Northern Cities Shift. Unlike the situation in the South, the Northern area is considerably larger than the outer extent of the Northern Cities Shift.



Map 11.8 defines the North in accordance with the logic of Maps 11.1 and 11.2, where the status of the low vowels /æ/ and /o/ is seen to determine the dynamic possibilities within a dialect region. The North is defined as an area in which /o/ and /oh/ are not merged and in which /æ/ is one unit, that is, not split into lax and tense categories The red isogloss on Map 11.8 accordingly outlines the core area of the North where /æ/ is raised as a whole (as first shown in Maps 11.1 and 11.2). This coincides for the most part with the dark blue oriented isogloss, which shows the area of greatest resistance to the low back merger – where /o/ and /oh/ are different in both production and perception for all allophones examined. A somewhat smaller area is defined by the dark blue isogloss, first introduced in Map 11.2 as a measure of the progress of the NCS. It is the area where the backing of /e/ and the fronting of /o/ bring them into close proximity on the front–back dimension.

Outer limits of the North. The outer limit of the North is shown by the barred light blue isogloss. Its extent is defined first by the oriented green isogloss, which marks the outer limits of the area where the low back merger is complete: /o/ and /oh/ are the same in perception and production in all environments. It is also limited by the black isogloss, defining the area where short-*a* is split.[30] A third outer limit is set by the oriented light blue isogloss, which outlines the area in which /ow/ remains a back vowel, with a mean F2 for the nucleus of less than 1200 Hz.[31] The /ow/ isogloss determines the Southern limit of the North, on a line which will later appear to be the North/Midland line, the deepest phonological division between North American dialects. The conservative behavior of /ow/ in the North is matched by a parallel measure of the fronting or backing of /aw/. As with /ow/, the North maintains a relatively back position of the nucleus of /aw/, in contrast with the Midland and the South.[32]

Appendix 11.1 shows that this construction of the Northern isogloss achieves reasonably high homogeneity (.82) and consistency (.78), with low leakage (.08).

Between the North and the South

The presentation so far has defined the boundaries of Canada, the North, the South, Eastern New England, and Western Pennsylvania. There remains a large undefined territory extending from Ohio to the Pacific coast. The analysis to follow will divide that large territory into two regions, the West and the Midland. Neither territory is dominated by the active chain shifts discussed so far. Instead, they are largely characterized by negative features – the absence of these chain shifts – and by the differential development of sound changes that affect the continent as a whole.

The Midland (Chapter 20)

The Midland was first defined in Kurath (1949) as a narrow stretch of the Atlantic eastern seaboard, extending westward through Pennsylvania (except for the northern tier of counties) and expanding broadly southward to include the Appalachian region of West Virginia, eastern Kentucky, and eastern Tennessee. This definition of the Midland is based on a broad base of lexical evidence which in turn reflects the settlement history of the region (Kurath 1949: 2–3; Frazer 1993; Carver 1987). The North/Midland boundary is strongly reinforced by phonological evidence. The tight bundle of isoglosses that separates the North from the Midland in Maps 11.7 to 11.9 (to be described further in Chapters 14 and 20) coincides almost perfectly with the westward extension of Kurath's North/Midland line by Shuy (1962) and Carver (1987). On the other hand, the definition of the South advanced here does not match that of Kurath (see Map 1.1). The Appalachian areas, assigned to the Midland by Kurath, here show a heavy concentration of the chain shifts that define the South. In this respect, the Appalachian region is more southern than the areas that Kurath defined as the South. Kurath's Midland areas 9, 11, 12, 13 are therefore incorporated into the South in the ANAE definition. The Midland dialect region will be defined here as the westward extension of Kurath's Midland areas 8 and 10.[33] It includes the various midwestern lexical studies that followed (Davis 1951, 1948; Shuy 1962; Carver 1987).

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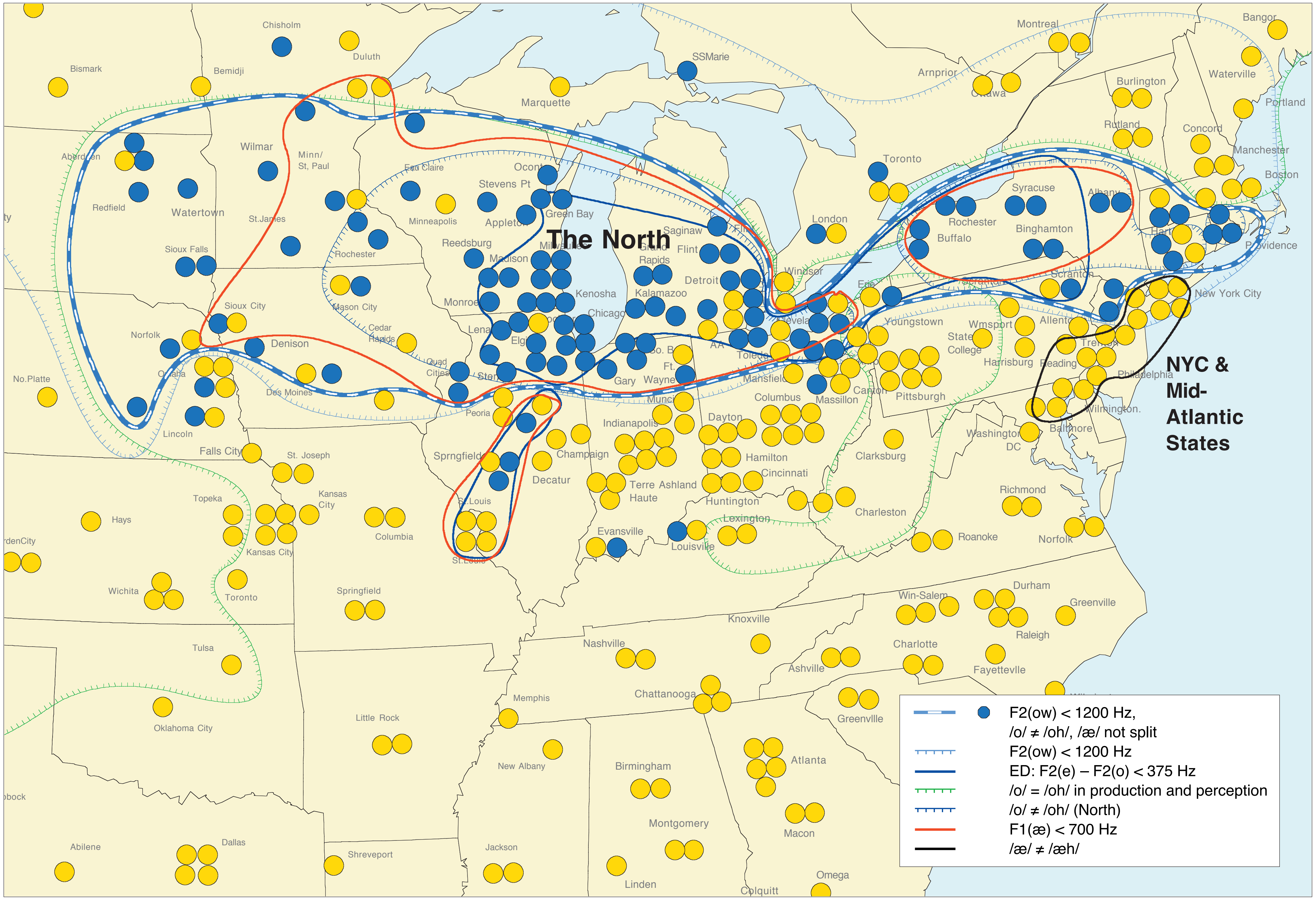
29 Though glide deletion of /aw/ is a well-established feature of Pittsburgh speech, it was not recorded in PEAS.

30 This area has already been split into two sections: NYC on the North, where /r/ is vocalized, and the Mid-Atlantic States, where it is not.

31 An isogloss may also be drawn at 1100 and 1300 Hz (see Chapter 12). The 1200 Hz isogloss is the one that coincides most closely with other measures of the vowel system.

32 The third member of the Vw system, /uw/, is undergoing fronting in almost all North American dialects, except for in a few sections of the North (Chapter 12). The fourth member, /iw/, has collapsed with /uw/ except for a scattering of conservative speakers, mostly in the South (Chapter 8).

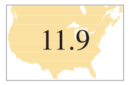
33 In Carver (1987), an area closely approximating the Midland as defined here is called the "Lower North", and the area defined by Kurath as the South Midland, along with its westward extensions, is called the "Upper South" (Carver 1987, Map 8.1).



Map 11.8. The outer limits of the North

Maps 11.1–11.2 defined the Inland North on the basis of resistance to the low back merger and the Northern Cities Shift as shown by the dark blue isoglosses. The barred medium blue isogloss establishes the outer limit of the North, representing the conditions necessary for the NCS to take place. One such limiting condition is shown by the oriented blue isogloss for the fronting of /ow/. The North is extremely conservative in this respect. A second limit is the light green oriented isogloss, representing the completed low back merger. The black isogloss of the split short-*a* systems in the Mid-Atlantic States forms the eastern limit of the North, since such split systems are incompatible with the NCS.

The Midland proper (Chapter 20.1)



The Midland region that is the main focus of Map 11.9 is enclosed in the brown isogloss. It outlines an area that extends westward from central Ohio, a territory intermediate between the North and the South. Its western border will be considered in the discussion of Map 11.10. As the legend of Map 11.9 indicates, the Midland is defined by the absence of the defining features of the neighboring regions. Those neighboring features are indicated by (1) the blue symbols for the Northern Cities Shift and the larger definition of the North; (2) the grey symbols for the defining features of Western Pennsylvania; and (3) the red symbols for the defining glide deletion of the South. Aside from the corridor running southwest from Chicago to St. Louis, there is only a scattering of such symbols in the Midland. Midland speakers, designated by the light brown symbols, are defined by a set of criteria more complex than any presented so far:

- F2(ow) > 1200 Hz;
- F2(e) – F2(o) > 375 Hz;
- /o/ and /oh/ not clearly distinct or clearly the same in production and perception;
- short-*a* not split;
- no monophthongization of /ay/ before obstruents.

More generally, Midland speakers show the following characteristics:

- The low back merger is in a transitional state. In the Midland system, /o/ and /oh/ are neither consistently the same in production and perception nor consistently different (see Chapter 9, Maps 11.1 and 11.2).[34]
- There is marked fronting of the nucleus of /ow/, a feature shared with the South. Unlike the South, glide deletion of /ay/ is found only before resonants.
- There is no split of short-*a*; the lexical short-*a* patterns of the original Midland areas to the east are not found.[35]

Thus the Midland participates in the general fronting of /ow/ (and /aw/) and in the ongoing low back merger, without involvement in the active chain shifts of Maps 11.1 to 11.8. Appendix 11.1 figures for homogeneity (.66) and consistency (.44) are quite low compared to the isoglosses reviewed previously, and leakage is high (.16). There is reason to believe that the Midland is becoming the default system of North American English. Several Southern cities on the Atlantic coast show brown symbols: Norfolk, Richmond, Greenville, and Charleston, suggesting that these cities are losing their original local dialects and are shifting to the regional Midland pattern. Atlanta has received strong Northern influence from recent immigration, but instead of the blue symbols of a Northern dialect, three of the five Atlanta speakers show the brown symbols of the Midland.

One of the general principles of sound change is that mergers expand at the expense of distinctions (Chapter 3, 8). It might seem surprising that the eastern boundary of the low back merger in the West has not progressed further eastward since it was first established in the 1964 telephone survey (Labov 1974). However, the Midland displays a different type of merger expansion. The low back merger does not reach completion in the Midland, but the Midland as a whole is in transition; its definition excludes a firm distinction between /o/ and /oh/.[36]

The diversity of the Midland

It is not accidental that Appendix 11.1 shows sharp differences in the levels of homogeneity for the isoglosses defining the South (.90) and the Inland North (.87) on the one hand, and the Midland (.66) on the other. Though there still remains great variation within the Southern region, the basic organization of the vowel system is dominated by the Southern Shift. The Northern region varies considerably from Wisconsin to Maine, but the central area is dominated by the Northern Cities Shift. The Midland area shows no such organizing principle or direction of sound change, aside from those tendencies that are general to North America (Chapter 12). Instead, many major Midland cities show distinct local patterns, in a few cases shifting in opposing directions.

As noted above, the original Midland was related to Philadelphia and its surrounding region, along with Pittsburgh and Western Pennsylvania. Chapter 17.2 will discuss the rapid changes that have taken place in the vowel system of Philadelphia since the second half of the twentieth century. These involve changes in the split short-*a* system and a re-orientation of the front vowels away from the Southern Shift towards the Northern pattern that lowers the short front vowels. The Pittsburgh dialect appears to have developed its characteristic glide deletion of /aw/ recently (Johnstone et al. 2002), leading to directions of change quite different from those of the surrounding region.

Cincinnati

Map 11.9 shows the diverse tendencies of different urbanized areas within the Midland. Cincinnati, located in southwestern Ohio, has a phonological pattern quite distinct from the surrounding area (Boberg and Strassel 2000). The traditional Cincinnati short-*a* system is unique in the Midland area that extends from Ohio westward to Kansas. While there is no evidence for a phonemic split, the phonetic conditioning of short-*a* in conservative Cincinnati speech is similar to that of New York City, with the raising environments including /ʃ/. As in New York, short-*a* before voiced stops (*sad*, *bad*, *mad*) is as high and front as before nasals. For all three Cincinnati Telsur speakers, all /æd/ words are higher and fronter than the general mean, with a Cartesian distance to the general mean greater than 200 Hz. Weaker forms of this pattern are shown by speakers from nearby Dayton, Springfield, and Mansfield, Ohio. Boberg and Strassel (2000) reported that Cincinnati's traditional short-*a* system was giving way among younger speakers to a nasal system similar to those found elsewhere in the Midland and West.

St. Louis

Another distinctive Midland city is St. Louis, represented by four Telsur speakers on Map 11.9. The St. Louis dialect has been the subject of a number of studies (summarized in Murray 2002). Its most distinctive traditional feature is a merger of /ahr/ in *barn*, *are*, *far* with /ɔhr/ in *born*, *or*, *for*, while /ohr/ in *bore*, *ore*, *four* remains distinct (Chapter 8, section 8.3). Though this feature is in recession, it is still strong enough to act as a defining feature of the St. Louis dialect; three of the four St. Louis speakers showed some evidence of the merger.[37] At the same time, St. Louis is undergoing a very general shift towards the NCS pattern of the Inland North. In many maps of this and other chapters, Inland North features appear in St. Louis and along the "St. Louis corridor" following Route I-55 in Illinois, through Joliet, Bloomington, and Springfield (see Map 11.14, Chapter 14).

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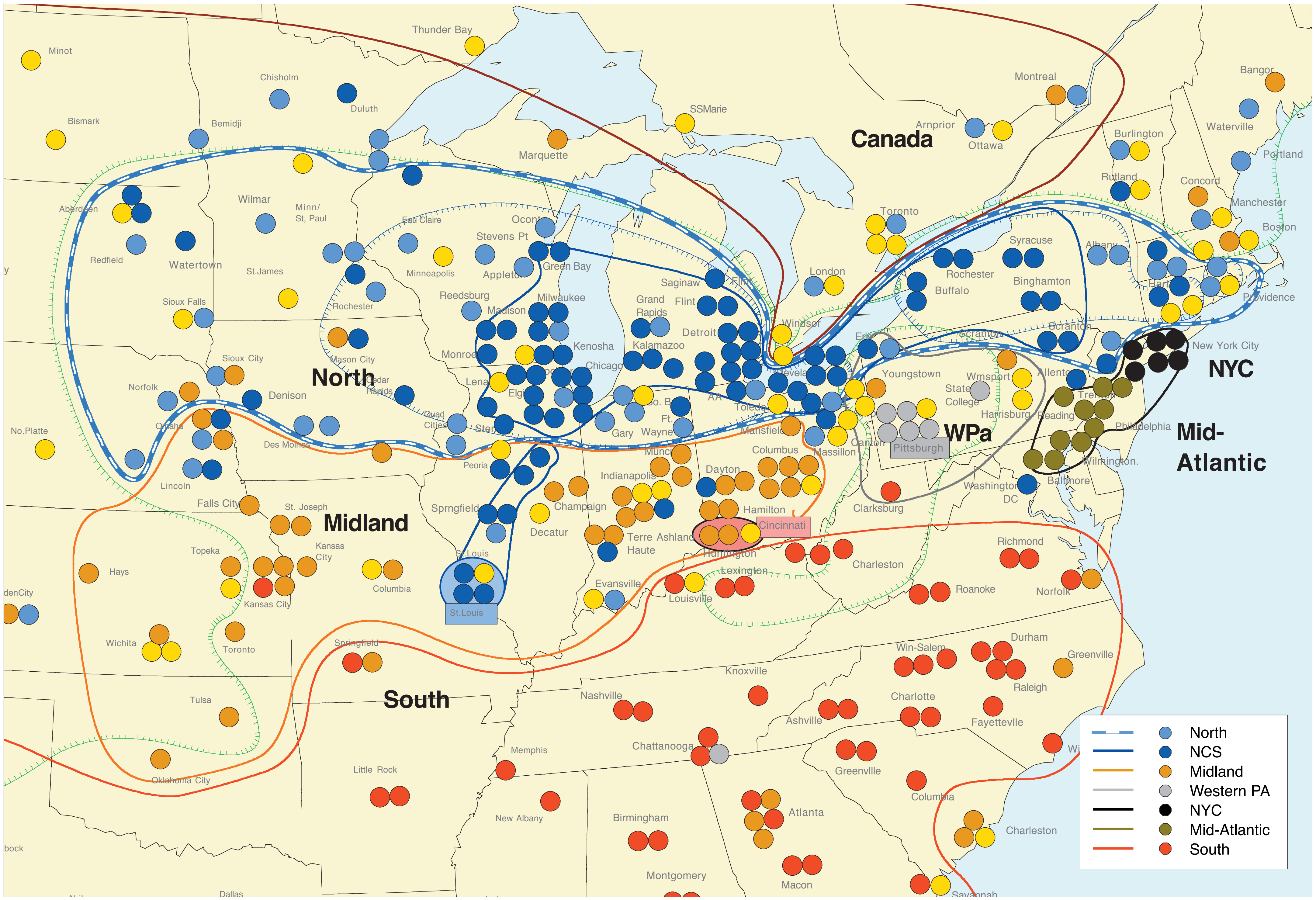
34 It should be noted, of course, that consistent distinctions and mergers can be found in some particularly conservative or innovative speakers.

35 Though as will appear below, Cincinnati reflects an earlier connection with that pattern.

36 This is not intended to suggest that that the merger is proceeding with perfect social uniformity. Boberg and Strassel's (1995) study of Cincinnati showed that the older speakers had very solid and reliable distinctions, while many of the teenagers had equally categorical mergers.

37 The merger of /ɔhr/ and /ohr/ is found in Utah and central Texas as well.



Map 11.9. The Midland and the Mid-Atlantic regions

This map provides a closer view of the dialects of the Midland, the region between the North and the South. New York City and the Mid-Atlantic region are both marked by the unique split of short-*a* into lax /æ/ and tense /æh/. New York shows vocalization of postvocalic /r/ but the Mid-Atlantic States do not. Pittsburgh has the unique development of /aw/ noted in Map 11.8. The older Cincinnati dialect shows the phonetic pattern of New York City, but this is receding among younger speakers in favor of the general Midland pattern. The Midland proper (tan symbols) is transitional in regard to the low back merger and shows a strong fronting of /ow/ in *go*, *road*, etc. Columbus, Indianapolis, and Kansas City exemplify this pattern. St. Louis is losing its traditional dialect, with a merger of *are* and *or*, in favor of the Northern Cities Shift of the Chicago area, and the corridor along Route I-55 shows the direction of influence.

The local dialects of Pittsburgh, Cincinnati and St. Louis are treated in more detail in Chapter 19.

The West

The solid green isogloss defines the West in terms of the phonological patterns that proceed from the Telsur survey. The West was the last area in North America to be reached in the gradual westward expansion of English-speaking settlement, and its history shows considerable mixing of the linguistic patterns of the regions defined so far.[38] The oriented green isogloss of Map 11.10 confirms earlier findings that the West is one of the major areas of the low back merger (Chapter 9); but it forms a continuous region with Canada in this respect.[39]

The legend at lower left on the map presents the relatively complex definition that distinguishes the West from the neighboring regions of North America as defined so far, the South, the Midland, the North, and Canada. The legend at upper right labels the isoglosses that establish the dialect regions in Maps 11.1 through 11.9. Essentially, the West differs from these other dialects in being a region of low back merger in which /uw/ is strongly fronted, but /ow/ is not/.[40]

The differentiation of the West from the South is the simplest case: the West shows no glide deletion for /ay/.[41] No red symbols appear within the green isogloss.

In the treatment of /uw/ and /ow/, the West resembles Canada and the North. The West is distinguished from the North by the low back merger. As pointed out above, this does not establish a clear opposition with the Midland, since the low back merger is in transition in that region. Further separation from the Midland is in the fronting of /ow/, which is strong in the Midland but limited in the West. Chapter 12 displays the full range of isoglosses that register the degrees of fronting of /ow/ and /aw/ in the Midland and the South.

The differentiation of the West from Canada is a more difficult question, involving the degree of activity of similar sound changes. Canada and the West share both the low back merger and the conservative treatment of /ow/. The low back merger lays the foundation for the backing of /æ/ and the consequent lowering of /e/ which form the Canadian Shift. Since the merger takes place at a position further back in Canada, the Canadian Shift is developed more strongly there.

Canadian raising offers a further means of differentiating the West from Canada. Although there is some variation among the Canadian subjects, we can use this characteristic Canadian feature to separate the two dialects. Accordingly, the green symbols that define the West identify speakers with the following characteristics:

- Differential fronting of /uw/ and /ow/: the F2 of /uw/ after coronals (the most advanced class) is more than 500 Hz greater than the F2 of /ow/.
- Complete or nearly complete low back merger: /o/ and /oh/ are identical either in production or perception.
- No Canadian raising of /ay/ before voiceless segments. The difference between the F1 of /ay/ before voiced and voiceless segments is not more than 50 Hz.

On Map 11.10, this definition is applied to subjects after the definition of the Canadian Shift. Of the nine subjects in the West who showed the Canadian Shift on Map 11.7, six are redefined as Westerners. At the same time, five Canadian subjects are redefined as Westerners.

This complex definition yields only a moderate homogeneity of .60, even lower than that of the Midland, and a comparable consistency of .59, with a leakage of .05. At the same time, the fact that such a complex definition was required leads to the conclusion that the West is a dialect area in formation.

The larger Southeastern region

The isoglosses of Map 11.10 do not cover all of North America; there are a number of interstitial and marginal areas remaining. The largest of these is Florida, which lies outside of the definition of the South as the area of monophthongal /ay/. The southern and western portions of Texas (Corpus Christi and El Paso) have a similar status. Yet these regions adjoining the South are not devoid of Southern character, as shown in Map 11.11, which establishes a Southeastern super-region. It is defined quite simply as an area of fronting of /ow/, using the established criterion of F2(ow) > 1200 Hz, and no completion of the low back merger (that is, /o/ and /oh/ are never the same in production and perception).[42] It thus represents the intersection of the converses of the low back merger isogloss and the F2(ow) < 1200 isogloss of Map 11.8.

The Southeastern super-region is well-defined, as Appendix 11.1 shows. Both homogeneity (.87) and consistency (.76) are high. It groups the Midland with the South and includes the original Midland area of the Mid-Atlantic States. New York City and Northern New Jersey are not included, since they do not satisfy the /ow/-fronting criterion, and Pittsburgh and Western Pennsylvania are excluded on the basis of their completed low back merger.

A comparison with the AYM isogloss that defines the South by glide deletion shows two cities that are excluded from the Southeastern super-region but are included in the South: Savannah, Georgia, and Amarillo, Texas. With those exceptions, the South is a proper subset of the Southeast.

Eastern New England (Chapter 16.1)

The first and still most detailed study of North American dialect geography is the Linguistic Atlas of New England (LANE; Kurath et al. 1941). The small number of Telsur urbanized areas in this region cannot match the detailed view that is obtained from LANE itself. Map 11.12 focuses on the general features that relate the Northeast region to the dynamics of sound change in the continent as a whole.

Chapter 7 reported the state of *r*-vocalization for the 12 Telsur speakers from Eastern New England. These results are reproduced in the magenta symbols of Map 11.12, which identify all speakers who show some degree of vocalization in Boston, Providence, Worcester, and the states of New Hampshire and Maine.[43] Though all but one of the symbols within the isogloss are magenta, this does not indicate that *r*-vocalization is uniform. As Chapter 7 showed, (r) exhibits considerable variation in this region; *r*-lessness is defined here as any degree of vocalization of /r/ as a syllable coda, that is, after a vowel and not before another

38 Carver (1987) points out that the American English of the West "is both extremely young and still undergoing the modifications and leveling processes of a region in social flux" (1987: 205).

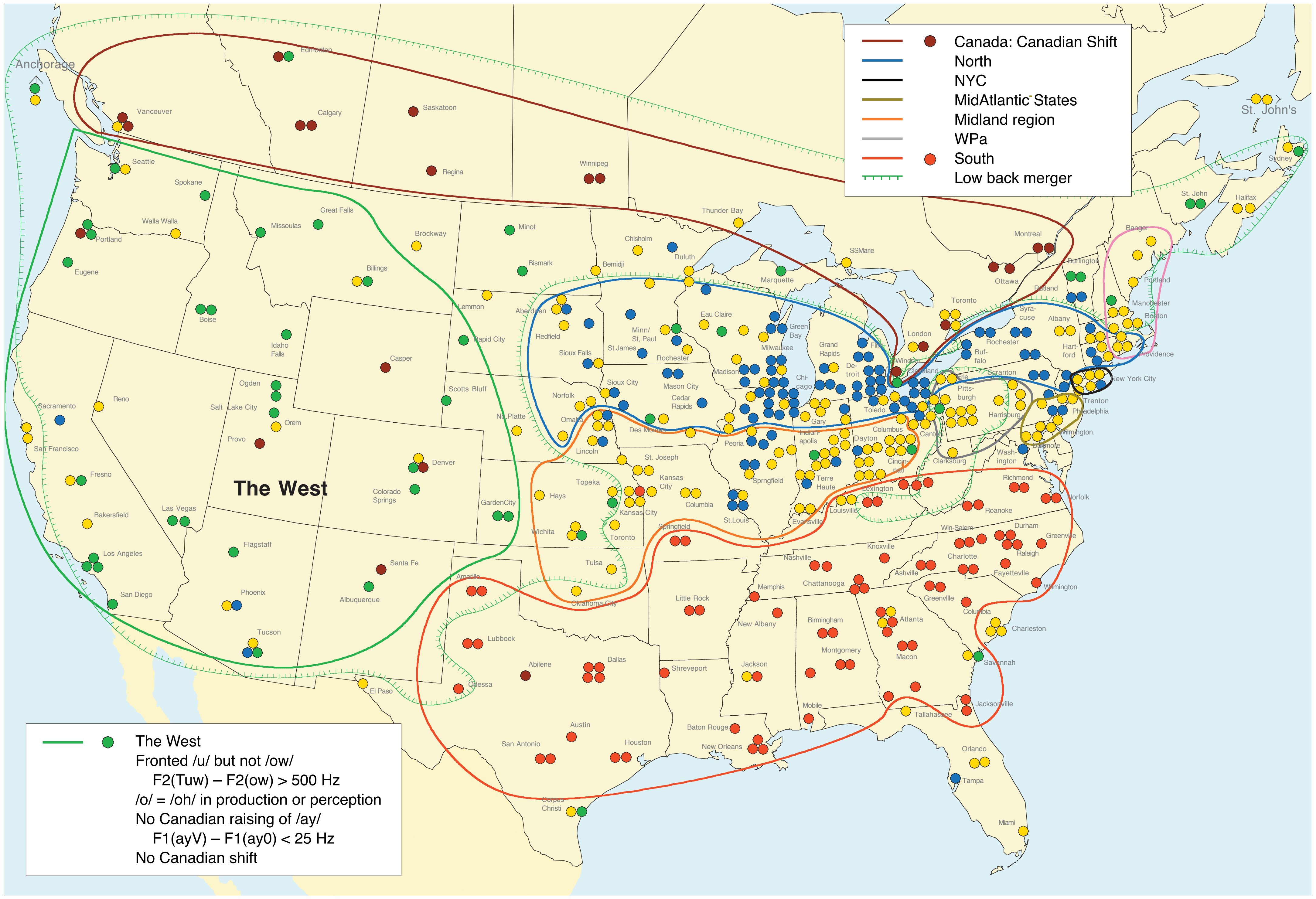
39 There is, however, notable variation found in the major cities of the West Coast, San Francisco and Los Angeles. The central mountain areas of the West are more consistent in regard to this merger.

40 There have been reports of the fronting of /ow/ as a sociolinguistic variable of some importance (Luthin 1987). Note also the strong fronting of /ow/ as well as /uw/ in Moon Zappa and Frank Zappa's song, "Valley Girl" (1983). It is because /ow/ fronting is not general that it can function as a marked social variable.

41 Map 11.4, which shows this feature, does not extend to the Western region. But it is important to note that in addition to the southern portion of the Midland, there is some glide deletion before resonants for at least one speaker in each of three southwestern cities: Tucson, Phoenix, and Los Angeles.

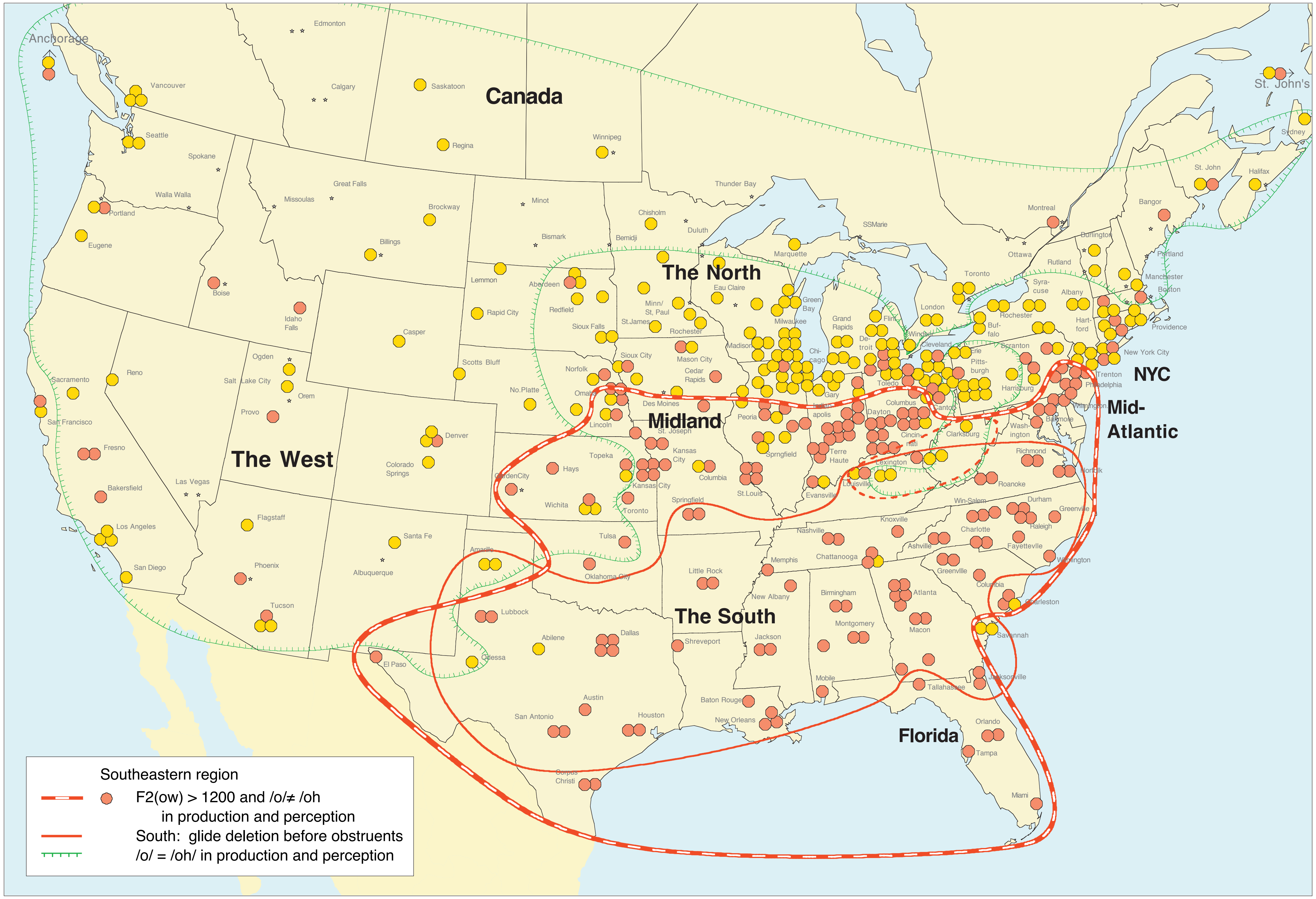
42 But as the merger of /o/ and /oh/ spreads in the South, as in the area shown within the red dashed line, this definition may not continue to hold.

43 One Rutland, Vermont, speaker shows 25 percent *r*-vocalization.



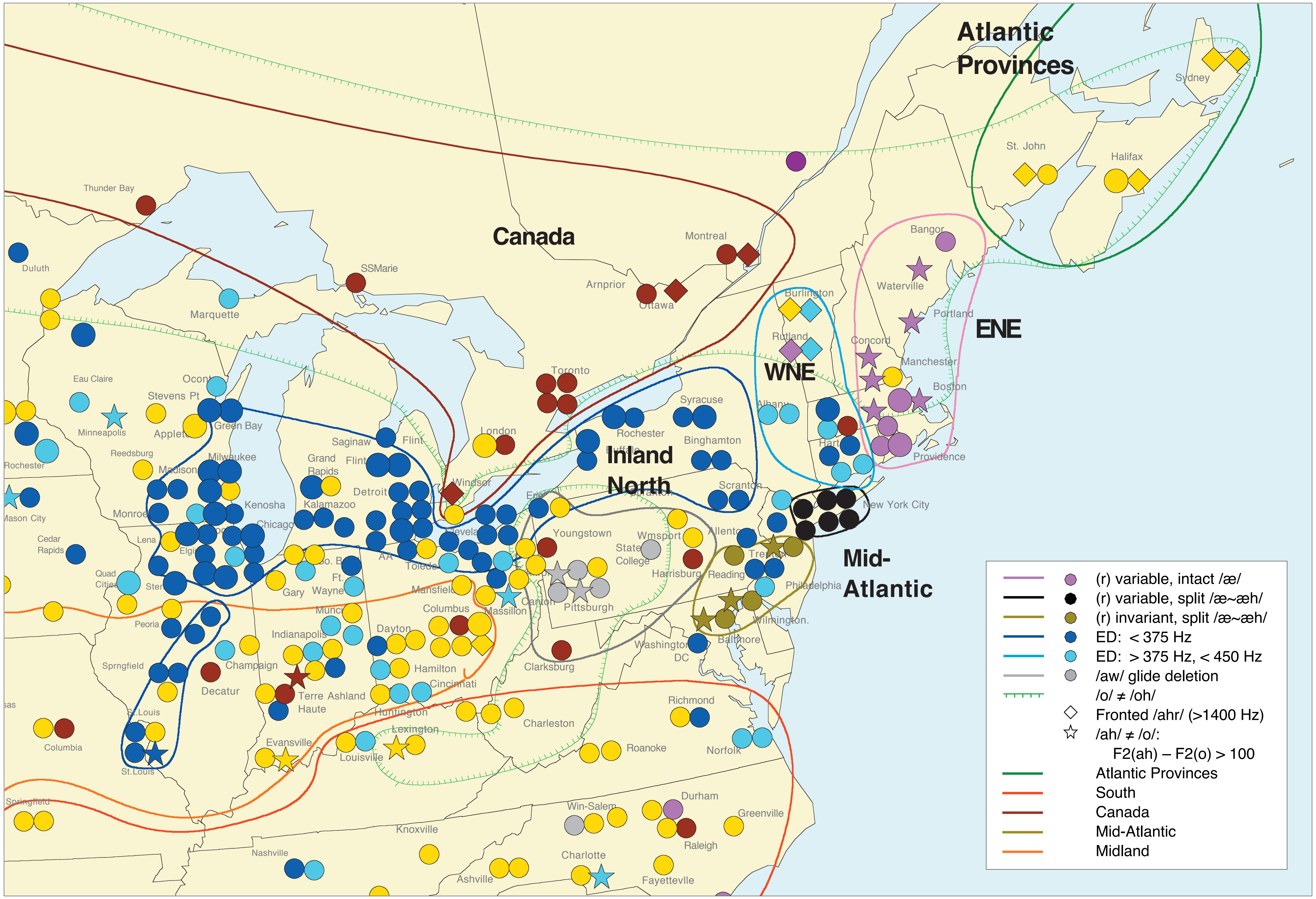
Map 11.10. Defining the West

This map shows the dominant phonetic and phonological tendencies of the West indicated by the green symbols and green isogloss. It is clearly a dialect area in formation without the focused and homogeneous character of the Inland North (blue symbols) or the South (red symbols). The West shares the low back merger with Canada (dark red symbols), but can be distinguished from Canada by its limited participation in the Canadian Shift and by the absence of Canadian raising in *right*, *out* etc. It is separated from the North by the low back merger. The West can be distinguished from the Midland by the absence of the /ow/ fronting that is characteristic of that region. On the whole, the West can be defined as the region of low back merger with strong fronting of /uw/ in *too* and, *do*, but limited fronting of /ow/ in *go* and *road*.



Map 11.11. The Southeastern super-region

Although the regional dialect of the South is consolidated by the mechanism of the Southern Shift, a broader range of Southern characteristics are indicated in this map, defining a larger southeastern super-region. It includes the fronting of /ow/ in *go*, *road*, *boat*, etc. where the nucleus is fronted to central position or even front of center. This trait involves the South proper, extends southward to southern Texas and Florida, and includes cities on the eastern margin like Charleston. The Southeastern region extends northward to include all of the Midland and the Mid-Atlantic states. The fronting of /ow/ separates the Southeast from the North, Canada, and the West.



Map 11.12. The Northeast

In the northeastern section of the United States, Eastern New England was originally marked by the vocalization of post-vocalic /r/ in *car*, *card*, *fear*, etc. Though this feature is receding, it is still strong in the area ranging from Bangor, Maine to Providence, marked by magenta symbols here. The stars represent speakers who distinguish the class of /ah/ words in *father*, *pa*, *spa*, etc. from the merged class of /o/ and /oh/ in *pot*, *bother*, *paw*, *caught*, etc. Western New England is *r*-pronouncing. The northern half shows the low back merger, along with consistent fronting of /ah/ before /r/. Southwestern New England shows the basic tendency of the Northern Cities Shift to back /e/ and front /o/ (blue symbols).

vowel.[44] The *r*-less area extends southward to include Providence, a city with a unique dialect that lies outside of the area of low back merger. This entire *r*-less region is geographically and linguistically distinct from the *r*-less region of New York and is distinguished from it by the absence of a lexical split within the short-*a* system.

The Eastern New England region, centered upon Boston, may be defined more specifically by the behavior of /ah/ in *father*, *spa*, *pa*, etc.[45] In many areas of North America, the nucleus of /ah/ is merged with unrounded /o/, but in a few cases it is distinct. Speakers with /ah/ distinct from /o/ are indicated by stars on Map 11.12. The acoustic criterion used here is that for /ah/ to be distinct, its mean F2 should be at least 100 Hz greater than the mean F2 of /o/. A scattering of star symbols also appears in *r*-pronouncing areas: two in Philadelphia, two in Pittsburgh, etc. However, the only area where such stars are characteristic of the community as a whole is Eastern New England, where six of the eight speakers are so marked. In Eastern New England, /ah/ and /ahr/ are both shifted to the front (the criterion for the fronting of /ahr/ is that F2 is greater than 1400 Hz).

Western New England (Chapter 14.2)

Western New England is an important transitional area between Eastern New England and the Inland North; it is the staging ground for the westward migration that led to the formation of the North and the Northern Cities Shift. On Map 11.12 it appears that only three speakers in Western New England show the alignment of the front–back position of /e/ and /o/ that defines the Northern Cities Shift; these are the dark blue circles that indicate mean F2(e) – F2(o) < 375 Hz. The isogloss for the North cannot be extended to include these Western New England speakers. But seven speakers in the area satisfy the less stringent criterion that F2(e) – F(o) should be less than 450 Hz, indicated by the light blue symbols. Western New England can therefore be characterized as displaying an early stage in the Northern Cities Shift. The light blue isogloss also includes Albany in New York's Hudson Valley, a city that shares other features with New York City (Chapter 17.1). Further exploration of the vowel systems of Western New England is found in Chapter 14.2.

The symbols in the northern half of Western New England are diamonds. These indicate speakers with the low back merger who show fronting of /ahr/ but not /ah/. Chapter 16 will develop the division between Northwestern New England and Southwestern New England.

The Atlantic Provinces (Chapter 15)

So far, little has been said about those parts of Canada that are not affected by the Canadian Shift. The Atlantic Provinces are not involved in any of the sound changes that have been located in the rest of the continent except for the low back merger. All symbols within the dark green isogloss on Map 11.12 are yellow, indicating lack of involvement in the processes that mark the other areas. A linguistic definition for the Atlantic Provinces is largely negative. The region is not similar to Western New England with respect to the Northern Cities Shift; it does not exhibit the vocalization of /r/ like Eastern New England; it does not have strong fronting of /ow/ like the Midland; but it is not as strongly conservative as Providence. As established above, it does not participate in the Canadian Shift, as does the rest of Canada. However, Map 11.12 shows one unifying trait that will emerge more strongly in Chapter 15. It is characterized as a whole by a front position for /ahr/: all but two of the symbols are diamonds.

Transitional areas

The North Central Region

There are 26 Telsur speakers who do not fall within any of the dialect areas defined so far. Eight are grouped in a residual dialect area, the North Central region. This region ranges from Montana to Michigan along the U.S.–Canadian border, including the communities of Billings, Bismarck, Minot, Fargo, Duluth, and Marquette. It does not participate actively in any of the sound changes in progress discussed so far except for the low back merger. It is distinguished from the North by the strong presence of that merger (Maps 9.1–9.2, 11.1). It is distinguished from Canada by the absence of the Canadian Shift. It is distinguished from the both Canada and the West by a very limited fronting of /uw/ after coronals (see Chapter 12; F2 < 1700 Hz for all speakers in this area).

Transitional cities

11.13

Eighteen other communities are identified in Map 11.13 as transitional (red circles). No common characteristic of their vowel systems has been established, and their patterns reflect the transitional or marginal character of their location.

The cities of Paterson, Passaic, and Allentown/Bethlehem are located just outside of the New York City and the Mid-Atlantic areas. They show the nasal short-*a* system characteristic of the Midland, in which raising occurs primarily before nasals, but not the fronting of /ow/ that marks the main Midland regions.

A number of these transitional cities are marginal to the South, ranging from Washington, DC to Corpus Christi and El Paso in Texas. Charleston once displayed a highly specific dialect of its own, but in losing that pattern has not acquired the defining feature of the Southern region, glide deletion of /ay/.[46] However, Chapter 18.2 will show that Charleston has not lost its Southeastern character in other respects and that it has continued as a distinct variety of Southeastern speech. Florida is large enough to form a region of its own, if some unique defining character could be found. All of these Southern marginal cities are included in the Southeastern super-region, along with the Midland (Map 11.11).

The two Alaskan speakers studied by Telsur do not resemble the West strongly enough to be included in that region, but there is not enough data on Alaska to assign it separate status.

In the area between Western Pennsylvania, the Midland, and the North is a section of Ohio that is intermediate in regard to the defining features of these regions, as exemplified by the cities of Canton and Massillon.

Within the major regions, there are also speakers whose vowel systems are intermediate or unmarked in the same sense as the 26 Telsur speakers labeled transitional. However, they are surrounded by other speakers who do exemplify the region they are in, and they are therefore included as members of that region or dialect. Variation of this kind is inevitable when change is in progress or when dialect features become socially marked. On the other hand, we do not find within the heartland of a region any speakers who are fully characteristic of other re-

44 The Bangor speaker on this map does not show r-vocalization herself, but five other Bangor speakers who were not analyzed acoustically show strong *r*-vocalization. The magenta color for this symbol therefore represents the community norm.

45 This class is amplified by a certain number of words found in the British broad-*a* class (Chapter 16.1), but the irregular lexical distributon involved here makes these words less suitable for a general definition of the region.

46 See Baranowski (2002). More detailed studies may well show the same pattern in Savannah, but the Telsur speakers located for that city are not as distinct from the general Southern pattern as those we find in Charleston.

Map 11.13. The North Central and transitional areas

This map shows North Central dialect area, a residual region defined by the presence of the low back merger and the absence of the marked features of Canada, the North, and the West. The map also shows the other speakers who do not fit into any of the dialects defined so far. On the margins of the South are Charleston, Florida, Corpus Christi, and El Paso, which fit into the Southeastern super-region of Map 11.11. Other transitional areas appear in northeastern Ohio, where Canton and Akron lie on the border between the North and the Midland.

gions. There are no exponents of the Northern Cities Shift in North Carolina, for instance, nor any speakers who reverse the relative positions of /e/ and /ey/ in the West or the North.

Linked behavior of /ow/ and /ʌ/

Map 11.14 develops the structural relations between /ow/ and /ʌ/ in the Midland and the North. The blue symbols represent speakers for whom /ʌ/ and /ow/ are both backer than /o/. The red symbols represent speakers for whom /ʌ/ and /ow/ are both fronter than /o/. Yellow symbols are speakers for whom /ʌ/ and /ow/ are not linked in this way – one may be fronter than /o/ and the other backer.

The separation of North and Midland in Map 11.14 is sharper than any developed previously. There are no red symbols in the North (though they appear in Canada), and there are no blue symbols in the Midland. There are only two blue symbols in the South, both remote from the North/Midland line. This opposition not only provides the most extreme differentiation of the North from the Midland, but it also coincides with the North/Midland line formed by other phonological and lexical variables. It may be inferred that the uniform pattern in the North is the joint result of the conservative position of /ow/ and the backing of /ʌ/, while the uniformity in the South is the joint result of the fronting of /ow/ and the fronting of /ʌ/.

This inverse relation is supported by the results of regression analyses of /ʌ/ by age for all dialects. In Table 11.2, age coefficients for the North show a significant shift of /ʌ/ to the back for younger speakers. The neighboring Midland shows the reverse situation: /ʌ/ is strongly shifting forward. This reflects a Midland and Southern chain shift involving /u/ and /ʌ/ (Chapter 18). The bottom half of Table 11.2 shows the corresponding figures for /ow/. No age coefficients appear for the North, but the negative coefficient for /ow/ indicates a strong movement in apparent time: younger speaker use fronter vowels than older speakers in the Midland.

Table 11.2. Age coefficients for /ʌ/ and /ow/ in the North and Midland

	Age Coefficient	t	P
F2(ʌ)			
The North	2.32	2.31	.023
Midland	−2.95	−3.55	.0007
F2(ow)			
The North	–	–	–
Midland	−2.77	−2.48	.0158

The close relationship between /ow/ and /ʌ/ makes it possible to dispense with /ow/ and use the relation of /ʌ/ to /o/ as a structural indicator of the progress of the Northern Cities Shift, parallel to ED. These two measures are defined as follows:

(a) the ED condition, the front-back alignment of /e/ and /o/
F2(e) – F2(o) < 375 Hz
(b) the UD condition, the reversal of the relative frontness of /ʌ/ and /o/
F2(ʌ) < F2(o)

As /o/ moves forward, it approaches /e/, which is moving back on its parallel track, to produce condition (a). The same movement brings about a reversal in the relative frontness of /ʌ/ and /o/, which is accelerated when /ʌ/ shifts backward, producing (b), the UD condition. It appears on Map 11.14 as an oriented brown isogloss outlining the symbols that records the relative backness of both /ʌ/ and /ow/ compared to /o/.

Map 11.8 used condition (a) to create the Inland North boundary, appearing as a dark blue isogloss on Map 11.14. There is a close match of the ED and UD isoglosses on the southern boundary of the Inland North – that is, the North/Midland boundary. The oriented brown UD isogloss is located just north of the general Northern boundary (medium blue isogloss), and it coincides with the dark blue ED isogloss. It extends farther west than the ED line. Like the ED line, it excludes Canada. It is discontinuous, unlike the ED line, reflecting the re-alignment of Erie (with two red circles) to western Pennsylvania. The UD line extends somewhat further east than the ED line to include the southern half of Western New England, New York City, and Providence. Within the Inland North, the UD isogloss achieves the same high homogeneity (.87) as the ED isogloss (.87); consistency is much higher (.85 against .62); and leakage is only half as great (.05 as against .10). There is also a good representation of blue symbols in the St. Louis corridor.

The link between /ʌ/ and /ow/ holds with extraordinary rigor for the North, the South and the Midland.[47] There is only a small minority of yellow symbols, which represent those cases in which /ʌ/ and /ow/ differ in their relation to /o/. On the other hand, yellow symbols predominate in Canada and the West, so that the tight linkage between /ʌ/ and /ow/ must be seen as a feature of the eastern half of the United States rather than the continent as whole.

Chapter 14 will examine the North/Midland isogloss bundle in greater detail; it will appear that a number of other isoglosses follow the same geographic pattern.

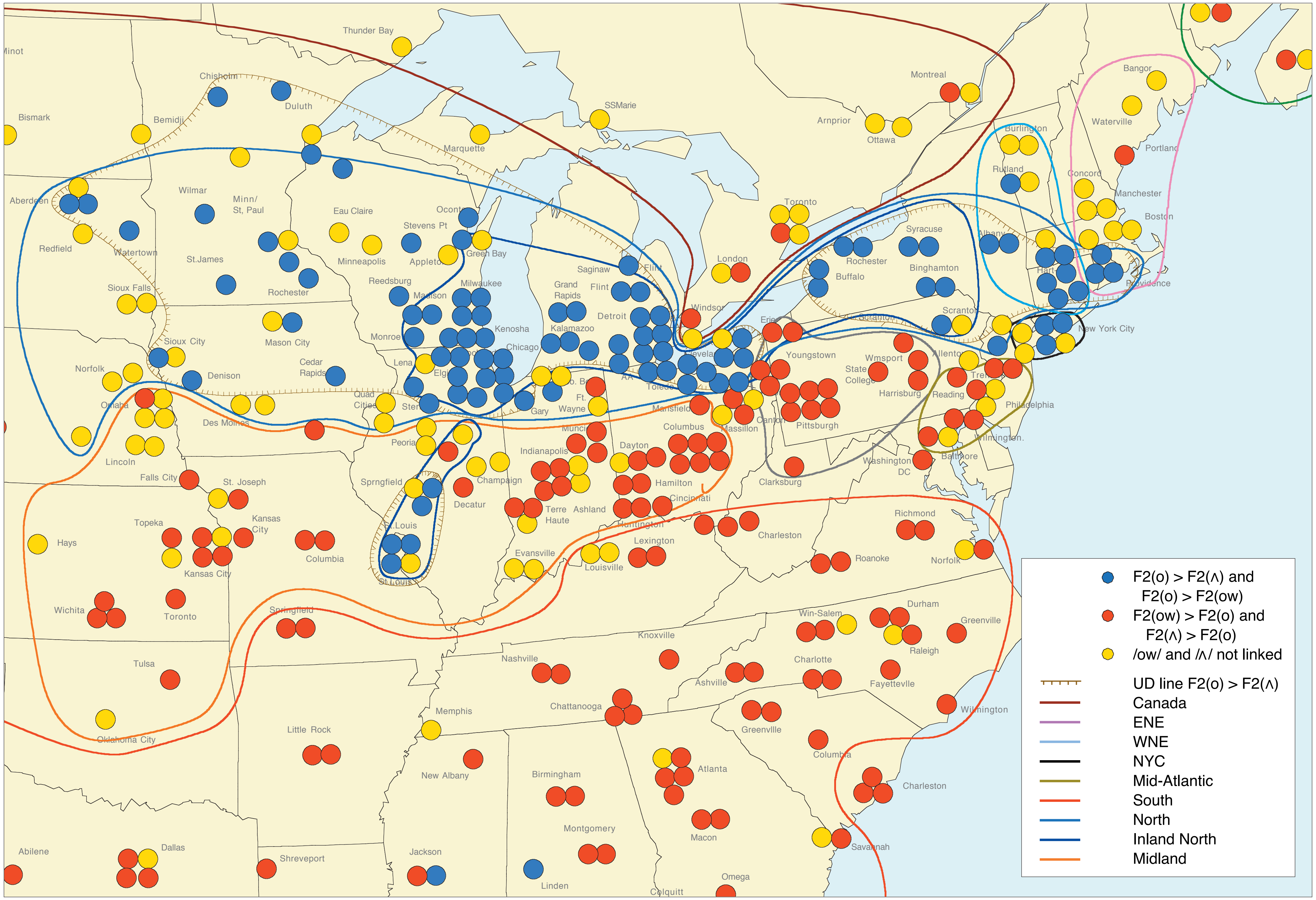
11.2. North American dialects classified by the fronting of /uw/ and /ow/

Dialect differences in the fronting of /ow/ were used as criteria in Maps 11.8 to 11.10 and 11.14. The conservative treatment of /ow/ with a mean F2 less than 1200 Hz is a defining feature of the North, the West, and Canada, and the more advanced position of /ow/ (mean F2 > 1200 Hz) is a defining feature of the Midland. On the other hand, almost all of these regions show a marked fronting of /uw/, especially after coronal consonants. A revealing display of the regions and dialects as defined so far can be obtained by plotting the mean F2 of /uw/ after coronals against the mean F2 of /ow/.

In the discussion of dialects and regions, the following abbreviations will be used:

AP	Atlantic Provinces	MA	Mid-Atlantic
B	Boston	N	North
Ca	Canada	NYC	New York City
Ci	Cincinnati	Pr	Providence
Cs	Charleston	S	South
ENE	Eastern New England	SE	Southeast
Fl	Florida	TS	Texas South
IN	Inland North	W	West
IS	Inland South	WNE	Western New England
M	Midland	WPa	Western Pennsylvania

47 Eastern New England is outside the North as defined in Map 11.8; hence the red symbol in Portland, ME is not a counterexample.



Map 11.14. The North/Midland boundary and linked movements of /ʌ/ and /ow/

The division between the North and the Midland appears in its sharpest form here. The blue symbols represent speakers for whom both /ʌ/ in *cut* and /ow/ in *coat* are back vowels, further back than /o/ in *cot*. The red circles are speakers for whom the reverse is true: both /ʌ/ and /ow/ are further front than /o/. Except for the St. Louis corridor, there are no blue circles in the Midland and no red circles in the North. This division is further accentuated by the fact that /ʌ/ is shifting to the back in the North, as part of the Northern Cities Shift, while /ʌ/ is moving to the front in the Midland area.

Figure 11.5 displays the 11 regions of North America on these axes. In the lower right corner is Eastern New England, with the most conservative values for both /ow/ and /uw/. Directly above is the North, with a small degree of fronting of /uw/ but none at all for /ow/. Directly above is a set of three regions with stronger fronting of /uw/. Close to the right hand margin is Canada, with strong fronting of /uw/ but none for /ow/. New York City and the West are shifted to the left, showing a slightly stronger tendency to front the nucleus of /ow/. Opposed to these regions is a cluster of five at upper left, with strong fronting of both /ow/ and /uw/.

The fronting of /uw/ is well in advance of the fronting of /ow/. For /uw/, only one dialect shows values back of center (1550 Hz in the normalized system) and the great majority are well above 1700 Hz; none of the mean values for /ow/ is above the center value.[48] Within this range, /ow/ means are sharply dichotomized at the 1300 Hz line.

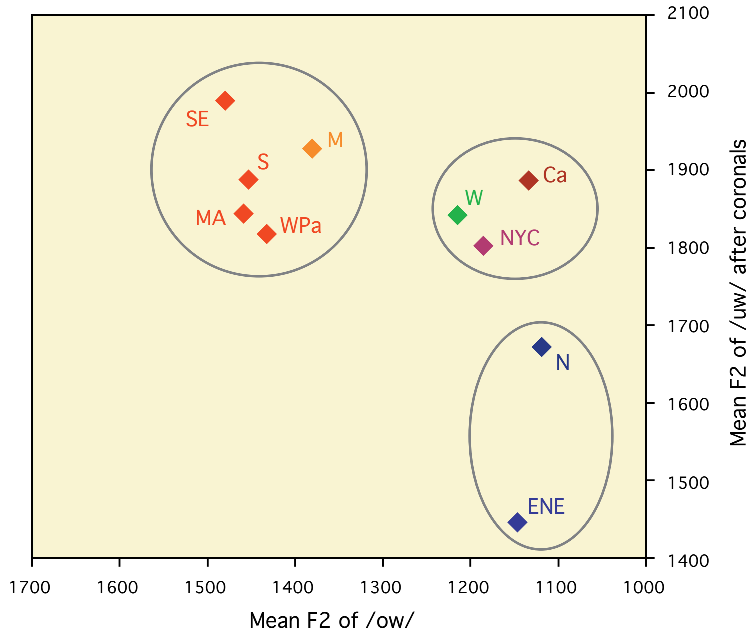


Figure 11.5. Mean values for the fronting of /uw/ after coronals and the fronting of /ow/ for North American regions

Figure 11.6 gives a more detailed view by charting /ow/ against /uw/ for the 20 dialects established in the previous maps. The two extremes at upper left and lower right are now occupied by Charleston and Providence, respectively. These cities are each represented by only three speakers, and it might be expected that their extreme positions will be modified by more detailed studies to follow.[49] The Boston dialect area is in the lower range of Figure 11.6 but shows more fronting of /uw/ than the rest of Eastern New England, comparable to that found in Western New England. Moving up the diagram, it appears that the strongest fronting of /uw/ among those dialects that do not front /ow/ is to be found in Canada. At upper left central are dialects that show substantial fronting of /ow/, including the main body of Midland and Southern dialects.

The characteristic fronting of /ow/ in the South and the Midland is part of a generalized fronting of the nuclei of back upgliding vowels, affecting /uw/, /ow/, and /aw/. It has already appeared that the fronting of /aw/ is associated with the Southern Back Upglide Chain Shift /oh/ → /aw/ → [æo]. It remains to be seen what connection exists between the resistance to the fronting of /ow/ in the North and the activation of the Northern Cities Shift in the core of the Northern area.

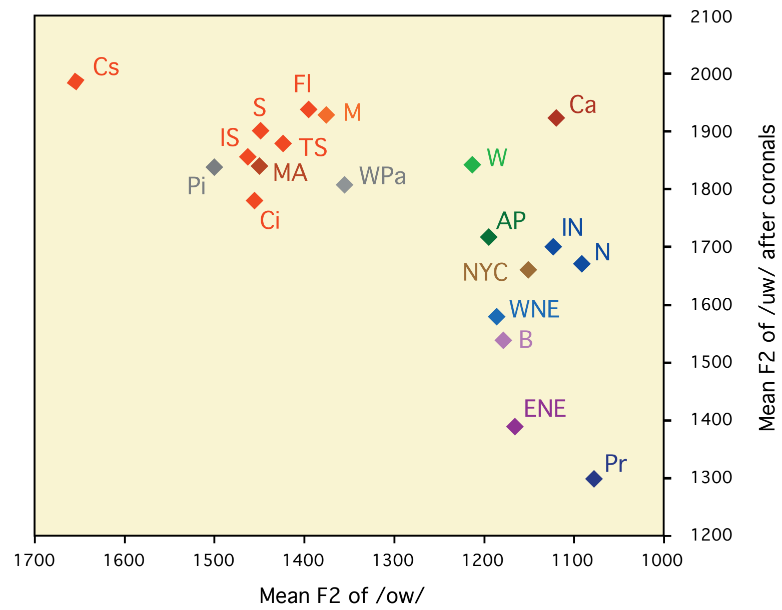


Figure 11.6. Mean values for the fronting of /uw/ after coronals and the fronting of /ow/ for North American dialects

11.3. Regions and dialects of North America

In Maps 11.1 to 11.13, Telsur speakers are located in areas that are categorized by "region" and "dialect". The categories established are listed in (2), and the smaller regions – dialect areas – are indented below the region in which they are contained. Within most regions, there are areas for which "dialect" is the same as "region" along with dialects that are more specifically marked. Dialect definitions are brief abbreviations of the more detailed discussions above. Dialect definitions in parentheses indicate features that are declining. Individual cities, such as Charleston and Providence, are included as examples of the local variations on the regional themes with their traditional features in parentheses. The Southeast is a super-region that includes the South, the Midland, Florida, and other areas marginal to the South.

48 However, 39 individual speakers do show mean values above 1550 Hz, ranging up to 1710.

49 However, Baranowski's detailed study of Charleston (2005) confirms in detail the extreme fronting of /ow/ in that city.

(2)

Region / Dialect	Defined by
North	Conservative /ow/, no low back merger
Inland North	Northern Cities Shift
St. Louis Corridor	Northern Cities Shift
Western New England	Less advanced Northern Cities Shift
Eastern New England	Vocalization of /r/, short-*a* nasal system
Boston	Fronting of /ah/ distinct from /o/, low back merger
Providence	Conservative /uw/ and /ow/, no low back merger
New York City	Vocalization of /r/, split of short-*a*
Mid-Atlantic	No vocalization of /r/, split of short-*a*
Western Pennsylvania	Low back merger
Pittsburgh	Glide deletion of /aw/
South	Glide deletion of /ay/
Inland South	Southern Shift
Texas South	Southern Shift
Charleston	(Monophthongal /e:/ and /o:/; r-lessness)
Midland	Transitional low back merger, fronting of /ow/
Cincinnati	(short-*a* system like NYC)
St. Louis	(/ah/ and /oh/ merged)
Southeast	Fronting of /uw/, /ow/,
West	Low back merger, fronting of /uw/ but not /ow/, no Canadain Raising
North Central	Low back merger, conservative /uw,ow/, no Canadian Shift or raising
Canada	Low back merger, fronting of /uw/ but not /ow/
Canada	Canadian Shift and Canadian raising of /aw/
Atlantic Provinces	Canadian raising, fronting of /ahr/

11.4. Principal components analysis of North American regions

The selection of dialect boundaries presented so far involves a certain degree of subjective choice, particularly influenced by knowledge of where boundaries have been located in the past. Efforts have been made to develop a systematic algorithm for constructing isoglosses, as described in Chapter 6. Another approach to developing objective methods is to determine the relations of speakers to each other without reference to geography or social attributes, purely on the basis of vowel measurements.

In the determination of the major regional boundaries for North American English, reference was made to a total of 21 measures of the vowel system: F1(e), F2(e), F1(æ), F2(æ), F2(o), F2(ʌ), F1(ey), F2(ey), F1(ay0), F2(ay0), F2(Tuw), F2(ow), F1(aw), F2(aw), F1(æh), F2(æh), F1(oh), F2(oh), percent monophthongization of /ay/ before voiced obstruents and finally, percent monophthongization of /ay/ before voiceless consonants, and percent back upglides with (oh). The mean values of these variables were entered into a principal components analysis of the 439 Telsur subjects. The first two components, U1 and U2, accounted for 21.8 percent and 14.4 percent of the variance respectively. Figure 11.7 is a two-dimensional plot of the Telsur subjects' values for U1 and U2. Dialects are identified by colors and symbols.

The display is sharply divided into two distributions along the U2 axis. The dialects with a split short-*a* system, New York City and the Mid-Atlantic region, are segregated at the right, and the main series is at the left.[50] The vertical axis U1 evidently reflects a North–South dimension, the Northern and Southern Telsur speakers are almost completely separated by U1. Furthermore, the most advanced Northern speakers are segregated at upper left, where the dark blue circles indicate the Inland North. The most advanced Southern speakers, from the Inland South, are segregated at lower left (magenta circles). The Texas South speakers (magenta x) are in the lower part of the Southern distribution, closer to the rest of the South than the Inland South. Western New England, marked by a less advanced form of the Northern Cities Shift, occupies an intermediate position between the Inland North and the rest of the North. The West, Canada, and the Midland are in the center of this distribution and not so clearly separated. Their overlap in this display corresponds to the lower consistency figures of Appendix 11.1. In Figure 11.7, the yellow circles representing Midland speakers are concentrated in the lower part of the Canada–West–Midland grouping, while Canada occupies a higher position, reflecting the features it shares with the North, and is shifted towards the right. Eastern New England speakers are high in U1 values but spread out across the U2 axis, probably reflecting the lack of uniformity in Map 11.1 for the low back merger, among other variables.

On the whole, Figure 11.7 shows that these vowel measurements are sufficient to separate the major regional dialects identified in the maps of this chapter, although the West, the Midland and Canada are not as clearly distinguished as other regions. If one were to recognize a type of North American English to be called "General American", it would be the configuration formed by these three dialects in the center of Figure 11.7.

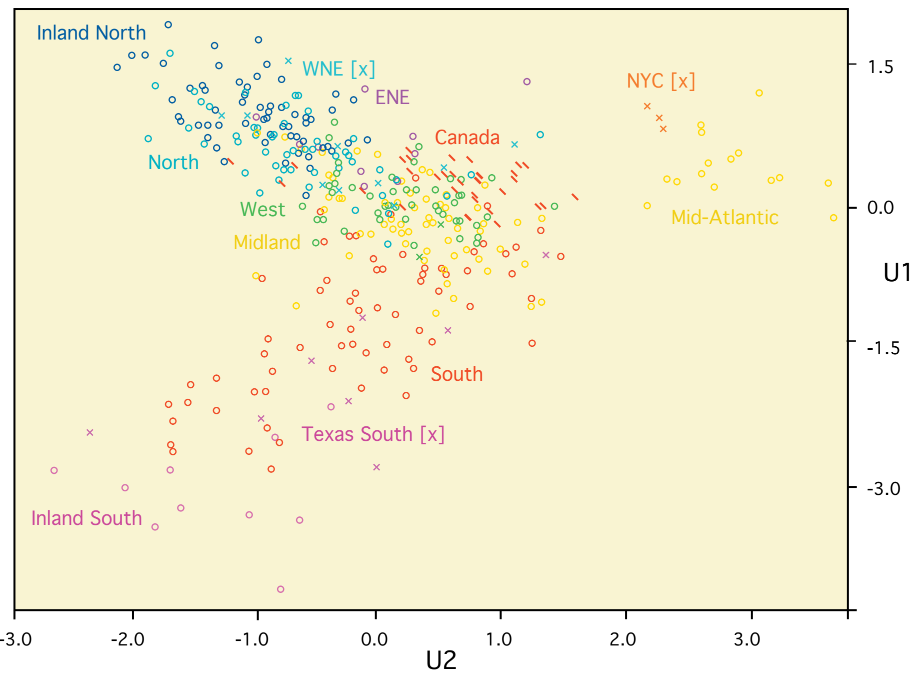


Figure 11.7. Scattergram of first two principal components of mean values of 21 vowel measures for 439 Telsur subjects

Figure 11.8 simplifies this display by a principal components analysis of the same variables based on the means of the major regional dialects. All of the distinctions made in Figure 11.7 are displayed here. Though the means of ENE and WNE are very close, reference to Figure 11.7 shows that ENE is distinguished by a range of

50 This dichotomy is in part a result of the qualitative nature of the feature; those dialects on the left that do not have a tense /aeh/ category have zero values for both F1 and F2.

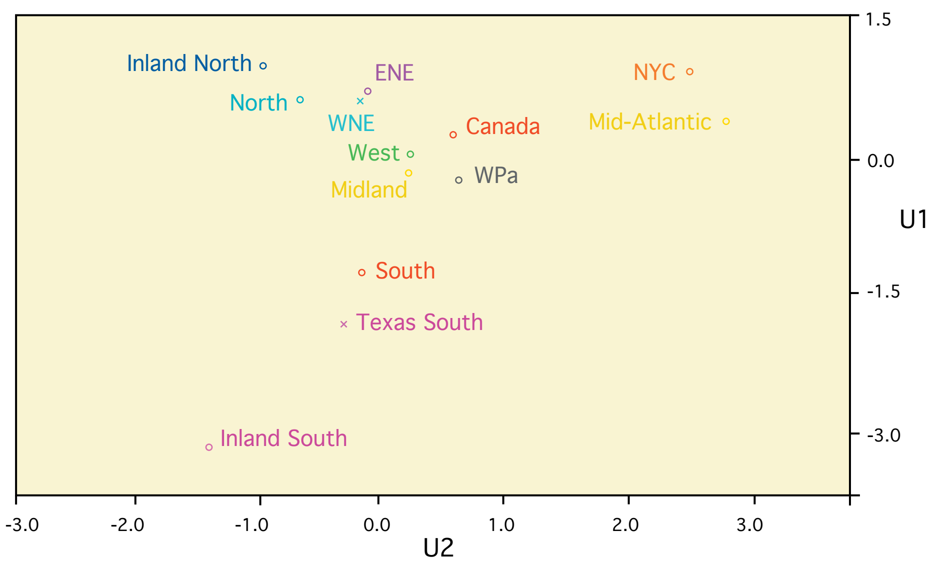


Figure 11.8. Scattergram of first two principal components of mean values of 21 vowel measures for 13 regions and dialects

tokens that extends considerably to the right and left. In contrast, the distributions of means for the closely approximated Midland and West are compact.

Map 11.15 assembles all of the dialect isoglosses described in this chapter, presenting the best current answer of the Atlas to the questions, "How many dialects of North American English are there?" and "Where are their boundaries located?" Since the Atlas samples only two speakers in most cities or urbanized areas, the location of these boundaries cannot be taken as definitive at any one point. A dialect area is defined by the overall consistency of patterning, as shown in Maps 11.1 to 11.14.

Several isoglosses on Map 11.15 are adjusted to take into account the findings of chapters to follow. The outer isogloss that defines the North (light blue) is not extended into New England, in consideration of the distinct characteristics of New England that are developed in Chapter 16. Providence is distinguished from Eastern New England and separated from the northeastern area that is centered around Boston. The Inland North is a continuous area, since the city of Erie in northwestern Pennsylvania is divided on the defining ED criterion. Chapter 14 will show that most Inland North features show a discontinuous distribution, with Erie plainly located in the Midland.

11.5. The hierarchical structure of North American dialects

Figure 11.9 displays the differentiation of the dialects of North American English by the sound changes that are in active progress in each region (indicated by arrow heads). The upper part of the diagram is a hierarchical structure that is generated by linguistic changes in progress. It begins with the division of all dialects into two groups: those that show a strong fronting of /ow/ and /aw/ and those that do not. This sets the Midland and the South against the North, the West, and Canada. The active sound changes are shown with the colors that have been associated with them in the preceding maps. On the left, the Northern Cities Shift differentiates the Inland North from the rest of the North and affects Western New England to a lesser extent. The process of *r*-vocalization marks three of the other Northern dialects, Providence, Eastern New England, and New York City.

The right half of the diagram splits immediately into the Midland and the larger Southeastern region. Charleston and Florida are at present marginal members of the latter group; the main line of development is dictated by the Southern Shift that defines the South as a whole, as well as two more advanced subsections of it. The original Midland area is here labeled "Midland region", which breaks into Mid-Atlantic, Western Pennsylvania, and the Midland, as defined in Map 11.9. Within Western Pennsylvania, Pittsburgh is defined by the monophthongization of /aw/. St. Louis is adjoined to the North by its participation in the Northern Cities Shift.

The lower half of the diagram shows the interaction of the vowel chain shifts with the low back merger and short-*a* split. The split of the short-*a* class unites New York City and the Mid-Atlantic region. The merger of /o/ and /oh/ affects all dialects except those where it is blocked by some specific result of the sound changes in progress. In the Inland North, it is blocked by the fronting of /o/; in New York City and the Mid-Atlantic dialect, by the raising of /oh/; and in the South, by the development of the back upglide which forms part of the /aw/ shift shown in the upper part of Figure 11.9. Five dialects in the center are shown to be governed by the low back merger: ENE, Canada, North Central, the West, and Western Pennsylvania, with the Midland area shown to be in transition. The

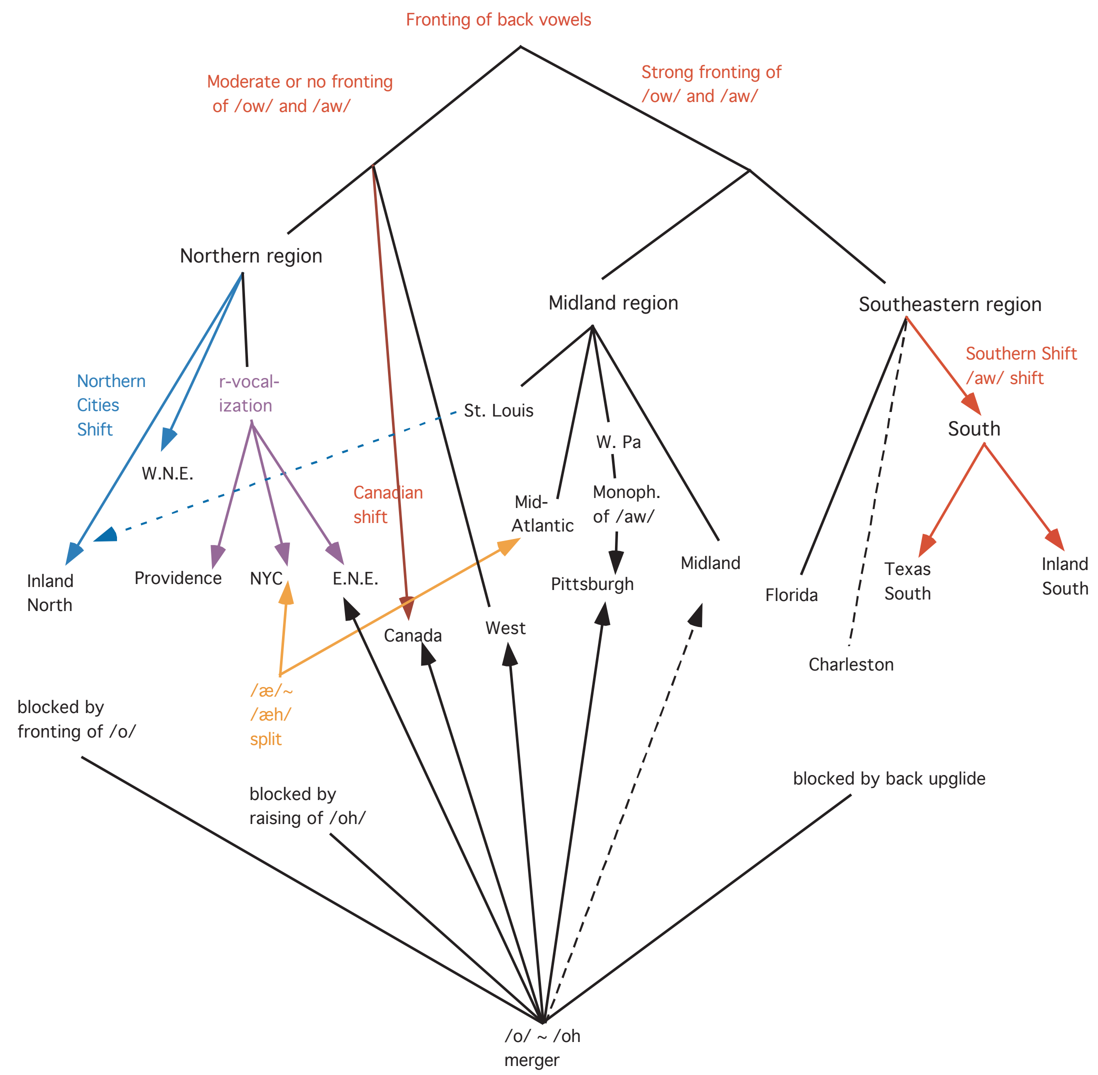


Figure 11.9. Hierarchical structure of North American dialects

Map 11.15. An overall view of North American dialects

The various regions and dialects defined in previous maps are here displayed by the isoglosses that define them. Some regions include smaller dialect areas in which the sound changes in progress are most advanced. This is seen most clearly in the relation of the Inland North to the North and in the relation of the Inland South and Texas South to the South as a whole.

North Central region is not connected to any node on the upper half of the diagram, since it does not participate in any of the sound changes shown.

This overall view of North American dialects is a description of the dialects studied by Telsur, that is, the urbanized areas sampled by the methods of Chapter 4. It does not include many rural and local dialects that are a distinctive and important part of the linguistic ecology of North America. It does not deal with the Outer Banks or the adjoining dialects of eastern North Carolina, the isolated dialects of the Chesapeake Bay area, the Iron Range of Minnesota, the Pennsylvania German area, and many others. Given this concentration on urbanized areas, it is important to specify the sizes of the populations that have been sampled. A total of 297 speech communities are represented by the 762 subjects interviewed. Table 11.3 shows the aggregate populations of the Metropolitan Statistical Areas that were sampled by Telsur, grouped by region and dialect.

The total population of the MSAs represented by the Telsur sample is more than 203,000,000. The sample represents 68 percent of the population of 300,000,000 of the U.S and Canada in 1997. Table 11.2 also shows the heavy concentration of the Northern population in the Inland North (45 million), and the relatively small population of the Midland (16 million) compared to the North and the South (36 million). The Inland South is a small fraction of the South as a whole, just 8 percent. This underlines the contrast between North and South: the most advanced speakers of the Northern Cities Shift are concentrated in the many big cities of the North, while the leading edge of the Southern Shift is found in a few medium-sized cities in a limited area.

Table 11.3. Aggregate populations of Metropolitan Statistical Areas (MSAs) represented in the Telsur sample (in thousands)

	Region	Dialect
Eastern New England	5,319	
ENE		228
Boston		3,966
Providence		1,124
Canada	13,500	
Canada		9,235
Atlantic Provinces		956
North	45,330	
Inland North		34,000
WNE		2,601
St. Louis		2,548
North		6,179
NYC	8,643	
Mid-Atlantic	9,046	
Western PA	4,054	
Pittsburgh		2,379
WPA		1,674
Midland	16,820	
South	36,456	
Inland South		3,096
Texas South		5,167
South		28,192
Charleston	495	
Florida		5,952
West	38,852	
Transitional	14,273	
TOTAL	203,625	

The large populations of the eastern seaboard are reflected in the population of 22 million of the conurbation that stretches from Boston to Baltimore, a comparatively small area with a heavy concentration of large cities. Though much of the West is sparsely inhabited, the large cities of the Pacific coast contribute to a sizeable total of 38 million. The proportion of the population sampled in Canada is less than that for the United States, only 45 percent of the 30 million people in the country as a whole.[51]

11.6. Relation to previous studies

Map 11.16 superimposes on Map 11.15 the dialect boundaries that were suggested by Carver in his 1987 study of selected lexical items from DARE data. The Carver boundaries are shown by the broken black-and-white lines. The shaded areas and the labeling show the dialect areas identified by Carver and can be compared with the colored isoglosses determined by the phonological systems examined by ANAE. It should be borne in mind that the preliminary view provided by Carver may be modified when the dictionary is completed.

There is a great deal of agreement in these two sets of isoglosses, particularly in the major divisions between Inland North, Midland, and South. First, it can be seen that the North/Midland boundary of ANAE (represented by the dark blue boundary) coincides almost exactly with the Upper North–Lower North boundary of Carver. The minor boundaries separating Eastern and Western New England are not much different from the ANAE boundaries, and the westward extension of the Upper Midwest is very close to the western limits of the North. The major difference in the Carver and ANAE views of the North is that Carver does not identify the core area of the Inland North in which the Northern Cities Shift is active. In addition, the North Central residual region is not recognized in Carver's maps.

The Midland/South boundary along the Ohio River also coincides for a good part of its length with the Lower North/Upper South boundary of Carver. In the eastward portion of this boundary, Carver follows the Mason–Dixon line, while the ANAE's northern limit of the South is below that line. Florida is included in the South by Carver, but not by ANAE. The South proper for Carver does not include Texas, though another Carver isogloss, running north to south through New Mexico, comes close to the westward extension of the South in ANAE terms. Within the South, there is little agreement on the identification of sub-areas. The Inland South of ANAE does not appear on the Carver map as a distinct region and the Carver division between the Upper and Lower South is not recognized in the ANAE data.

The Midland necessarily shows similar agreement in its northern and southern boundaries. Carver does not identify a distinct Mid-Atlantic or Western Pennsylvania area, and his Lower North does not extend as far west as the ANAE Midland. ANAE does not identify the distinct "Hoosier Apex" which is a major feature of Carver's Upper South.[52]

None of the subdivisions of the West found by Carver appear in the ANAE data. It is not surprising that the least agreement between the two views of American dialects is found in the West. In the principal components diagrams of Figures

51 This is in part due to the fact that Canada's 7 million native speakers of French, almost a quarter of the population, do not form part of our target population.

52 The Hoosier apex is identified in ANAE Map 9.5 for the merger of /in/ and /en/.

Map 11.16. Comparison of the ANAE dialect boundaries with Carver's lexical boundaries based on DARE

The black-and-white and hatched areas and the barred black-and-white isoglosses are the dialect regions defined by Craig Carver in his 1987 summary of the lexical evidence of the *Dictionary of American Regional English*. These are superimposed on the dialect boundaries of ANAE as given in Map 11.15. For the most part, there is good agreement. Carver's Upper North corresponds quite closely to the ANAE North, and his Lower North corresponds to the ANAE Midland. ANAE does not make the distinction between Upper South and Lower South but defines instead the core Southern areas of the Inland South and Texas South. The ANAE South extends farther west than Carver's, including almost all of Texas. The divisions in Carver's analysis of the West are not supported by ANAE data.

11.5 and 11.6, the West is not clearly distinguished from the Midland as a whole, although the distinctions drawn in Maps 11.9 and 11.10 seem fairly clear.

Since DARE does not include Canada, Carver's boundaries cannot be compared to the ANAE definitions of Canada.

The lexical boundaries in Carver's work are built upon the original regional vocabulary identified by Kurath and represent the effects of settlement patterns which date from the eighteenth and nineteenth centuries for most of the country. The ANAE definitions of dialect are built upon sound changes that originated at the very end of the nineteenth century (for the South) and the middle of the twentieth century (for the North and Canada). The coincidence of these two sets of boundaries is striking.

Appendix 11.1. Isogloss parameters

			Total marked	Total inside	Marked inside	Marked outside	Homo-geneity	Consis-tency	Leak-age
Map 11.2	F1(æ) < 700[1]		91	86	72	19	.84	.78	.05
	ED < 375[2]	Inland North	99	70	61	38	.87	.62	.10
		Great Lakes		51	44		.86		
		Western NY		10	10		1.00		
		St. Louis corridor		9	7		.78		
	Midland and South								
	(oh) back upglide	Over 0%	67	62	54	13	.87	.81	.03
		Over 20%	35	44	29	6	.66	.83	.02
		Over 50%	22	20	16	6	.80	.73	.01
Map 11.3 – South	GDel (ay)[3]		76	83	75	1	.90	.99	.003
Map 11.4 – South	/e/ & /ey/ reversed		47	49	41	6	.84	.87	.02
	/i/ & /iy/ reversed		11	10	8	3	.80	.73	.01
Map 11.5 – South	GDel (ay0) > 0%[4]		49	62	42	7	.68	.86	.02
	GDel (ay0) > 50%		14	18	13	1	.72	.93	.00
Map 11.7	Canadian Shift[5]		62	25	21	41	.84	.34	.10
	ENE r-vocalization[6]		11	11	10	1	.91	.91	.002
Map 11.8	The North[7]		123	117	96	27	.82	.78	.08
Map 11.9	Midland[8]		108	73	48	60	.66	.44	.16
Map 11.10	The West[9]		73	50	33	40	.60	.59	.05
Map 11.11	Southeast[10]		206	180	156	50	.87	.76	.19
Map 11.14	UD[11]		105	102	89	16	.87	.85	.05

1 and no monophthongization of /ay/
2 and no vocalization of /r/, split of /æ/, or monophthongization of /ay/
3 monophthongization of /ay/ before voiced obstruents (/b, d, ǰ, g, v, ð, z/) and finally
4 monophthongization of /ay/ before voiceless consonants
5 F2(e) < 650 Hz and F2(æ) < 1825 Hz and F2(o) < 1275 Hz
6 and no split of /æ/ and no monophthongization of /ay/
7 F2(ey checked) < 2200 Hz and F2(ow) < 1275 Hz
8 F2(ow) > 1200 Hz and /o/ ~ /oh/ transitional and F2(e)–F2(o) < 375 Hz and no split of /æ/ and monophthongization of /ay/ < 50%
9 F2(uw)–F2(ow) > 500 Hz and /o/ = /oh/ in either production or perception, no Canadian raising and no Canadian Shift
10 F2(ow) > 1200 Hz and /o/ ~ /oh/ not merged in both production and perception
11 F2(ow) < F2(o) and F2(ʌ) < F2(o)

12. The fronting of back upgliding vowels

The subsystem of back upgliding vowels in North American English appears in the initial position as in (1).

(1) Back upgliding vowels

	front		back	
high	*dew*	/iw/	/uw/	*do*
mid			/ow/	*know*
low			/aw/	*now*

The front member of this series, /iw/, was originally /yuw/. With the general loss of the /y/ glide after coronals in North America, the /iw/ vowel maintained a contrast of front vs. back for at least some speakers. Kenyon and Knott (1953) transcribe *dew* as **dju, dɪu, du** and *do* as **du**. This contrast appeared only in the limited environments of apical onsets[1] with *do* ~ *dew* as the only common minimal pair.

The vowel /aw/ is historically a back vowel – that is, with a nucleus back of center. However, the development of /aw/ from M.E. **u:** in the course of the Great Vowel Shift does not arrive at a single termination point. It is frequently realized with central [ao], but we also find back [ɑo] and fronted [æo]. This chapter will show that there is a clear division between back nuclei in the North and front-of-center nuclei in the Midland and the South, which might well be written as /æw./ It is quite possible that this division existed when North American English was first established, and there was no single initial position for /aw/. We also know that in a variety of southern English dialects the nucleus of /aw/ has shifted to front of center and risen to a front mid or upper-mid nucleus (Orton 1962; Labov 1994: Ch. 17).

Thomas (2000) presents acoustic analyses of speakers from several regions of North America, with a number born in the nineteenth century. The nineteenth-century vowel systems that he records for North and South Carolina (excluding the Outer Banks) include two with /aw/ and /ay/ in central position, two with /aw/ slightly fronted, and one with strong fronting. In Texas–Oklahoma, he reports a similar distribution. The three New England speakers born before 1900 include one with /aw/ back of /ay/, one with /aw/ and /ay/ the same, one with /aw/ front of /ay/. This evidence indicates that the North–South difference in the realization of /aw/ existed in the nineteenth century, but in a form much less marked than today.

12.1. The fronting of /uw/

The /uw/ class includes all descendents of M.E. **o:** that have not been shortened: *too*, *do*, *soon*, *noon*, *roof*, *move*, *boot*, *tool*, *school*. However, the class is far from homogeneous, as Figure 12.1 indicates. The left-hand diagram shows a clear bimodal distribution. The right-hand diagram shows that the lower mode, with low F2, is almost entirely composed of the sub-group before /l/. It is clear that in any analysis of the fronting of /uw/, vowels before /l/ should be placed in a separate category. In most dialects, the vowels of *tool*, *school*, etc. occupy high back position while all other /uw/ vowels are shifted well to the center or front. However, fronting of vowels before /l/ is a hallmark of the Southern dialect region, and the end of this chapter will examine this feature as a separate variable.

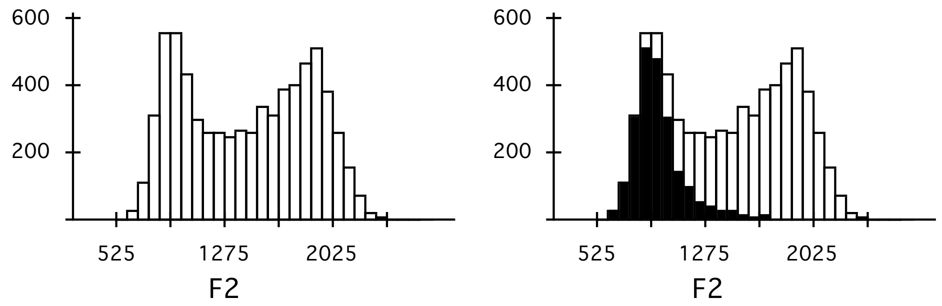


Figure 12.1. Distribution of F2 of /uw/ for all of North America. N = 7036. Left: all tokens. Right: black = tokens before /l/

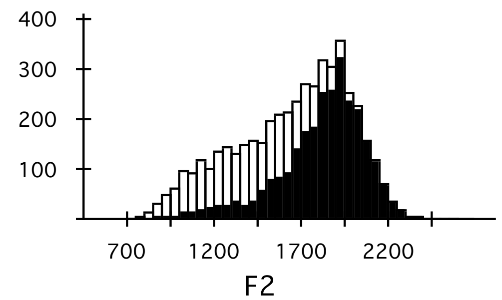


Figure 12.2. Distribution of F2 of /uw/ not before /l/ for all of North America. Black = coronal onsets [Tuw] (mean = 1811 Hz)

In Figure 12.2, vowels before /l/ are eliminated. The distribution now has a single mode, around 1950 Hz, and is heavily skewed to the left, that is, towards the lower end. The non-lateral /uw/ vowels form two sets with different distributions; those with coronal onsets (in black) are heavily concentrated at the upper end. This is an unusual situation; onsets generally have much less effect on the realization of English vowels than codas. For most of the long vowels, the major division between allophones (excluding liquids) is between word-final and non-final vowels.[2]

Figure 12.3 is the same distribution, but with the non-coronal onsets shown in black. Instead of the sharp peak at 1809 Hz with strong skewing to the left, there

1 Palatal onsets also produced a fronted vowel, but no contrast with a back upgliding vowel was found, so the analysis of *choose*, *chews*, *shoes*, *chute*, *juice*, etc. is ambiguous. These words may represent the extreme fronting of /uw/ or the maintenance of /iw/, even when their historical origins are clear. The history of the word *shoes* is unclear in this respect.

2 As in the study of Language Change and Variation in Philadelphia (Labov 2001), where /iy, ey, uw, ow/ were all divided into word-final and non-final allophones.

is a diffuse and symmetrical distribution around the mean of 1424 Hz. In all of the following analyses, the non-lateral tokens of /uw/ will be divided into the group with coronal onsets, notated as /Tuw/ (*two*, *to*, *do*, *noon*, *soon*, *soup*, *stoop*, *shoot*, *choose*) and non-coronal onsets (*move*, *movie*, *room*, *boots*, *food*, *boom*, *coop*). [3]

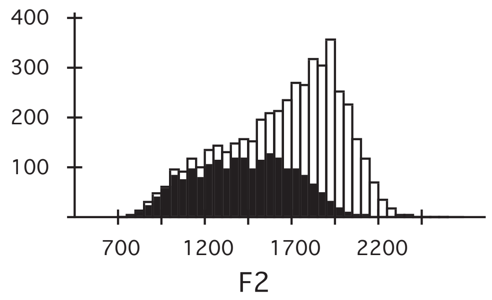


Figure 12.3. Distribution of F2 of /uw/: not before /l/ for all of North America. Black = non-coronal onsets [Kuw] (mean = 1433.Hz)

Table 1 is a regression analysis of F2 for the 4,747 tokens of /uw/ not before /l/. Among the phonetic effects on the variable, by far the strongest is coronal onset. No significant effect of word-final position appears.[4] Word-final /uw/ is in fact strongly fronted, but there is a high degree of association between word final and coronal onset.[5] The predominant effect of coronal onset is found in separate analyses of all regional dialects, with the exception of the South, where word-final position has a slightly higher coefficient.

Table 12.1. Regression coefficients for F2 of /uw/ for all of North America. Vowels before /l/ excluded [N = 4,747]

	Coefficient	Probability
Constant	1537	
Age * 25 yrs	–101	<.0001
Female	42	<.0001
Less than high school	–35	.0036
High school education	–45	<.0001
Some college	–64	<.0001
Onset		
Coronal	480	<.0001
Velar	181	<.0001
Liquid	151	<.0001
Obstruent+Liquid	164	<.0001
Labial	104	<.0001
Nasal	–54	.0020
Coda		
None	–	n.s.
Coronal	70	<.0001
Nasal	–193	<.0001
Fricative	–137	<.0001
Stop	–89	<.0001
Voiced	40	.0095

Table 12.1 shows many strong effects of onset features besides coronal. Velar, labial, and obstruent+liquid onsets (*coupon*, *boots*, *broom*) all have positive effects on fronting. This situation is quite different from other fronting movements, such as those affecting the second formant of /aw/ and /æ/.

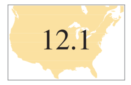
Many phonologists class /r/ as [+coronal] on the basis of tongue-tip movement. But the evidence of this Atlas firmly places /r/ with the non-coronals as far as /uw/ fronting is concerned. Words like *root*, *room*, *roost* regularly cluster with the /Kuw/ group in vowel systems where it is well separated from /Tuw/. When we add onset-*r* to the regression analysis of Table 12.1, no significant effect appears. The grooved shape of the tongue and the contact with teeth do not correspond to a definition of "coronal" that involves articulation with the blade of the tongue.

The age parameter in Table 12.1 shows a negative value, indicating a general fronting movement in apparent time (speakers of lower age have higher F2). Table 12.2 lists the mean values of F2 of /uw/ for eight regions defined in Chapter 11, along with age coefficients and the coronal onset coefficient. The Mid-Atlantic region – a relatively small one – is the only exception to the general pattern, which is replicated in Eastern New England with very conservative means of /uw/ (1584 Hz), and in the South and Midland, with very advanced forms (ca. 1700 Hz). As noted above, the South shows a considerably smaller effect of coronal onset.

Table 12.2. Regression analysis of F2 of /uw/ of vowels not before /l/ by region. All coefficients significant at .0001 level

	N	Mean F2(uw)	Age*25	Coronal Onset
Midland	580	1713	–107	442
South	1107	1703	–86	141
ENE	116	1584	–244	456
Mid-Atlantic	190	1534		
Western Pa	161	1529	–119	338
West	468	1520	–76	362
Canada	521	1492	–155	469
North	1062	1359	–83	514

The geographic reflection of the situation portrayed in the previous section appears in Map 12.1. The red circles indicate all speakers for whom /Tuw/ is front of the normalized center line of 1550 Hz. Of 439 Telsur subjects, 389 fall in this category. The blue isoglosses show the three areas where the mean value of /Tuw/ is not front of center: a North Central region covering most of Wisconsin and Minnesota; Eastern New England; and Northern New Jersey. In the Inland North, only a small section northwest of Chicago is included in this conservative domain, with a scattering of points elsewhere.

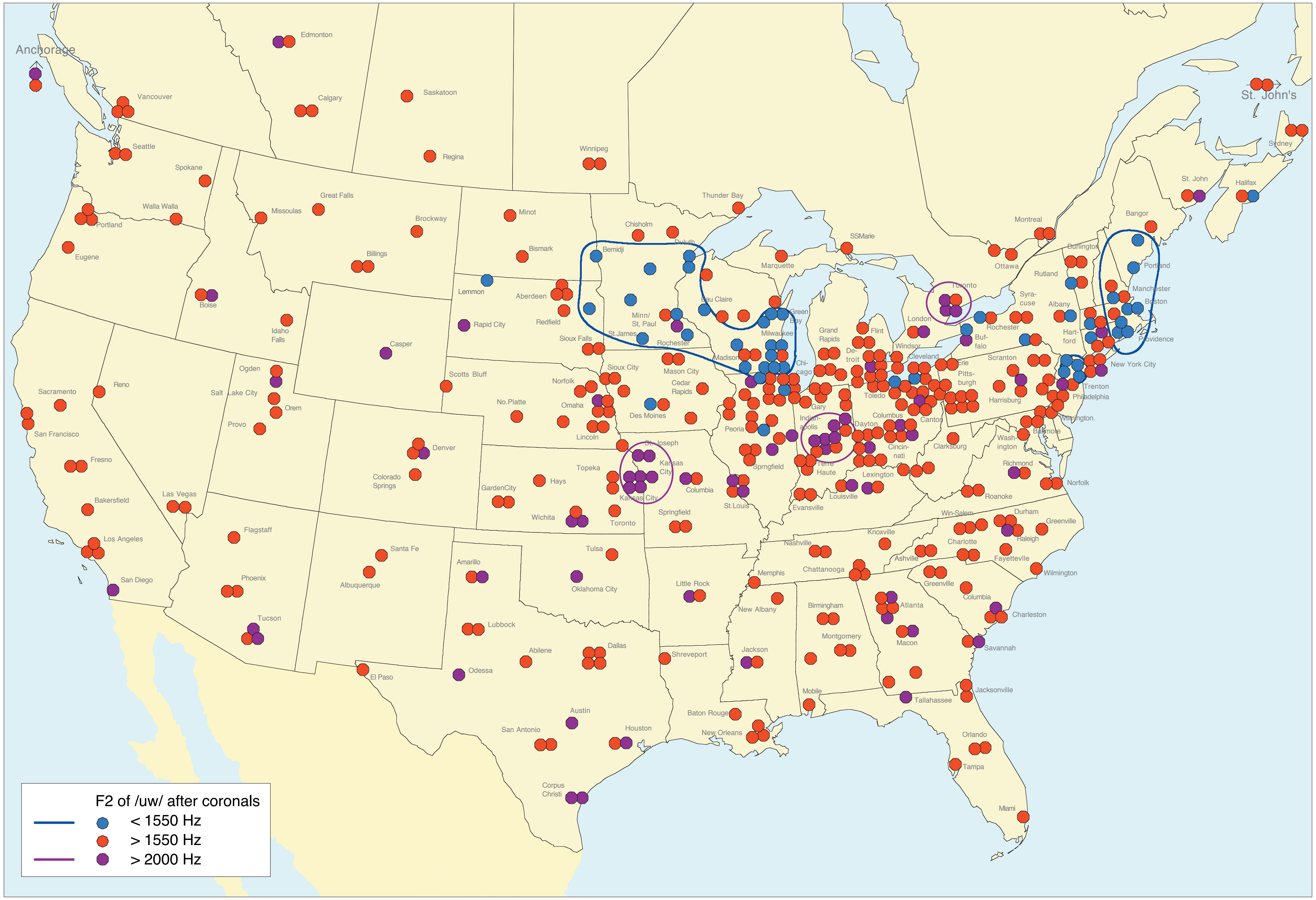


Several small regions of extreme fronting can be identified. Purple circles are drawn around four areas that are dominated by such extreme fronting, where F2 of /Tuw/ is greater than 2000 Hz. Surprisingly, these are not located in the South, but in the Midland (Kansas City, St. Louis, Indianapolis) and in Canada (Toronto). The South shows extreme fronting in two ways: fronting before /l/ codas (see below), and fronting of the glide target from high back to front rounded. The 7036 Telsur records of /uw/ include 42 tokens where such a fronted upglide was noted by the analyst; all of these are in the South.

3 For /r/ as a non-coronal, see below.

4 The negative coefficients for nasal, fricative and stop features of the coda reflect a relatively positive effect of word-final position. If these factors are removed, word-final position re-appears with a significant coefficient of 137; this is still only one-third of the size of the effect of coronal onset.

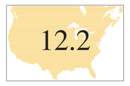
5 The first Telsur interview schedules elicited word-final words with coronal onsets (*too*, *do*) and checked vowels with non-coronal onsets (*roof*, *boots*, *move*), Later interview schedules and the results of spontaneous speech provide enough contrast that a multivariate analysis can weigh the independent effects of coronal onset vs. word-final position.



Map 12.1. Fronting of /uw/ after coronals (Tuw)

The fronting of /uw/ is general over almost all of North America, particularly after the coronal consonants /t, d, s, n/, as in *too*, *do*, *soon*, *noon*, etc. Only a few areas, shown with blue symbols, have mean values for this set lower than 1550 Hz, which is the center line in this normalized system. The conservative areas are eastern New England and a portion of the North Central, extending to include the Chicago portion of the Inland North. Areas with extreme fronting of these vowels are mostly in the Midland: Kansas City, St. Louis, Indianapolis, and also Toronto. Here /uw/ after coronals reaches the position of French /ü/ in *tu*.

The geographic distribution of the more conservative allophone /Kuw/ appears in Map 12.2. The medium-blue circles indicate the speakers who are most conservative in their fronting of /Kuw/, where the mean F2 of /Kuw/ is less than 1200 Hz. The dark blue isoglosses for dialects that resist /Tuw/ fronting are retained on this map, and may be compared with the medium-blue isogloss; they are a proper subset of the /Kuw/ isogloss, which encloses them. The conservative /Kuw/ region is quite irregular; it includes all of New England, all of the Inland North, and extends westward to North Dakota and most of Montana.



The area of strong fronting of /Kuw/ is outlined by the orange isogloss, where the mean value of /Kuw/ is greater than 1550 Hz, the center value of the normalized system. This again is an irregular area. It covers roughly the region of the South (as designated by the red AYM line for glide deletion of /ay/), but it also includes the "Hoosier apex" in southern Indiana and the Kansas City area, which are already marked for their extreme fronting of /uw/. The advanced /Kuw/ area extends northward into the Mid-Atlantic region, southward into Florida and in the western section of the South, northward into Oklahoma and Nebraska. In a point to be developed further in Chapter 18, the /Kuw/ area does include Charleston, which was excluded from the South as defined by the AYM line.

There is also a heavy concentration of orange symbols in the Midland, in about the same area as the magenta circles that indicate extreme fronting of /Tuw/. This includes almost all the major Midland cities: Kansas City (but not St. Louis), Indianapolis and Columbus, Pittsburgh and the cities of the Mid-Atlantic region.

The yellow circles on Map 12.2 indicate intermediate fronting of /Kuw/. Large geographic areas, including Canada, the Midland, and the West, show only moderate fronting of /uw/ after non-coronals, well behind the center of the vowel system, and considerably behind /uw/ after coronals.

12.2. The fronting of /ow/

In the history of many languages, the fronting of /o/ or /ow/ is found parallel to and somewhat behind the fronting of /u/ or /uw/. In the triangular shape of the acoustically defined vowel space, there is a smaller fronting range available to /ow/ in absolute terms (a maximum of only 1400 Hz for /ow/, compared to 2200 Hz for /uw/). But even in relative terms, the fronting of /ow/ lags behind the fronting of /uw/. Map 12.1 showed that the great majority of speakers have a /Tuw/ mean fronter than the mid position of 1550 Hz, while for /ow/, it will appear that maximal fronting is at mid position and very few speakers go beyond this point. Figure 12.4 shows the distribution of all /ow/, with a relatively small number of tokens above 1550 Hz.

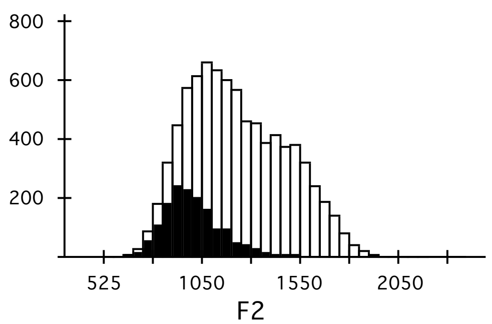


Figure 12.4. Distribution of /ow/ vowels for all of North America (N = 8313). Vowels before /l/ are shown in black (N = 1577)

The major allophonic divisions for /ow/ are much less marked than for /uw/. Figure 12.4 does not show a bimodal pattern. The vowels before /l/, shown in black, fall into a symmetrical range around 900 Hz within the overall /ow/ distribution.

Figure 12.5 shows all /ow/ not before /l/. The vowels with coronal onsets are shown in black. The contrast with Figure 12.2 is striking. There is a tendency for /ow/ with coronal onset to be grouped at the upper end, but there is no single modal value; the distribution is diffuse over a broad range from 1200 to 1600 Hz. In contrast to /uw/, the effect of coronal onset on /ow/ is not markedly greater than other environmental effects.

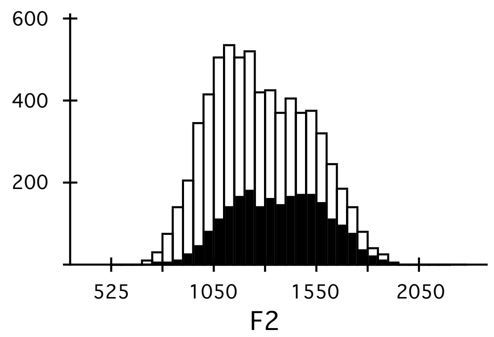
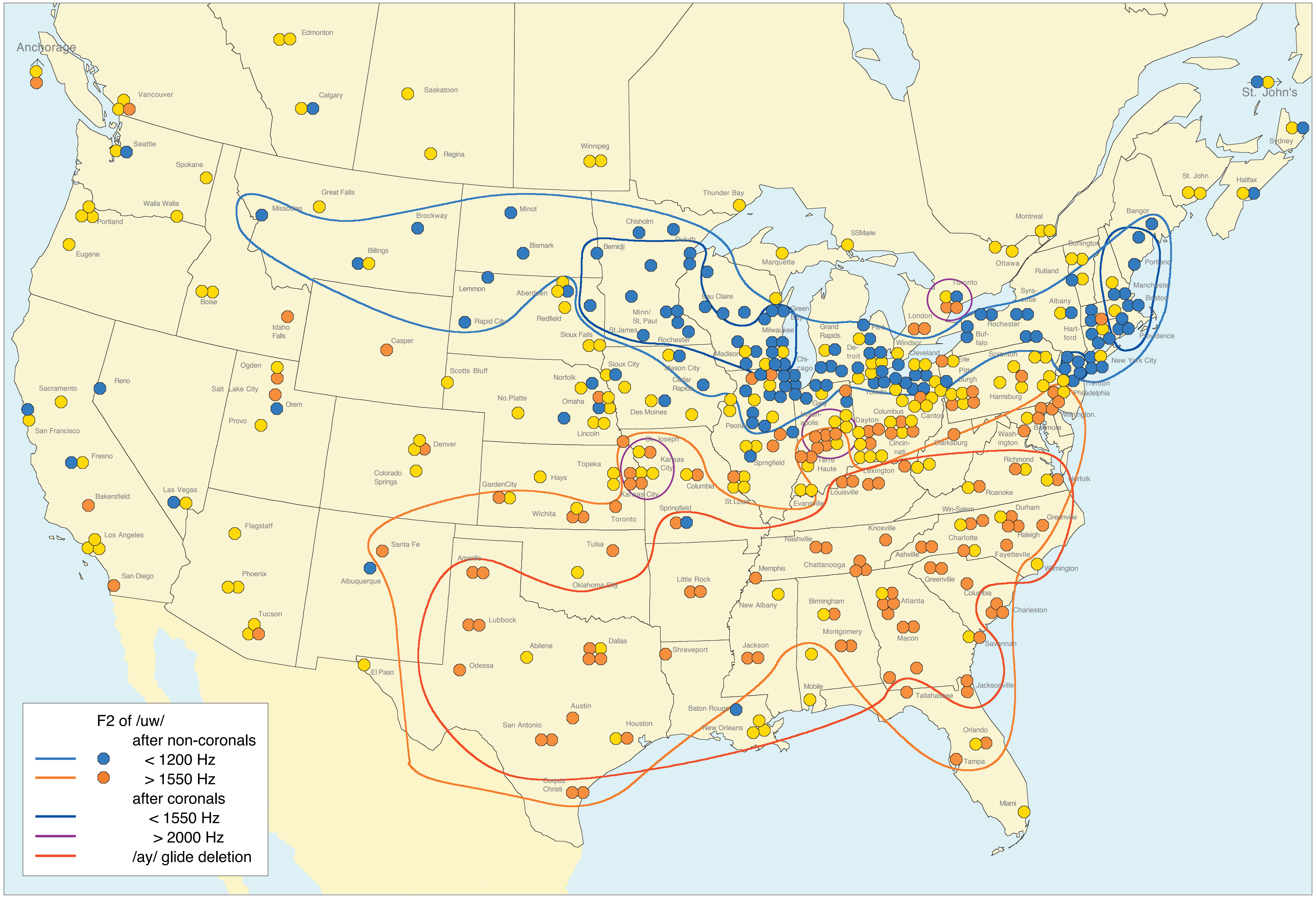


Figure 12.5. Distribution of /ow/ tokens not before /l/ for all of North America (N = 6736). Black = vowels with coronal onsets (N = 2251).

Table 12.3. Regression coefficients for F2 of /uw/ and /ow/ for all of North America. Vowels before /l/ excluded

	/uw/ [N = 4747]		/ow/ [N = 6736]	
	Coef	*Prob.*	*Coef*	*Prob.*
Constant	1537		1386	
Age * 25 yrs	–101	<.0001	–24	<.0001
Female	42	<.0001	46	<.0002
Less than high school	–35	.0036	–21	.0116
High school education	–45	<.0001	–67	<.0001
Some college	–64	<.0001	–35	<.0001
Onset				
Coronal	480	<.0001	94	<.0001
Velar	181	<.0001	43	<.0001
Liquid	151	<.0001	—	n.s.
Obstruent+Liquid	164	<.0001	—	n.s.
Labial	104	<.0001	–70	<.0001
Nasal	–54	.0020	—	n.s.
Coda				
None	—	n.s.	31	.0003
Coronal	70	<.0001	—	n.s.
Nasal	-193	<.0001	-101	<.0001
Labial			–122	<.0001
Fricative	–137	<.0001	–21	.0023
Stop	–89	<.0001	–30	<.0002
Voiced	40	.0095	—	n.s.
Following syllables			–75	<.0001

Table 12.3 compares the regression analysis of /uw/ (from Table 12.1) with a parallel analysis of the /ow/ tokens not before /l/. The age coefficient for /ow/ is much smaller, indicating a slower rate of shift in apparent time. Gender and educational effects are similar, indicating that women are in the lead and that col-



Map 12.2. Fronting of /uw/ after non-coronals (Kuw)

The vowel systems of North America also show fronting of /uw/ in words beginning with non-coronal consonants, as in *boot*, *move*, *roof*, and *coupon*. This tendency is minimal in the Northern area outlined in light blue; when /uw/ is less than 1200 Hz, it is heard as a back vowel. In a southern area somewhat larger than the South as defined in Chapter 11, the Kuw vowels are front of center (orange symbols and orange isogloss). Otherwise, Kuw is fronted only moderately, about halfway from its original back position to the center line.

lege graduates shift more than others. A striking difference appears in the effect of coronal onset: only 94 Hz for /ow/ as opposed to 480 Hz for /uw/. There is in addition a significant effect of final position. In other respects, the conditioning effects on /ow/ are not as strong as for /uw/, except for the effect of a following labial, which is strongly negative for /ow/ but not at all for /uw/.

Table 12.4 gives data parallel to Table 12.2, showing the regional distribution of the major constraints on /ow/ not before /l/. The regions are arranged in order of descending mean /ow/, followed by the age coefficient, the effect of coronal onset, and the effect of word-final position. The ordering of dialects is similar to Table 12.2, except that ENE is much lower in the scale, and Mid-Atlantic is advanced beyond the Midland and the South. The most advanced region, the Mid-Atlantic, shows no further movement in apparent time. The shift appears to be active in the South, western Pennsylvania, the Midland, the West, and Eastern New England. The North and Canada show a small but significant tendency in the other direction; /ow/ does not appear to be advancing in these areas.

All dialects but ENE show a moderate effect of coronal onset. But in two of these the effect of final position is as great as coronal onset, and in ENE, final position is the only environmental constraint. Since coronal onset does not have the dominant effect that it does with /uw/, all /ow/ not before /l/ will be treated together in what follows.

Table 12.4. Regression analysis of F2 of /ow/ of vowels not before /l/ by region.
Note: * = $p < .05$; ** = $p < .01$; *** $p < .001$.

	N	Mean	Age*25	Coronal Onset	Final
Mid-Atlantic	226	1467	–	78**	75*
South	1452	1445	–77***	110***	–
Western Pa	252	1422	–57*	105***	90**
Midland	994	1367	–56***	132***	–
West	709	1233	–72***	98***	–
E.N.E.	136	1152	–90***	–	109***
Canada	475	1147	43*	55**	–
North	1836	1127	14*	120***	52***

The geographic distribution of the fronting of /ow/ in North America is shown in Map 12.3. As the legend indicates, the degrees of fronting are divided into five color-coded levels. The lowest degree of fronting of /ow/ (<1100 Hz) is indicated by dark blue circles, the next lowest by medium blue (< 1200 Hz) and third lowest by light blue (<1300 Hz). The areas of strong fronting are indicated by orange (1300–1400 Hz) and by red (> 1400 Hz).

The dark blue isogloss for F2(ow) < 1100 Hz outlines the area of minimal fronting. It extends over the Inland North, and falls a little short of the North–Midland line. It does not stop at the westward boundary of the Inland North or the Northern Region, but extends well into Montana and western Canada. In addition, the city of Providence is marked by (two out of three) speakers at this level.

The oriented medium blue isogloss for F2(ow) < 1200 Hz /ow/ includes (by definition) the dark blue isogloss. It extends in the east to cover all of the North, including Eastern New England, and extends only slightly southward to the line separating the North from the Midland, but in the west it expands widely to cover most of the Western region. This expanded area of moderate /ow/ fronting shows low homogeneity, and there is great variation within it.

The light blue isogloss for F2(ow) < 1300 Hz is bundled quite closely to the medium blue isogloss except again in the West, where it expands to cover all of the Western region.

No boundary can be justified to separate the orange and red symbols on Map 12.3. The Midland and the South (identified by the AYM line, here dashed) are equally engaged in the fronting of /ow/. Very few blue symbols in the South or the southern portion of the Midland lie below the blue isoglosses; moderate to strong fronting of /ow/ is characteristic of the Southeastern region as defined in Map 11.11.

The overall view provided by Map 12.3 is a sharp division of the eastern half of North America into a region where /ow/ is fronted and a region where it is not, while the western half shows the opposite situation: a graded shift from low to high fronting, with much individual variation. The region of minimal fronting cuts through Canada as defined in Map 11.7 (see Chapter 15).

The relation between the fronting of /uw/ in Map 12.1 and the fronting of /ow/ in Map 12.3 generates the taxonomy of American dialects first displayed in Figure 11.3, reproduced here as Figure 12.6. The added circles are intended to suggest that all American dialects can be divided into three types: those that front neither /uw/ nor /ow/; those that front /uw/ but not /ow/; and those that front both. Here "the fronting of /uw/" indicates the more advanced allophone, /uw/ after coronal onsets.

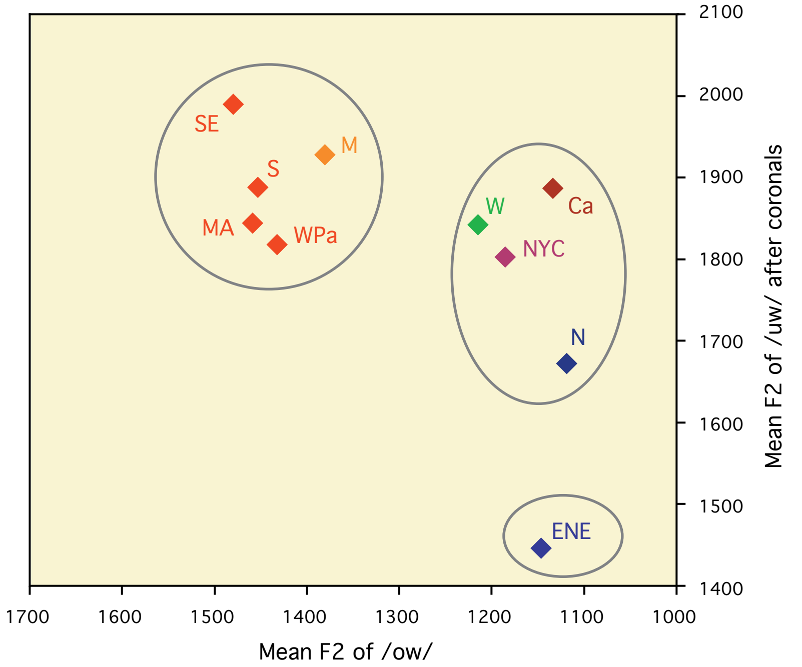
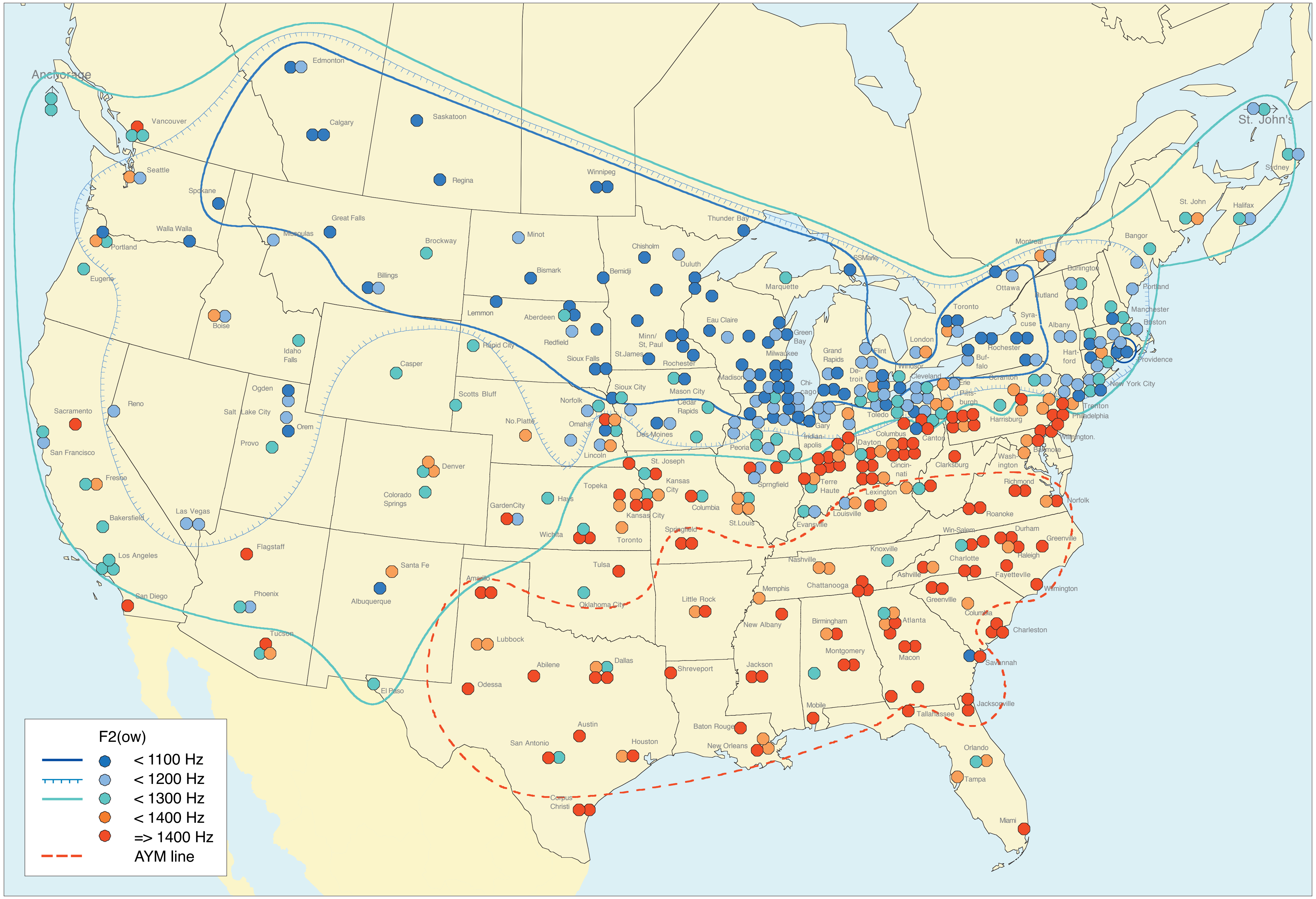


Figure 12.6. Mean values for the fronting of /uw/ after coronals and the fronting of /ow/ for North American regions

12.3. The fronting of /aw/

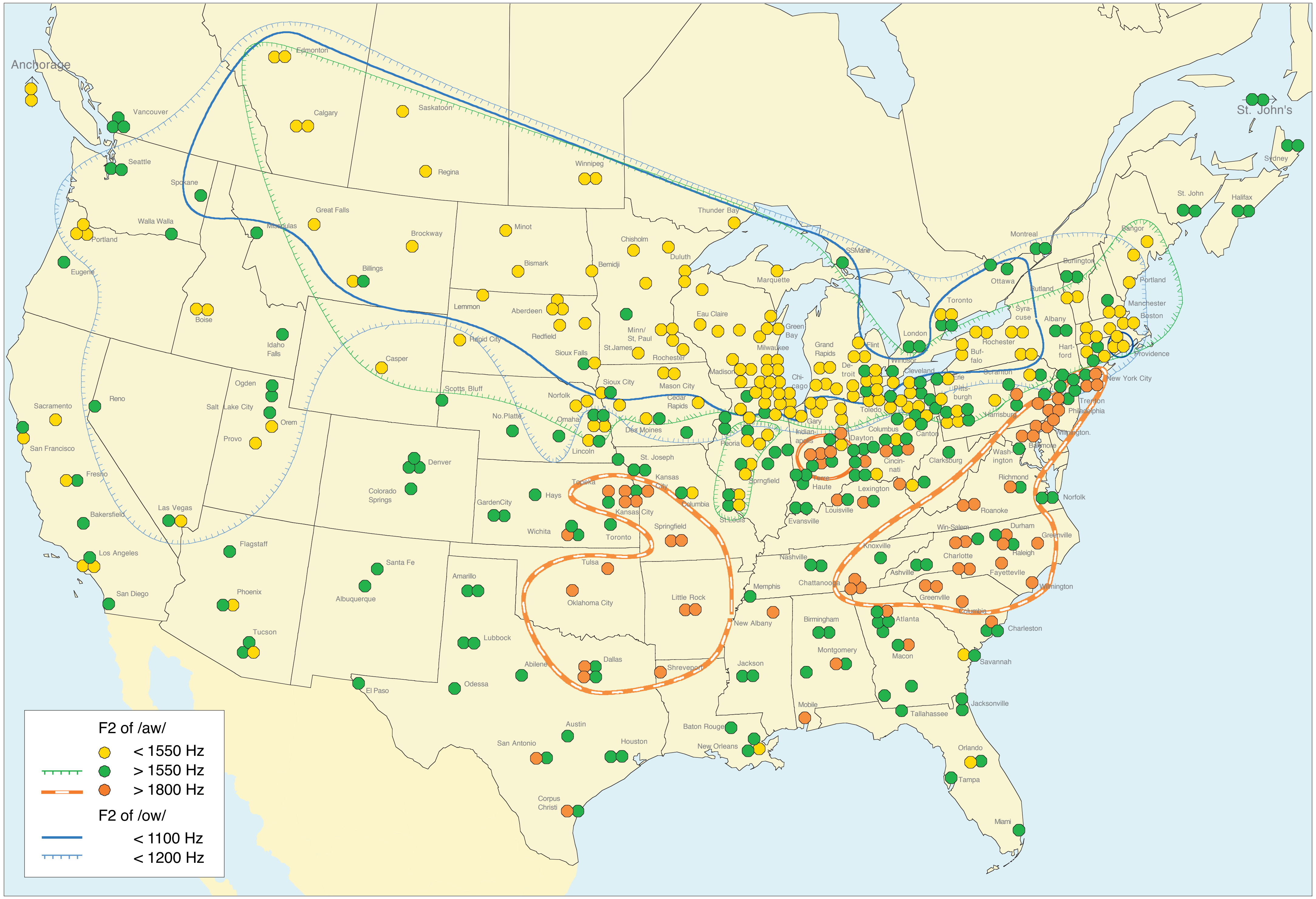
The sharp division of North American dialects in the fronting of /ow/ is matched by an equally sharp division between front and back positions of /aw/. It should be noted that the mean values for the nucleus of /aw/ exclude vowels before the apical resonants /l/ and /n/. Vowels before /l/ are fronted less than others, while vowels before nasals are considerably more fronted as a rule, and often raised to lower-mid or upper-mid position.

Map 12.4 shows the distinction between the dialect areas where the nucleus of /aw/ is back of center (< 1550 Hz) and those where it is front of center, and it compares these areas to the distribution of fronted /ow/. The light green and orange symbols representing fronted /aw/ are rarely to be found in the northern area where /ow/ resists fronting, with the exception of a minority of speakers from the Detroit–Cleveland area of the Inland North, and most of the speakers in eastern



Map 12.3. The fronting of /ow/ in North America

The general fronting of /uw/ is not matched by the mid back upgliding vowel /ow/. The North shows a conservative treatment of /ow/, which remains a back vowel within the area of the darkest blue isogloss. This includes the prairie provinces in central Canada. In the eastern half of the continent, the close approximation of all blue isoglosses shows an abrupt break between the North and the area of the Midland and South that shows strong fronting of this vowel. In the West, the transition is much more gradual; while there is no strong fronting in this area, there is a scattering of speakers with slight fronting of /ow/.



Map 12.4. The geographic distribution of /aw/

The Northern area of conservative /ow/ shows equally conservative treatment of /aw/, which has a back or central nucleus throughout the area of conservative /ow/ in Map 12.3. The South and the Midland generally show /aw/ with a low front beginning, similar to the vowel of *bat*. The areas of greatest fronting (barred orange isoglosses) are found in the Inland South, but also in such Midland locations as Kansas City, Indianapolis, and Philadelphia.

Canada. In the eastern half of North America, the green isogloss for fronted /aw/ runs close to the light blue oriented line for F2 of /ow/ < 1200 Hz; in the western half, it is close to the dark blue line for the even more conservative criterion of F2 < 1100 Hz.

In most of North America, including eastern Canada and Vancouver, /aw/ is in front position and might well be represented as /æw/ rather than /aw/. This pattern is more consistent in the South and the Midland than in the West. Nine speakers with back /aw/ are found in the Far West. The orange circles indicate speakers with extreme fronting (and raising) of /aw/, using the criterion of F2 of /aw/ > 1800 Hz. The broken orange isoglosses identify several regions where such speakers are concentrated: in Virginia, North Carolina and South Carolina, and in a region west of the Mississippi River, including Kansas City; Dallas; Springfield Missouri and Little Rock. We also find strong concentrations of the fronting of /aw/ in the largest Midland cities: Indianapolis and the cities of the Mid-Atlantic region: Philadelphia, Baltimore, and Wilmington. As with /ow/, the strong fronting of /aw/ is not primarily a Southern characteristic; it is equally strong, or stronger, in the Midland.

12.5 The criterion used in Map 12.4 is a quantitative measure of the F2 of /aw/, which can be referred to as the AW1550 line. An even sharper division between North and South can be achieved with the structural isogloss that is defined by the relative frontness of /ay/ and /aw/. In Map 12.5, the dark green symbols represent speakers for whom the mean second formant of the nucleus of /aw/ is backer than the mean second formant of the nucleus of /ay/. The dark green isogloss that is defined by these points is very similar to the light green isogloss for /aw/ back of center, but it does not extend as far south. The dark green isogloss does not reach St. Louis; only three of the 12 speakers in the St. Louis corridor show /aw/ backer than /ay/. It also does not include western Pennsylvania, where only one such point is found.

The greatest difference between the two /aw/ criteria is the number of marked points outside the isogloss. Table 12.5 compares the parameters of the two isoglosses. The total number of points within the AWY line is considerably less than those within the AW1550 line, but the greatest difference is in the total marked outside, 14 as against 43. The homogeneity of the AWY line is less, only 0.72 as against 0.82 for the AW1550 line, but consistency is greater, at 0.86 vs. 0.77. The structural isogloss appears to be most effective in dividing the dialect regions into two separate groups. It is also the criterion used in assessing the recordings analyzed in Thomas (2000) at the outset of this chapter, where a certain number of the nineteenth-century speakers in the South did not show the characteristic shift of /aw/ to the front reflected in the solid array of yellow symbols on Map 12.4.

Table 12.5. Isogloss parameters for the AWY line and /aw/ < 1500 line

	Total marked	Total inside	Total marked inside	Total marked outside	Homo-geneity	Con-sistency	Leakage
aw < 1500	183	170	140	43	0.82	0.77	0.16
AWY line	102	123	88	14	0.72	0.86	0.04

Social and phonological constraints on /aw/

Table 12.6 shows the social and phonetic conditioning of the second formant of /aw/ for the eight regions that were tabulated in Tables 12.2 and 12.4. There is an immediate and striking contrast of age coefficients. Table 12.2 showed significant negative age coefficients for the fronting of /uw/ in all but one region, and Table 12.4 showed a similar pattern for /ow/ in all but the two most conservative regions. But there is no indication of fronting in apparent time for /aw/. Table 12.6 shows that three regions – the two most advanced and the one least advanced – show positive age coefficients, suggesting a shift towards backer forms of /aw/. The others show no significant relation to age coefficients.

The Mid-Atlantic region is of particular interest here because the fronting of /aw/ in Philadelphia is one of the new and vigorous changes found in that city from the 1970s on, and it has been used as a model of the social trajectory of a linguistic change (Labov 1990, 2001). ANAE analyzes acoustically a set of 15 Mid-Atlantic speakers from Wilmington (4), Baltimore (2), Philadelphia (3), and four from central and South Jersey. The strong positive age coefficient indicates the change is not characteristic of the region as a whole: in Baltimore, Wilmington, and South Jersey, it is the older speakers who show greater fronting of /aw/.[6]

The phonological conditioning of /aw/ is consistent in the sense that all trends are in the same direction, though significant correlations are not found in all regions. As in the case of /uw/ and /ow/, coronal onsets favor fronting (in *doubt*, *towel*, *now*, *sow*, etc.). Even more consistently, fricative codas disfavor fronting, (in *house*, *houses*, *mouth*, etc.) Word-final position strongly favors fronting in four of the eight regions, but not in the other four. On the whole, the /aw/ situation resembles that of /ow/ more than /uw/, since coronal onset does not play a predominant role in the relative degree of fronting or backing.

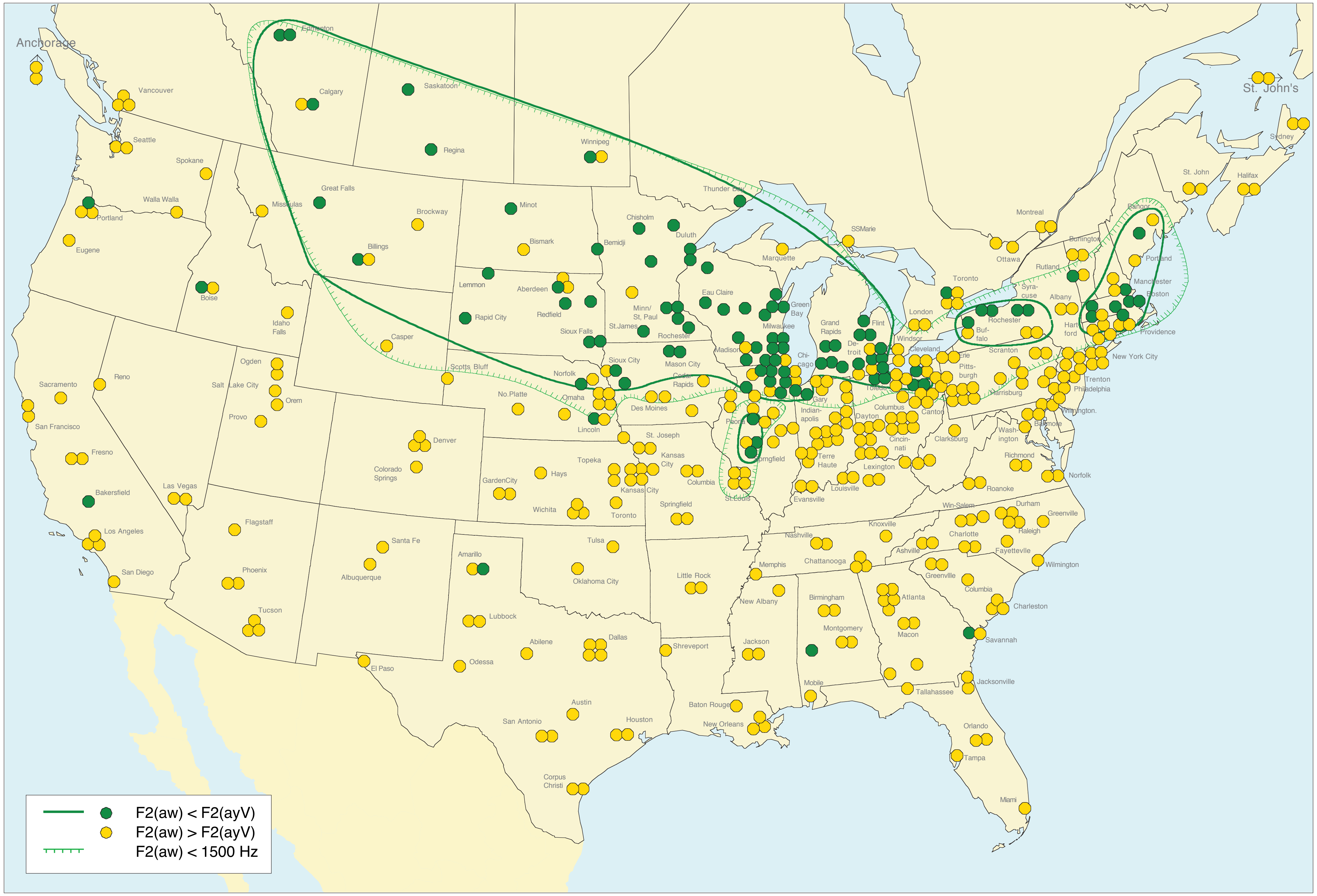
Table 12.6. Regression analysis of F2 of /aw/ by region
Significance: *** $p < .001$, ** $p < .01$, * $p < .05$

	N	Mean	Age*25	City pop'n	Coronal Onset	Fricative Coda	Word Final
Mid–Atlantic	209	1,870	116***	134***	101*	−229**	–
South	1,393	1,812	26***	−64***	–	−43**	140***
Midland	929	1,739	–	34***	35*	−128***	114***
West	571	1,655	–	–	146***	−188***	–
Western Pa	230	1,637	–	−298***	–	−91*	217***
Canada	604	1,597	–	–	78***	−47*	89***
E.N.E.	113	1,505	–	−285***	86*	−236***	–
North	11,610	1,468	32***	–	66***	−102***	–

The final member of the back upgliding class is /iw/, the high front rounded vowel that was the result of the loss of /y/ before /uw/ after coronals in *dew*, *suit*, *chew*, *fruit*, *tube*, etc. Map 8.3 presented the minimal pair data on this contrast, showing that the opposition of /iw/ and /uw/ is now confined to two small areas in the South. For the great majority of the Telsur speakers, /iw/ does not exist as a separate phoneme, but is merged with /uw/. The fact that /iw/ exists only after coronals links it with the behavior of /uw/ after coronals. It seems likely that there is a structural connection between the merger of /iw/ and /uw/ and the strong fronting of the merged phoneme after coronals.

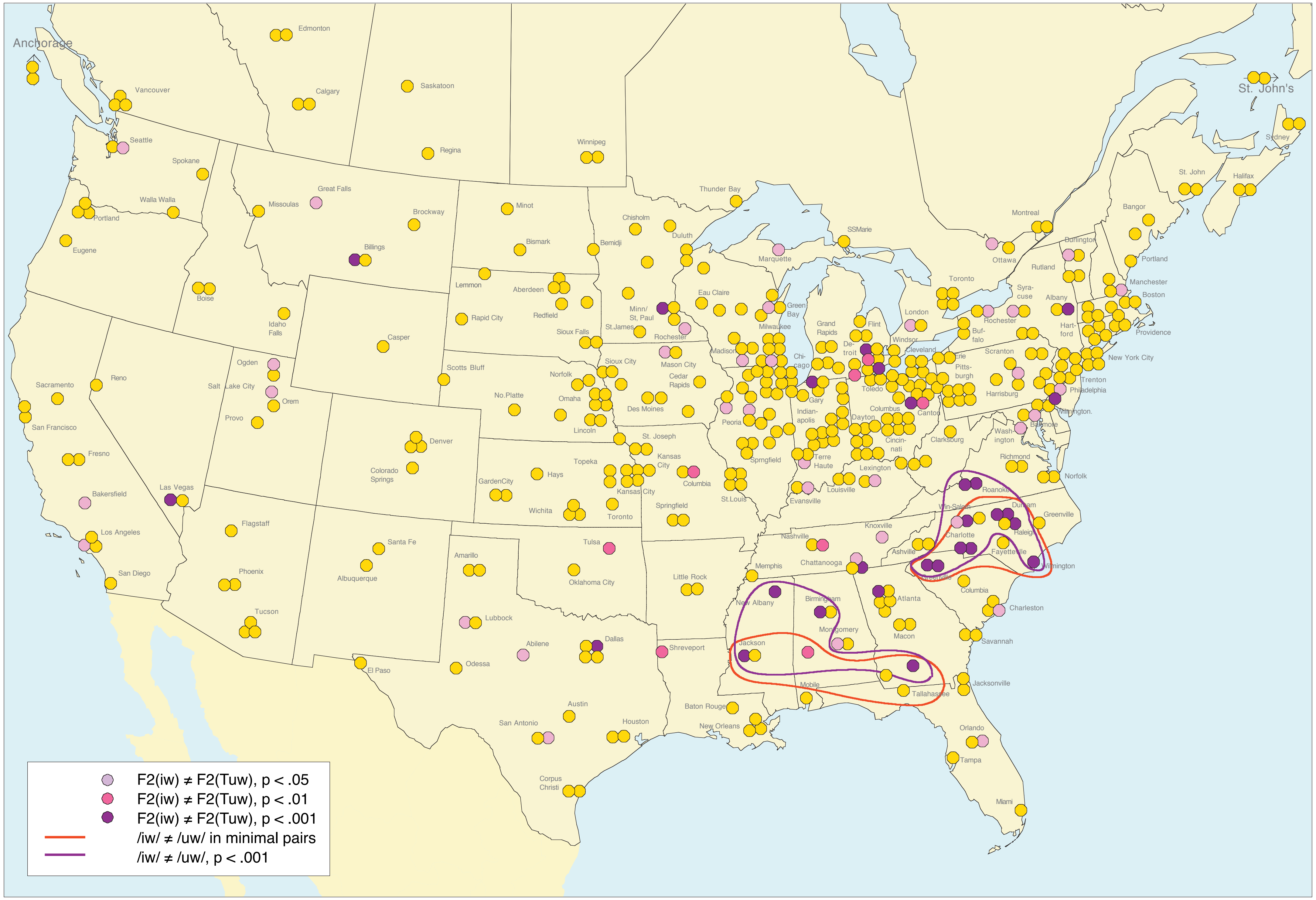
12.6 Map 12.6 superimposes the results of acoustic measurements of the /uw/ and /iw/ classes on the minimal pair data of Chapter 8. Because the /iw/ class is relatively small, mean differences between /iw/ and /uw/ must be tested for statistical significance. The light red symbols on Map 12.6 are speakers for whom the difference in the means of /iw/ and /uw/ shows a *t*-test probability of less than .05, The magenta symbols show a probability less than .01, and the purple symbols

6 In a recent re-study of Philadelphia with 73 subjects, Conn (2005) finds that two of the new and vigorous changes, the fronting and raising of /eyC/ and the raising and backing of /ay0/, have proceeded further but that the fronting and raising of /aw/ is receding among younger speakers.



Map 12.5. The relative frontness of /aw/ and /ay/: The AWY line

The dark green isogloss represents the structural relationship between /aw/ and /ay/, which is geographically sharper than the division that results from using the phonetic criterion of Map 12.4 (the light green isogloss). The dark green isogloss is also closer to the North–Midland bundle of isoglosses that divides the eastern United States into the North and the Midland regions (Chapters 11, 14).



Map 12.6. The status of /iw/

The phonemic distinction between /iw/ and /uw/ in *dew* ~ *do*, *lute* ~ *loot*, has almost disappeared from North America. The red isogloss shows those narrow areas of the South where Telsur subjects showed a consistent distinction in minimal pairs. The symbols colored dark, medium, and light purple show acoustic patterns in spontaneous speech that support such a distinction. The dark purple isogloss surrounds the communities where *t*-tests show that the difference between the two categories would arise by chance less than once in 1000 trials.

less than .001. Since we are testing 439 speakers, we can expect some 22 results at the .05 level purely by chance. There are in fact 25, and the light red symbols may safely be ignored. The purple symbols indicating a .001 effect are concentrated in the South; there are only four tokens scattered in other regions. The purple isogloss is the outer limit of communities where /iw/ differs acoustically from /uw/ at the $p < .001$ level.

The red isoglosses on Map 12.6 are not derived from the pink, magenta, and purple symbols on this map, but are superimposed from the minimal pair data of Map 8.3. They show the regions where there is a dominant tendency for speakers to judge /iw/ and /uw/ as different and to produce them as different in minimal pairs. The purple isogloss shows the outer limit of a clear difference in production of /iw/ and /uw/. There is a general coincidence of the two ways of recording the distinction, in North Carolina, and in the southern section of the Gulf States.

In the treatment of /uw/ in Maps 12.1 and 12.2, vowels before /l/ were excluded since they showed no tendency toward fronting.[7] The South is an exception to this generalization, as shown in Figure 12.7. The dialect regions of North America are arranged from right to left in order of increasing mean value of F2 for /Tuw/, as indicated by the magenta line. The dark blue line shows the mean value for /uw/ before /l/, which is maintained below 1000 Hz for all regions except the South. The display of /uwl/ by region shows somewhat higher values in the Texas South and Inland South. But while the differences between the three Southern dialects and all others are significant at $p < .0001$ (t = 6.38, d.f. = 1331), differences among the Southern dialects are not significant.

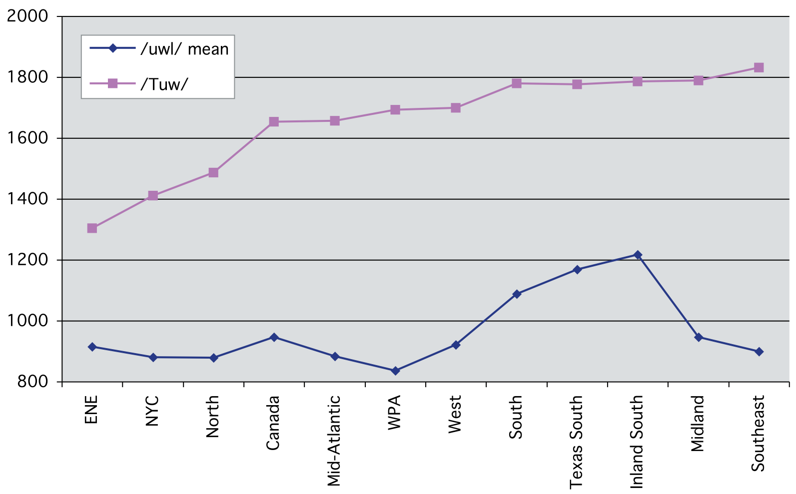
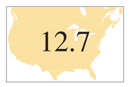


Figure 12.7. Second formant of /Tuw/ and /uw/ before /l/ by Region. Inland South and Texas South separated from other regions of the South



Map 12.7 locates the extreme development of the fronting of /uw/ before /l/ by identifying the speakers with /uwl/ greater than 1550 Hz, the general mid-line of the Telsur sample. The size of the red circles indicates the number of tokens with this characteristic. Though only a few speakers have such an extreme development of /uwl/, the map shows that this feature is concentrated in the Texas South more than the Inland South and in the area of cenreal North Carolina isolated in Map 12.6. Map 12.7 also locates an area of high fronting of /uwl/ that has not been identified as a leading subsection of the South up to now; this area includes most prominently Little Rock in Arkansas, and it extends northward to Springfield, Missouri, and southward to the Mississippi delta.

The social parameters of this fronting of /uwl/ are different from that of /uw/ as a whole, as a comparison of Table 12.7 with Table 12.1 makes clear. The age coefficient for F2 of /uw/ as a whole in Table 12.2 is −101 Hz, indicating a 100 Hz shift frontward with each younger generation. Table 12.7 shows the opposite: a large positive value of 187, indicating a rapid retreat in apparent time. The gender situation is accordingly reversed; in place of a positive value of 42 for female gender, we have a negative value of −78. The phonetic parameters, on the other hand, are similar; the two features of the onset are strongly positive for coronal, and negative for labial.

The educational profile for the fronting of /uwl/ is also similar to that for /uw/ in general. The negative coefficients for education indicate that those with intermediate educational status show the strongest retreat from the fronting of /uw/ before /l/, As in other studies, this intermediate group shows a greater sensitivity to social stigma than those who are lower or higher in the socioeconomic scale (Labov 1972: Ch. 5). From the evidence of age, gender, and educational coefficients, it seems that the fronting of /uw/ before /l/ has received a certain amount of social stigma, although this effect has not risen in social consciousness to the level of a stereotype, available for overt discussion of Southern speech.

Table 12.7. Regression analysis of F2 of /uw/ before /l/ in the South

	Coefficient	Probability
Age (* 25 yrs)	187	≤ 0.0001
City size (*10^6)	−123	≤ 0.0001
Female	−78	≤ 0.0001
Coronal onset	138	0.0031
Labial onset	−86	≤ 0.0001
H.S. education	−55	0.0163
Some college	−59	0.0021

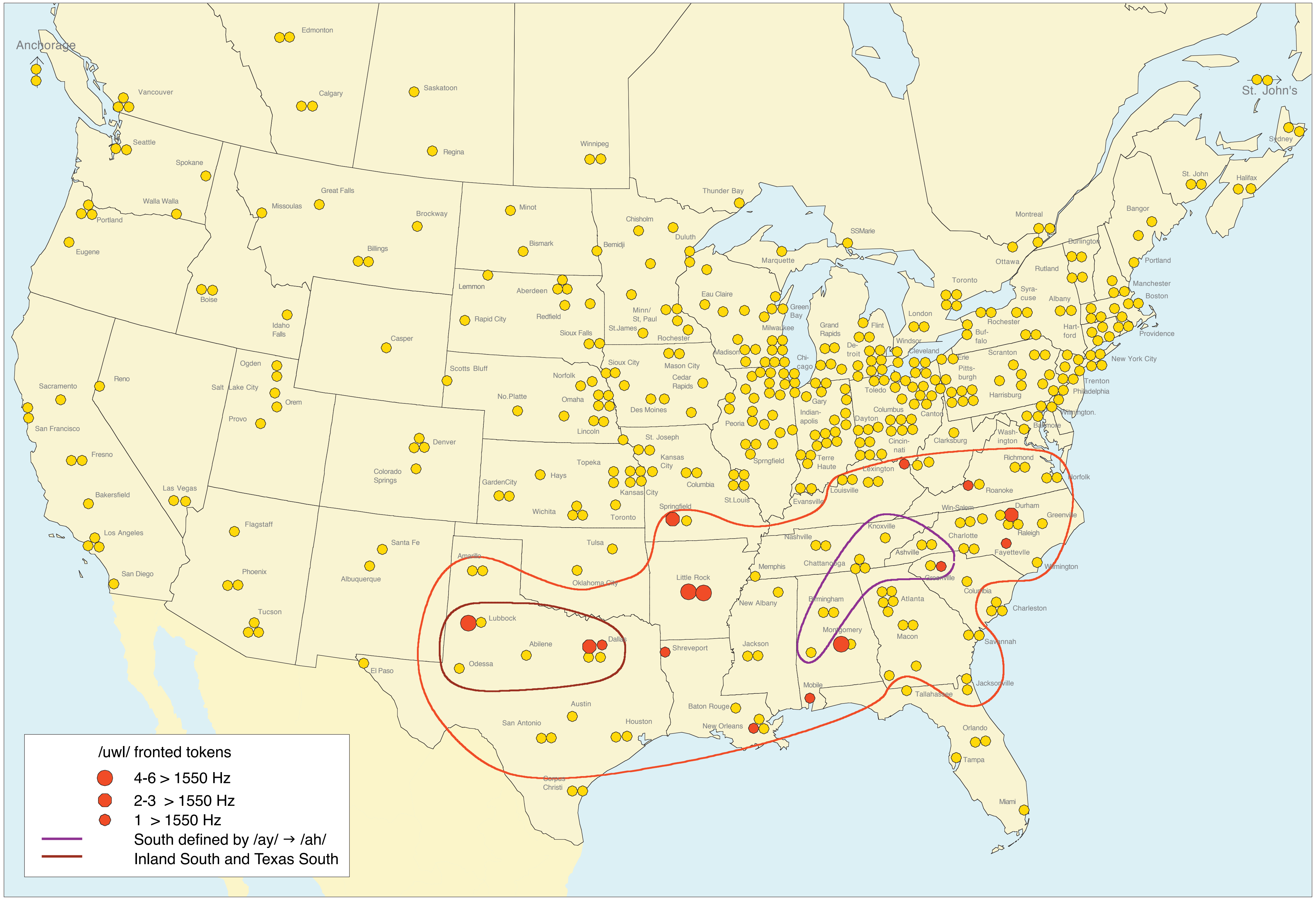
The overall view of /uw/ fronting in the South shows that it is advancing with younger speakers, though not as strongly as in some other sections of the country. Strong fronting of /uw/ and /ow/ is even more of a Midland feature than a Southern feature. The marginal areas of the South included in the Southeast region are carried along in a general Southeastern fronting. The general tendency to front /uw/ does not include fronting before /l/, which is in retreat in the one area where it developed. Finally, fronting has never affected vowels before /r/ in any section of North America.

12.4. Individual vowel systems

This section will present individual vowel systems that exemplify the various types of fronting, or absence of fronting of back upgliding vowels, in North American English. The phonetic conditioning shown by the regression coefficients in the various tables will here be illustrated by the words that most strongly favor and disfavor fronting. Most of the vowel systems presented in this section show no fronting before /l/, so that the degree of fronting of a given vowel can be measured by the distance of the main distribution of tokens from those before /l/.

The most conservative dialect, Providence, Rhode Island, is displayed in Figure 12.8. In this system, the means of all Vw vowels remain back of center. Vowels after coronal onsets (/Tuw/) are just short of mid position (*two*, *too*, *do*) and the other set (/Kuw/), is not much fronter than /uwl/ (*boots*, *roof*, *goose*). The representatives of the /iw/ class – *Tuesday*, *stupid*, *studios* – are further back than

7 This is a common characteristic of vowels before liquids, and it holds even more strongly for /r/ than for /l/. Since Plotnik treats vowels before /r/ as separate categories, vowels before /r/ did not appear in the vowel systems of the preceding section.



Map 12.7. Fronting of /uw/ before /l/

In most of North America, there is a strong prohibition against fronting of /uw/ or /ow/ before liquids /l/ and /r/, but throughout the South such fronting is common. This thematic map shows by the size of the red circle the frequency of fronted /uwl/. It is concentrated in the Inland and Texas South, but also quite prominent in Little Rock, Arkansas, where other features of Southern States phonology are not very far advanced.

the mean of /Tuw/. But they are also higher, a dimension that we do not usually take into account. The same phenomenon is seen in the vowel systems of all three Providence speakers.

In Figure 12.8, /ow/ is not fronted at all, except for one token of *toast*. The word that is usually in the forefront of /ow/ fronting, *go*, is firmly a back vowel.

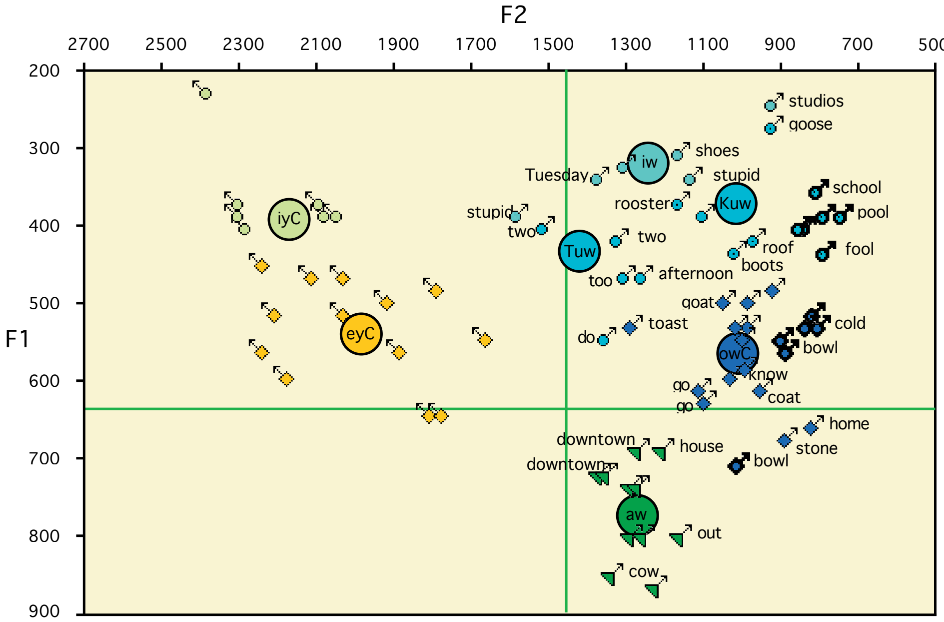


Figure 12.8. Absence of Vw fronting in vowel system of Alex S., 42, Providence, RI, TS 474. Back vowels before /l/ highlighted

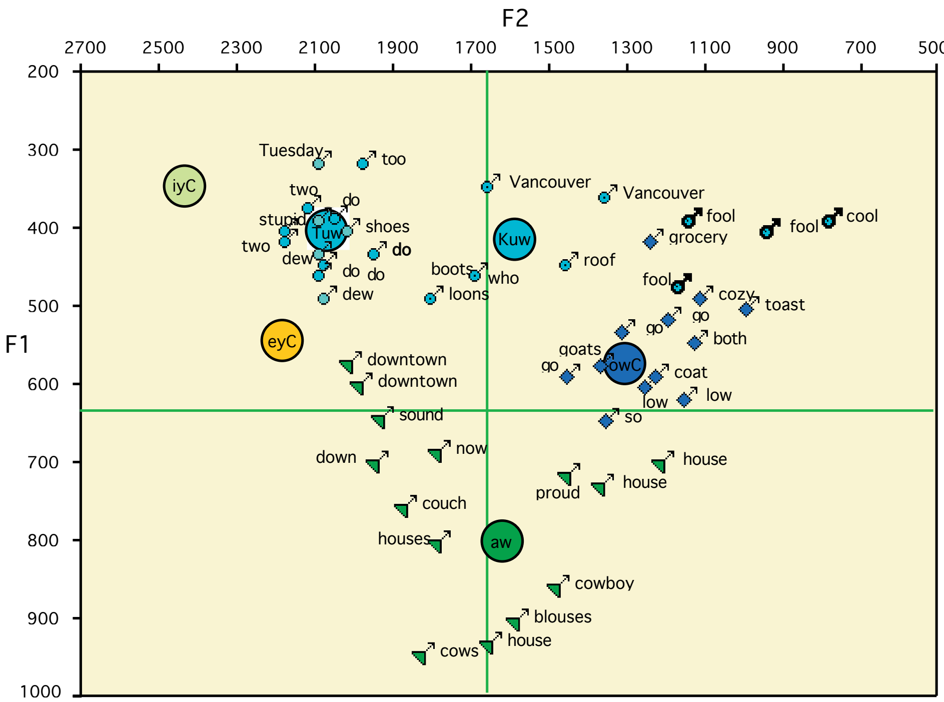


Figure 12.9. Canadian pattern of /Tuw/ fronting in vowel system of Lena M., 34, Toronto, ON, TS 645. Vowels before /l/ highlighted

The /aw/ class is also squarely back of center, as in most Northern systems, and even /aw/ before nasals is found back of center.

The large northwestern area comprising Canada and the West shows common properties in the fronting of Vw words. In this system, the vowel /uw/ is fully fronted after coronals but only moderately after non-coronals, and /ow/ remains fully back. As an example, Figure 12.9 displays the Vw vowel system of Lena M., a 34-year-old woman from Toronto. The /Tuw/ class is fully fronted, with a mean well beyond 2000 Hz, (*two*, *too*, *do*), intermixed with the /iw/ class in the same position (*Tuesday*, *stupid*). In fact the mean for /iw/ is identical with that of /Tuw/ and is concealed by it. The /Kuw/ class (*boots*, *roof*) is back of center, though considerably advanced beyond /uwl/.

The nucleus of /ow/ remains fully back in Figure 12.9. The word *go*, usually the frontest member of the class, is well back of mid position.

Toronto is outside the Northern area in which /aw/ is backer than /ay/ (Map 12.5). Figure 12.9 shows that about half of the non-nasal /aw/ tokens are front of center, with the vowels before nasal consonants fronted even further and raised. The two back tokens of *house* reflect the Canadian raising of /aw/ before voiceless consonants (Jooa 1942, Chambers 1973). The pattern is not as clear as usual, however, since *proud* is close to these tokens and another *house* is in low central position.

The characteristic Vw pattern of the West is similar to that of Canada, with /Tuw/ and /iw/ fronted together, /Kuw/ well behind, and little observable shift of /ow/. Figure 12.10 is the vowel system of a 55-year-old woman from Reno, Nevada that exemplifies this pattern. The /iw/ and /Tuw/ classes are not distinct and no tokens have F2 greater than 1900 Hz. There is a great distance between these vowels and the /iy/ mean. The /Kuw/ allophone is located firmly back of center, but well fronted in comparison with /uwl/. On the other hand, /ow/ shows no signs of fronting except for the word *no*. The /aw/ class is just front of center, but without any trace of Canadian raising.

In Maps 12.3 and 12.4 it appeared that the most extreme fronting patterns are not found in the South, but in various areas of the Midland. Figure 12.11 shows the vowel system of a 37-year-old woman from Columbus, Ohio. The means of

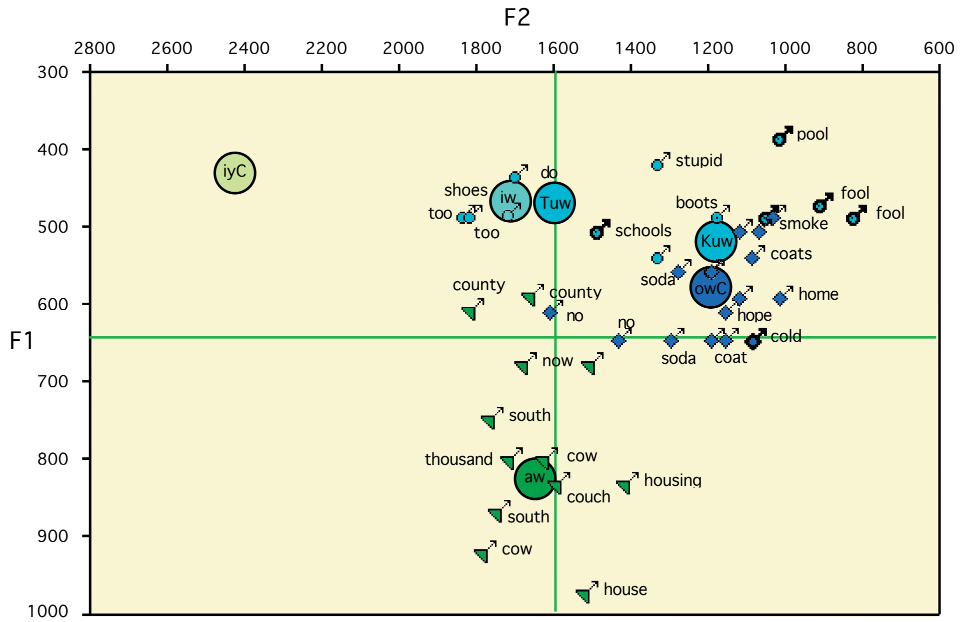


Figure 12.10. Western pattern of Vw fronting in system of Ira H., 55, Reno, NV, TS 312. Vowels before /l/ highlighted

/iw/, /Tuw/, /Kuw/, /ow/, and /aw/ are all well front of center. The only vowels remaining in back position are those before /l/; the remainder form tight groups front of the midline. The /iw/ class (*juice*, *dew*) is slightly front of /Tuw/ (*Doodie*, *two*) but not significantly so. The /Kuw/ class (*boots*, *hoot*) is also front of center, in contrast to the pattern of Figure 12.9.

The main body of /ow/ words are tightly clustered front of center, with *go*, the most advanced token, in front nonperipheral position. The back /ow/ vowels are those before /l/, along with the single word *home*, which is a regular exception to fronting.

The /aw/ class is more consistently fronted than in the previous diagrams, with the nasals leading. Note that /aw/ before /l/ (*owl*) is well to the front unlike pre-lateral tokens of /uw/ and /ow/.[8] Here the relative positions of /ow/ and /aw/ suggest a chain shift, with /ow/ in nonperipheral position and /aw/ in peripheral position.[9]

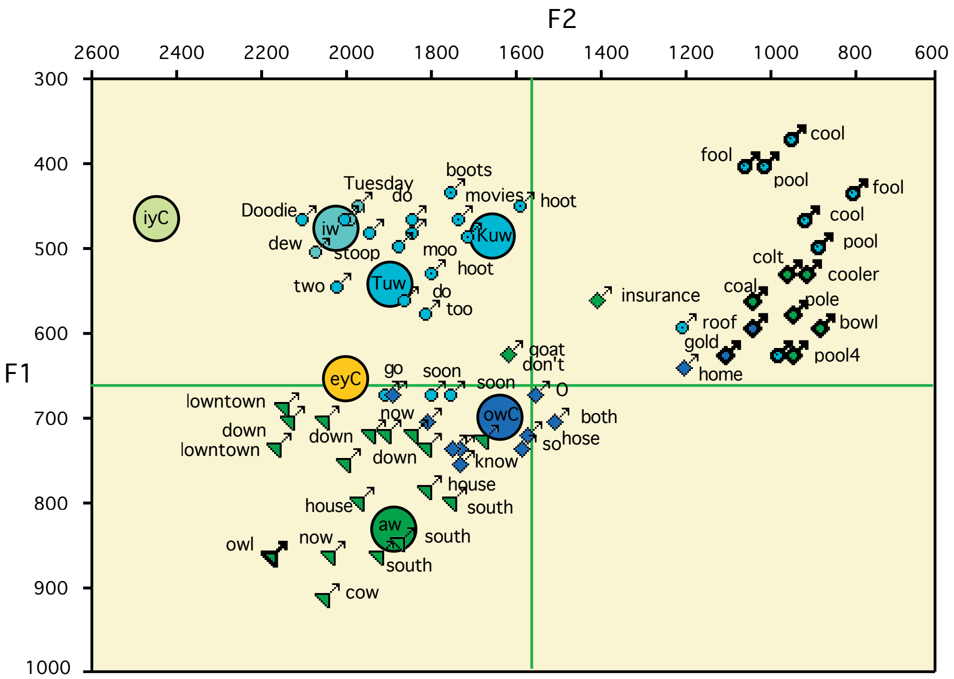


Figure 12.11. Fronting of all Vw in the vowel system of Danica L., 37, Columbus, OH, TS 737. Vowels before /l/ highlighted

The northern cities of Ohio contrast sharply with the strong fronting found in Columbus and the other cities in the Midland dialect area. Figure 12.12 shows the conservative pattern of /ow/ in the vowel system of a Cleveland speaker. While the main body of /ow/ words is not as far back as /ow/ before /l/, none of them approaches the center, and they are heard as back vowels. In this Northern system, Tuw is well fronted (*do*, *two*) but /Kuw/ is well back of center (*roof*, *coop*, *boots*). One can also note the conservative behavior of /aw/; Cleveland is north of the green isoglosses of Map 12.4.

Figure 12.13 shows the strong fronting of Vw in a southern system where /iw/ is preserved as a separate category, the vowel system of a 45-year-old man from Charlotte, N.C. The /iw/ class (*news*, *dew*, *new*, *shoe*, *Duke*) is in high front position. It is the frontest vowel of the system since the nucleus of /iy/ has undergone the Southern Shift and its mean is lower and backer than the mean of /iw/.[10] This /iw/ class is higher and significantly fronter than /Tuw/ (*do*, *two*), with no overlap.

In Figure 12.13, the /Kuw/ allophone (*through*, *blue*, *roof*) is well back of center and only moderately fronted. The /ow/ mean is also back of center. How-

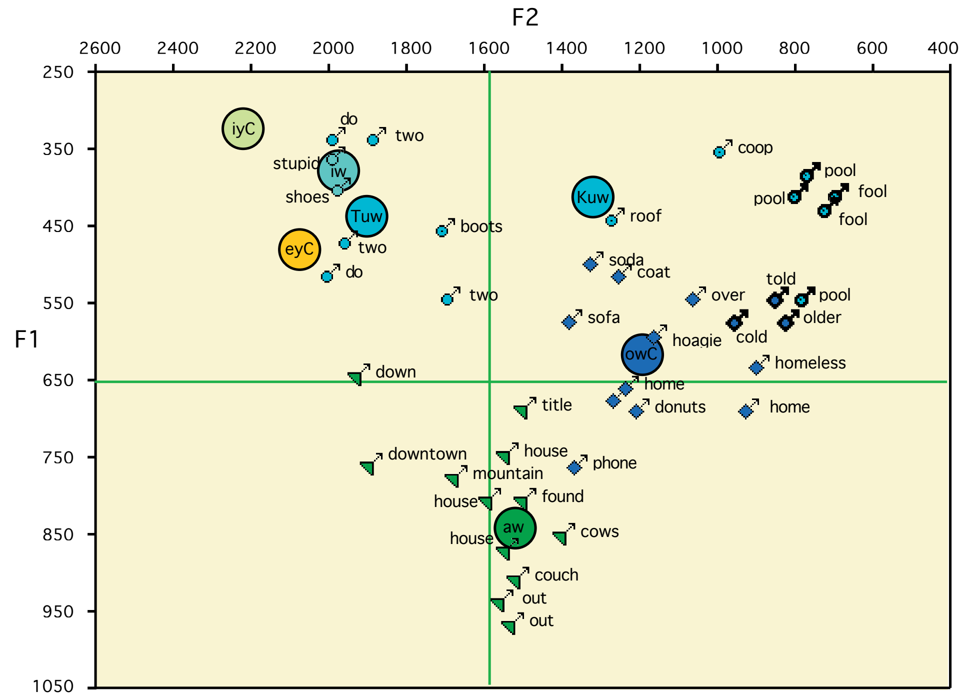


Figure 12.12. Conservative /ow/ in the vowel system of Alice R., 32, Cleveland, OH, TS110. Vowels before /l/ highlighted

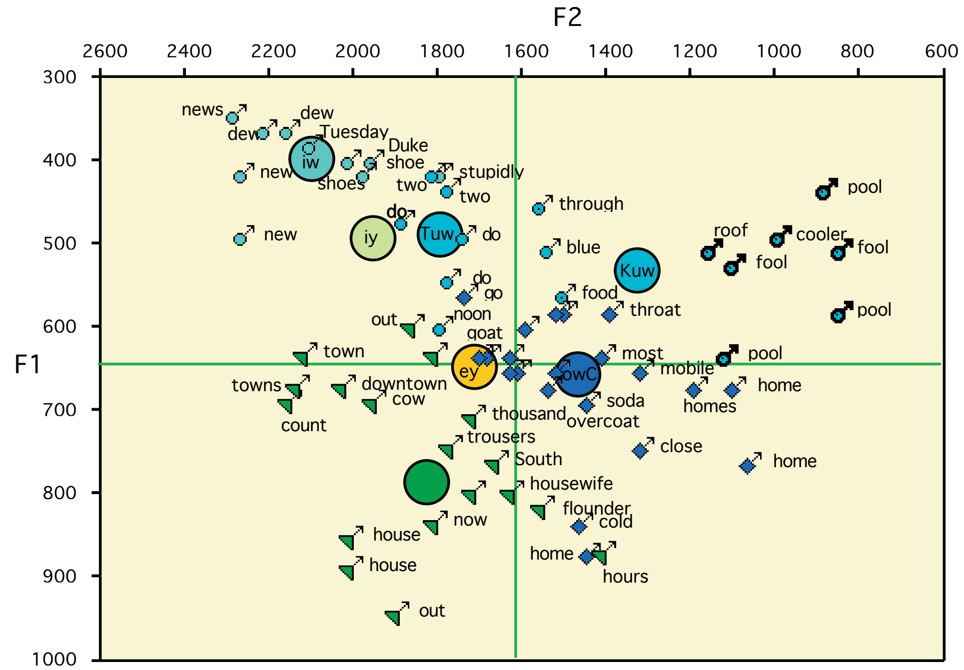


Figure 12.13. /iw/ distinct from /uw/ in the vowel system of Matthew D., 45, Charlotte, NC, TS 483. Vowels before /l/ highlighted

8 This is not a general feature of /aw/ for all regions. But in the regression analysis of the fronting of F2 in the Midland, a following /l/ has a positive coefficient of 130, with a p value of $< .01$.

9 This pattern is replicated in the Philadelphia vowel system (Labov 2001).

10 Most short /i/ tokens have not moved to peripheral position, so that the mean of /i/ is close to that of /iyC/.

ever, the most favored forms with velar initial (*go*, *goat*) are located front of center and overlap with the centralized and lowered nucleus of /eyF/. On the other hand, /aw/ is well fronted, with the nasal allophones raised, and only the least favored forms (*flounder*, *hours*) remain back of center.

In Southern dialects where /iw/ has completely merged with /Tuw/, there is no longer any impediment to the fronting of the high vowels. Figure 12.14 is the vowel system of a 34-year-old woman from Lexington, Kentucky. All of the non-lateral high back upgliding vowels are clustered together in high front, non-peripheral position, with a majority of the F2 measurements above 2000 Hz. The distance between these fronted forms and the /uwl/ forms is 1000 Hz.

For this Lexington speaker, /ow/ is not as fully fronted as in the Midland pattern of Figure 12.11, though there is considerable lowering, mirroring the lowering of /eyC/. The mean value would be considerably fronter if the lexical exception *home* were excluded. The wholesale fronting of /aw/, with raising of vowels before nasals, is notable in this dialect.

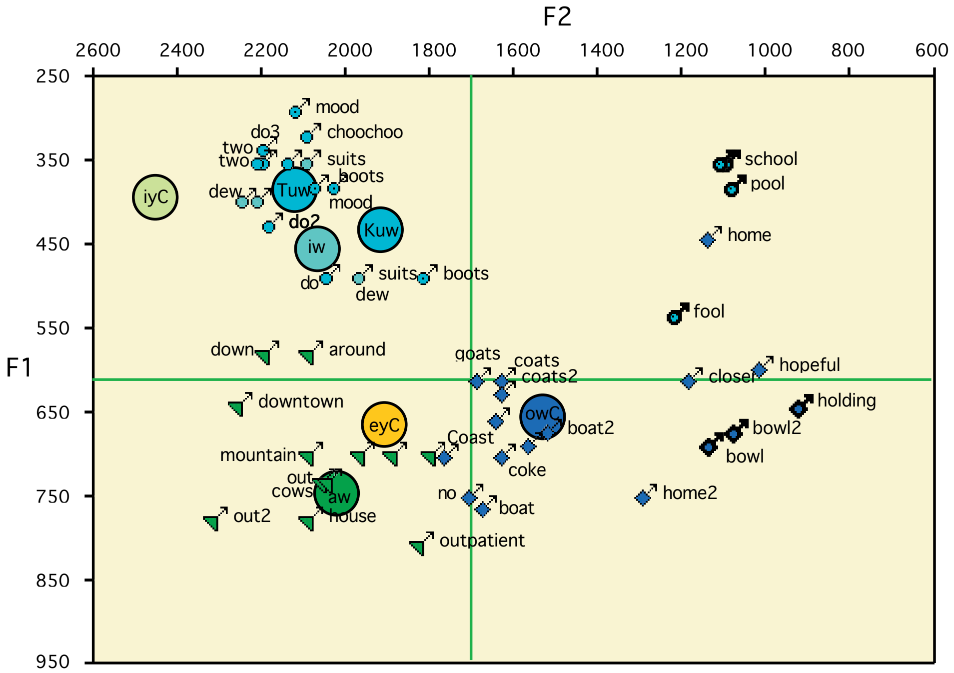


Figure 12.14. Fronting of all /Tuw, Kuw, iw/ in the vowel system of Fay M., 34, Lexington, KY, TS 283. Vowels before /l/ highlighted

Figure 12.15 displays extreme fronting in the vowel system of a 71-year-old woman from Little Rock, Arkansas. Because so many vowels are strongly fronted, the grand mean of this particular system is shifted forward 100 Hz from the usual normalized mean of 1550 Hz. There is marked fronting of /uw/ before /l/. The /uwl/ vowels for *fool* have F2 higher than 1550, and both *tool* and *foolish* are fronter than the grand mean of this system, at 1650 Hz. Tokens of /uwl/ with coronal onsets (*tool*, *tooling*) are even fronter than many /Kuw/ tokens. They are however not as far front as /Tuw/, which has the same mean as /iw/, with some tokens above 2200 Hz.

The /ow/ tokens are fronted as far as in most Southern systems, but not to the midline of this system. On the other hand, all /aw/ tokens are tightly clustered in low front position with higher F2 values than the mean of /eyC/. Map 12.4 showed that extreme fronting of /aw/ is characteristic of this region.

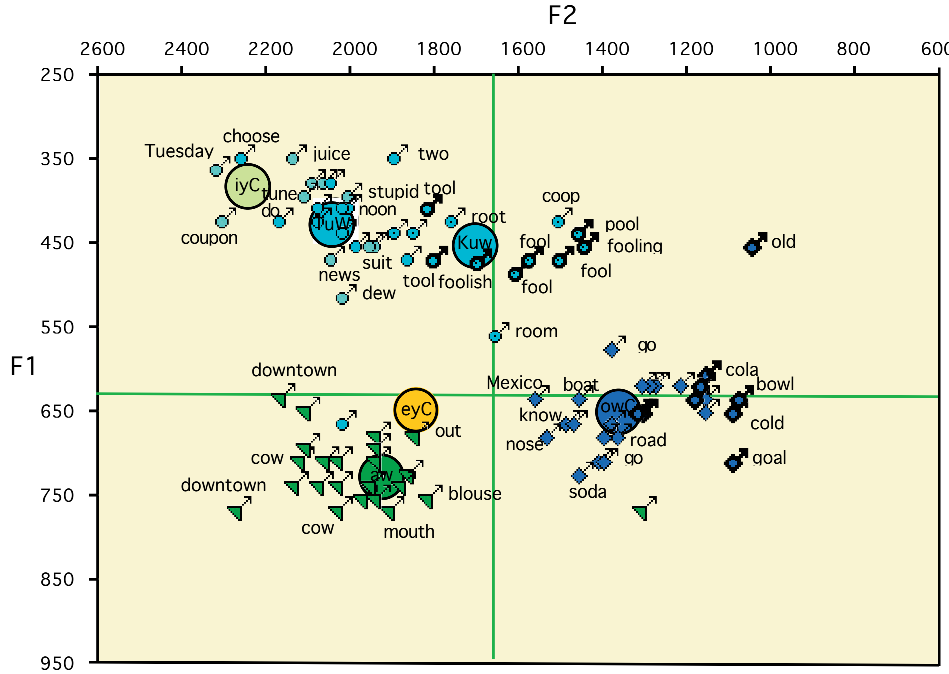


Figure 12.15. Fronting of /uwl/ in the vowel system of Mary K., 71, Little Rock, AR, TS 402

12.5. Overview

A review of the back upgliding vowels shows that the fronting process is general across North America. The earliest of these three movements appears to be /aw/, followed by /uw/ and then /ow/. In general, the position of /aw/ appears to have reached a maximum and may be beginning to recede, but active change in progress is found in the continued fronting of /uw/ and /ow/.

While the fronting of /uw/ is active across the entire continent, there is a sharp split between the North and the Southeastern region in the fronting of /ow/ and /aw/. The fronting of /ow/ is most advanced in the Mid-Atlantic region but is also seen to be advancing in apparent time in all other areas except the North and Canada. The fronting of /ow/, like the fronting of /aw/, is sharply constrained by the North–Midland border, while the fronting of /uw/ is not.

In general, there is no fronting of Vw vowels before liquids. The one exceptional case is the fronting of /uw/ before /l/ in the South. But while /uw/ generally shows negative age coefficients, indicating an active fronting in apparent time, the fronting of /uw/ before /l/ shows the reverse behavior and is receding strongly across the South.

Figure 12.16 is a Plotnik Meanfile diagram of Vw, showing the relative position of the 22 dialects defined in Chapter 11 for /Tuw/, /Kuw/, /ow/, and /aw/. Individual dialects are labeled with the abbreviations introduced in Section 11.3. The /iy/ and /ohr/ means are added as points of reference to show how far Vw means are from the front and back limits of the vowel space.

It is immediately apparent that the changes affecting /uw/ now in progress are responsible for the wide range of means from 1000 Hz to 2100 Hz, in sharp contrast to the /iy/ and /ohr/ mean values, which are tightly clustered. One /iy/ value lies outside of the main distribution, the green circle with an arrow representing the Inland South at F1 456, F2 2071 (Map 12.4). Otherwise, there is no overlap of /iy/ and /uw/ means. The most advanced fronting of /Tuw/, characteristic of Charleston and the Southeast,[11] is several hundred Hertz lower than the /iy/ means, indicating that the /uw/ vowels are still rounded.

This diagram also reproduces the pattern of Figure 12.6 in the relations of /Tuw/ and /ow/. A group of Southern dialects have means of /Tuw/ well front of center, while Eastern New England and Providence are the most conservative, well back of center. The symbols with dots at the center and bold labels indicate the corresponding relations for /Kuw/, with the IS and SE means at one extreme, front of center, while Eastern New England and Providence are again in back position, not far from /ohr/.

Figure 12.16 also shows that the fronting of /ow/ is considerably behind /Tuw/. Charleston is in the lead, along with the Mid-Atlantic States, Pittsburgh, the Texas South, and the Inland South, while the New England dialects and the North are in the rear. Canada shows strong fronting of /uw/, but is quite conservative to the fronting of /ow/.

It can be seen that the realizations of /aw/ are fairly evenly divided into those back of center and front of center. Again, Eastern New England and Providence have the furthest back means, but all Northern dialects are located back of the medial green line. The strongest fronting is found in the Mid-Atlantic dialect, but the three Southern dialects are not far behind.[12] New York City shows an unusual pattern, with strong fronting of /aw/ but conservative, Northern-like treatment of /uw/ and /ow/.[13]

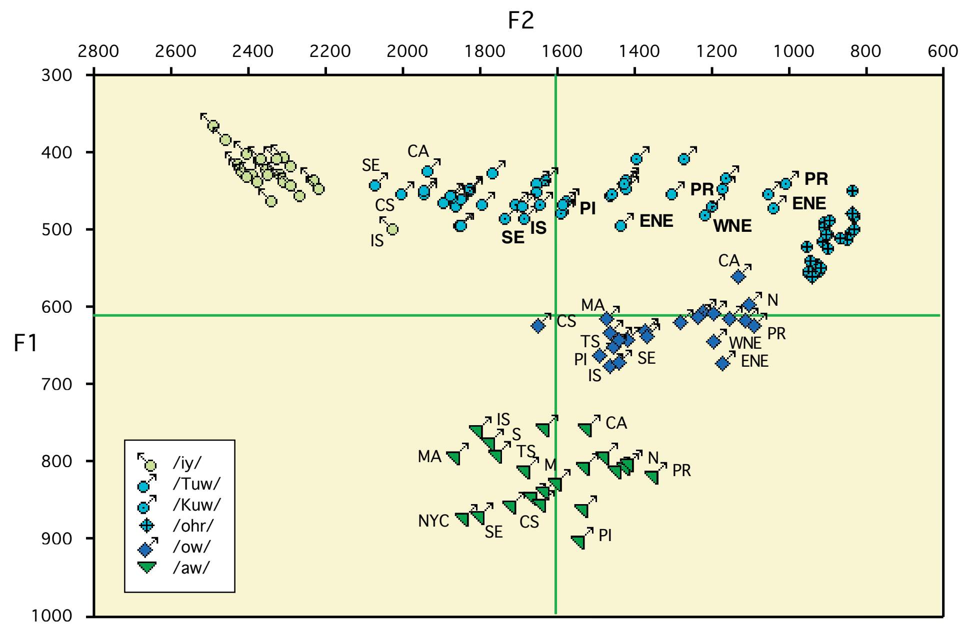


Figure 12.16. Meanfile diagram of Vw vowels for 22 dialects

11 The Southeast, as defined here, is the small group of Southern States communities that are not included in the South or the Midland, but are included in the Southeast super region on the basis of strong fronting of Vw classes.

12 It should be noted that /aw/ tokens before nasal consonants are not included in these means, but form a distinctly separate distribution further front and extending to upper mid position.

13 See Labov (1966: Ch. 10) for the early stages of the fronting of /aw/ in New York City.

13. The short-*a* and short-*o* configurations

Chapter 11 established a typology of North American dialects that is based on the phonological status of the two low short vowels /o/ and /æ/. The chain shifts in progress are to a large extent governed, or even triggered, by the merger and/or split of /o/ and /oh/, /æ/ and /æh/. Chapter 9 traced the ongoing merger of /o/ and /oh/. This chapter will present a brief account of the phonetic realizations of short-*o* and then proceed to the more complex topic of short-*a* configurations across the continent.

13.1. Short-*o* configurations

The historical short-*o* class of words is preserved in spelling as *got*, *God*, *hop*, *cob*, *hock*, *hod*, etc. To this must be added the class of words that are spelled with *a* and preceded by /w/ or /wh/. If these words end with velar consonants, they are realized as /æ/ along with other short-*a* words: *whack*, *whacky*, *wack*, *wag*, *waggle*, *wagon*, *wax*, *waxy*, etc. If the spelling shows that the syllable was closed historically with a liquid, the vowel is realized as /oh/: *wall*, *tall*, *call*, *talk*, *balk*, *caulk*, *stalk*, *wart*, *warm*, *wharf*, *warp*. In the case of /r/, the coda can be simply /r/, as in *war*. Otherwise, words spelled historically with *a* and preceded by /w/ join the /o/ class: *wasp*, *wander*, *Watson*, *wad*, *waddle*, *wadding*, *wan*, and (variably) *want*, *watch*, *wallet*. Some of these, like *watch* and *wallet*, appear variably with /oh/ in dialects that maintain the /o/ ~ /oh distinction. *Water* commonly occurs with /oh/, but the alternation with /o/ is frequent and a matter of much social comment.

The formation of the /oh/ class and the opposition of /o/ and /oh/ was discussed in Chapter 9, along with the migration of a large number of /o/ words into the /oh/ class in North America. For dialects where /o/ merged with /oh/, there is no further history of /o/ to be discussed, since it then forms a part of a long and ingliding vowel that occurs in final as well as checked position. For those that do not merge /o/ with /oh/, the most common sequence is for /o/ to merge with /ah/. The /ah/ class has a small nucleus of native words: *father*, *pa*, *ma*, to which are added a large and variable class of loan words, the "foreign a" class (Boberg 1997): *pasta*, *llama*, *macho*, *taco*, *Mazda*, *teriyaki*, *pajamas*, etc. When /o/ is unrounded it normally merges with the /ah/ class, and becomes a low central peripheral vowel. Among the dialects where /o/ and /oh/ are distinguished, it is only in the South that this combined class remains a low back rounded short vowel in opposition to the long and ingliding vowel /oh/. As Chapter 18 will show, the differentiation of these two vowels is developed further when /oh/ shifts from a long and ingliding vowel to the back upgliding subsystem as /aw/.

The realization of the short-*o* class

Map 13.1 displays the realization of /o/ in both phonetic and phonemic terms. As in Chapter 11, the green-oriented isogloss defines the region in which /o/ and /oh/ are merged. The red isogloss outlines the region in which /æ/ is raised as a whole, with a mean value for non-nasal environments of less than 700 Hz. These red symbols denote speakers for whom the /o/ ~ /oh/ distinction is preserved by the fronting of /o/, with an F2 greater than 1400 Hz. The red symbols fill the /æ/-raising area, but extend beyond it westward to an area of eastern South Dakota and western Iowa, and also are heavily concentrated in western New England. Very few red symbols are found outside of these areas.

13.1

The blue symbols are speakers with back (and usually rounded) /o/, with F2 values of less than 1200 Hz, while the yellow symbols are the residual, or unmarked case of F2 greater than 1200 Hz but less than 1400 Hz. It is the distribution of the blue symbols that is noteworthy here. There are none in the Inland North. The heaviest concentrations are to be found in the low back merger region, especially in western Pennsylvania and Canada, where the merger is realized in low back rounded position. Table 13.1 shows the extent to which the back position of /o/ is associated either with the low back merger, or the diphthongization of /oh/. Only six blue tokens are found in other regions.

Table 13.1. Distribution of low back rounded forms of /o/

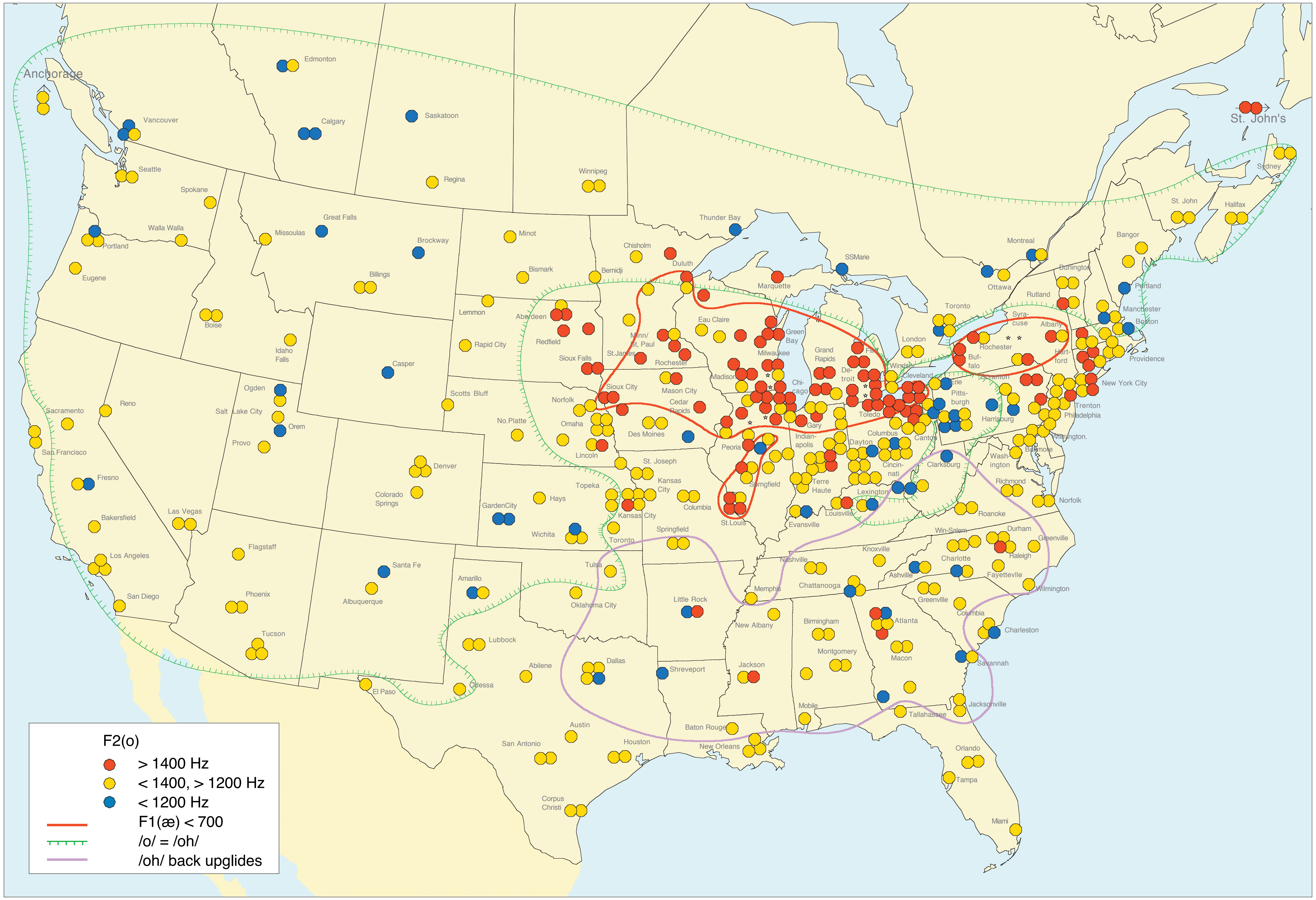
	No. speakers	Low back rounded vowel	Percent
Area of low back merger	136	37	27%
Area of back upglide chain shift /oh/ → /aw/ →	62	12	19%
Other	242	6	2%

In the initial position of Chapter 2, the /ah/ class of *father*, *spa*, *pa*, *garage*, *Bahamas*, etc. is presented as distinct from /o/, although for the majority of speakers, these two classes are firmly merged. Map 13.2 identifies those areas in which the two classes are distinct. The data here are somewhat sparse; /ah/ is not frequent in spontaneous speech, and no minimal pairs were elicited in the Telsur interview. Such pairs are rare and marginal (e.g. *bomb* ~ *balm* for the diminishing number who do not pronounce the /l/ in *balm*). We therefore have data on /ah/ and its relation to /o/ for only 310 of the 439 Telsur speakers who were analyzed acoustically.[1]

13.2

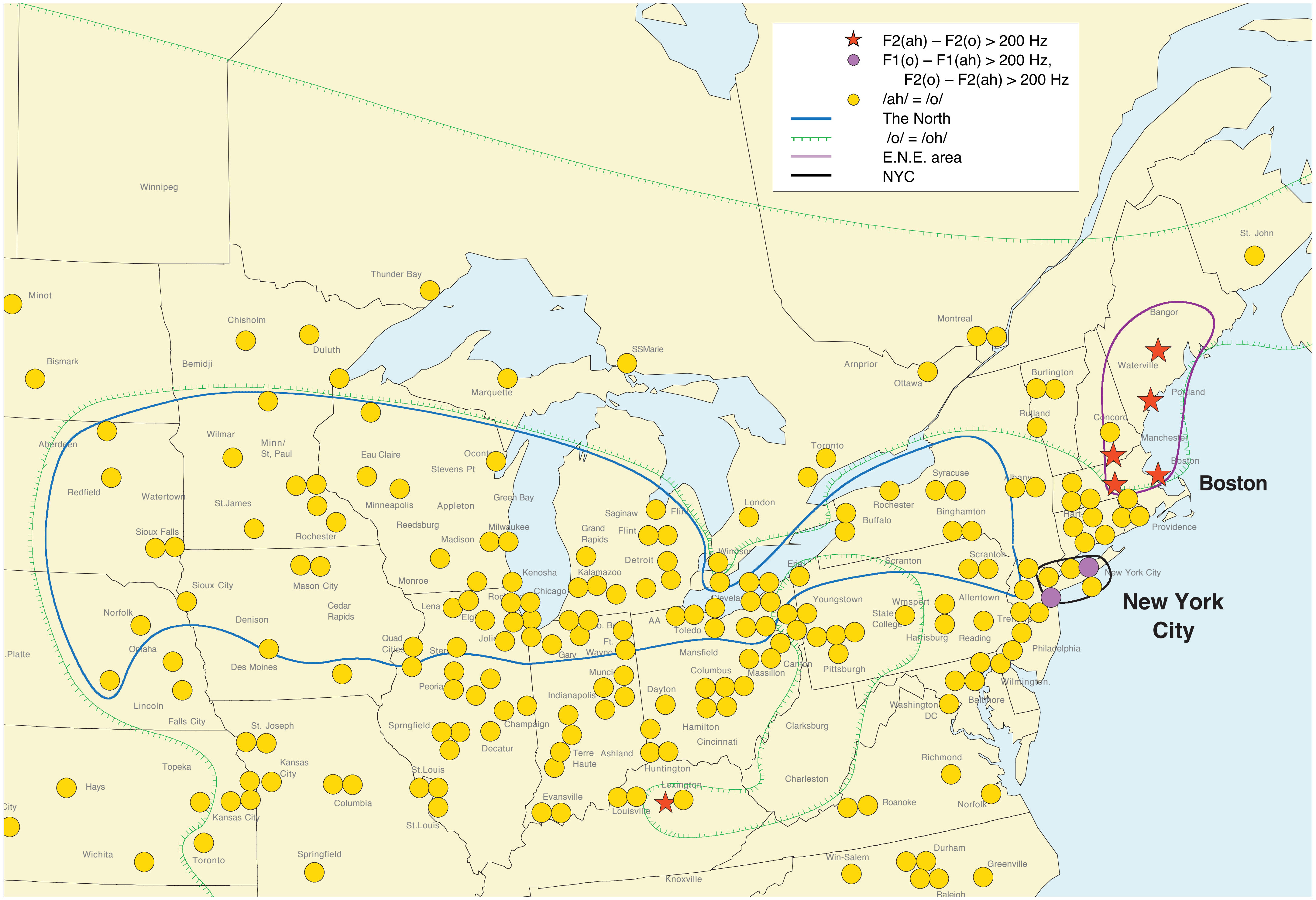
For the great majority of the speakers – shown as yellow symbols on Map 13.2 – there is no evidence of a phonemic difference between /o/ and /ah/. For those within the green-oriented isogloss, /ah/ forms part of the low back merger, so that the vowels of *pa*, *paw*, *pot*, *pod*, *pawed*, *taught*, form a single phoneme. For those outside that isogloss, where /o/ is generally distinct from /oh/, /o/ is unrounded as a rule and merges with /ah/, so that *pa*, *pot*, *pod* is opposed to *paw*, *pawed*, *taught*. The distinction between /ah/ and /o/ is maintained in only two narrowly circumscribed areas on Map 13.2: the area of Eastern New England centered on Boston, and some speakers in New York City. Though these areas are small geographically, they include large populations.

1 Map 32 of Kurath and McDavid (1961) gives phonetic realizations of the word *father*. Though there is a considerable variety of forms, they correspond quite closely to the vowel of /o/ except for Eastern New England.



Map 13.1. Front–back position and phonemic status of /o/ in North American dialects

The position of the word-class /o/ on the front–back dimension is closely connected with the various chain shifts that differentiate North American dialects. The red circles are the speakers with mean values of /o/ that are clearly in central (or even front) position. Red circles are dominant inside the red isogloss, which marks the general raising of (non-nasal) /æ/; this shows the close connection between these two sound changes. The fronting of /o/ extends to the east and west of the red isogloss, but not north or south of it. It is well dissociated from the area where /o/ and /oh/ merge, within the green oriented isogloss.



Map 13.2. Relations of /o/ and /ah/ in North America

In one region of North America, /o/ in *bother* and /ah/ in *father* are kept apart by the relatively front position of /ah/: in Eastern New England. In New York City, many speakers also retain the distinction between these two word classes, but here *father* is further back and higher than *bother*. In the rest of the country, /o/ of *bother*, *got*, *rock*, *Don*, etc. is not clearly distinct from /ah/ of *father*, *pa*, *spa*, etc. This merged phoneme is best noted as /o/, to retain comparability of word classes across dialects.

The criterion here is a simple acoustic one, based on F2 measurements. It appears that for some speakers, /ah/ is front of /o/. It has been found in a number of studies that a minimum of 200 Hz is needed to maintain a stable distinction on the F2 axis (LYS; Labov 1994: Ch. 12). Accordingly, for /o/ and /ah/ to be phonemically distinct in Map 13.2, the difference in the mean values of F2 must be greater than 200 Hz. This condition holds for only seven of the 310 speakers. Five are concentrated in the Boston area, where only one of the Telsur speakers fails to meet the criterion. The sixth is an isolated person in Lexington, Kentucky. The seventh (not shown in Map 13.2) is in Corpus Christi. Discounting these isolated points, it appears clear that /ah/ is maintained front of /o/ only in Eastern New England.

Figure 13.1 shows the distinction between the /ah/ and /o/ classes in the vowel system of Denise L., 21, of Boston. Figure 13.1a displays the clear separation of /ah/ and /o/. The four /ah/ tokens are well to the front of the 18 /o/ tokens, with a mean difference of 304 Hz, and a t-test value that is significant at $p < .001$. Figure 13.1b shows how this distinction is embedded in the larger system of back vowels. The /ah/ tokens (*father*, *father's*, *Bahamas*) are part and parcel of the /ahr/ distribution: /ah/ and /ahr/ are merged in this *r*-less dialect (Chapter 7). The /o/ class is merged with the /oh/ class in low back position.

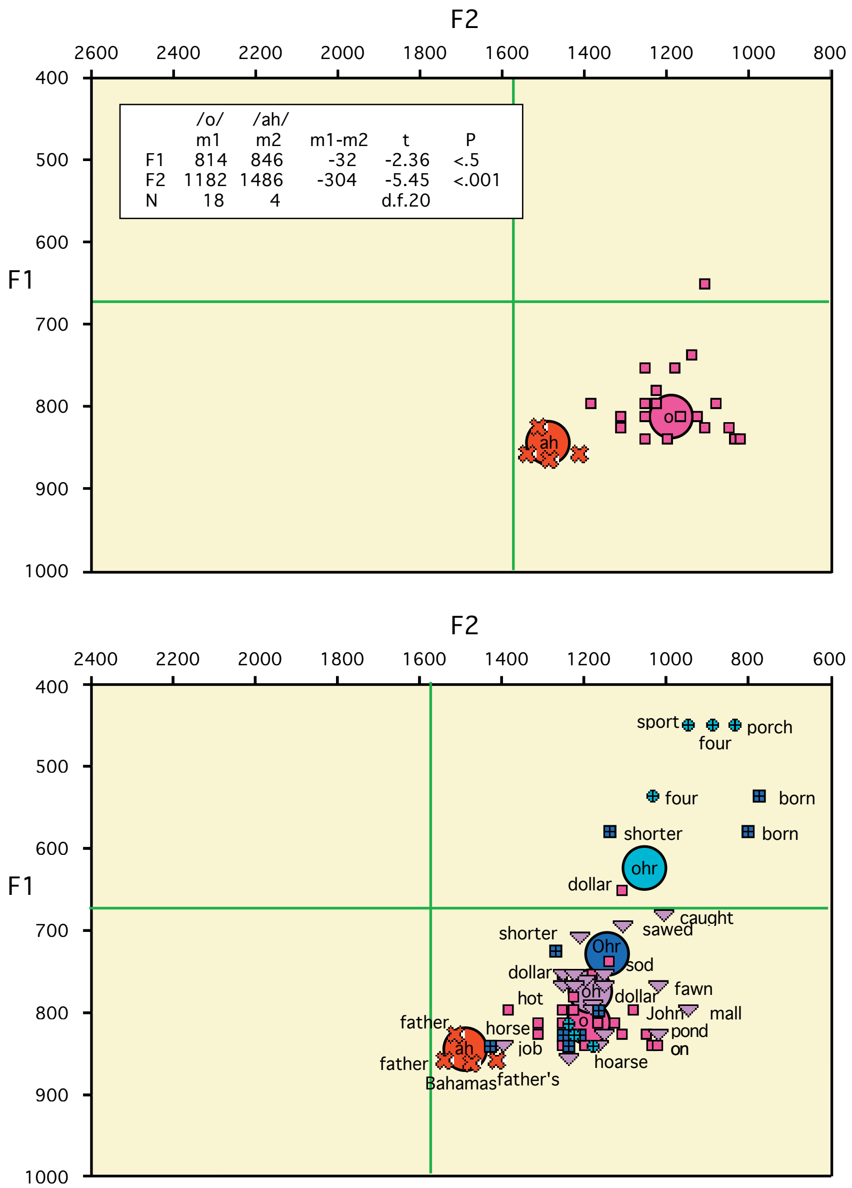


Figure 13.1 a, b The distinction between /ah/ and merged /o, oh/ in the vowel system of Denise L., 21 [1995], Boston, TS 427

The reverse pattern is for /o/ to occupy a back unrounded position, between 1200 and 1400 Hz, while unrounded /ah/ is in back lower mid position. As Map 13.2 shows, this pattern is characteristic of New York City: the F1 mean of /o/ is more than 200 Hz higher than /ah/ and the F2 mean of /ah/ is more than 200 Hz lower than /o/.[2] In the data from one New York speaker in Figure 13.2, the /ah/ class is represented by three tokens: *father*, *garage*, and *mater* (from *Alma mater*).

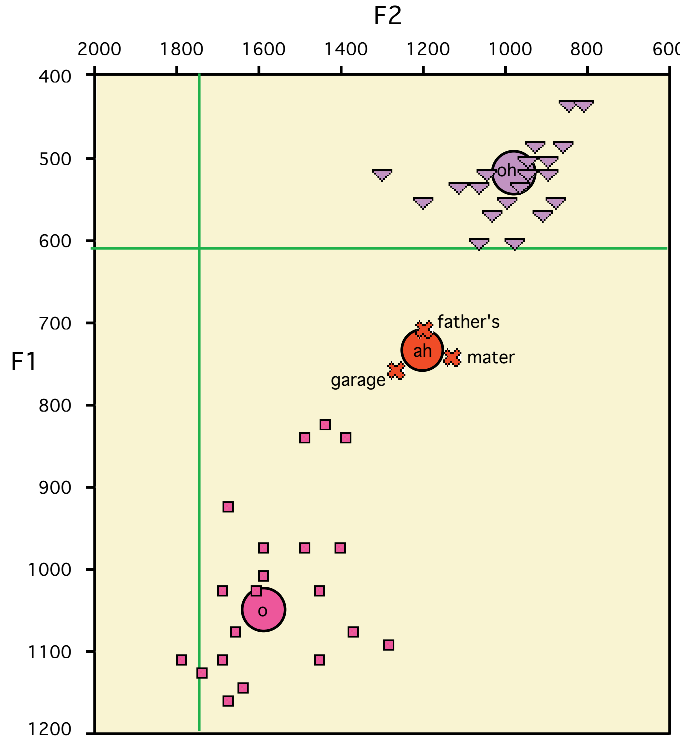


Figure 13.2. Distinction between /o/ and /ah/ in the NYC system of Pat M., 48 [2000], TS 800

Representation of the merged classes

Within the green-oriented isogloss that outlines the low back merger, the great majority of speakers have a single phoneme that combines initial /o, ah, oh/. Since it includes a large word-final vocabulary (*law*, *saw*, *pa*, *spa*), this is clearly a member of the long and ingliding subsystem. This category is best represented then as /oh/. Outside of the low back merger area, two phonemes are usually combined: /ah/ and /o/. The question remains as to whether the more limited merger of /o/ and /ah/ is also a member of this subsystem and would therefore should be represented as /ah/. The merged phoneme occurs in stressed word-final position as *pa*, *ma*, *bra*, *spa*, recent loan words like *shah* and *éclat* and many marginal

2 The /o/ phoneme is actually split in New York, with a set of words before a voiced consonant in far back position along with /ah/: see Chapter 17.

items such as *rahrah*, *blah blah*, *tata*, *hahaha*, *tralala*. To maintain comparability with all dialects, this merged unit will be referred to as /o/.[3]

The general view of low back vowel configurations is shown in Figure 13.3, which displays the number of distinct categories for each dialect.

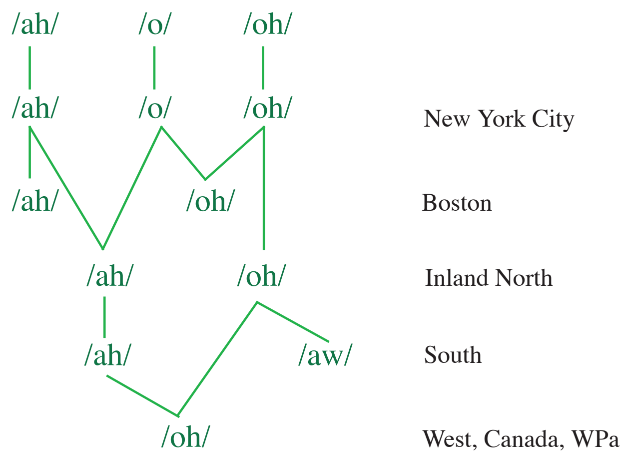


Figure 13.3. Short-*o* configurations

13.2. Short-*a* configurations

The variety and complexity of short-*a* configurations in North America is considerably greater than the short-*o* systems reviewed in the preceding section. There is a wide range of allophonic relations with various degrees of raising along the front diagonal. In NYC and the Mid-Atlantic region, short-*a* is split into a tense and lax class. There is reason to believe that the tense class /æh/ descends from the British /ah/ or "broad-*a*" class.[4] In current-day British dialects, this special class appears as a low back vowel /ah/ in *can't*, *dance*, *half*, *last*, etc., but in the Middle Atlantic States and New York City it is a front tensed vowel /æh/ that ranges from low to upper mid or higher.[5]

In many ways, the North American distinction between /o/ and /oh/ is parallel to the distinction between /æ/ and /æh/. The migration of /o/ words into the /oh/ class (*strong*, *off*, *lost*, *broth*) is governed by phonetic environments similar to those operating in the lexical assignment to /æh/: both involve vowels before nasals clusters and voiceless fricatives.

The split system

As early as 1896, Babbitt noted that the environments for British broad *a* are fronted and raised in New York City. The system that has been described in some detail from 1930 on is shown in Figure 13.4. The main phonetic factor involved in the split is the place and manner of the following consonant. The tensing environments for New York City comprise all following voiced stops, front nasals and voiceless fricatives. The remaining environments (voiceless stops, voiced fricatives, and liquids) retain lax, low-front vowels. While the distribution is phonetically governed, there are many other phonological, grammatical and lexical conditions. It must be specified that tensing occurs only in closed syllables; that syllables are closed by inflectional boundaries (tense *planning* vs. lax *planet*); that all auxiliaries and other weak words[6] are lax (*can*, *have*, *had*); that short-*a* is frequently tense before voiced fricatives (*magic*, *imagine*); that learned words are lax (*alas*); that tense vowels appear in word-initial position in common words (*ask*, *after*) but lax vowels in less common ones (*asterisk*, *Afghan*); that tense *avenue* is a common lexical exception (Cohen 1970; Labov 1994: 335). Further, it should be noted that raising of /æh/ is overtly stigmatized in New York City, and with any attention given to speech is apt to show correction of raised /æh/ to low front [æ:].

Figure 13.5 shows the NYC split-*a* system of a 62-year-old New Yorker, Nina B. The tense /æh/ tokens are concentrated in upper-mid position, discretely separated from lax /æ/, except for three corrected tokens (with bold labels): *bad*, *Babs*, *bag*. One can note the contrast with tense *bad2* and *bad3*, along with other words ending in voiced stops. The tense group includes syllables closed by voiceless fricatives, including palatals (*calf*, *half*, *glass*, *flash*) and nasals (*ham*, *panties*, *lamb*). Open syllables have lax vowels (*manatee*, *animals*). Words with velar nasal codas are consistently lax (*frank*, *Sanka*), as with voiced fricatives and liquids (*asthma*, *locality*). Auxiliaries are lax even when they end in consonants that are normally in the tense class (*am*, *had*).

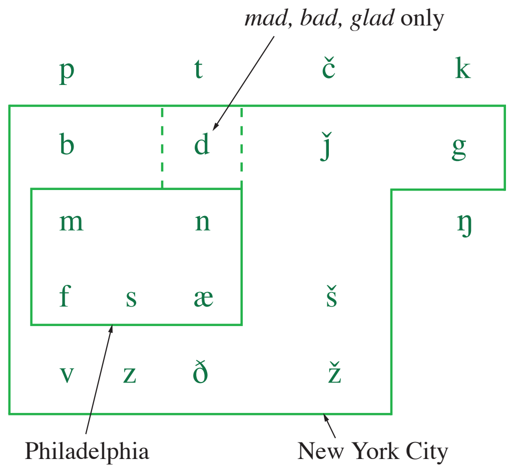


Figure 13.4. Following environments for /æh/ class in New York City and Philadelphia

Figure 13.4 also shows the tensing environments for the Philadelphia short-*a* system, a subset of those in the New York City system. In Philadelphia, tensing is confined to syllables closed with front nasals, voiceless fricatives, and (as indicated by dotted lines) three common affective adjectives ending in /d/: *mad*, *bad*, *glad* (but not *sad*, or any other word ending in /d/) (for further details see Ferguson 1975, Payne 1976, and Labov 1989, 1994: 340). Figure 13.6 shows a realization of the Philadelphia pattern in the vowel system of a 30-year-old Telsur subject, Rosanne V. Again, there is a clear separation of the phonetic distribution of /æ/ and /æh/ in acoustic space. The Philadelphia /æh/ class includes vowels

3 The measurements for the merged class will continue to be taken from the tokens of the initial /o/ class, since the number of initial /ah/ tokens is much smaller in comparison.

4 In Britain, pre-nasal environments are limited to clusters, but in the U.S. this was expanded to vowels before single nasal consonants. For the relation between Middle Atlantic short-*a* pattern and British broad-*a* see Ferguson (1975) and Labov (1994: 535–356). Jespersen (1949: 10,5) provides a detailed account of the history of broad-*a*, and traces its origin to open syllable lengthening.

5 It appears that in Britain, this broad-*a* class was strongly fronted during the period of early colonization of America.

6 A weak word is one in which the only vowel can be schwa. It is not equivalent to "function word" since the function word *can't* cannot be reduced to schwa.

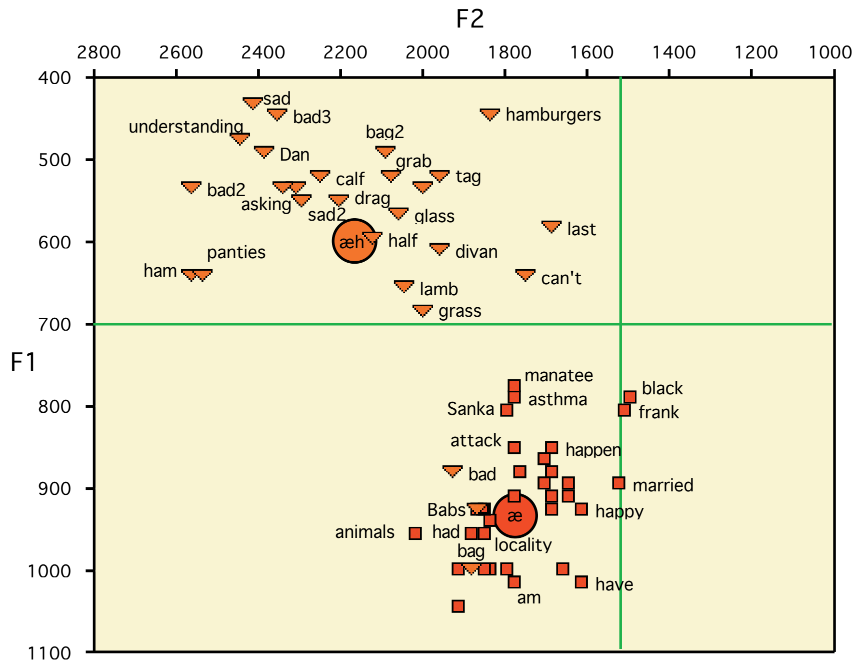


Figure 13.5. Split /æ/–/æh/ system of Nina B., 62 [1996], New York City, TS 495

before nasals (*Dan*, *pants*, *handy*, *rancher*, *aunt*, *lamb*, *fan*, *understand*), voiceless fricatives (*bathroom*, *fasten*, *asked*, *grass*, *plastic*) and the limited set before /d/ (three tokens of *bad*). The lax class includes the other voiced stops (*tag*, *bag*, *sad*), and vowels before nasals in open syllables, as in New York City (*Spanish*, *ceramic*, *Montana*), along with the remainder of the historical short-*a* class (*cap*, *hat*, *sack*).

There are three exceptions to the clear separation of tense and lax nuclei: *grandfather*, *glass*, and *last* (shown with bold labels). These three cases are not the result of the correction process that operated in Figure 13.5, but of consonantal conditioning. They represent the least advanced of the tense class, under the influence of a stop–liquid onset (*grandfather*, *glass*), initial /l/, and complex codas (*grandfather*, *last*). Directly above them, *grass* and *plastic* show a weaker form of the same coarticulatory effects. The corresponding conditioning in the lax class is shown by the word *language*, where an initial liquid, a velar nasal coda, and a following syllable all contribute to make it the most retracted of the lax tokens.

The broad-*a* system

A remnant of the British broad-*a* system is found in Eastern New England, where several common words of the British class are preserved with a low vowel back of center: *half*, *aunt*, *laugh*. The broad-*a* distribution has not been given a full sociolinguistic study, but the Telsur interviews do indicate the general pattern, as shown in Figure 13.7, the low vowel system of a 21-year-old Bostonian. It shows the clear separation of /o/ and /ah/ that is indicated in Map 13.2. Short-*o* remains in low back (rounded) position, merged with /oh/ and quite distinct from /ah/. The /ah/ class is represented by three tokens of *father*, by the foreign-*a* word *Bahamas*, and by the broad-*a* item *half*. Though *half* is close to the most retracted members of the /æ/ class, it is quite distant from most /æ/ before voiceless fricatives (*hashbrowns*, *Mass*, *fasten*).

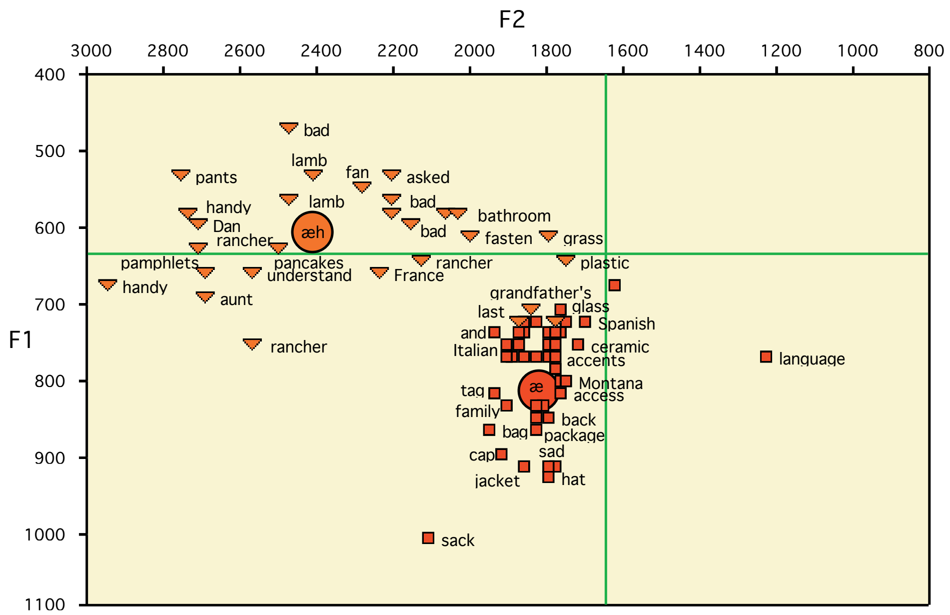


Figure 13.6. Split /æ/–/æh/ system of Rosanne V., 30 [1996], Philadelphia, TS 587

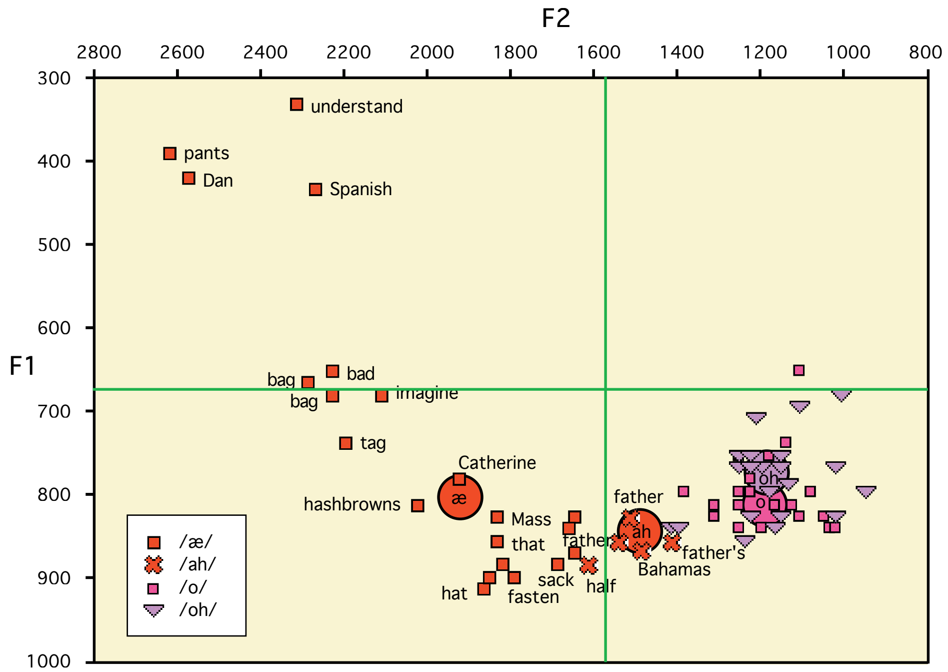


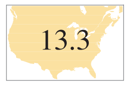
Figure 13.7. Low vowels of Dana L., 21 [1995], Boston, TS 427

The nasal system

A striking feature of the ENE system is the wide separation between the vowels before nasals and others shown in Figure 13.7, where the nuclei before nasals are in high front position. /æ/ before voiced stops forms a separate sub-group in front-mid position, as compared to the major set of /æ/ tokens in low front position. The /æ/ allophone before nasals includes both open and closed syllables (*Spanish*, *Dan*). This separation of vowels before nasals from those before oral consonants is the nasal short-*a* system, found in many regions of North America.

The most general conditioning factor in the raising of /æ/ is the effect of a following nasal consonant (Labov, Yæger, and Steiner 1972; Labov 1994: Table 18.1). This effect can be accounted for in part by the acoustic effects of opening the nasal cavity. It can be shown that the location of formant positions reflected in Figure 13.7 are systematically shifted to higher F2 and lower F1 positions by the presence of nasal formants and nasal zeroes (Plichta and Rakerd 2002). This does not necessarily mean that such measurements are artifacts of the methods used, since the positions of the vowels in Figure 13.7 conform quite closely to what trained phoneticians hear, and presumably to what languages learners hear and reproduce. In the course of sound change, /æ/ or /æh/ tokens before nasals move more quickly towards the high front target than other tokens for all dialects. Nevertheless, the degree of separation between nasal allophones and others varies widely across dialects. Although the initial effect of nasallity may be triggered by such acoustic interaction, there is no doubt that nasal allophony has been translated to the phonological level, and the wide variation in the degree of pre-nasal raising across dialects is a linguistic fact of considerable consequence.

Map 13.3 shows the differences in mean F1 values between the pre-nasal allophones of /æ/ and the conservative allophone before /t/. The brown symbols within the black isogloss are the split systems discussed above, including New York City and Philadelphia, where nasal allophones are divided between /æ/ in open and /æh/ in closed syllables. The magenta circles represent the most extreme differences: greater than 300 Hz. These 30 speakers represent the nasal system in its extreme form. They are heavily concentrated in Eastern New England and Nova Scotia, with a scattering of points through the southern half of the Midland area, extending into Kansas. No such points appear in the Inland North, where the raising of all /æ/ in the Northern Cities Shift greatly reduces the distance between pre-nasal allophones and others, nor in most of Canada, where raising before nasals is quite limited, nor in the South. Most short-*a* systems show moderate differences between the two sub-classes of 200–300 Hz [orange symbols, N = 73], and more moderate differences of 100–200 Hz [green symbols, N = 139].



As noted above, the nasal short-*a* system is the simplest of the short-*a* patterns. The /æ/ class is raised and fronted before any nasal consonant, in closed or open syllables; otherwise the nucleus remains in low front position. Figure 13.8 shows a typical example in the vowel system of Cynthia G., a 36-year-old woman from Columbus, Ohio. The separation is not as extreme as in Figure 13.7, but all /æ/ before nasals are raised and fronted in a set disjunct from the main body of /æ/ words. The raised group includes such open syllable words as *family* and *Spanish*. The lax /æ/ class shows considerable range, with the most advanced tokens before voiced stops (*sad*, *had*, *tag*), but there is no overlap between the two sets. Words with /æ/ before velar nasals (*banking*) are among the lowest of the raised class, but still distinct from the unraised vowels.

Many short-*a* systems show small variations from the pattern of Figure 13.8. Words with velar nasal codas (*bank*, *bang*) may be lax; some words with open syllables may be lax, while all other vowels before nasals are tense. Nasal systems grade into continuous systems (see below) where there is no clear separation of allophones.

The raised /æh/ system[7]

Chapter 11 introduced the Northern Cities Shift [NCS] as the defining feature of the Inland North dialect. The triggering event for the NCS is the general tensing, raising, and fronting of all short-*a* in all words in which this vowel occurs. This raised vowel then develops an inglide (or a second mora – see below). Its struc-

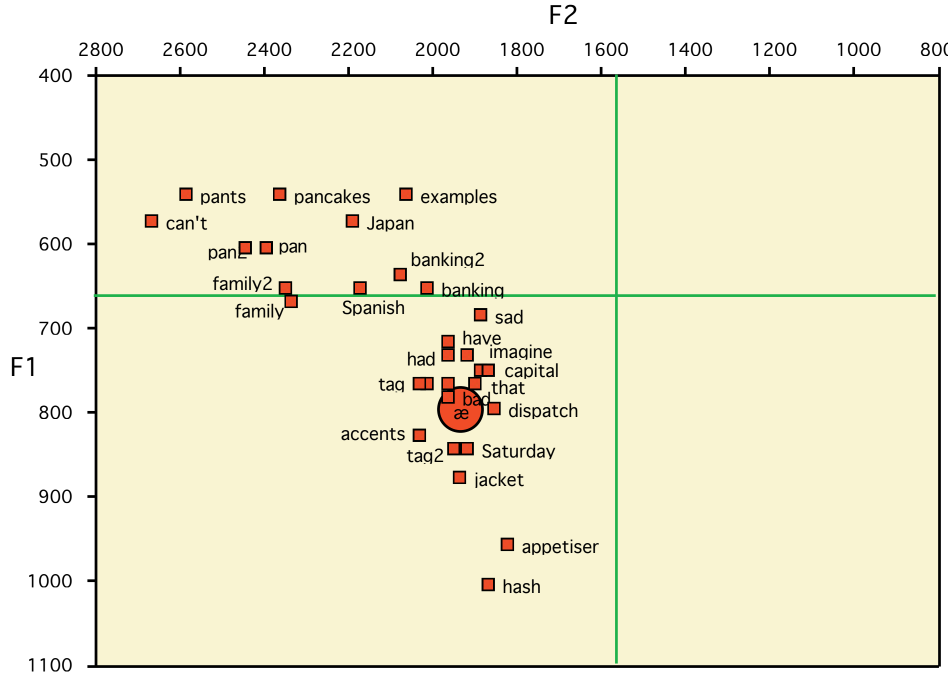


Figure 13.8. The nasal short-*a* configuration in the vowel system of Danica L., 35 [1999], Columbus, OH, TS 757

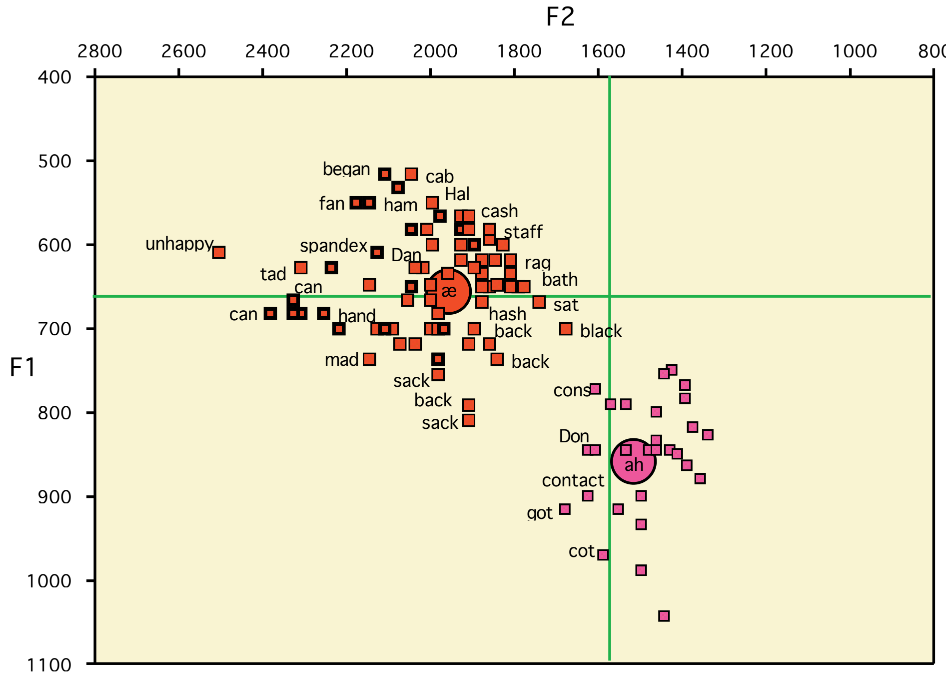
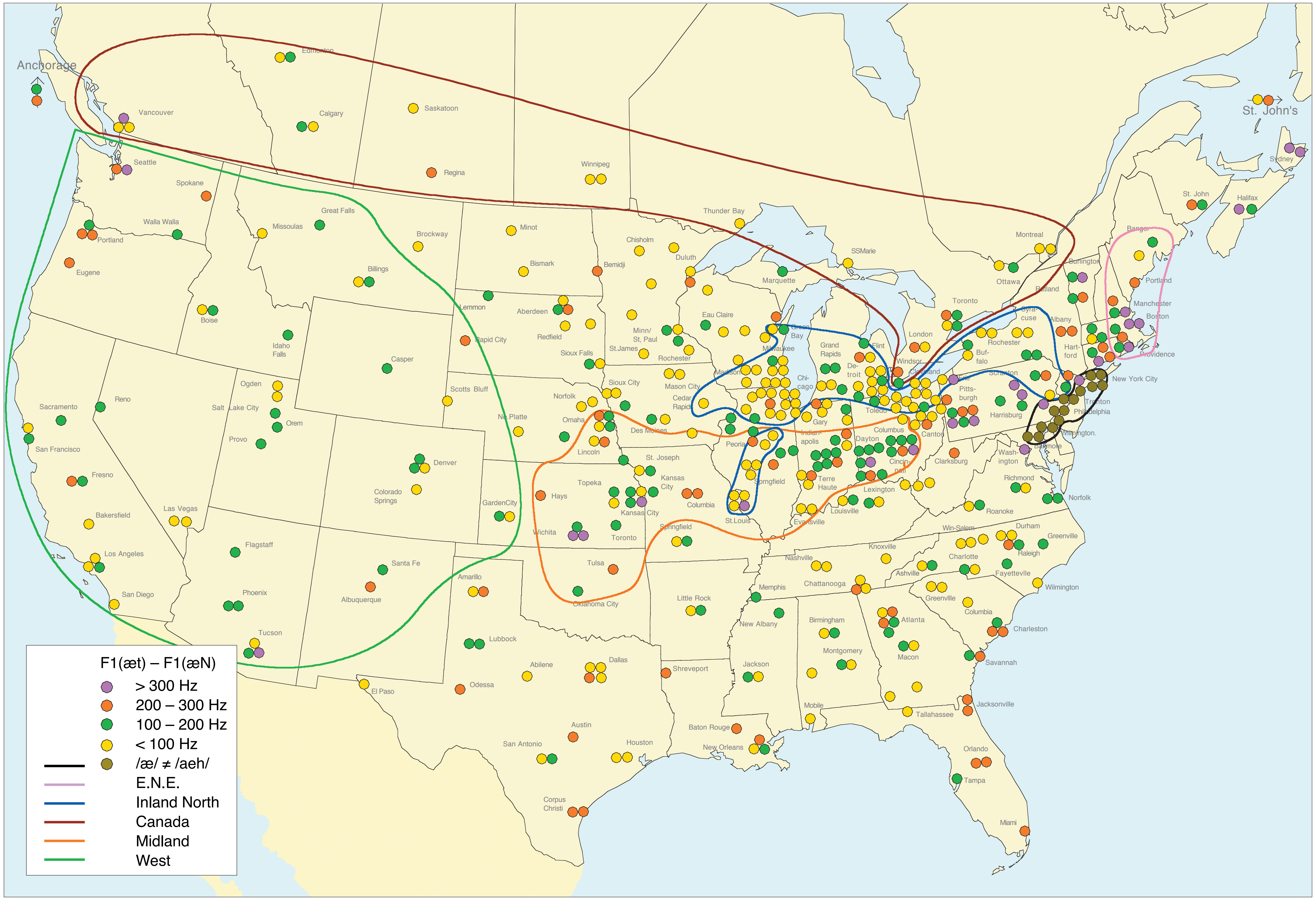


Figure 13.9. Raised /æ/ system of Randall R., 24 [1993], Chicago, IL, TS 67 [nasal coda highlighted]

7 The generally tensed, lengthened and raised class discussed in this section might well be described as /æh/, a member of the long and ingliding system. There is reason to think that it is accompanied by a parallel shift of /o/ to /ah/. However, the notation /æh/ in this volume is reserved for cases of clear phonemic opposition in the Mid-Atlantic states, where /æh/ is opposed to /æ/. Until further evidence is assembled to show that /æ/ has shifted its phonemic identification in the North, we will continue to refer to it by the original class label /æ/.



Map 13.3. Differences in height between allophones of /æ/ before nasals and elsewhere in North American dialects

In all North American dialects, the short-*a* class is further front and higher before nasal consonants, as in *man*, *ham*, *hang*, etc. This tendency is most extreme for the speakers shown with magenta and orange circles: heavily concentrated in Eastern New England, the Atlantic Provinces, and scattered throughout the Midland. The yellow circles, showing the minimum differentiation, are dominant in the Inland North, where all short-*a* is raised as /æ/. In the Mid-Atlantic States and New York City, vowels before /m/ and /n/ (but not /ŋ/) are in a separate phonemic category, as part of the lexical split that defines that area.

tural relation to the long and ingliding system is evident in that it is involved in a chain shift with the /o/ that resulted from the merger of /o/ and /ah/, and /oh/.

Figure 13.9 shows the /æ/ system of Randall R., 24, of Chicago. The /æ/ group forms a continuous series from lower high to lower mid. The vowels with nasal codas are concentrated in the upper left of the distribution, but they are interspersed with /æ/ before voiced stops (*tad*, *bag*, *mad*), and after palatals (*jacket*). The most conservative tokens are those with velar codas and obstruent/liquid onsets (*back*, *black*, *haggling*), but even these have vacated the low front area and are established in lower mid position.

As in the nasal systems, the mean values of /æ/ before nasals show the lowest F1 and highest F2, but in the raised /æ/ system the pre-nasal allophones are not distinctly separated from the rest of the class. The raised /æ/ system contrasts with the nasal system in that the effect of following nasals is not a simple categorical constraint, but rather one of many independent influences on the raising and fronting of the vowel. The factors responsible for the high F2 and low F1 before nasal consonants cannot then be entirely due to the distortion of formant positions by nasal formants and zeroes, since the magnitude of the effect varies widely across dialects.

Northern breaking

The formant pattern of lax /æ/ shows a simple trajectory where measurement at the relative maximum of F1 can be used as an indicator of the central tendency of the vowel, and corresponds to its overall auditory impression. Figure 13.10 shows the formant trajectories for a typical lax vowel, *sack*, produced by a Philadelphia speaker. The overall duration of the vowel is 173 msec. Approximately halfway through this trajectory, F1 reaches a maximum value of 1003 Hz.

The general raising and fronting of /æh/ in the Inland North creates a more complex phonetic pattern. When /æh/ is tensed and raised to mid position and higher, it develops an F2 maximum before a final inglide. Figure 13.11 shows the word *pants* pronounced by an Inland North speaker from Rochester. F1 is low and steady, while F2 begins at 2264 Hz, then rises to 2477 Hz halfway through the 190 msec resonant portion of the vowel before declining again as the tongue moves into the inglide. Measurement at the F2 peak corresponds to the auditory impression of a fronted, upper mid, ingliding vowel.

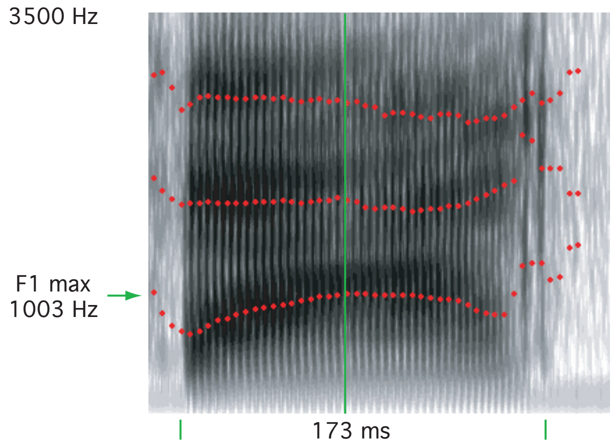


Figure 13.10. Formant trajectories for lax *sack* of Rosanne V., 30 [1996], Philadelphia, PA, TS 587, Duration = 173 msec.

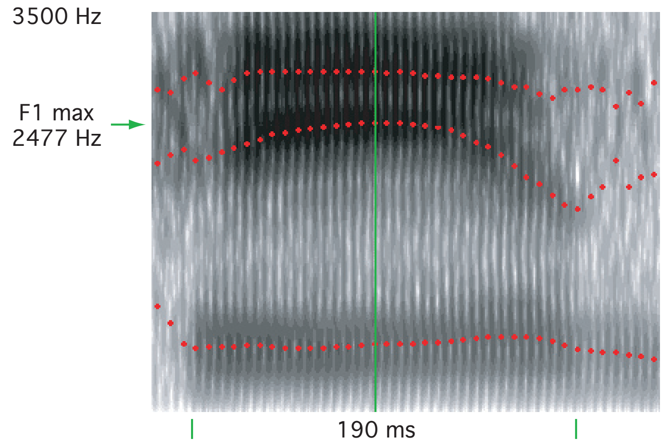


Figure 13.11. Formant trajectories for ingliding tense vowel in *pants* of Sharon K., 35 [1995], Rochester, NY, TS 359, Duration = 190 msec.

Ingliding vowels of this type have been extensively studied as sociolinguistic variables in New York City (Labov 1966), Philadelphia (Labov 2001), Boston (Laferriere 1977), northern Illinois (Callary 1975), and elsewhere. In the pilot studies for ANAE in the North Central states, it was discovered that a great many tokens of short-*a* followed a different trajectory,[8] in which the nucleus of raised and fronted /æh/ is followed, not by an inglide to mid central position, but by a second steady state. These tokens break abruptly into two moræ of equal length: one in mid front position, the other in low front or central position. Both moræ are of sufficient length to be heard as individual short vowels when isolated, and have distinctly different quality from that of an off-glide.

Figure 13.12 shows a broken /æh/ pronounced by the speaker of Figure 13.11. The first half of the vowel is an upper mid tense nucleus with F2 at a relative maximum of 2261 Hz and a corresponding F1 value of 669 Hz. The second half is a lax vowel with F1 at a maximum of 901 Hz and F2 minimum at 1756 Hz. The duration of each half of this complex vowel is that of a simple, short nucleus, about 130 msec. Figure 13.13 shows an even longer broken vowel, where each half is 180 msec. The first half is an upper mid fronted vowel with an F2 maximum of 2146 Hz and a corresponding F1 of 516 Hz, while the second half is a lax vowel with an F1 maximum of 720 Hz and a corresponding F2 of 1624 Hz.

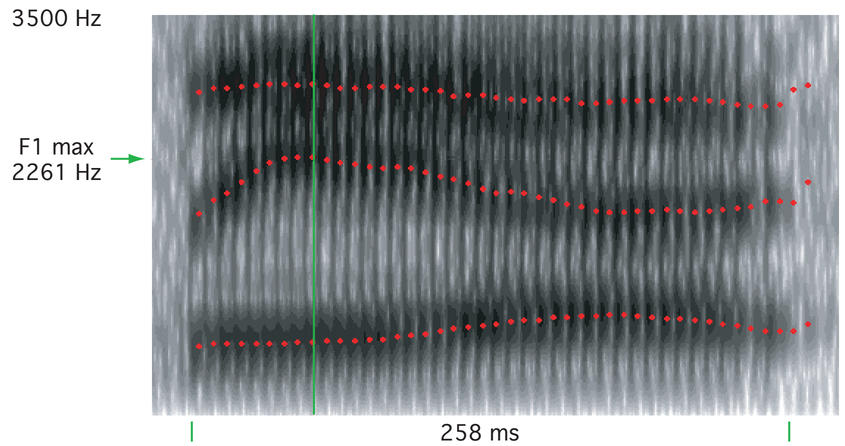


Figure 13.12. Formant trajectories for broken /æ/ in *that* of Sharon K., 35 [1995], Rochester, NY, TS 359. Duration 258 msec.

8 S. Ash and C. Boberg are the observers here.

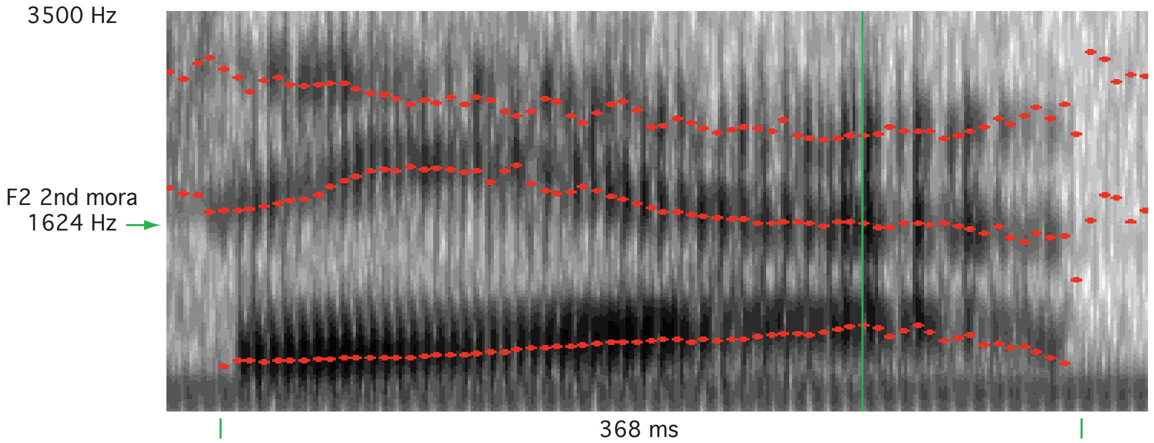


Figure 13.13. Formant trajectories for broken /æ/ in *sad* of Joseph K., 53 [1994], Youngstown, OH, TS 93, Duration 368 msec.

The geographic distribution of Northern breaking by regional dialects is shown in Figure 13.14. The North has a sizable number of speakers with 2 to 15 broken short-a vowels. The Midland follows weakly behind the North, and the West with only a few speakers with more than one broken vowel. Breaking of short-*a* is a Northern phenomenon: those Midland and Western speakers who use broken short-*a* are located near the Northern border.

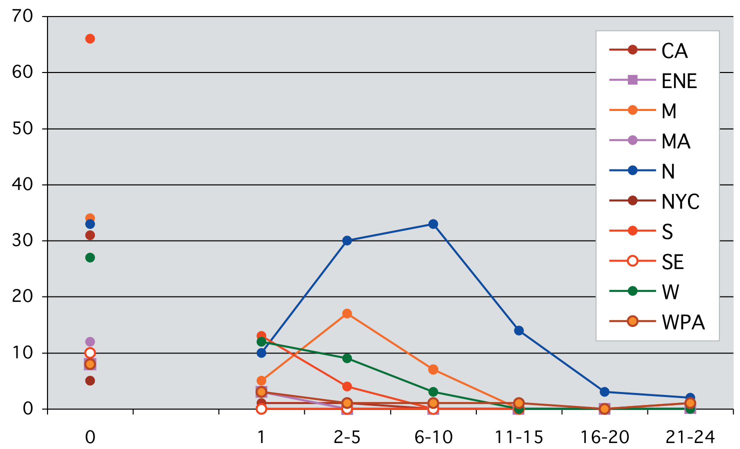


Figure 13.14. Distribution of broken short-*a* vowels by region

Southern breaking and the Southern drawl

Only a very few examples of Northern breaking are to be found in the South. There is however another form of short-*a* breaking centered in that region which is even more prominent phonetically. In *Southern breaking*, the vowel nucleus begins in low front position, is followed by a [j] transition, and then returns to a phonetic position not far from the origin. Figure 13.15 shows the characteristic Southern breaking for *pants*, the word that appeared with Northern breaking in Figure 13.11. The second formant begins at 1839 Hz and rises rapidly to 2477 Hz, then falls to 1400 Hz. This extreme breaking is characteristic of the "Southern drawl" (Feagin 1987). Although the South shows some raising of /æ/ before nasals, Southern breaking of /æ/ usually begins with a nucleus in low front position, with the auditory impression of [æʲə].

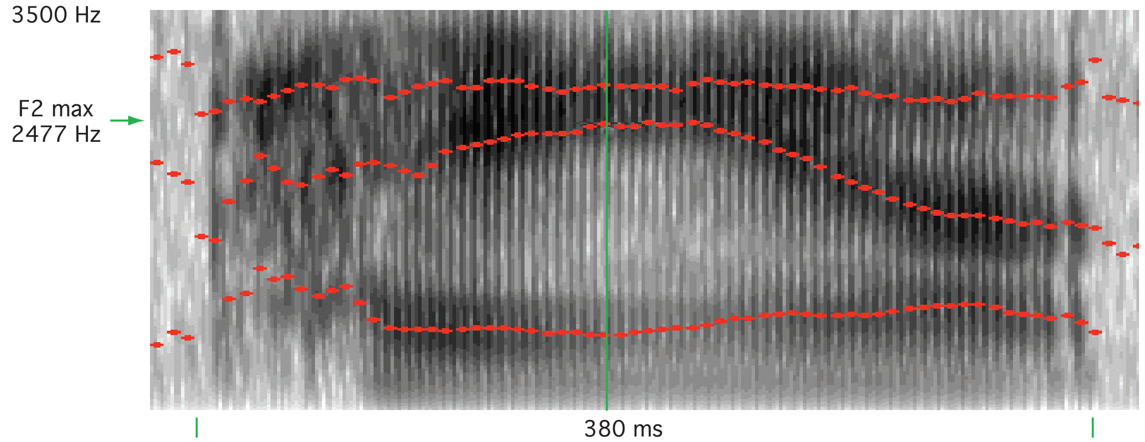


Figure 13.15. Spectrogram and formant trajectory for Southern breaking of nucleus of *pants*, spoken by Thelma M., 31 [1992], Birmingham, AL, TS 341, Duration = 380 msec.

The Southern drawl is shown in a non-nasal context in Figure 13.16: the word *past* as spoken by Thelma M., with a smoother set of formant contours than in Figure 13.15. The formant trajectories are almost symmetrical, starting in low central position, proceeding to a low energy transition state in high front position, and returning to low central before the final fricative. Figure 13.17 displays four /æ/ tokens measured for Thelma M., with nuclei shown in red, [j] transitions in yellow, and endpoints of the nuclei in orange, including the trajectories of *pants* and *past*, the tokens in Figures 13.15 and 13.16. It can be seen that various realizations of the vowel start at different positions, and reach different points of inflection and endpoints, but all maintain the same general pattern. The inglides shown in Figures 13.15 and 13.16 are quite different from the steady-state second morae of Northern breaking: they are typical glides which move continuously toward the center without reaching such a steady state.

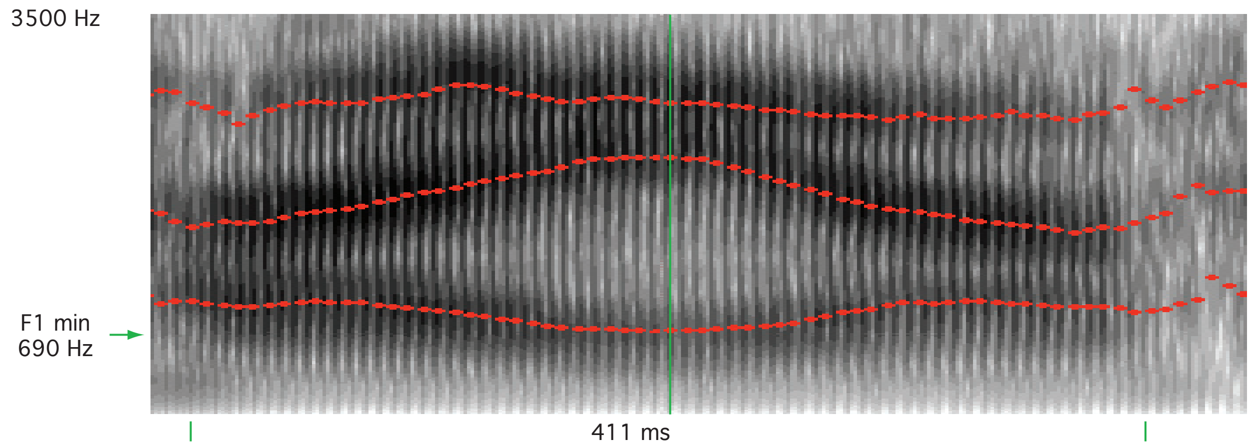
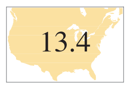
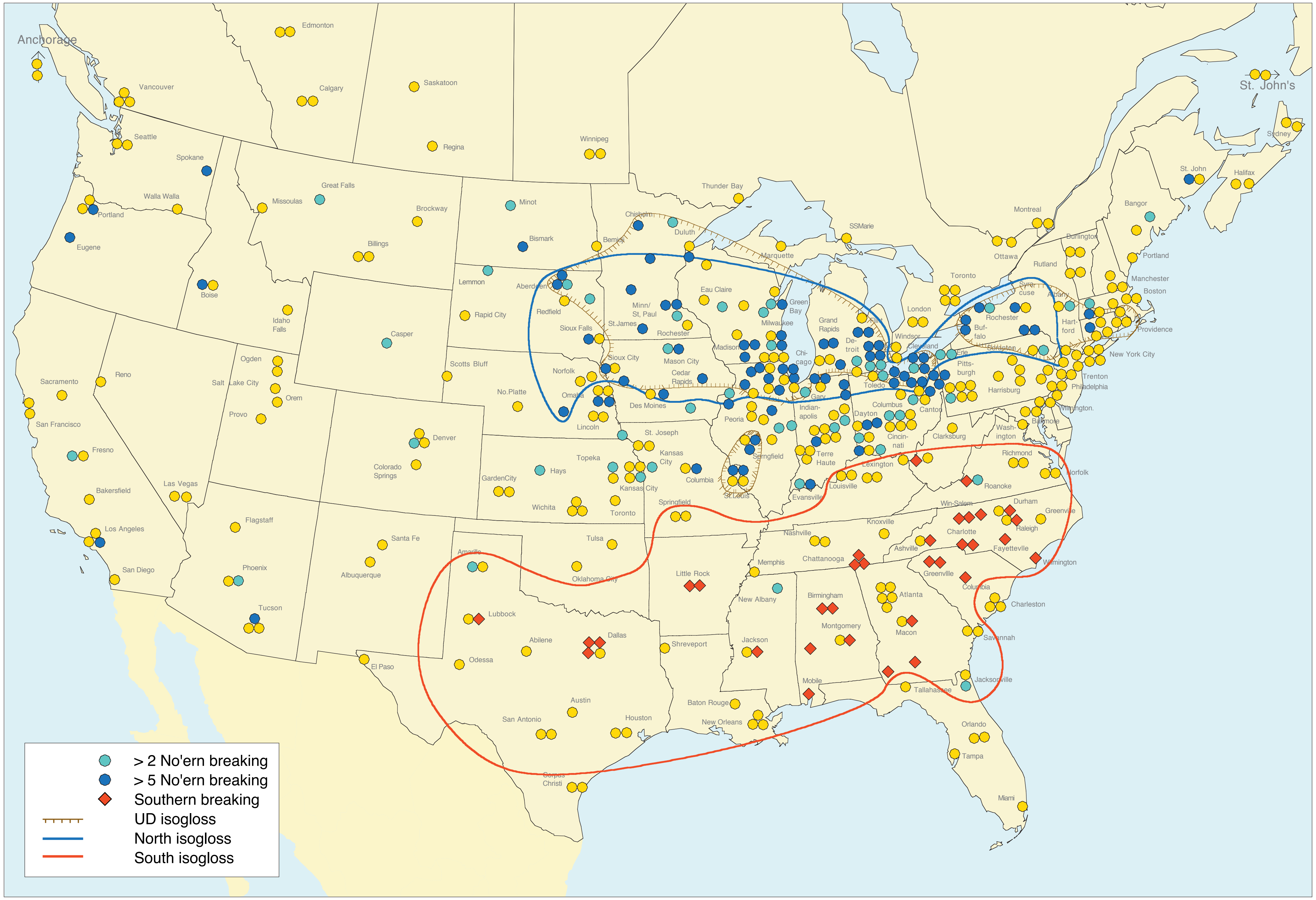


Figure 13.16. Southern breaking of /æ/ in spectrogram and formant trajectories for *past*, Thelma M., Birmingham, Duration = 411 msec.



The geography of breaking is displayed in Map 13.4. Northern breaking is indicated by the blue circles, with the heaviest concentration of breaking tokens in dark blue (more than five examples), and a lesser frequency (2–5 tokens) in light blue. The blue isogloss is the outer definition of the North from Chapter 11: it is evident that Northern breaking is heavily concentrated in the Northern region.



Map 13.4. Geographic distribution of Northern and Southern breaking

As part of the general raising and fronting of /æ/, there is a strong tendency for the vowel to break into two parts. The blue circles show the distribution of "Northern" breaking, where instead of a single nucleus and inglide, the vowel appears as two sharply separated steady states of equal length. Within the red isogloss that defines the South (by glide deletion of /ay/), the dominant tendency is to break into three parts: a relatively low nucleus, a high front glide, and a following inglide. This is frequently described as the "Southern drawl".

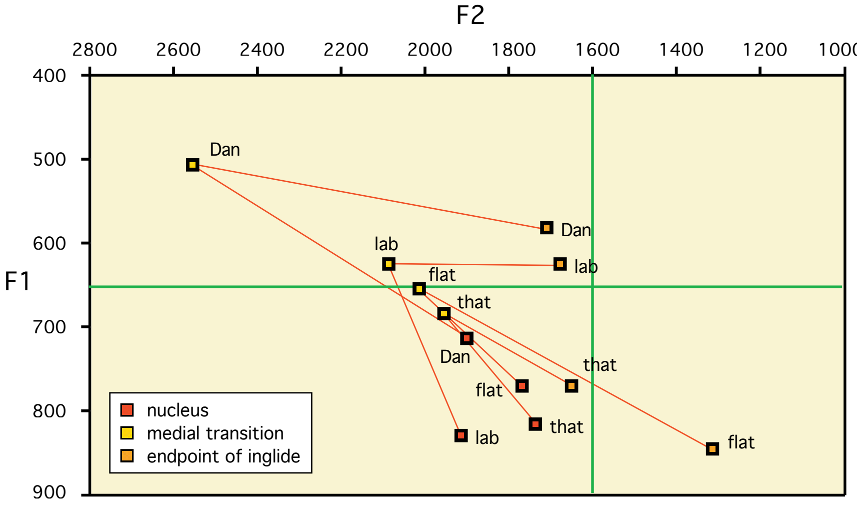


Figure 13.17. Four short-*a* tokens for Thelma M. with Southern breaking

This is not the Inland North defined by the ED isogloss, but a somewhat broader area that extends well into the North Central area in a manner coincident with the UD isogloss of Chapter 11 (the oriented brown line of Map 13.4; see Map 11.14). As already indicated in Figure 13.14, there are a small number of dark blue symbols in the West, mostly in the areas bordering the North, and in the Midland, again not far from the North. Four of these outliers are found in the St. Louis corridor, matching again the pattern of the UD isogloss. A smaller concentration of speakers exhibiting Northern breaking appears in the Pacific Northwest, well separated from the main concentration in the Inland North.

The phonetic conditioning factors for breaking are quite different in the North and the South. Northern breaking occurs before all oral obstruents except /k/, and is especially favored before apicals /t/ and /s/. It is not found before nasals. On the other hand, Southern breaking is strongly favored by nasal codas, with apical /n/ showing by far the highest percent breaking and lower frequency before /m/ and /ŋ/. It occurs with moderate frequency before other apical consonants /s, d, t/ and occasionally before other stops /b, g, t, c/. Neither type of breaking is found before /k/ or /l/ in the Telsur data.

Continuous short-*a* systems

The most common short-*a* configuration in the West and the Midland is a more or less continuous range of allophones from low front to mid position, with no marked break. A typical continuous system is that of Lorraine K., 35, of Spokane, Washington, shown in Figure 13.18. The most conservative environments, with /æ/ before voiceless velars (*sack*) are in low front position with an F1 as high as 900 Hz. The most advanced tokens are in high front or mid front position. The highest and frontest tokens are with nasal codas, but interspersed with the nasals are vowels before other favoring environments, such as /d/ (*bad*, *dad*).

It is evident that a continuous system of this sort differs from the nasal system only in the degree of differentiation of the vowels before nasal consonants. In both cases, the effect of the nasal consonant is independent of syllable construction: open syllables like *Canada* are raised as much as closed syllables like *demand*. Given the great range of realizations of /æ/, the question remains as to whether the environmental constraints are ordered in the same way across and within systems. In general, this is true: the effects of following nasals, following voiceless velars, complex codas, and obstruent/liquid onsets are the same for almost all North American speakers. However, following voiced stops show a remarkable differentiation.

Differentiation of the voiced stops

In Figure 13.18, a following /d/ produces higher and fronter /æ/ nuclei than a following /g/ (compare *dad*, *dad's*, *bad* with the three examples of *bag* and the two tokens of *tag*). This is the most common configuration. However, there are speakers who show the reverse ordering of these voiced stops. Figure 13.19 is

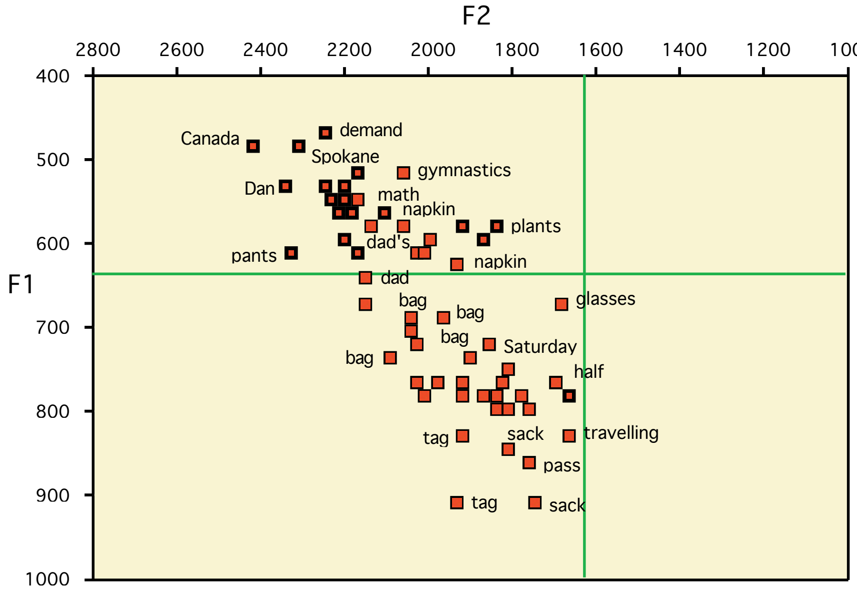


Figure 13.18. Continuous short-*a* system of Lorraine K., 35 [1995], Spokane, WA, TS 318. Highlighted tokens: /æ/ before nasal consonants

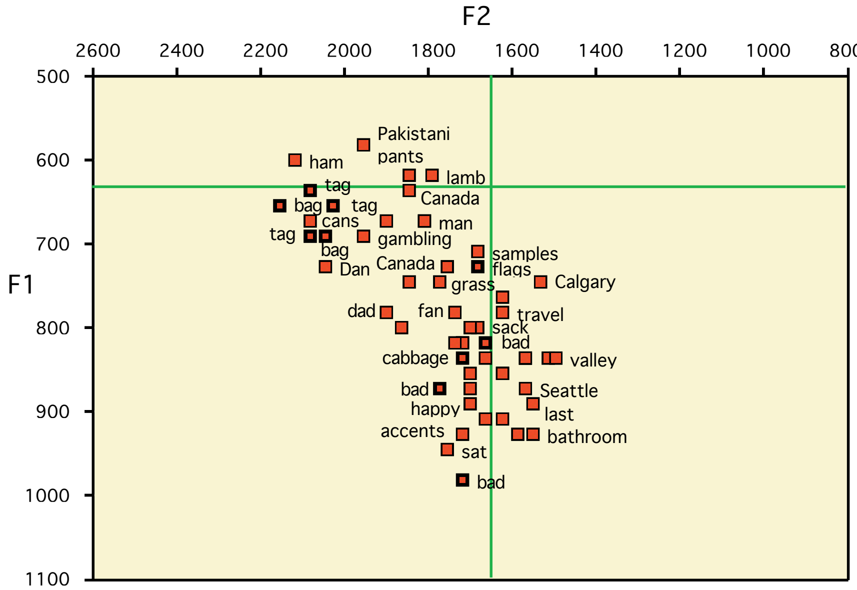
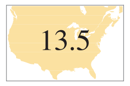


Figure 13.19. Relative advance of /g/ over /d/ in the short-*a* system of Duncan D., 29 [1997], Edmonton, Alberta, TS 655. Highlighted tokens: /æ/ before voiced stops

the short-*a* pattern from the vowel system of a 29-year-old man from Edmonton, Alberta, with a continuous short-*a* pattern. Vowels before voiced stops are highlighted. Vowels before nasals are in upper mid position, but along with them are vowels before /g/ (*tag*, *bag*). The word *flags* is somewhat lower and backer, under the influence of the *fl-* onset. Words with /æ/ before /d/ are considerably lower (*dad*, *bad*) along with /æ/ before /b/ (*cabbage*). This reversal of the ordering of /d/ and /g/ environments is not an accident, but is distributed over broad areas in a geographically coherent pattern, as shown on Map 13.5.



The merger of /æg/ and /eyg/

In the early 1990s, Zeller (1997) reported a merger of /æ/ and /ey/ before /g/ in Wisconsin, in which *haggle* and *Hegel* are homonyms and *bag* rhymes with *vague*. Like most mergers, it was not noticed by members of the speech community affected.[9] Although the opposition has a low functional load, with very few words in the /eyg/ category, the raising of /æg/ to [e^{i}g] is sometimes noted by outsiders. Speakers who have this merger report that when they are traveling in other regions they are often not understood when they ask for a *bag*.

A merger of this type is shown in Figure 13.20. The five tokens of /æ/ before /g/ are clearly closer to the /ey/ distribution than to the remainder of /æ/ before oral consonants, significantly higher than even the most raised tokens of /æ/ before nasals, e.g. *hand*. The token of /æ/ before /d/ (*bad*) is much lower, in the main body of /æ/ words. In this case, the /æg/ syllables are monophthongal, matching the tendency of /ey/ in this region, but in other cases, the shift of /æg/ to /eyg/ is shown by the development of a front upglide.

In the common vocabulary, no minimal pairs differentiate /æ/ and /ey/ before /g/.[10] The words *bag*, *tag*, *rag*, *drag*, *flag* are common enough to show the relation of this allophone of /æ/ to the checked /ey/ distribution for most speakers. The status of /æg/ for each speaker was determined by examining the degree of overlap between /æg/ and /eyC/ in the completed chart of the vowel system, combined with a search for any evidence of a front upglide with /æg/.[11] Merged /æg/ ~ / eyC/ is found in Wisconsin and Minnesota, the general area in which it was first reported by Zeller, though not in Milwaukee, the city she studied most closely (see the light blue stars in Map 13.5).

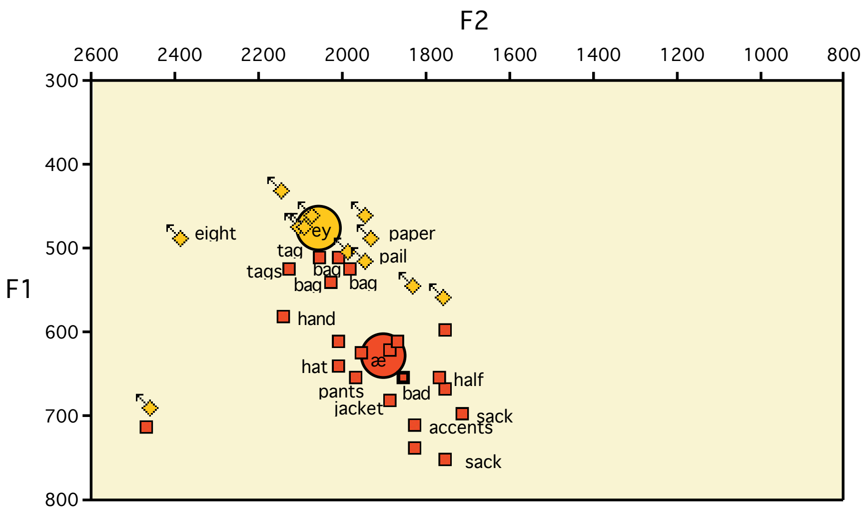


Figure 13.20. Merger of /æg/ and /ey/ in vowel system of Jan X., 14, Green Bay, WI, TS 219

It might seem at first glance that the predominance of /g/ in the raising of /æ/ in Figure 13.19 is simply a reflection of this underlying merger. But the study of the geography of short-*a* configurations indicates the opposite. The merger represents only a small subset of the dialect areas where the normal relations of /g/ and /d/ are reversed, and may well be a consequence of whatever factors have led to this reversal.

The over-all geographic distribution of short-*a* systems is displayed in Map 13.5, along with the relationship between them and the dialect regions defined in Chapter 11.

Distribution of short-*a* systems

The *split /æ/ ~ /æh/ systems*, indicated by brown circles, are confined to New York City and the Mid-Atlantic States, as shown in a number of other maps.

The *nasal system*, in which /æ/ is raised and fronted before any nasal consonant in a separate distribution from other /æ/, is designated by magenta circles. These predominate in New England, with a further concentration in northern New Jersey outside of the New York City area. A second striking area of concentration of nasal systems is found across the Midland, especially in the large cities of Pittsburgh, Columbus and Indianapolis (but not Cincinnati).

The Inland North is dominated by the *raised /æh/* system, with blue symbols indicating the well defined ordering of influence of the following consonant: n > d > g (Northern breaking is not shown).

The light green and dark green circles represent the parallel situation for the *continuous* short-*a* systems: these alternate with nasal systems throughout the Midland and predominate in the West. The light green circles show speakers who follow the n > d > g pattern, raising /æ/ considerably more before /d/ than before /g/; the dark green circles are speakers who show no clear difference between /d/ and /g/.

Southern breaking is indicated by red diamonds, entirely confined to the Southern area as originally defined by the AYM line. As always, Atlanta appears as an island of non-Southern speech. For four of the five Atlanta speakers, magenta circles show the nasal system. This is also the case for the peripheral areas of the Southeastern region: Charleston, Florida, Corpus Christi. The nasal system appears to be the default short-*a* pattern for the eastern half of North America.

A geographic pattern of great interest is the distribution of the star symbols, which indicate the speakers for whom /æ/ is raised before /g/ more than before /d/. The magenta isogloss is the outer limit of these symbols (the GD line). It includes the entire Canadian dialect region except Montreal. It extends well beyond Canada to include most of the north central and northwestern United States. The homogeneity of the magenta isogloss is .80; consistency is .86, and leakage is only .02.

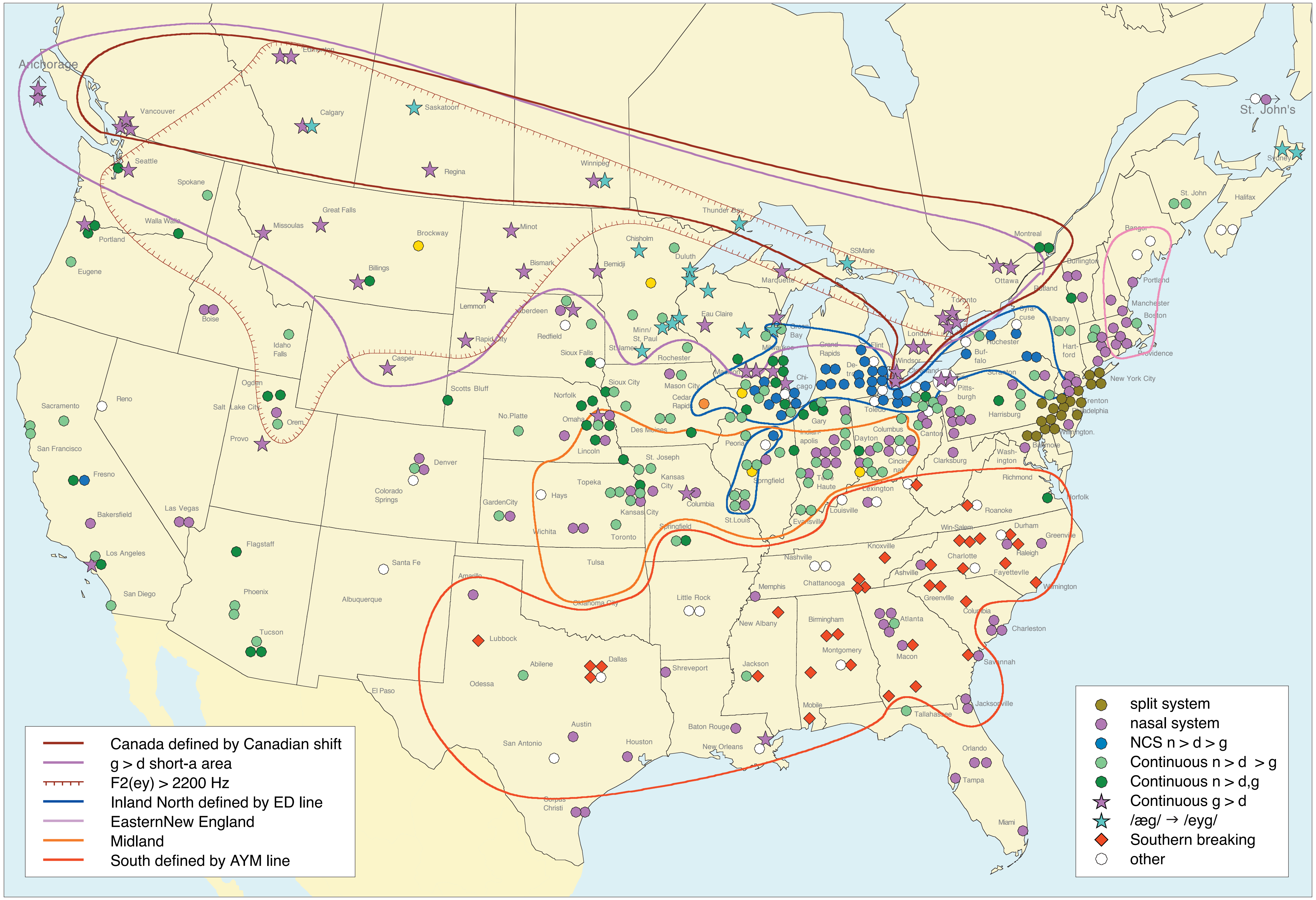
The two red stars located in Sydney, Nova Scotia indicate a special case of a nasal system, with extreme separation of vowels before nasal consonants, combined with a merger of /æg/ with /eyg/.

The light blue stars are the vowel systems in which there is evidence for the merger of /æg/ and /eyg/. Though Zeller first discovered this merger in Milwau-

9 Zeller reports that she first became aware of the merger when she went to college in Toronto.

10 The surnames *Jagger* and *Jaeger* offer one possibility for a minimal pair elicitation. Other comparisons with proper nouns are *Craig* and *crag*, *Hague* and *hag*.

11 As noted in the previous section on Southern breaking, glides of this type are not uncommon in the South. However, such Southern /æ/ systems are excluded from any possibility of such a merger by the relatively low position of the /æ/ nucleus.



Map 13.5. Short-*a* systems in North America

This map shows the geographic distribution of the various types of short-*a* system described in this chapter. The main focus is on the relative height of /æ/ before /n/, /d/, and /g/. The magenta isogloss surrounds the region where the usual order /n, d, g/ is altered or reversed: the region where /g/ leads to extreme raising of /æ/ includes most of the Canadian dialect region but also a large section of the Northwest and North Central U.S. The blue stars indicate the speakers from whom /æ/ and /ey/ are merged before /g/, so that *bagel* rhymes with *Hegel*.

kee, it is not the predominant pattern among the Telsur Milwaukee speakers, but appears strongly in the rest of Wisconsin, Minnesota, and in neighboring regions of northwestern Ontario and the Canadian prairies.

The GD isogloss cuts across the West and North as defined in Chapter 11 and forms a distinct area of its own. It is mutually exclusive with the Inland North, except for four speakers at the northwestern edge of that dialect area: two in Madison, one in Milwaukee and one in Chicago. The GD area also includes the city of Erie, which as we have seen has shifted its allegiance from North to Midland: it is not clear why Erie has now developed this feature.

The dark red oriented isogloss on Map 13.5 outlines an area similar to that of the GD isogloss: the region of tense, sometimes monophthongal /ey/, defined by an advanced second formant greater than 2200 Hz. It includes the Prairie provinces of Canada, along with a large area of the North Central States in U.S. It does not extend as far west in Canada as Vancouver, or as far east as Ottawa, and it does not include that region of Wisconsin and Minnesota where the merger of /æ/ and /ey/ before /g/ is most concentrated. In many respects, this is one of the most conservative regions of North America: the front tense /ey/ is matched by /ow/ in a mid back, sometimes monophthongal position.

The reversal of the phonetic effects of /d/ and /g/ on the raising of /æ/ is unusual and unexpected, since most environmental effects are the products of the action of a uniform articulatory apparatus and operate in the same way across dialects. Figure 13.21 shows the degree of uniformity of phonetic effects across dialects. It is based on a regression analysis of the following stop effects on the F1 of /æ/ for the regions defined in Chapter 11.[12] Instead of the features of manner, place and voice, the individual consonants are given as three separate series by place (labial–apical–velar): one series for nasals, one for voiced stops, and one for voiceless stops. The height of any given point on the vertical axis reflects the contribution of the following consonant to the lowering of F1 – that is, raising of the vowel

The nasal series shows similar patterns across dialects, with least raising for the velar nasal.[13] Labial and apical nasals are at about the same level; only the Midland shows a significant advantage of /n/ over /m/. The Inland North, the Midland, the South, the Mid-Atlantic States, and western Pennsylvania show that the vowels before the velar nasal are significantly lower than before the apical nasal.

In general, nasal codas produce greater raising than either of the oral stops. Within the nasal series, Eastern New England has by far the lowest F1 values, reflecting the great distance between the nasal and oral allophones of /æ/ in the nasal systems of that region (Figure 13.5 and Map 13.3). Western Pennsylvania follows closely behind in this respect. The two dialects with split-*a* systems show the least tendency of nasals to raise. This is because the tense /æh/ class (included in this analysis) includes oral voiced stops and voiceless fricatives (Figures 13.5 and 13.6), which equal the nasals in the lowering of F1. The great differentiation of the velar nasals corresponds to the fact that they are excluded from this tense class, thus exaggerating the general effect.

At the right of Figure 13.21 it is evident that the voiceless stops have the smallest effect on the raising of /æ/ (lowering of F1), and the normal ordering is apical > labial > velar. Only Eastern New England and NYC vary slightly from this pattern.

The most striking deviation from the general agreement across dialects of the effects of manner, place and voice appears in the center series of Figure 13.21, for the voiced stops /b, d, g/. Here the general pattern is that /d/ has the greatest effect upon the raising of /æ/, with /b/ and /g/ considerably behind. Canada, however, shows a dramatic reversal of this effect, with a following /g/ by far the most influential of the three stops in the raising of /æ/.

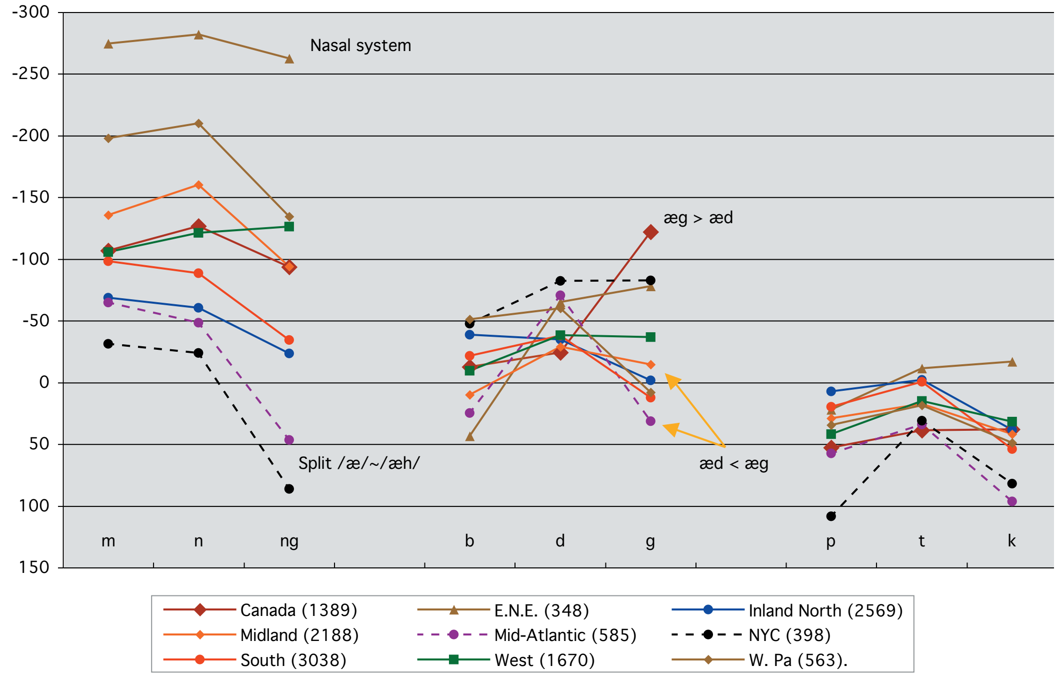


Figure 13.21. F1(æ) Regression coefficients for F1 means of /æ/ by region, place and manner of coda. Numbers of tokens in parentheses. Dashed lines = split short-*a* system

Figure 13.21 does not take into account the fact that the g > d area intersects the West and the North. The figures for Canada reflect the conditioning factors for the GD area accurately, since Canada is wholly contained within that area, but the coefficients for the West are the results of a more heterogeneous mixture of short-*a* patterns. Figure 13.22 clarifies this situation by dividing all Telsur subjects into two groups: those within the GD isogloss of Map 13.5 and those without.

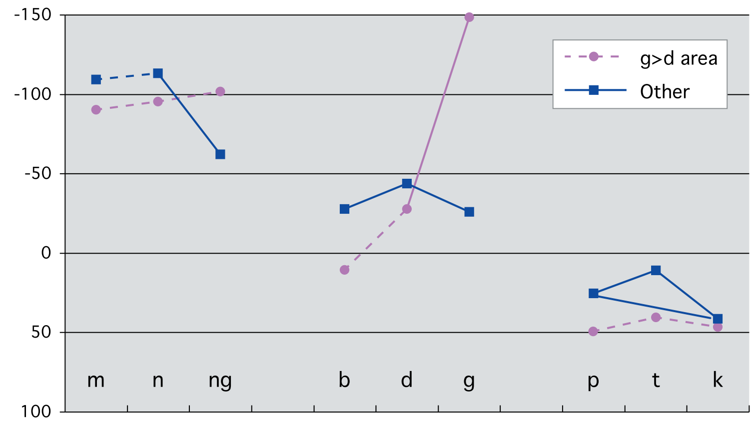


Figure 13.22. Regression coefficients for F1 of /æ/ by place, manner and voice for /g/ > /d/ area of Map 13.4 vs. all others. Dotted lines not significant at $p < .01$. N = 17,826

12 In Figure 13.19, the Inland North is examined rather than the North as a whole, which is split by the GD line.

13 The relatively high values for the velar in the West are exceptional, and reflect the fact that much of the West falls within the area in Map 13.4 where /g/ raises /æ/ more than /d/.

For both areas, the general ordering holds: nasals > voiced > voiceless stops, with the exception of /g/ for the g > d area, which has by far the highest effect on raising of /æ/. As far as relations of place are concerned, the residual area shows a significant advantage of apicals for all three series, except for nasals, where the difference between /m/ and /n/ is not significant. This is not true for the g > d area, where the slight advantage of velar nasals in the raising of /æ/ may reflect the same factors that are operating for /g/. The difference between /ŋ/ and /n/ is not significant for the g > d area, but the difference between /ŋ/ and /m/ is significant at the $p < .05$ level.

A problem for future research is to discover the origins of this sharp differentiation of the effect of /d/ and /g/ on the raising of /æ/ across dialects.

Part E Regional patterns

14. The North

14.1. The North as a whole

Map 11.8 defined the outer limits of the North by the characteristic behavior of the low vowels: in the back, the distinction between /o/ and /oh/ is maintained, and in the front, a single phoneme /æ/ is maintained. These are two essential preconditions for the Northern Cities Shift, the chain shift that operates in the Inland North at the core of the larger Northern region. Another Northern feature is the conservative behavior of /ow/, with the absence of any strong fronting movement. In parallel, a conservative position of /aw/ is maintained throughout the region. In the front, Northern vowel systems show a similar conservative behavior, with relatively tense, peripheral /iy/ and /ey/, opposed to lax, nonperipheral short vowels /i/ and /e/. This chapter will begin with the general characteristics of the North, and then focus on the sound changes in progress in the Inland North.

The definition of the North used in this chapter is based on the "outer limit" of the North as defined in Map 11.8. It is the region where

(a) the low back merger is not completed: /o/ and /oh/ are not the same in production and perception in all environments;
(b) short-*a* is not split into tense and lax phonemes;
(c) /ow/ is not fronted: F2 is less than 1200 Hz.

The barred-blue isogloss developed in Map 11.8 will be used throughout this chapter. The principal difference between this and the plain-blue isogloss that defines the North in Map 11.15 is that the outer limit extends into Southwestern and Southeastern New England. This larger view of the North will be useful in discussing the origins and extent of the Northern Cities Shift, the dynamic process at the center of the Northern region.

Chapter 12 gave a detailed presentation of the various degrees of fronting of /uw, ow, aw/ on a continental scale. It appeared that most of North America was involved in the fronting of /uw/, except for two limited areas: one in the North Central States and one in Eastern New England, particularly the city of Providence. However, the fronting of /ow/ and /aw/ sharply divides North America.

14.1

Map 14.1 displays the structural relations between the nuclei of /ay/ and /aw/. In the North, the nucleus of /aw/ is further back than that of /ay/, while in other regions it is the reverse. The dark green symbols indicate those speakers for whom this condition is true, and the dark green isogloss is the outer boundary for that criterion (the AWY line).

The AWY line is discontinuous, as in several other maps of the Inland North area. First, because the connecting city of Erie, in the northwest corner of Pennsylvania, is once again re-aligned with the Midland rather than the North. Secondly, because it is separated by Albany from the area of Eastern New England where this condition holds. This discontinuity is due not so much to fluctuations in the position of /aw/, but rather to variations in F2 of /ay/.

The AWY line also stretches out to the north and west, including many points in on the Canadian prairies (Maps 12.4–5). It is the southern boundary of AWY that will be the central focus here, coinciding with many other isoglosses along the North/Midland line. The southern limit of the AWY line falls somewhat to the north of the North isogloss. It will be seen to coincide with the isoglosses of the Northern Cities Shift.

The light green symbols indicate speakers who approximate this relationship: /aw/ is front of /ay/, but by a small margin of less than 75 Hz. The light green symbols fill in the area of the North, so that there are only eight yellow symbols within the AWY line – those for whom /aw/ is distinctly fronter than /ay/. Furthermore, there are almost no dark green or light green symbols south of the Northern region.

Three dark green symbols appear along the St. Louis corridor.[1] Another set of four appears in Pittsburgh, representing the monophthongized version of /aw/ that is characteristic of that city. Otherwise, the division between speakers with fronted /aw/ and those with central or back /aw/ is very sharp, as shown by the high homogeneity and consistency figures of Table 12.5.

The word *on* has a unique position in the North American vocabulary in regard to the alternation of /o/ or /oh/ as its nuclear vowel. As the spelling indicates, it was originally a short-*o* word. The tensing of /o/ that produced /oh/ before voiceless fricatives (*loss*, *cost*, *off*, *cloth*) affected vowels before velar nasals primarily, so that the common words *strong*, *song*, *long*, *wrong* all have /oh/ in dialects that distinguish /o/ and /oh/. Words containing /o/ before /n/ were less frequently involved in tensing and show greater regional variation. The word *on*, in particular, shows a sharp North–South split between membership in the modern /o/ and /oh/ classes.[2]

14.2

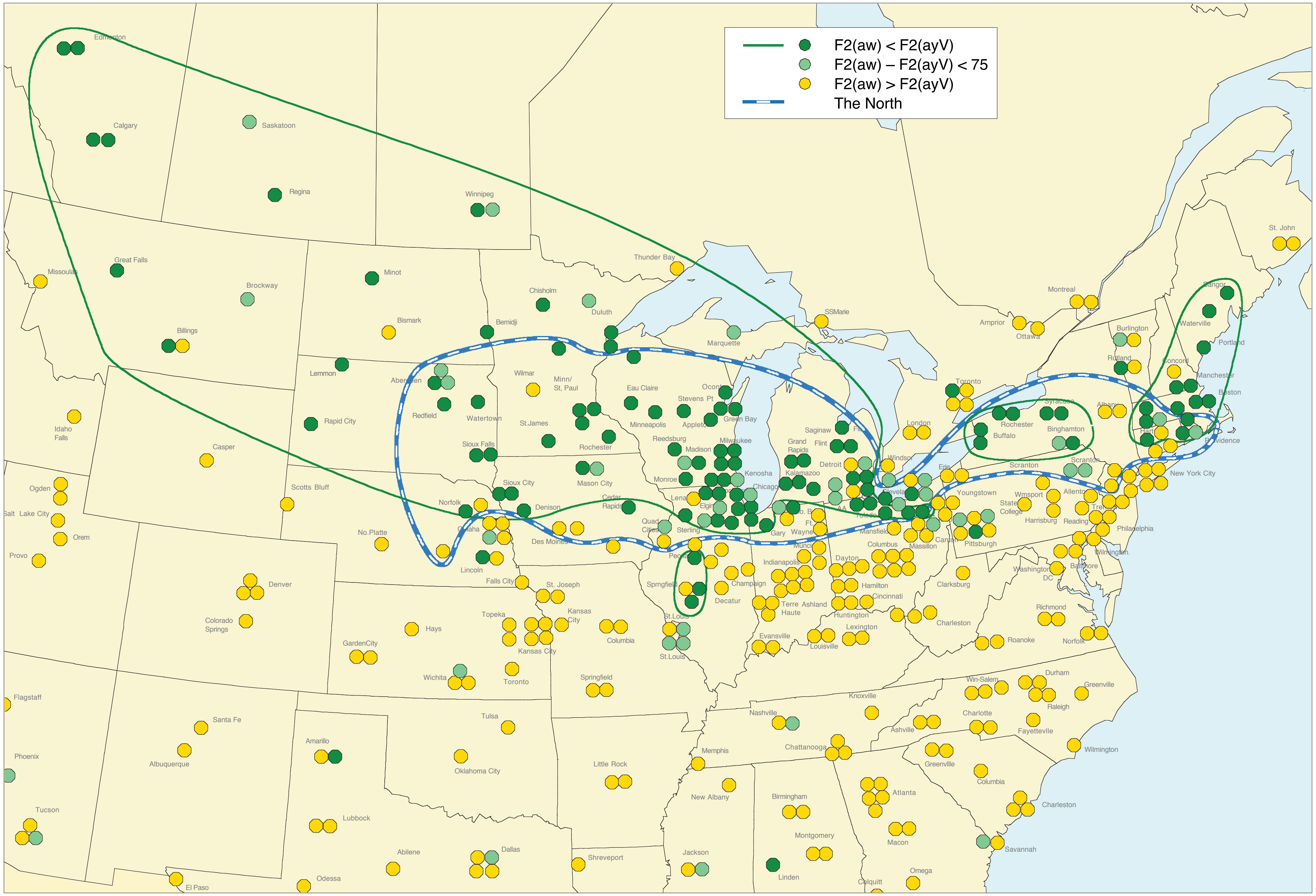
Map 14.2 shows only the speakers for whom /o/ and /oh/ are distinct: all those for whom *Don* and *dawn* were 'the same' in production or in perception are eliminated. The dark red symbols are those who pronounce *on* with /o/ to rhyme with *Don*. The magenta symbols indicate a low or mid back rounded /oh/: speakers for whom *on* rhymes with *dawn*. Yellow symbols indicate the few speakers who showed indeterminate results. The dark red isogloss is the ON line, marking the southern boundary of /o/.[3]

Map 14.2 shows complete homogeneity north of the ON line and a high degree of consistency in the occurrence of /o/. There are no magenta symbols north of the ON line, and only a few dark red symbols south of it.[4] In the east in particular, the ON line falls much closer to the North isogloss than the AWY line. From Nebraska to New Jersey, there are only one or two communities that fall in between the two isoglosses. In Indiana, the ON line goes north, coinciding with the AWY line and the NCS isoglosses.

14.2. The Northern Cities Shift

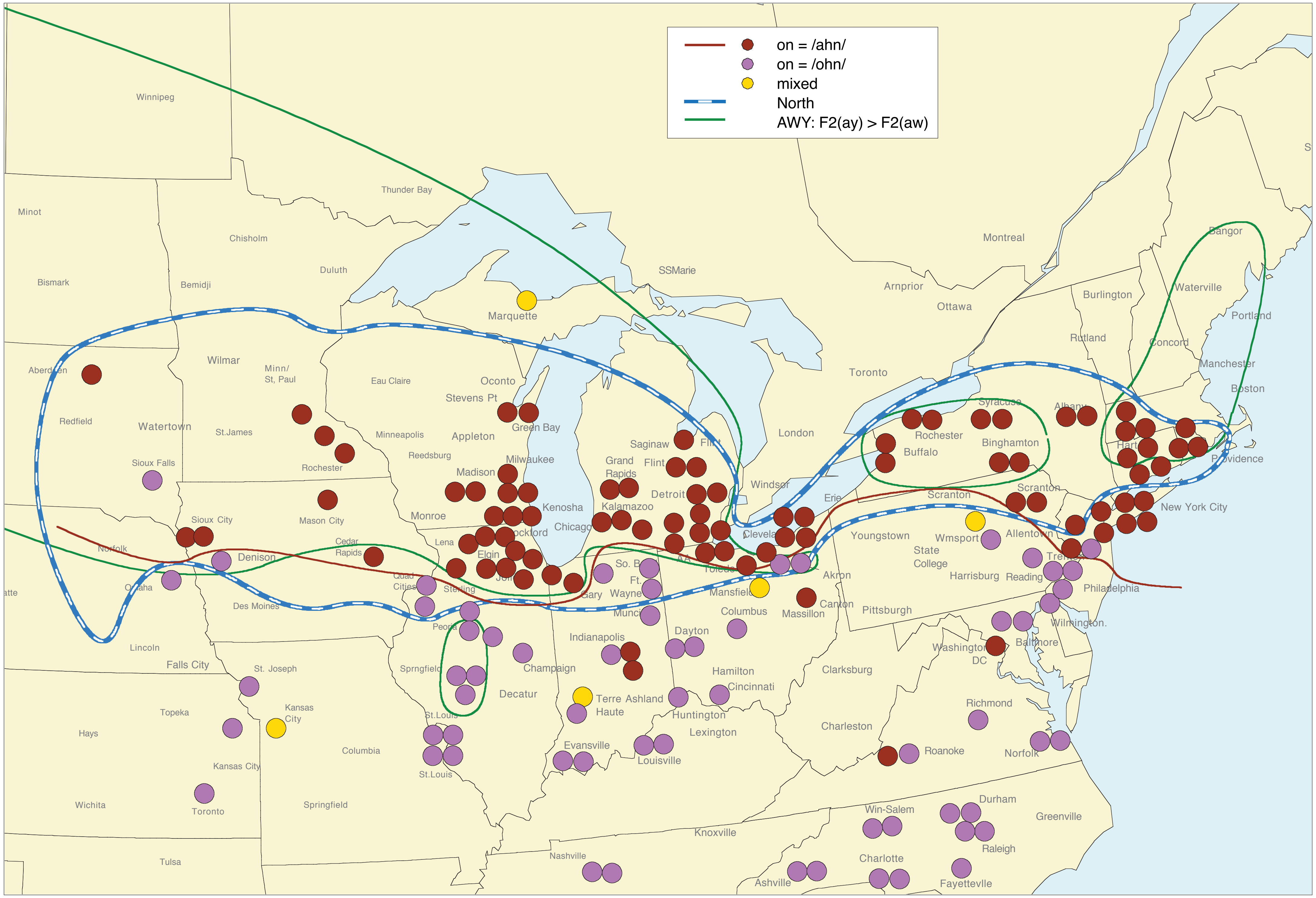
Map 11.2 gave an initial portrait of the Northern Cities Shift as the dynamic tendency defining the Inland North and the larger envelope of the Northern region. Figure 11.1, reproduced below as Figure 14.1, actually involves seven vowel

1 Since St. Louis itself is not affected, the corridor here is somewhat truncated.
2 The line distinguishing Northern /on/ from Southern /ohn/ has been called the "linguistic Mason–Dixon line". Philadelphia is sometimes considered the northernmost of Southern cities on the basis of its location south of the *on* line.
3 All of these speakers appear to have merged /o/ with /ah/; the merged vowel will be shown as /o/.
4 This is one northern feature that does not appear in the St. Louis corridor.



Map 14.1. The relative fronting of /aw/ and /ay/ and the AWY line

The dark green isogloss is the AWY line, which separates the dialects of North America into two distinct parts: in the North, the nucleus of /aw/ is further back than the nucleus of /ay/; in the Midland and the South, the reverse is true. The light green symbols are speakers who approximate this relationship: they fill the area between the AWY line and the larger definition of the North. Here the St. Louis corridor is plainly included in the North. The green symbols in Pittsburgh are related to a different phenomenon: glide deletion of /aw/.



Map 14.2. The ON line

One of the sharpest delineators of the North–Midland boundary is the pronunciation of a single word: *on*. North of the ON line, this word is pronounced /on/, to rhyme with *Don* and *Ron*. South of the line, *on* is /ohn/, and rhymes with *dawn* and *lawn*. The ON line runs very close to the southern part of the AWY line. In this map, all the speakers for whom /on/ and /ohn/ are the same are eliminated.

classes. The diagram uses the notation of initial position (Figure 2.2), so that five of the seven vowels are shown as members of the short subsystem: /i, e, æ, o, ʌ/, while two are members of the long and ingliding class: /ah, oh/. At the stage where the NCS begins, two of these appear to have merged: /o/ and /ah/. ANAE did not inquire directly into this contrast, but the available evidence points in this direction. For both /ah/ and /o/, the Inland North shows higher F2 values than any other dialect, and the correlation between /ah/ and /o/ is much larger for the Inland North than for other dialects (.70 vs. .48). Such a merger of /o/ and /ah/ must be considered to produce the phoneme /ah/, a member of the long and ingliding subsystem with both checked and free allophones in *cot*, *got*, *dollar*, *spa*, *father*, etc. At the same time, /æ/ can be considered to have migrated into the long and ingliding class, and can be represented as /æh/. Thus the NCS can be seen to involve three long and ingliding vowels and three short vowels, and the movements within and across subsystems are best understood from that perspective.[5] Nevertheless, this and the following chapters will continue to use the notation of the initial position of Figure 2.2 in order to maintain consistency and clarity in comparing dialects. The original /æ/ class will continue to be labeled as /æ/ and the merged /o, ah/ class will be referred to as /o/. The mean values for /o/ are based upon the measurements of the original /o/ class, which considerably outnumber the /ah/ tokens.

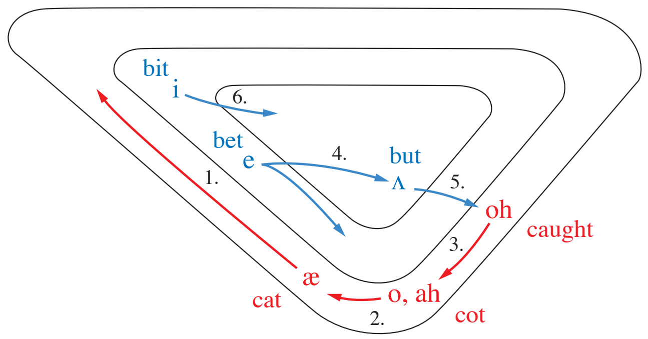


Figure 14.1. The Northern Cities Shift

History of the Northern Cities Shift

In the history of the English language, the long vowels have undergone cycles of shift and rotation, while the short vowels have been relatively stable for more than a millennium. Old English /i, e, u/ were most likely pronounced in a way very similar to the initial position of Modern English /i, e, u/. The low front vowel /æ/ was probably [æ] in Old English, though it has fluctuated to and from [ɛ] and [a] several times in the intervening period. Most of the short /u/ words underwent unrounding to wedge /ʌ/, but left a remnant that opposes /u/ to /ʌ/ in *put* ~ *putt*, etc. Short /o/ also unrounded in many dialects, and merged with /ah/ in *father* (Chapter 13), or as Chapter 9 showed, merged with the long and ingliding /oh/. The short vowel classes have lost membership through lengthening (*name*, *made*, *right*, *might*, *yolk*, etc.) and gained membership through shortening (*bread*, *dead*, *look*, *cook*) and through massive importation of loan words. Yet the short vowel paradigm has not shown any of the systematic shifts that have so notably skewed the English long vowels from their European counterparts.

The dialect of the region around the Great Lakes, known as the "Inland North", was also relatively stable since that region was first settled in the middle of the nineteenth century. It is reportedly the basis for Kenyon and Knott's *Pronouncing Dictionary of American English* (1953), which was in turn the basis for the broadcast standard adopted by radio networks in the middle of the twentieth century (Frazer 1993). Although the lexical and phonological patterns of this area were plainly linked with Northern patterns of the eastern U.S., Inland North speech was also the basis for the vague term "General American" which continues to appear in popular accounts of American dialects. Though there remain features common to the North and the Midland – such as *r*-pronunciation and the merger of *Mary*, *merry*, and *marry* – the sharp split between the vowel systems of the Inland North and other areas makes this dialect an unlikely candidate for a "general" or unmarked form of American English.

The first report of the Northern Cities Shift appeared in an unpublished paper of Fasold (1969) based on an impressionistic study of Shuy, Wolfram, and Riley's data from Detroit (1967). Fasold's findings are reproduced as Figure 14.2. The focus is social distribution: lower-middle-class women were leading in both the raising of /æ/ and the fronting of /o/. The parallel movement of these vowels was the first indication that they were structurally linked.

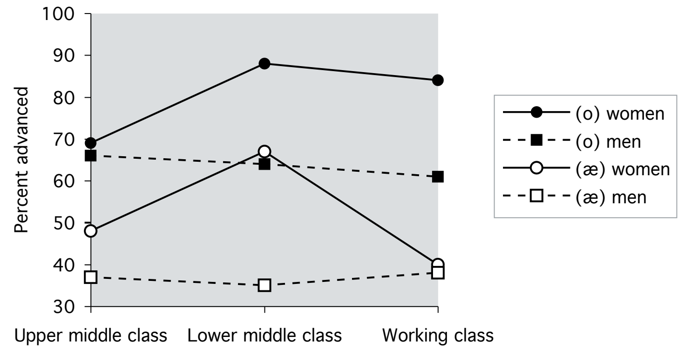


Figure 14.2. Stages 1 and 2 of the Northern Cities Shift by age and social class in Detroit (Fasold 1969)

In 1972, Labov, Yaeger, and Steiner described a *Northern Cities Shift* of five vowels on the basis of acoustic analyses of exploratory interviews in Chicago, Detroit, Buffalo, Rochester, and Syracuse. The studies of Chicago showed a number of features that both anticipate and differ from the patterns that have emerged from the current ANAE studies some 30 years later. Figure 14.3 shows the vowel system of Carol M., 16 years old when interviewed by Wald in Evergreen Park in 1968. The short-*a* vowels are shifted as a whole to mid front position. The leading tokens, before nasals, voiced stops, and voiceless fricatives, are located about half-way between /ey/ and /iy/. The more conservative environments, after laterals and before voiceless velars and labials, are in lower mid position: *laugh*, *slacks*, *crap*. Only the most conservative word, *black*, along with re-stressed *an*, can be considered low front. The /o/ class has accordingly shifted front of center: short-*o* words *god*, *knock*, *got*, are in low central or front of center position, along with /ahr/ words like *car*. Short /e/ has moved downwards with *dress* and *ahead* in the same range as *god* and *got*.[6] Only /e/ before /l/ is backed, as in *sell*. The /oh/ words *brought* and *caught* are somewhat centralized rather than lowered. No sign of the backing of wedge appeared at this stage.

5 From an articulatory perspective, with only [i] and [ɑ] as fixed anchor points, the short vowels can be seen as moving downward along a nonperipheral trajectory, while two of the long and ingliding vowels are moving upward and one downward along a peripheral trajectory (Labov 1994: Ch. 8).

6 This F1–F2 overlap of /e/ and /o/ does not represent a merger or a near-merger. The short-*o* words are in general longer, and appear to be opposed to /e/ as tense to lax (Labov and Baranowski in press).

Figure 14.4 shows the vowel system of Mike S., a male speaker from the same social network as Carol M., with similar indications of an early stage of the Northern Cities Shift. Short-*a* is well advanced to mid position, and some /o/ tokens are well front of center: *shot*, *Spock*, *communist*, *confidence*. Short /e/ is not backed: *fed*, *test*, and *met* are front of center, and there is a considerable distance between /e/ and /ʌ/. /oh/ is in mid-back position, with only *thought* showing a tendency to lowering.

The fifth stage of the NCS, the backing of /ʌ/, was first observed by Eckert (1986) in the Detroit area. With further observations of the lowering of /oh/ to the position formerly occupied by /o/, the complete rotation of the chain shift became evident, leading to the view of the shift in Figure 14.1. The numbering on this figure establishes the backing of /ʌ/ as a late change, but there are still unresolved questions of ordering involved. It is clear that the raising of /æ/ and the fronting

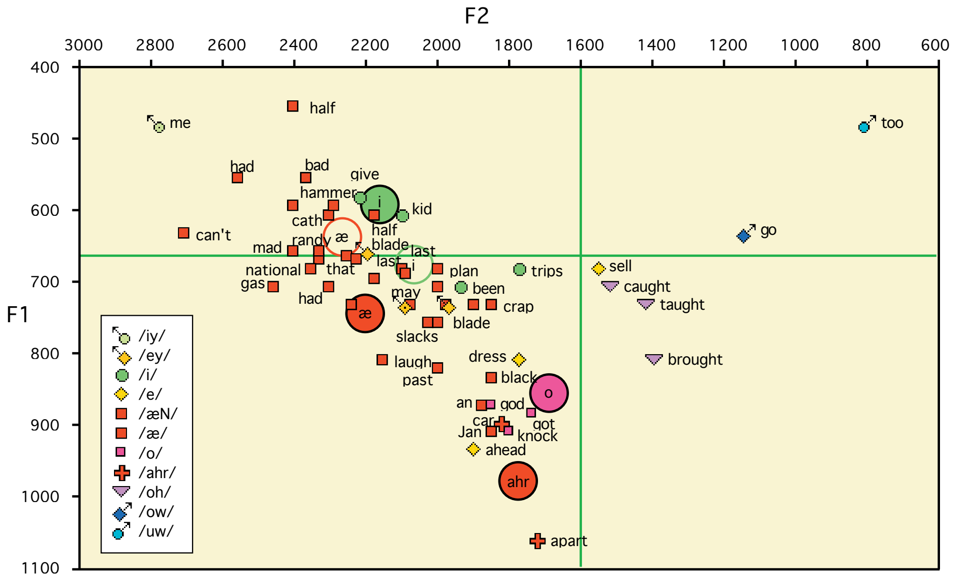


Figure 14.3. Vowel system of Carol M., 16 [1968], Evergreen Park

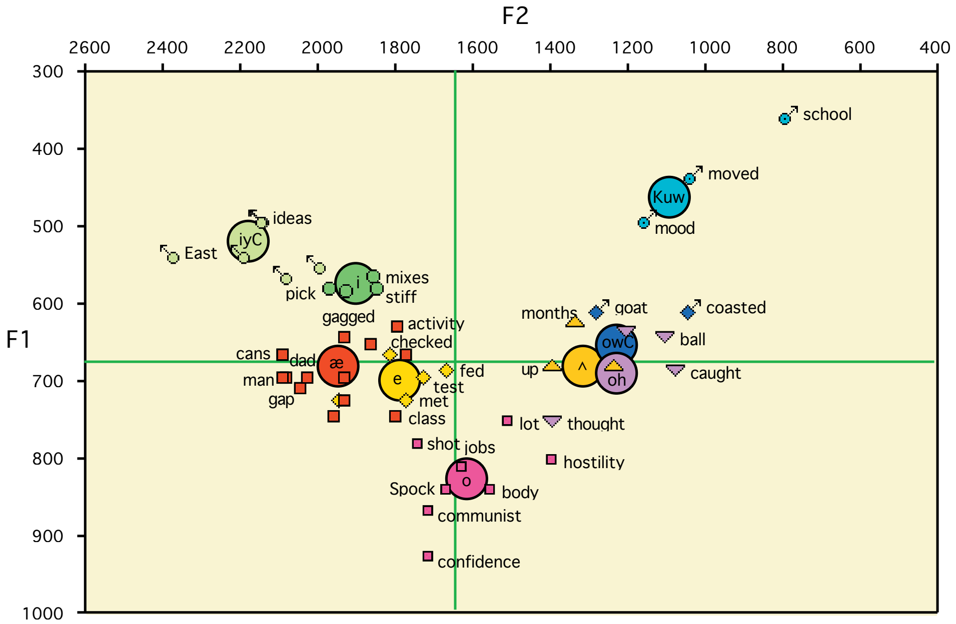


Figure 14.4. Vowel system of Mike S., 18 [1968], Chicago

of /o/ were the initial movements, though both the geography and real time are ambiguous in regard to their ordering. There is a great deal of irregularity from speaker to speaker in the lowering of /oh/: logically, it would be the third stage in a pull chain. but there are many speakers with back /e/ and some backking of /ʌ/ who have not lowered /oh/. Again, the logic of a pull chain would argue that the backing of /ʌ/ would precede the backing of /e/, and the geographic area of /ʌ/ backing is much broader than that for the backing of /e/. However, there are many speakers who show stressed tokens of /e/ pressing hard against the /ʌ/ frontier, with no accompanying backing of /ʌ/. The ordering of Figure 14.1 fits in with Eckert's findings in Detroit (1990) and will be adopted here, always with the reservation that different orders may be operating in different cities and different social groups.

14.3. Telsur subjects in the Inland North

Seventy-one of the 439 Telsur analyses are from subjects located in the *Inland North* as defined in Chapter 11. They represent 33 speech communities from western New York to eastern Wisconsin. The distribution of subjects by age, gender, and education is shown in Table 14.1. The pattern mirrors that of the complete Telsur sample as presented in Chapter 4, but since the analysis of social factors in the Inland North plays a major role in our understanding of the mechanisms of chain shifts, the numbers of Inland North subjects in each category are particularly relevant.

The most important deviation from an even distribution of the population is in the category of women 20 to 39 years old. In this age range, there are 24 women, as compared to half as many men, and half as many older women. This is a reflection of the Telsur policy of including wherever possible a woman between the ages of 20 and 39, in order to have a representation of the more advanced speech patterns in each community. Other figures on gender differentiation throughout the Atlas confirm the finding (Labov 2001: Ch. 9) that in the good majority of cases, women are leaders in the process of linguistic change. As indicated in Chapter 4, this imbalance biases the Telsur sample somewhat towards more advanced speakers, and therefore focuses upon the dynamic tendencies within the dialect, which might be missed if the two representatives of a community were both conservative speakers.

Table 14.1. Distribution of Inland North Telsur subjects by gender, education, and age

	Gender		Years of schooling completed					
	Female	Male	<12	12	13–15	16	>16	Total
Under 20	3	0	1	0	0	1	1	3
20–39	24	12	0	12	13	7	4	36
40–59	12	13	0	8	11	4	2	25
60–	2	5	1	3	3	0	0	7
Total	41	30	2	23	27	12	7	71

14.4. Mapping the Northern Cities Shift

The Northern Cities Shift patterns in the Natural Break maps of Chapter 10

The Natural Break maps of Chapter 10 provide a pre-theoretical overview of phonetic patterns. A review of these maps will provide an initial overview of the regional concentration of NCS features:

Raising and fronting of /æ/ [Maps 10.5, 10.6] Map 10.5 shows a heavy concentration of red circles in the Inland North, including the St. Louis corridor, red symbols designating the lowest F1, or highest vowels. The only other area where red circles are at all concentrated is in the Southern Mountain areas of Kentucky and Tennessee. The great majority of the 86 red tokens are in the area that is defined as the Inland North in Chapter 11. A similar situation is found in Map 10.6 for F2 of /æ/, though here the natural break algorithm places 110 in the highest group and there is a wider scatter, particularly in the Kansas City area, the North Central States, and the South.[7] Since these maps represent short-*a* before oral, not nasal only, they show the high concentration in the Inland North of the general raising of /æ/.

The fronting of /o/ The geographic concentration of the symbols in the group with highest F2(o) is denser than for F1 of /æ/; only 79 speakers are included in this group. The distribution in the Inland North is very similar to that of F1 of /æ/, with even less scatter in the South, but an additional area in the North Central states, including western Iowa and eastern South Dakota.

The lowering of /oh/ [Map 10.31] The natural break map for F1 of /oh/ is not particularly informative for the NCS, because the downward shift of /oh/ in the low back merger is not distinguishable from the lowering of /oh/ in the NCS.

The lowering and backing of /e/ [Maps 10.3, 10.4] The blue circles on Map 10.3 show the speakers with the highest mean values of F1 for /e/. Though there is some concentration of these low forms of /e/ in the Inland North, low /e/ is also found in Canada, the Mid Atlantic States, and the Boston area of Eastern New England. A similar, but more diffuse situation is indicated for the backing of /e/ by the blue symbols in Map 10.4.

The backing of /ʌ/ [Map 10.12] In this map, the Inland North shows a heavy concentration of blue symbols indicating the furthest back mean values of F2 of /ʌ/. In addition, there is a strong concentration in the Mid-Atlantic States and in Southern New England. There is a heavy concentration of red symbols, representing the furthest front positions of /ʌ/, directly below the blue circles, in the Midland Region. This contrast will play an important role in the further discussion of the NCS to follow.

The raising and fronting of /æ/

14.3

The triggering event for the Northern Cities Shift is the general raising and fronting of /æ/. (As noted throughout, the mean values of /æ/ do not include words with nasal codas.) A quantitative display of the degree of raising of /æ/ is provided by the thematic Map 14.3. The area of each circle is proportional to the square root of the quantity F1(æ) – 700. For all those speakers whose F1 of /æ/ is less than 700 Hz, this quantity is negative and the symbol appears as red, while all others are blue. The focus of interest is on the red symbols, which correspond closely to the red symbols of the Natural Break Map 10.5.

Map 14.3 reproduces the red isogloss of Map 11.2, outlining the area for which F1 of /æ/ is less than 700 Hz. (The natural break was calculated at 684 Hz, but Map 14.3 rounds the criterion value to 700.) Except for the St. Louis corridor, the red area is contained within the wider region of the North, as defined above. Within the red area, the largest circles appear in western New York State, which forms the eastern sector of the Inland North in Maps 11.8 and 11.14.

The regions with the greatest concentration of large blue circles are in Canada, the Mid-Atlantic, and Midland regions bordering the North. As Chapter 13 showed, Canada is the region with the least raising of /æ/. In the Mid-Atlantic regions, the mean values for /æ/ exclude the words with the strongest tendency to raising, as they are in a different phonemic class.

In the Appalachian areas, the size of the circles is minimal, and a number of points contain small red circles, indicating a more general tendency towards raising than in the South as a whole. The raising and fronting of /æ/ is associated with the parallel movements of /i/ and /e/ (Chapters 11, 18), but this effect is reversed when Southern breaking lowers the nucleus of /æ/ (Chapter 13).

14.4

Map 14.4 is a regional map of the Great Lakes area and the Midland, focusing in greater detail on the raising of /æ/ in the NCS area. All speakers with F1 of /æ/ less than 700 Hz are shown as red circles. The red isogloss, or **AE1 line**, shows the area of maximal raising. A scattering of red circles in the South can be observed, but there is no concentration sufficient to warrant a second isogloss. Within the Inland North (including the St. Louis corridor), the homogeneity of raising is high: as Table 11.1 showed, homogeneity is .84 and consistency is .78 for this isogloss. The scattering of four red circles in Western New England will become meaningful in tracing the origins of the NCS in that area (see below). There are virtually no red circles north of the isogloss.

Since the general raising of /æ/ is the triggering event for the NCS, the question may be raised whether this process is qualitatively different from raising in other parts of the continent. The natural break Maps 10.5 and 10.6 showed that the geographic concentration of the raising of /æ/ (seen in the lowering of F1) was similar to the pattern for the fronting of /æ/ (seen in the raising of F2). Figure 13.21 showed that the features of phonetic conditioning that affect the raising of /æ/ were the same across dialects, except for the ordering of voiced velar and apical stops. Table 14.2 and Figure 14.5 examine the conditions governing the combined movements of F1 and F2 along the front diagonal for the 126 speakers of the North who were analyzed acoustically as against the other 316 speakers combined. In this regression analysis, the dependent variable is the Cartesian distance along the front diagonal. Vowels with nasal codas are not included, as these strongly favor raising in all dialects The analysis is based on vowel tokens, so that N for the North is 3619 and for other areas, 8691.

The effects of the following environment are remarkably similar.[8] The manner of articulation of the coda shows nasals followed by obstruents (stops, affricates, fricatives) in the same order. As far as the place of the coda is concerned, velars and labials are equally disfavoring (as opposed to apicals). The manner of the onset shows close agreement, with nasals strongly favoring and liquids and obstruent/liquid clusters disfavoring. The place of the onset shows the shared order in the opposite direction from codas: velars, palatals, labials, apicals. Finally, the presence of following syllables disfavors raising of /æ/ to the same extent.

The triggering of the NCS by the general raising of /æ/ cannot be attributed to any difference in the phonetic conditioning of the sound changes involved. Some other factor must therefore be considered to account for the origination of the short-*a* pattern of the Inland North.

The similarity of regression coefficients extends to the social factors in Table 14.2. Both the North and other areas show positive coefficients for age, indicating a recession of the raising pattern in apparent time. They both show a favoring effect of Metropolitan Statistical Area size, and a negative relation to education. The chief difference is that the positive coefficient for age is larger in the North, indicating a stronger recession. The final section of this chapter will deal with the geographic and social distribution of the stages of the NCS and examine the historical factors that may be responsible for the general raising of /æ/.

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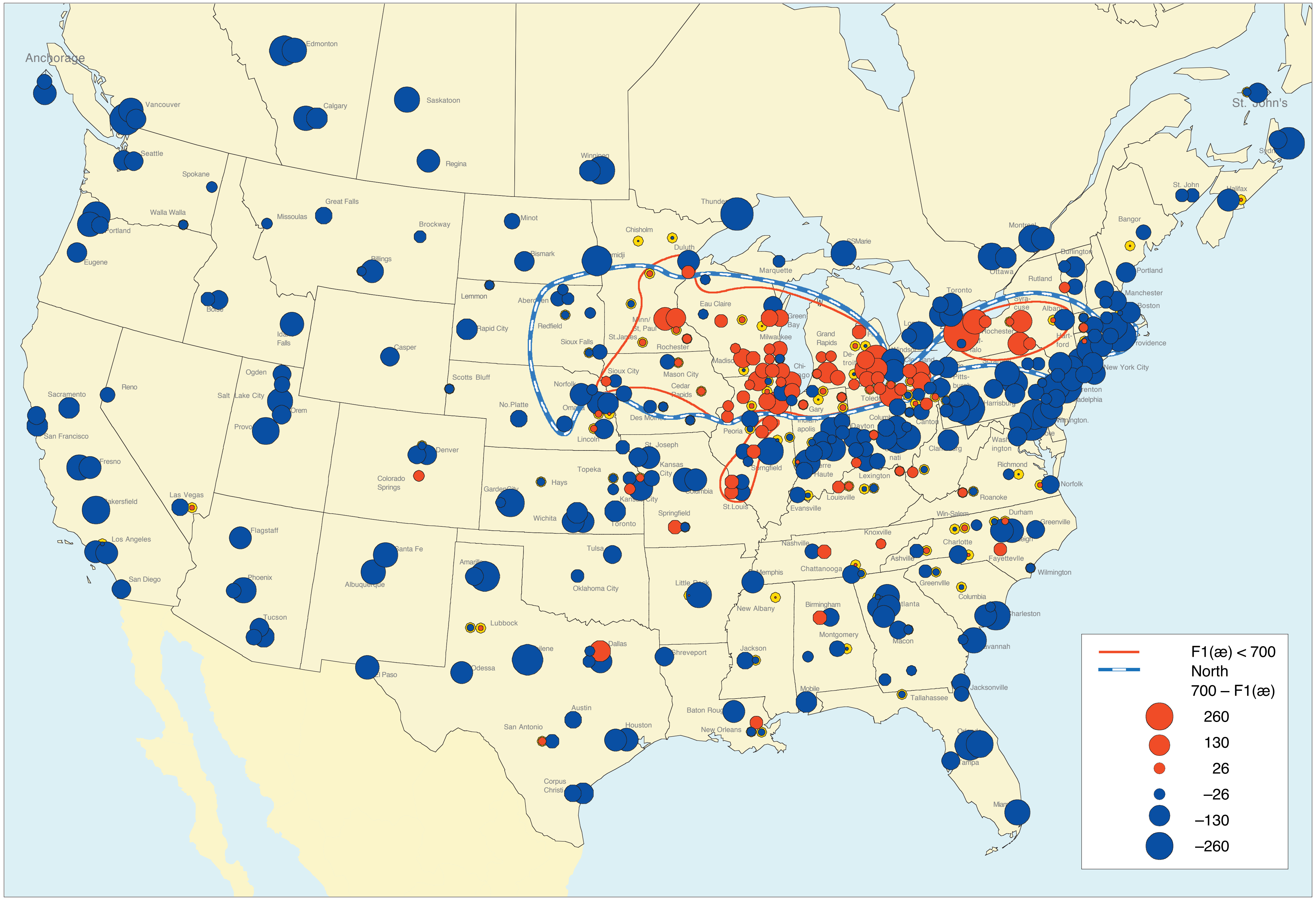
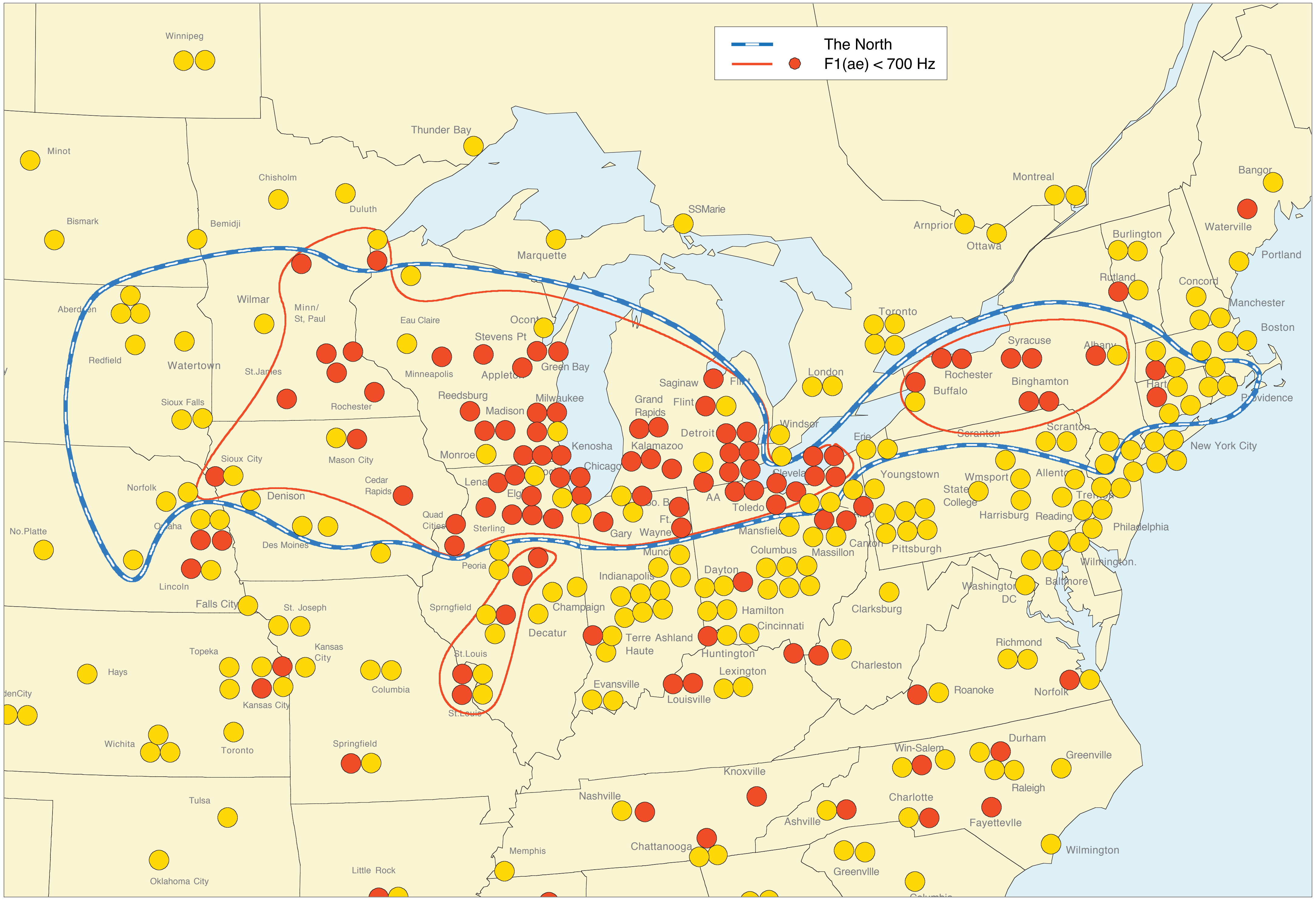
7 It is important to note that the raising of /æ/ is quite general across North America, but for many dialects it is concentrated in vowels before nasal consonants. The mean of /æ/ that is traced in Maps 10.5 and 10.6 does not include any vowels before nasals, so the contrast between the Inland North and other areas is maximized.

8 Since the area of differentiation of the effects of following /d/ and /g/ registered in Chapter 13 cuts across this division into the North vs. other regions, it does not appear in these results.



Map 14.3. Thematic map of the raising of /æ/

The red circles are all those speakers for whom the mean first formant of /æ/ is less than 700 Hz: that is, in upper mid position. The blue circles represent the speakers for whom mean F1 is greater than 700 Hz: below mid position. The size of each circle represents the degree to which mean /æ/ falls above or below the 700 Hz mark. It can be seen that the red circles are heavily concentrated in the North, and especially that part that was named the Inland North in Chapter 11. These mean calculations do not include vowels before nasal consonants, which are raised above mid position in many areas.

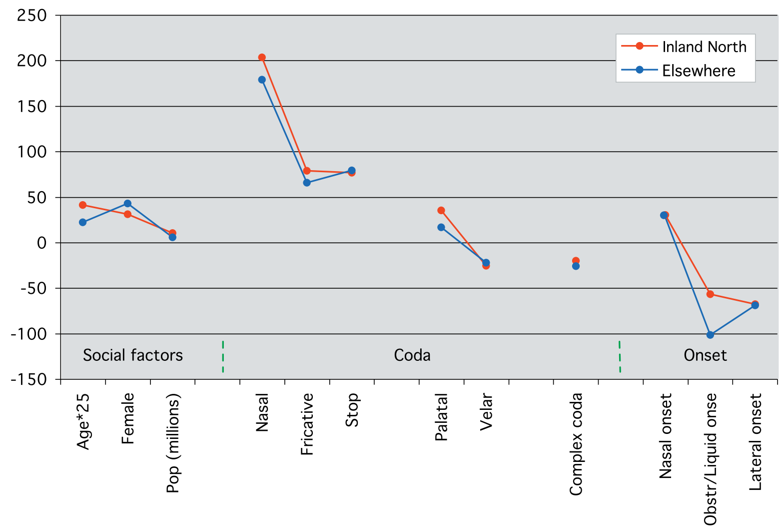


Map 14.4. The raising of /æ/

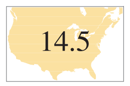
The raising of /æ/ is defined here by the discrete criterion that the mean first formant should be less than 700 Hz (the red circles). The red circles are heavily concentrated in the North, especially in the big cities of Cleveland, Detroit, and Chicago. At the same time, a number of red circles are seen scattered throughout the Midland and the South. The raising of /æ/ alone does not define the North as precisely as the AWY line or other criteria to follow: it is only one of the components of the Northern Cities Shift.

Table 14.2. and *Figure 14.5.* Regression coefficients for raising of /æ/ along the front diagonal in the North [N = 3619] and elsewhere [N = 8691]. Vertical axis: Sqrt(2*F1(æ)^2)+F2(æ)). Only factors significant at $p < .01$ or better are shown.

Variable	North	Elsewhere
CODA MANNER		
Nasal	189	154
Stop	66	58
Affricate	52	34
Fricative	44	30
CODA PLACE		
Velar	−11	−16
Labial	−10	−14
ONSET MANNER		
Nasal	70	40
Liquid	−131	−110
Obstruent/Liquid	−135	−152
ONSET PLACE		
Velar	−27	−13
Palatal	−81	−63
Labial	−86	−70
Apical	−103	−73
Polysyllabic	−53	−49
Age*25 yrs	32	.60
MSA (millions)	6.93	1.31
Education (yrs)	−2.5	−.86



The fronting of /o/



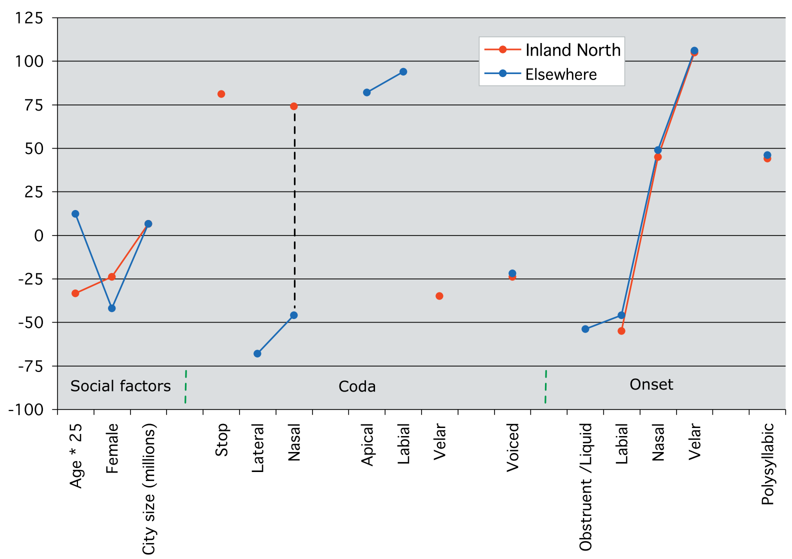
Map 14.5 shows the second stage of the NCS, the fronting of /o/ in *cot*, *rock*, *college*, etc. The brown symbols show all speakers for whom the mean F2 of /o/ is greater than 1450 Hz. Since in the normalized system of Telsur, 1550 Hz is the approximate center of the acoustically defined space utilized, a speaker with a mean value greater than 1450 is likely to have some tokens of /o/ that are front of center.

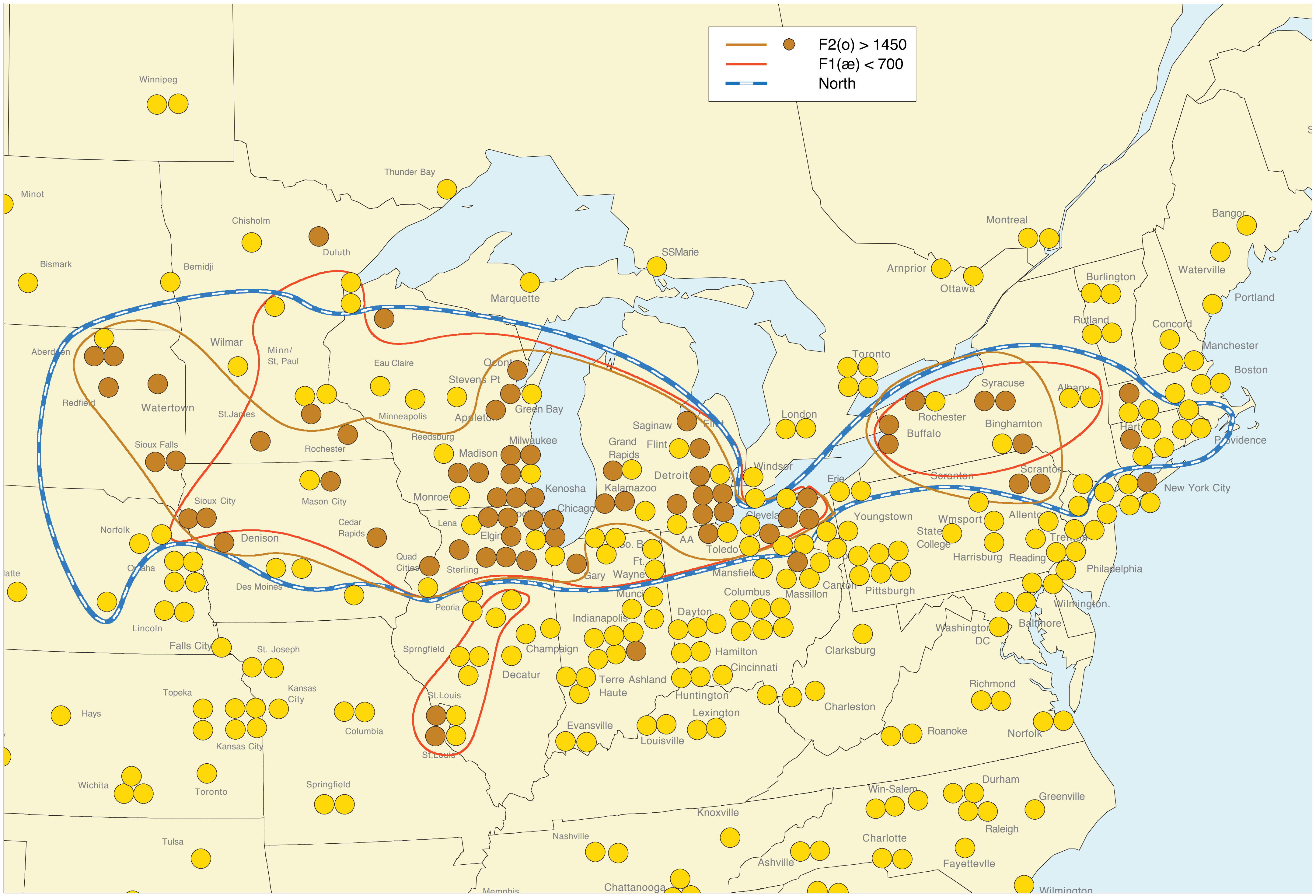
The area of fronting of /o/ is shown by the brown isogloss (the O2 line). The eastern section more or less coincides with the eastern section of AE1, and the agreement on the North/Midland line is quite high, with the exception of five speakers in Northern Indiana. The O2 line coincides with the main bundle of NCS isoglosses.

Table 14.3 and Figure 14.6 report the social and phonetic conditioning of the fronting of /o/, making the same comparison as in Table 14.2 and Figure 14.5. There is a high degree of agreement in phonetic conditioning, but not as great as with /æ/. Nasal codas strongly favor fronting outside of the North, but not in the North itself. Fricative and labiodental codas disfavor fronting in the North, but not elsewhere.

Table 14.3. and *Figure 14.6.* Regression coefficients for the second formant of /o/ for the North [N = 3354] and elsewhere [N = 8112]. Only factors significant at $p < .01$ or better are shown.

Variable	North	Elsewhere
CODA MANNER		
Fricative	−62	
Nasal		−59
Lateral	−84	−80
/r/	−112	−137
CODA PLACE		
Apical	31	28
Labial	24	28
Palatal	9	39
Labiodental		−59
ONSET MANNER		
Nasal	53	43
Liquid	−57	−24
Labial	−71	−40
ONSET PLACE		
Velar	43	54
Apical	24	31
Poly	13	28
Voiced	−26	−25
SOCIAL		
Sexnum	−23	−37
City Size (millions)	21	10
Age * 25 yrs	−11	





Map 14.5. The fronting of /o/

The brown circles show speakers for whom the second stage of the Northern Cities Shift is operative: the fronting of /o, ah/ in *got*, *rock*, *father*, and *pa* to center and front of center position. The criterion here is that the mean F2 of /o/ should be greater than 1450 Hz (the general mid-point for all vowels for all speakers is 1550 Hz). The isogloss for this fronting of /o/ coincides closely with the AE1 line on the north–south dimension, but extends further west, and to a certain extent, towards the east.

The social factors do not show /o/ involved in a sound change outside of the North; only in the North is there a significant age coefficient. The negative coefficient of −11 for 25 years of age indicates that younger people develop fronter /o/. This figure appears small by comparison with other age coefficients (−101 for the fronting of /uw/), but it must be borne in mind that the available range of fronting for a low vowel in the normalized system is no more than 400 Hz as compared to 2000 Hz for high vowels. The fact that the raising of /æ/ is no longer progressing in apparent time (Table 14.2), while /o/ is still advancing, lends support to the ordering of NCS events outlined in Figure 14.1.

The lowering and fronting of /oh/

The third stage of the NCS, the lowering and fronting of /oh/, is not easily given a parallel geographic treatment. The natural break Maps 10.31 and 10.32 show only a few strong geographic concentrations of regional variants of /oh/. One is a concentration of red symbols on Map 10.31 and blue symbols on Map 10.32 in the conurbation stretching from Western New England through New York City to Philadelphia, Baltimore, and Washington, where /oh/ is higher and backer than in any other area (Chapter 17). A second is a relative concentration of blue symbols on Map 10.31 and red symbols on Map 10.32 in the Inland South, where the nucleus is unrounded and fronted when it develops a back upglide, a change across subsystems to /aw/ (Chapters 11, 18). A third is the concentration of red symbols on Map 10.36 and 10.37 in Eastern New England, indicating a relatively front position for the /oh/ that is the product of the low back merger. There is also a heavy concentration of red symbols on both maps in the North Central States, and in the West on Map 10.17a, registering a low position for the low back merger. But in the Inland North, there is no clear pattern: representatives of all four natural break classes are intermingled.

It appears that the shift of /oh/ is not as tightly integrated into the NCS as its other elements. Regression analyses of F1 of /oh/ in the Inland North show a significant negative coefficient, indicating that younger speakers are using lower nuclei. However, this is also true for the areas outside of the Inland North. The lowering of /oh/ is apparently due to a variety of causes, rather than the operation of the NCS alone.

The lowering and backing of /e/

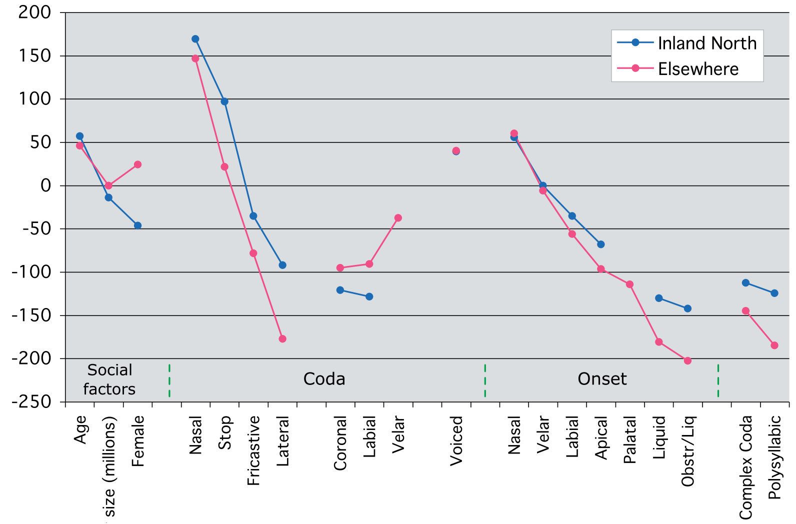
As shown in Figure 14.1, the phoneme /e/ moves in two different directions in the course of the Northern Cities Shift: lowering, as registered by an increase in F1, and backing, registered by lowering of F2. The Natural Break Maps 10.3 and 10.4 show that the geographic distribution of the lowering and backing of /e/ in the Inland North is not as concentrated as that delineated by the AE1 and O2 isoglosses in Maps 10.5 and 10.10. The dominant pattern is the lowering of F2 that corresponds to a backing movement. Table 14.4 and Figure 14.7 show the results of a regression analysis of social and phonetic factors influencing the backing of /e/ within the North.

The phonetic conditioning of /e/ shows close agreement across both regions. The more negative the coefficient, the more advanced the backing of /e/, so that the factors that lag far behind in the raising of /æ/, like obstruent–liquid codas, are well in advance of others in the backing of /e/. At the same time, some of these conditioning factors are specific to /e/. Fricatives show the strongly negative coefficient of −179, comparable to laterals. Manner, as always, has a more powerful effect than place. The /r/ environment here refers to intervocalic /r/ in *very*, *ferry*, etc., since coda /r/ is a different class altogether.

In the social factors, notable differences emerge. The age coefficient for the North is larger than elsewhere, but there is a general tendency towards backing on a continental basis.[9] The large negative city size factor indicates that the bigger cities are leading in the backing process. The North also differs from other areas in the positive effect of female gender: women are leading in the backing of /e/ in that region but not elsewhere.

Table 14.4. and *Figure 14.7.* Regression coefficients for the second formant of /e/ for the North [N = 2918] and elsewhere [N = 8553]. Only factors significant at $p < .01$ or better are shown.

	North	Elsewhere
CODA MANNER		
Nasal	98	131
/r/	118	97
Fricative	−149	−94
Lateral	−194	−200
CODA PLACE		
Apical	−111	−51
Labial	−94	−48
ONSET MANNER		
Nasal	40	62
Liquid	−136	−186
Obstruent/Liquid	−167	−220
ONSET PLACE		
Labial	−43	−58
Palatal	−40	−141
Apical	−77	−98
SOCIAL		
Female	−38	28
City size (millions)	−28.50	−4.50
Age * 25 yrs	75.9	51.6



9 The major process that would lead to the fronting and raising of /e/ is the Southern Shift. As Chapter 18 will show, this shift is receding somewhat in the South, so that it does not contribute to a reversal of the direction of /e/ movement in the "Elsewhere" group.

Structural measures of the NCS

The preceding maps of individual sound changes show strong geographic concentrations but the advance of the NCS as a whole is best registered by more structurally oriented measures based on relational changes within the system. One such measure is based on the relations of F1 and F2 of /e/ and /æ/, setting up four quadrants on the basis of relations of "greater than" or "less than". In the Figure 14.8 below, four quadrants register four possible relations of the F1 and F2 of /e/ and /æ/. The most conservative quadrant, common to most dialects of North America and elsewhere, is 1, where /æ/ is lower and backer than /e/. In the course of the Northern Cities Shift, vowel systems shift towards quadrant 2, as /æ/ becomes tense and peripheral, and then to quadrant 3 as /æ/ moves further up and /e/ moves down and back to quadrant 3. There are no representatives of quadrant 4 in the data.

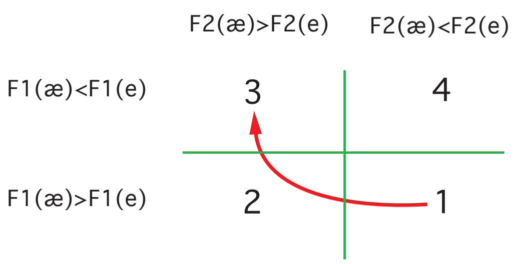


Figure 14.8. Relative positions of F1 and F2 of /e/ and /æ/

The following Plotnik NCS diagrams map the mean values of the six vowels involved in the Northern Cities Shift for individual speakers (vowels before nasal consonants are not included in the mean values for /i, e, æ, ʌ/). Figure 14.9 shows the quadrant 1 pattern for a conservative Midland speaker, Beatrice S., 62, of Williamsport PA. The front vowels /i, e, æ/ are equally spaced in a series of decreasing height and advancement. Characteristically, /æ/ is only slightly further back than /e/.

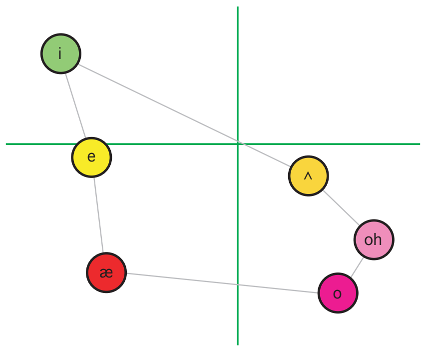


Figure 14.9. Quadrant 1 NCS vowels for Beatrice S., 62, Williamsport, PA

Figure 14.10 shows an early stage of a Quadrant 2 alignment for the oldest Chicago speaker, James W., 78 years old. Here /æ/ has shifted slightly forward of /e/, but is much lower. The other NCS vowels are close to their initial positions for the North: /e/ is aligned almost vertically with /æ/, /ʌ/ is aligned vertically with /o/, and /oh/ is at the same lower mid level as /ʌ/, with no signs of lowering.

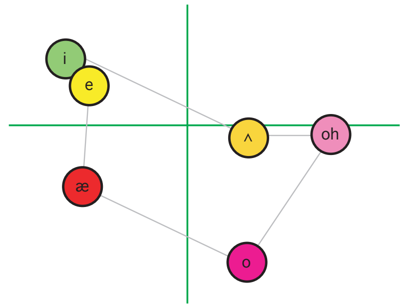


Figure 14.10. Quadrant 2 NCS vowels for TS 55, James W., 78, Chicago, IL

A more advanced stage of the NCS is seen in Figure 14.11, from the vowel system of a 43-year-old man from a small city of the Inland North, Ann Arbor. The upward progression of /æ/ has continued, to reach lower mid position, almost as high as /e/, and distinctly more peripheral than /e/. Other NCS vowels have begun to shift. /o/ has moved almost to center, and /oh/ has descended halfway down from its original mid position. On the other hand, /e/ and /ʌ/ show no signs of the backwards shift that is characteristic of younger speakers from larger cities.

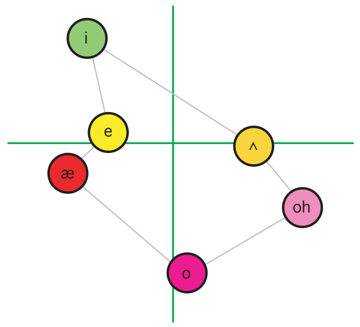


Figure 14.11. Quadrant 2 NCS vowels for TS 115, Steve A., 43, Ann Arbor, MI

The more advanced stages of the NCS are shown in Figures 14.12 and 14.13. Figure 14.12 is a vowel system from the eastern section of the Inland North, a 35-year-old woman from Rochester. Here /æ/ has risen to upper mid position, and the mean value of /e/ has descended to a position back of center and lower than the mid line. It is vertically aligned with /o/. At the same time, /oh/ has moved downward to low position, and /ʌ/ moved back so that it is vertically aligned with /oh/. It can also be noted that /i/ has shifted back, almost to central position.

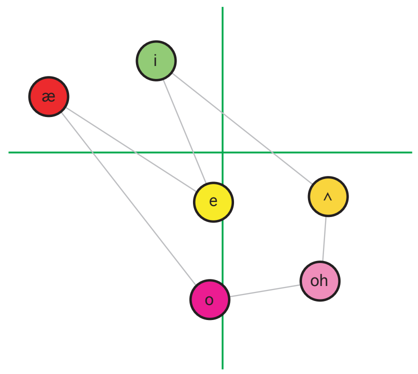


Figure 14.12. Quadrant 3 NCS vowels for TS 359, Sharon K., 35, Rochester, NY

A similar view of an advanced stage of the NCS is found in Figure 14.13, from the western portion of the Inland North. The speaker is a 28-year-old woman from the medium-sized city of Kenosha, Wisconsin. Again, /æ/ has moved to a position higher and fronter than /e/, which has moved backward until it is vertically aligned with /o/. In this case, /o/ is well front of center. /ʌ/ has moved back, but not as far back as in Figure 14.11.

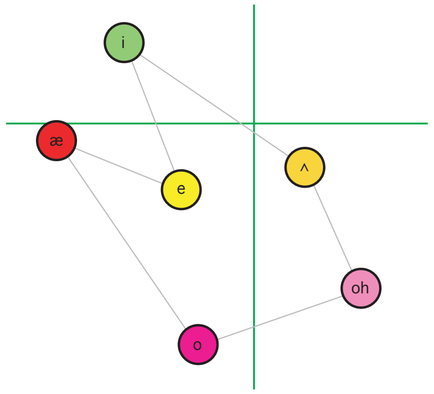
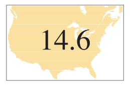


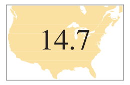
Figure 14.13. Quadrant 3 NCS vowels for TS 3, Martha F., Kenosha, WI



Map 14.6 shows the geographic distribution of speakers whose mean values for F1 and F2 of /e/ and /æ/ fall into quadrants 2 and 3. The barred blue line again marks the outer perimeter of the North as defined in Chapter 11. The barred orange isogloss defines the outer limit of communities with the dark orange symbols which identify quadrant 3: that is, the relative reversal of the positions of /æ/ and /e/. This will be referred to henceforth as the EQ measure and the EQ isogloss. It is contained within the red AE1 and brown O2 isoglosess, except for a westward extension in Wisconsin and Minnesota. Only two quadrant 3 speakers are to be found in the St. Louis corridor.

In the Midland area south of the blue Northern isogloss, there is about an equal mixture of yellow and light orange symbols. What is extraordinary about the quadrant 2 distribution is that it accounts for all Inland North speakers who are not quadrant 3. There are no quadrant 1 speakers within the orange EQ isogloss and only two within the red AE1 isogloss – one in Wisconsin and one in Albany. This includes the St. Louis corridor. On the other hand, there are equal mixtures of yellow and light orange symbols in those portions of the North outside of these two isoglosses.

The EQ line has a homogeneity of .71 – somewhat lower than that of AE1 but a high consistency of .80.



A second structural measure is the ED criterion. This was developed in Chapter 11 when the Inland North was first defined on the basis of the relative F2 positions of /e/ and /o/. Unlike EQ, it is quantitative rather than qualitative. A qualitative version of the ED measure would depend on the F2 of /e/ being less than the F2 of /o/, but this criterion describes only two speakers: one woman from Buffalo and one from Rochester. It is approximation to that situation that delimits the Inland North. The figure of 375 Hz defines a geographic distribution very close to those of Maps 14.4 and 14.5, including the St. Louis corridor. Map 14.7 displays speakers who satisfy the ED criterion with dark blue circles and delimits this area with the dark blue ED isogloss. The ED line falls close to the EQ line but goes beyond it in five respects:

- Four speakers in northeastern Pennsylvania and New Jersey are included in the ED line but not the EQ line.
- One of the two Erie speakers is included in the ED line so that the ED is not discontinuous.
- Toledo and Akron are included in the ED line but not the EQ line.
- The ED line extends to one speaker in eastern Iowa beyond the EQ line, and includes a half dozen scattered points in the western extension of the North where Map 14.6 shows only speakers in quadrant 2 rather than 3.
- Seven speakers in the St. Louis corridor satisfy the ED criterion but only two satisfy the EQ measure.

The EQ line extends outside of the ED line in only one area: the small concentration in the Minneapolis–St. Paul area.

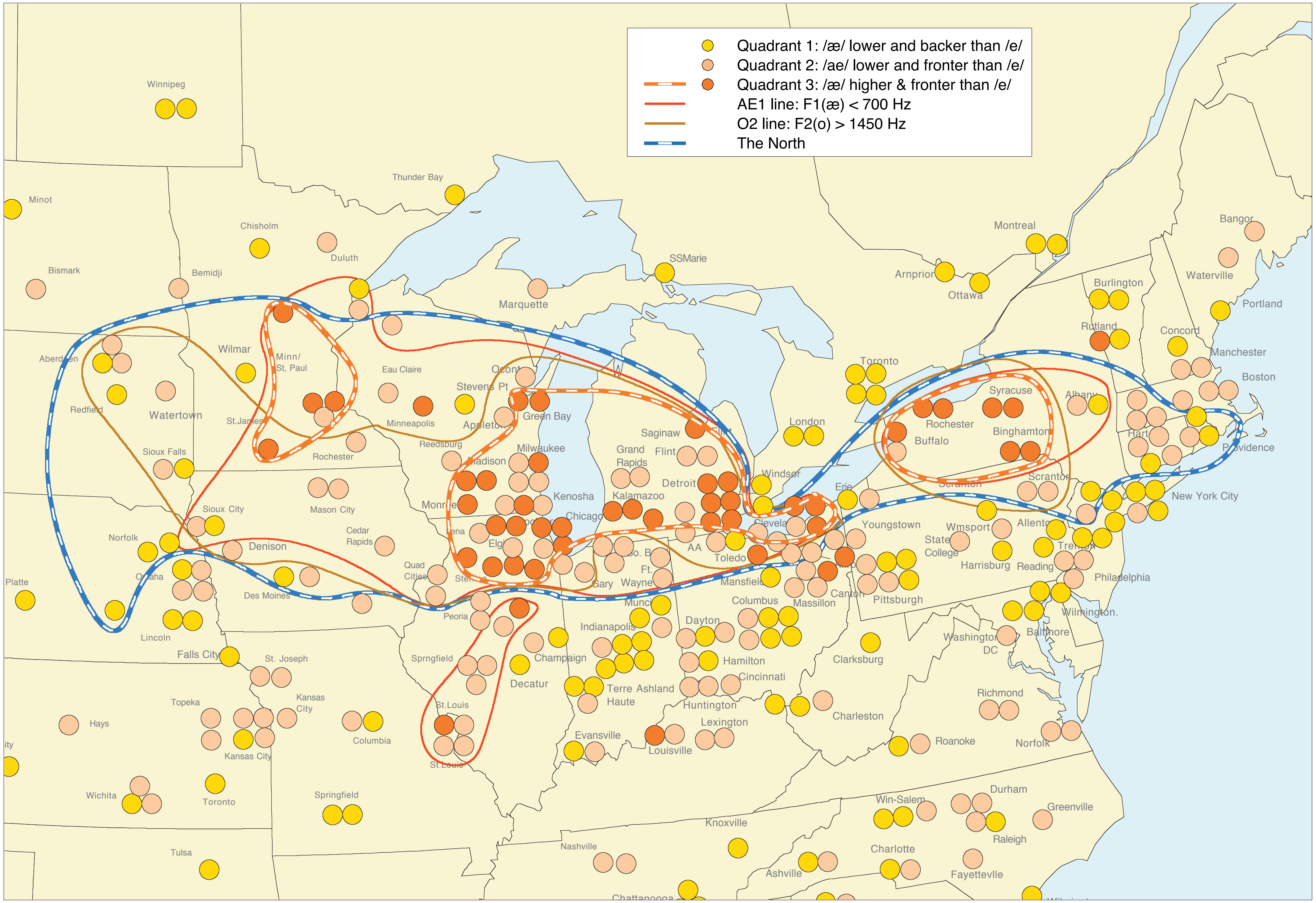
The homogeneity of the ED measure is considerably greater than the EQ and AE1 measures (.84). Consistency, however is lower (.68), This reflects the scattering of blue circles in the area of the Northern region west of the Inland North proper.

The most recent stage in the Northern Cities Shift is the backing of /ʌ/ in *bus*, *lunch*, etc. (Figure 14.1). The natural break Map 10.12 shows a strong concentration in the North of the blue symbols that indicate the most extreme backing of /ʌ/. Directly below the North is a concentration of red symbols, indicating the frontest values for /ʌ/ in the North Midland,

Table 14.5 and Figure 14.14 show the social and phonetic factors influencing /ʌ/ in the North as against all other dialects. Significant age factors indicate movement in apparent time in opposite directions. Age is a significant positive coefficient in the North, indicating a strong shift to the back in apparent time, with a smaller effect in the opposite direction for other regions. As in the other elements of the NCS, the phonetic factors are strikingly similar in magnitude and direction. The same phonological constraints affect the front–back position of /ʌ/, no matter in which direction it is moving.

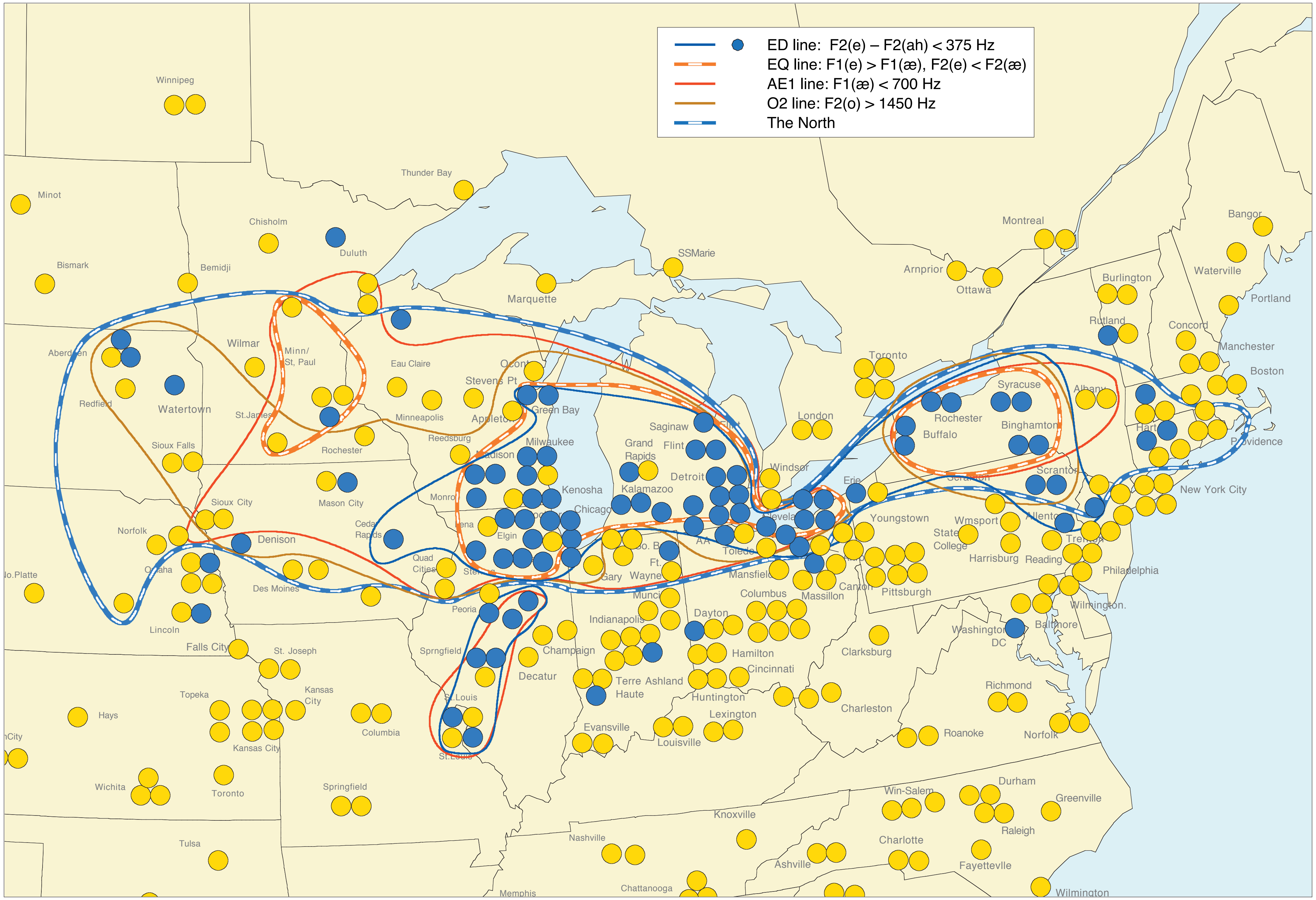
Table 14.5. Regression coefficients for the second formant of /ʌ/ for the North [N = 1794] and elsewhere [N = 5122]. Only factors significant at $p < .01$ or better are shown.

	North	Elsewhere
CODA MANNER		
Stop	27	69
Voiced	–25	–25
Lateral	–282	–339
CODA PLACE		
Palatal	118	116
Apical	115	110
Interden	52	61
Labiodental		40
ONSET MANNER		
Nasal	47	80
Liquid	–113	–93
Obstruent/Liquid	–107	–78
ONSET PLACE		
Palatal	59	55
Apical	43	51
Velar		40
Labial	–129	–124
Complex Coda		21
Polysyllabic		24
Female	7	29
City size (millions)	–29.70	–5.80
Age * 25	34.6	–9.45



Map 14.6. The EQ measure in the Inland North

The EQ measure is a structural criterion that combines the raising and fronting of /æ/ with the backing and lowering of /e/. The dark orange circles, and the broken orange isogloss, indicate those speakers for whom the initial position of /æ/ and /e/ is reversed. The EQ measure defines the Northern Cities Shift more narrowly than the raising of /æ/ or fronting of /o, ah/ alone. The east–west limits are much sharper, except for a small group of speakers in Minnesota. The light orange circles show vowel systems where the raising and fronting of /æ/ has brought it forward of /e/, but not higher.



Map 14.7. The ED measure of the Northern Cities Shift

The ED measure introduced in Map 11.2 as a defining feature of the Northern Cities Shift is here shown in greater detail. The dark blue circles are speakers for whom the nuclei of /e/ and /o/ are in close approximation on the front–back dimension. The ED isogloss is superimposed on the isoglosses of the preceding map, showing the high degree of convergence along the long North/Midland boundary. The St. Louis corridor is well defined. Beyond this, there are only four points in the Midland who satisfy the ED criterion.

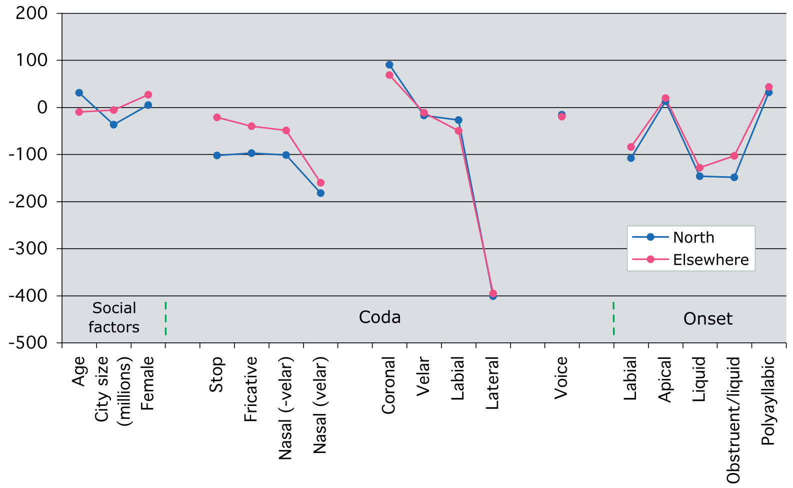
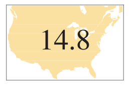


Figure 14.14. Regression coefficients for backing of /ʌ/ in the North and elsewhere

A structural relation similar to that between /e/ and /o/ holds for /o/ and /ʌ/. In communities affected by the NCS, /ʌ/ is further back than /o/ (Figures 14.10–14.13), while for dialects unaffected by the NCS, /ʌ/ is well to the front of /o/ (Figure 14.9). These diagrams suggest that the relationship between /o/ and /ʌ/ is more discrete than the ED relation, since as soon as the NCS begins, /o/ and /ʌ/ exchange their relative backness.



This discrete division is reflected in Map 14.8, which displays the geographic distribution of the front–back relations of /ʌ/ and /o/. The brown-oriented isogloss and the brown circles indicate all speakers for whom /ʌ/ is further back than /o/. This will be referred to as the UD measure.[10] It is satisfied by all but four of the 91 speakers in the Inland North as defined by the dark blue ED isogloss. The St. Louis corridor is not as consistent with the ED measure: only five of the nine speakers are included.

The UD measure extends considerably eastward and westward of the Inland North area as delimited by the ED and EQ measures. It includes most of the western section of the North, though this area does not show the high homogeneity of the rest of the UD region. The UD line also extends to the southern portion of Western New England, and includes the city of Providence as well. No brown circles in the Mid-Atlantic area are shown since the UD criterion as defined in Map 14.8 excludes areas in which short-*a* is split.

These east–west extensions of the UD measure contrast sharply with the abrupt southern termination at the North/Midland frontier. No brown circles appear in the Midland or western Pennsylvania areas, and only one symbol in the South. No such discrete division appears when the simple F2 values of /ʌ/ are mapped as in the Natural Break Map 10.12. No matter what numerical value is chosen, the results show a gradient dispersion of the merger across the North/Midland line. Only the structural measure UD displays such a clean separation of the major dialect regions.

The UD line exhibits remarkably high homogeneity (.87) and consistency (.85), with only .05 leakage, though the brown symbols are dispersed with some variability through the area west of the Inland North. Where the UD line coincides with the ED line, homogeneity rises to .90.

The southern boundary of the set of six isoglosses forms a well-defined bundle from the western border of Illinois to the Hudson Valley. Two cities in northern Indiana – South Bend and Fort Wayne – are included in the North and show raising of /æ/, but fail to show the three structural isoglosses EQ, ED, UD. In northwestern Pennsylvania, the city of Erie has lost all Northern features except ED (for one speaker only), and that shift of allegiance effectively divides the Inland North into two halves. The eastern half (western New York State) shows the most uniform behavior: Buffalo, Rochester, Syracuse, and Binghamton form a solid region of NCS speakers. The city of Scranton in northeastern Pennsylvania is the only variable community in the area.

The northern boundary of the North shows an equally tight bundling of isoglosses in the same east-west domain. This coincides almost completely with the Canadian border, with exception of Marquette in the Michigan's Upper Peninsula.[11] But the coincidence of a dialect boundary with an international border is not surprising. It is the location and coincidence of the southern boundary of the Inland North – the North/Midland boundary – that calls for an explanation.

The UD boundary is a qualitative criterion for dividing the F2 continuum. On the face of it, a distinction of 10 Hz either way might be taken to place a speaker in one dialect group or another, and it would seem unwise to put much stress on small differences. In fact, the UD boundary does not separate dialects by small differences, but by large ones. Figure 14.15 plots the distribution of the difference between the F2 of /o/ and the F2 of /ʌ/ for 61 Inland North speakers and 62 Midland speakers. The values range from −500 to 400. The mean value for the North is 79, for the Midland −203. This is a difference of more than 2 standard deviations. Figure 14.15 makes it immediately apparent that this is not a continuum, but two separate patterns. The Midland speakers have a modal value of −200, and the North of 0, with only 35 speakers of the 198 falling into the intervening area where differences are small. Such a result follows from structural pressures that drive the different vowel systems in opposite directions.

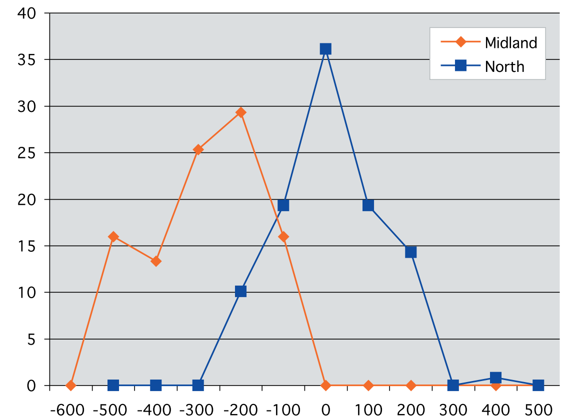
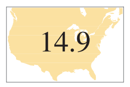


Figure 14.15. Distribution of F2(o) – F2(ʌ) for all North [N = 119] and Midland [N = 79] speakers



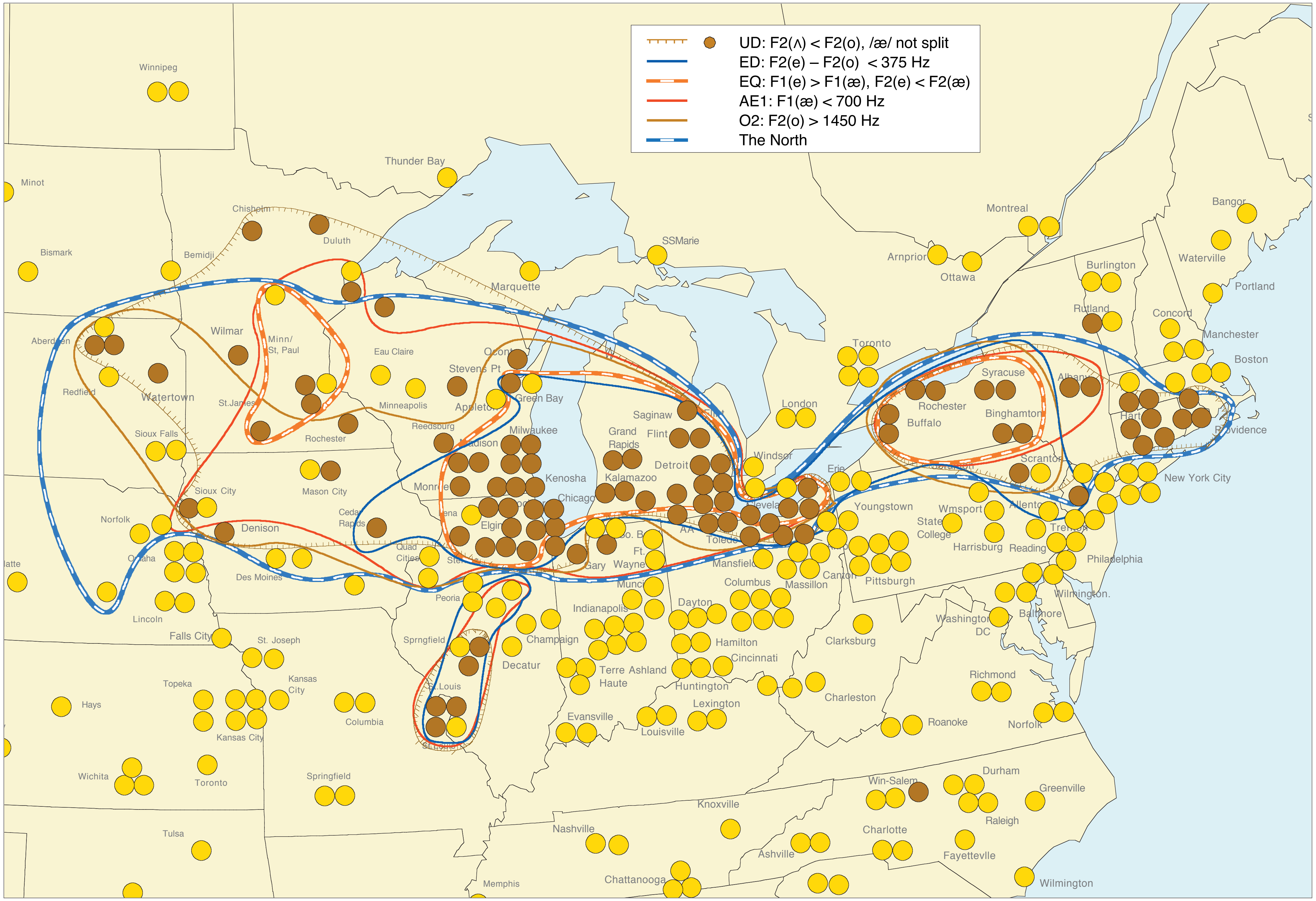
Map 14.9 shows the distribution of speakers who satisfy the three structural criteria of the NCS presented in Maps 14.6–14.8.[12] The blue circles represent speakers who are positive on the following measures:

Map		Measure	Acoustic parameters
Map 14.6	EQ	/æ/ in Quadrant 3	F1(æ) < F1(e), F2(æ) > F2(e)
Map 14.7	ED	Front–back alignment of /e/ and /o/	F2(e) – F2(o) < 375 Hz
Map 14.8	UD	/ʌ/ backer than /o/	F2(ʌ) < F2(o)

10 The UD criterion specifies that the mean F2 of /ʌ/ be lower than the mean F2 of /o/, and in addition that /æ/ not be split into two phonemes (thus excluding the Mid-Atlantic dialect speakers).

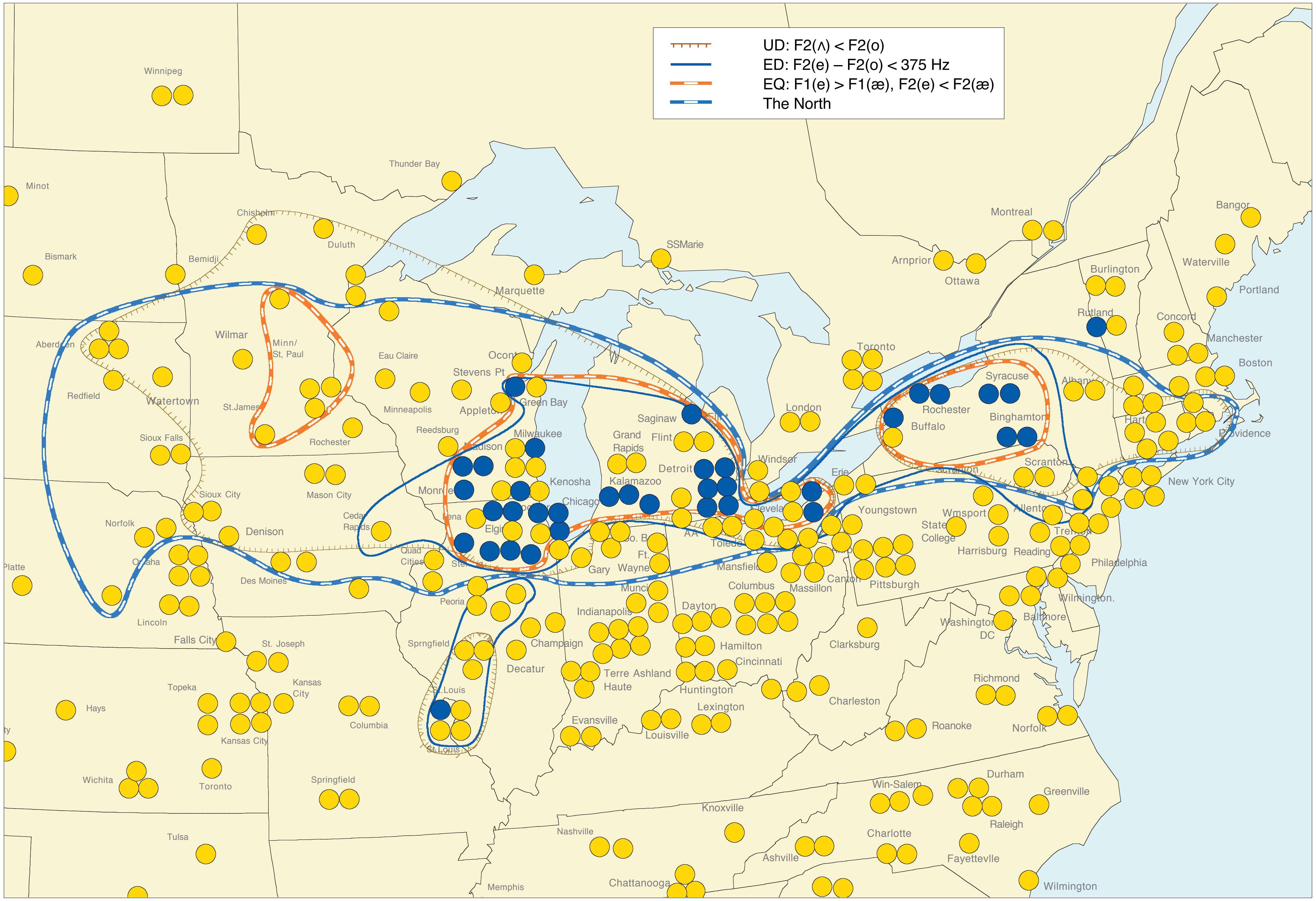
11 Plichta and Rakerd (2002) contrast the behavior of residents of a small city in northern Michigan with Detroit area speakers, indicating a different location of the short /o/ boundary for those outside of the NCS area.

12 The raising of /æ/ in Map 14.4 is not included since it is subsumed in Map 14.6, and the fronting of /o/ in Map 14.5 is not included since it is subsumed by Map 14.8.



Map 14.8. The backing of /ʌ/ and the UD measure

The third structural isogloss of the Northern Cities Shift is the relative fronting of /ʌ/ in *cut* and /o/ in *cot*. The brown circles and the oriented brown isogloss show speakers for whom wedge is further back than /o/; the yellow circles indicate the reverse relationship. The homogeneity of the brown circles within the Inland North is almost complete, while south of the isogloss there is only one brown circle. The UD isogloss extends further east and west than the other criteria, including most of the larger Northern region.



Map 14.9. Inland North features combined

This map indicates the speakers who exhibit all three structural features of the Northern Cities Shift: UD, EQ, and ED. The dark blue circles which identify them are necessarily contained within the isoglosses for these features. The cities of Syracuse, Rochester, Detroit, and Chicago are the most consistent in the development of the NCS. The St. Louis corridor is not: only one speaker is included. The same is true for Milwaukee, which is a part of the Inland North, but has only one of four speakers with all three defining features.

The isoglosses corresponding to these measures appear on Map 14.9, together with the isogloss used to define the outer limits of the North. The core area of the Inland North is the territory that is included in all four isoglosses.[13] The number of speakers who fall within all four isoglosses is 51, and 31 of these are marked with blue symbols indicating consistent participation in the NCS.[14]

The urban character of the Northern Cities Shift is well displayed in Map 14.9. The largest cities show the most consistent behavior: Chicago (3/4), Detroit (6/6). New York State is more consistent than the western portion of the Inland North. (7/8 vs. 23/43). The St. Louis corridor is the least consistent part of the Inland North (1/9).

Canadian raising in the North

Several studies of United States dialects have reported that some of them share with Canada the centralization of /ay/ and /aw/ before voiceless consonants (Chambers 1973, 1989). This has been discussed in detail in the upper South (Kurath and McDavid 1961; Keyser 1963), Martha's Vineyard (Labov 1963, 1965) and Philadelphia (Labov 1980, 2001). Centralization of the nucleus of /ay/ before voiceless codas is reported in various areas within the North: New York state (Keyser 1963) and Detroit (Eckert 2001). Map 14.10 delineates the area of "Canadian raising" of /ay/. Canadian raising is here defined with the acoustic criterion that the mean nucleus of /ay/ before voiceless consonants is at least 60 Hz less than the mean for /ay/ before voiced consonants and finally.

The green symbols indicating Canadian raising are heavily concentrated in the North, but extend westward to the North Central region, and include most of Canada (Vancouver excepted – see Chambers and Hardwick 1985). They also extend to New England, New York City, and the Mid-Atlantic areas of Pennsylvania, Delaware, and Maryland).[15] Canadian raising of /ay/ is not connected structurally with the elements of the NCS, and in Map 14.10, does not show any coincidence with the any of the boundaries that delineate the chain shifting of the Inland North.

The green isogloss defining the area of Canadian raising has moderate homogeneity (.74) and somewhat less consistency (.64). Where it falls behind the isoglosses that define the NCS is in a high degree of leakage (.25) – the phenomenon is scattered in many areas outside of the concentration that the isogloss defines. This is a feature of Northern speech that is not locked into the structural configuration of the Northern Cities Shift.

The North/Midland isogloss bundle

In Maps 14.3–14.9, it appeared that the elements that comprise the Northern Cities Shift show a high degree of coincidence in the area defined as the Inland North. Several isoglosses extend further to the east or west than others, but there is very little variation on the Northern boundary – which divides the North from Canada – and the southern boundary, which separates the North and the Inland North from the Midland.

The tight bundling of the various isoglosses does not exclude some evidence of the nesting pattern that places later stages of a change within earlier stages, as in the Southern Shift (Chapter 11, 18). The North isogloss is the envelope within which all of the relevant sound changes are nested. The earliest stage of the NCS, the general raising of /æ/, is the most widely extended, as shown by the red AE1 line. The EQ isogloss shows the narrowest distribution, nested within the other NCS isoglosses: it defines the relatively advanced stage where /e/ has lowered and centralized. Such a nesting pattern supports the possibility that the backing of /e/ follows the backing of /ʌ/.

The western boundary of the Inland North is defined by two structural criteria, the ED and EQ lines. These also coincide on the northern boundary, and for most of the eastern section of the Inland North (Scranton satisfies the ED criterion but not EQ). The southern limit of the Inland North, which separates the Inland North from the Midland, is defined by the most tightly bundled set of isoglosses. Since the UD measure gives a high degree of homogeneity (.87) and consistency (.85) and shows the sharpest differentiation along the North/Midland line, the brown symbols showing the UD criterion are retained in Map 14.11 as the clearest phonological differentiation of North and Midland.

The North/Midland boundary shows the bundling of eight ANAE isoglosses and a ninth: the generalized lexical isogloss drawn by Carver (1987) in his Maps 3.16 and 8.1. We can trace this bundle from west to east, noting the high degree of agreement among the isoglosses. The main bundle passes through Northern Illinois and passes over most of Indiana, includes the Western Reserve in the northeast of Ohio, then extends eastward to include most of New York State.

The main bundle is in fact the southern limit of the Inland North, and not the southern limit of the North. The two boundaries diverge primarily in Northern Indiana, where Fort Wayne and South Bend show only the Northern features for the raising of /æ/ and the conservative treatment of /ow/.

The tight bundling of these isoglosses is the result of the close structural relations among the linguistic features that define them, and does not argue that any given city along the border necessarily falls on the North or Midland side of the line. Since each of these cities is represented by only two or three speakers, it is possible that further studies of South Bend, Fort Wayne, Masillon, Akron, Canton, Youngstown or Scranton will show a different balance of Northern or Midland features. But if we take one step backward, and examine the extraordinary uniformity of linguistic behavior north or south of the line, it is not really possible that further studies will show that Terre Haute and Dayton are Northern cities or that Kalamazoo and Toledo are Southern cities.

The most remarkable feature of Map 14.11 is the alignment of the lexical North/Midland lexical boundary with the main bundle of NCS isoglosses. This coincidence holds from the center of Illinois to the eastern boundary of Ohio. Since the northern tier of counties in Pennsylvania does not contain any large cities, the Telsur data are mute in regard to the degree of agreement there. The city of Erie is the only data point where the NCS isoglosses deviate from the lexical boundary.

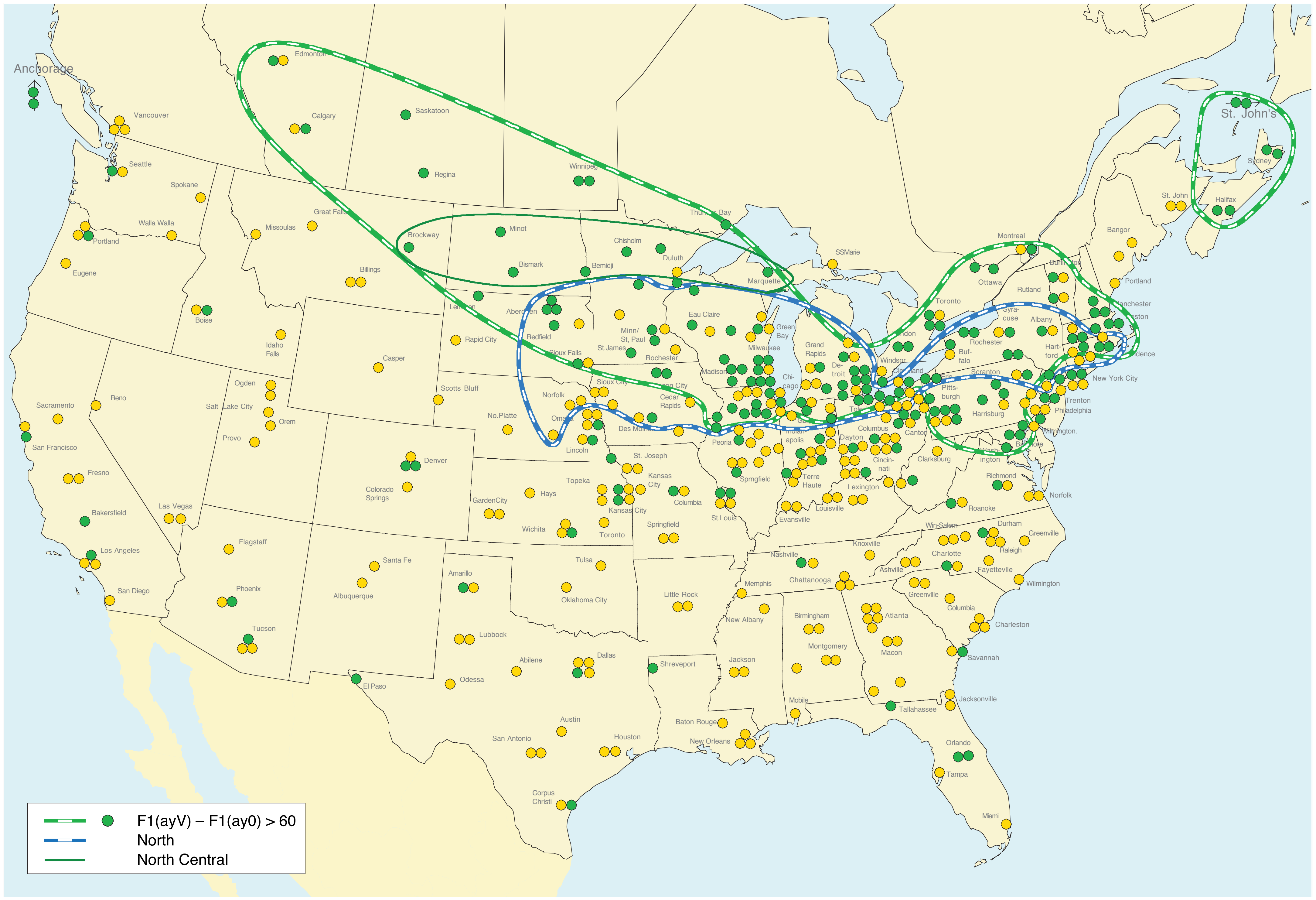
14.5. The city of Erie

The data from the Linguistic Atlas (LAMSAS), collected in the 1940s, shows the city of Erie as an integral part of the Northern dialect area; the line separating the North from the Midland passes just south of Erie. The lexical markers that define the North in Kurath (1949) are found in Erie: *whiffletree*, *pail*, *darning needle*,

13 Two speakers outside of this core area satisfy the four criteria but do not fall within all four isoglosses (Rutland, Vt and Buffalo, NY). This is because the other speaker in that community was not as consistent for all criteria. See the section on W.N.E. at the end of this chapter for a discussion of the Rutland speaker Phyllis P.

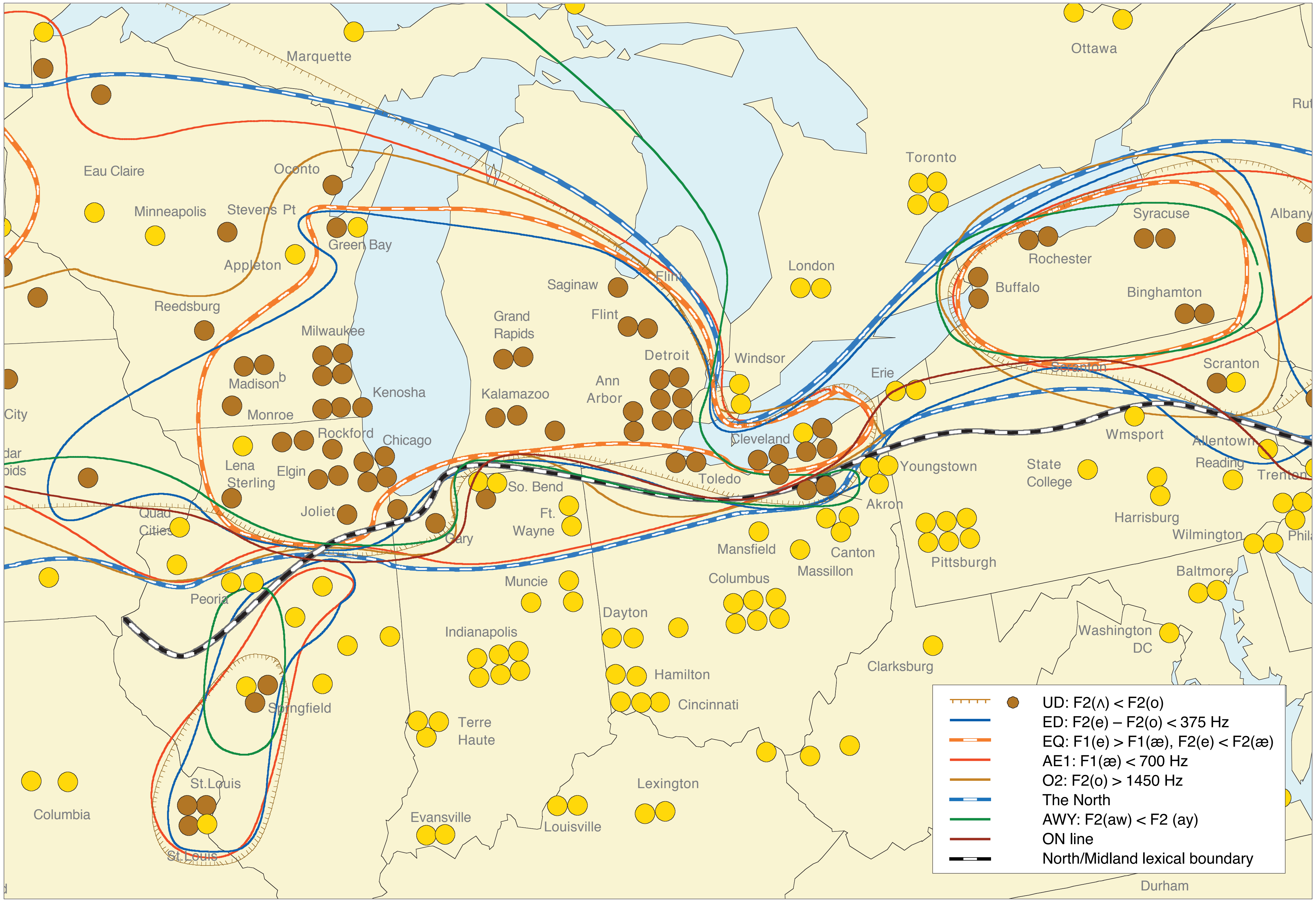
14 A total of 78 speakers are included in the Inland North as defined in Chapter 1, which includes all those within the ED isogloss except the two speakers from Erie.

15 Only one of the three Telsur subjects in Philadelphia is marked for this feature, though it has been shown to be a new and vigorous change in Philadelphia in more detailed studies (Labov 2001). It is consistent among the Telsur speakers in Wilmington and Baltimore.



Map 14.10. Canadian raising of /ay/

One of the features that the North shares with Canada is "Canadian raising" of /ay/ – the centralization of the nucleus of /ay/ before voiceless consonants but not for /aw/ the parallel vowel that is the most noted feature of Canadian English. The green circles are speakers for whom the mean first formant of /ay/ before voiceless consonants is at least 60 Hz less than for other /ay/. Canadian raising of /ay/ covers most of Canada and the Atlantic Provinces, includes the North, and extends to Midland areas like western Pennsylvania and the Mid-Atlantic states. However, the parallel Canadian raising of /aw/, a stereotype of Canadian English, does not extend across the border to the Northern area of the U.S.



Map 14.11. A detailed view of the cities of the Inland North and the relation of eight isoglosses to the North–Midland boundary

This close-up view of the Inland North identifies more cities and compares eight ANAE isoglosses with the lexical North/Midland boundary drawn from the data of LAMSAS and DARE. This tight bundling of phonological isoglosses along this boundary shows that sound changes that began in the middle of the twentieth century are sharply arrested at the frontier of settlement patterns in the nineteenth century.

teeterboard, *stone boat* (Figure 5); *spider*, *skaffle*, *buttry* (Figure 6); *stoop* (Figure 7). Only *belly-gut* is missing (Figure 7). Conversely, the defining terms of the Midland stop just short of Erie: *I want off*, *sook!*, *snake feeder*, *blinds*, *bawl*, *poke*, *sugar-tree* (Figures 15–17). Erie is included in the Midland distribution only for *run* ('small stream') and *smear case* ('cottage cheese', Figure 18).

Phonologically, Erie appears to be even more solidly Northern in the Linguistic PEAS maps. Kurath and McDavid (1961) show that the North/Midland line passes just south of Erie for six phonological features:

- Northern /e/ in *married* vs. Midland /æ/ (Map 51);
- Northern distinction of *four* ~ *forty* vs. Midland merger (Map 44);
- Northern /iw/ vs. Midland /uw/ in *Tuesday*, *new*, *due* (Maps 163–165);
- Northern unrounded vowel in *father* vs. Western Pennsylvania back rounded vowel;
- Northern unrounded /o/ in *on* (Map 138);
- Northern /s/ in *greasy* vs. Midland /z/ (Map 171);
- Northern voiced interdental in *without* vs. Midland voiceless (Map 170).

Map 14.11 shows a radical change in this situation. Erie is here an island of Midland phonology, distinct from the Inland North for five criterial measures: the AE1 line, the EQ line, the UD line, the AWY line, and the AH2 line. It is no longer north of the ON line, although both speakers showed /o/ in the 1940s. It is included in only two northern isoglosses: the general Northern definition (broken blue line) and the ED line. For both of these, the feature is found in only one of the two Erie speakers (and not the same in each case).

This shift of Erie from North to Midland status would seem to reflect an expansion of the regional influence of Pittsburgh, to the south. Erie has not, however, acquired the most iconic feature of Pittsburgh, the monophthongization of /aw/. Why Erie has become aligned linguistically with Pittsburgh, rather than with Buffalo and Cleveland, the large Northern cities and fellow lake ports to its east and west, remains an intriguing subject for linguistic and historical research.

14.6. Vowel systems of Inland North speakers

To show in more detail the operation of the Northern Cities Shift, this section presents the normalized vowel systems of six individual speakers. The charts of Figures 14.16 to 14.21 show the vowel tokens and means for the classes involved in the NCS: /i, e, æ, o, ʌ, oh/. In addition, selected data on /iy, ey, uw, ow/ are provided to define the relaton of the NCS movements to the rest of the system. Words with /æ/ before nasals are not shown, as the distinctive feature of the NCS is the raising of all vowels not before nasals. (Note that in general mean values do not include words with /l/ codas or glide onsets.)

The vowel system of James W. from Chicago: Figure 14.16

One of the most conservative speakers within the Inland North is the oldest of the four Telsur subjects from Chicago: James W., who was 78 years old when he was interviewed in 1993. Both sides of his family were Polish; he was educated in an all-white Chicago high school with a population dominated by ethnic groups that arrived at the beginning of the twentieth century: Italians, Poles, Jews, and Greeks. He had two years of schooling beyond high school and spent most of his career in the restaurant trade, first as a waiter, then as a captain and maitre d'.

The NCS means for James W. were displayed in Figure 14.10: the fuller details of the system appear in Figure 14.16. The low front location of the red squares identify the conservative behavior of /æ/. The most peripheral forms, like *mad* and *bad*, are also the lowest. The small dark red squares that represent /o/ are all back of center, except for one token of *not* which edges over the center line. Vowels before /t/ are mostly just back of center (*cot*, *lotto*, *hot*) while vowels before labials and velars are further back (*socks*, *opposite*).[16] The long and ingliding /oh/ tokens (magenta triangles) are in mid back position with vowels before /t/ *caught* and *bought* well above the mid line, while those before velars are considerably lower (*talk*). Short /e/ words appear as yellow diamonds: the mean value for /e/ is not far from /i/, in upper mid nonperipheral position. There is a sizeable distance between /e/ and /ʌ/ (light brown wedges). /ʌ/ shows no signs of backing, and remains the nonperipheral partner of /oh/.

As a whole, Figure 14.16 closely resembles the 1968 system of Mike S. in Figure 14.4. It displays the Northern configuration that underlies the NCS. It is a conservative system in many respects: fronting of /uw/ before coronals is quite limited, and has not reached center position.

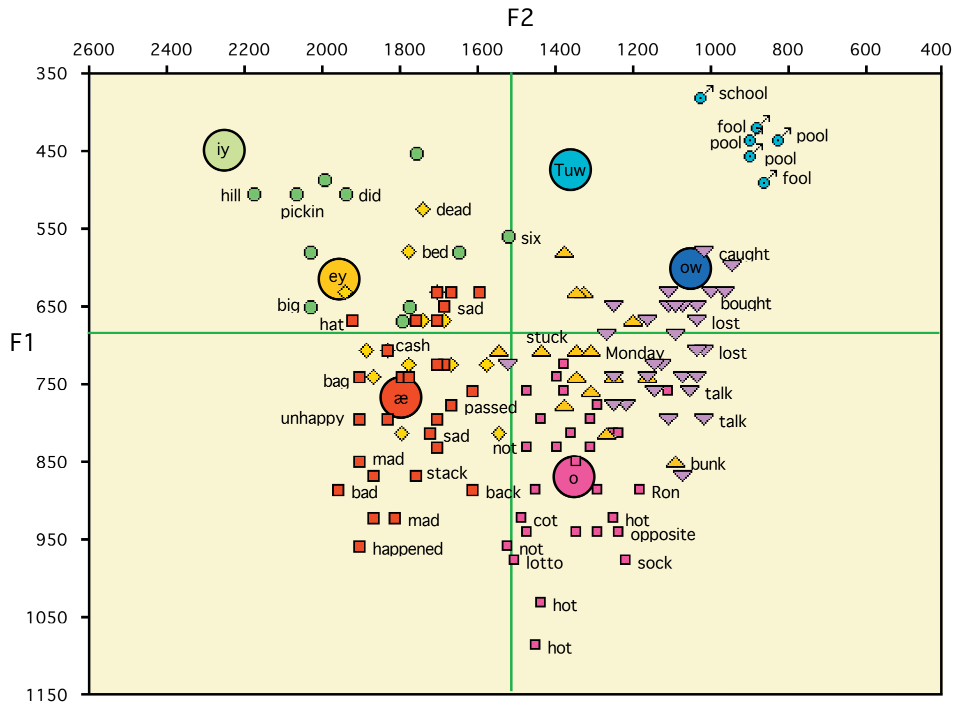


Figure 14.16. Vowel system of James W., 78 [1993], Chicago, IL, TS 55

The vowel system of Steve A. from Ann Arbor: Figure 14.17

Figure 14.17 shows the moderately developed NCS vowel system of Steve A., whose NCS mean pattern was displayed in Figure 14.11. He is a 43-year-old telecommunications consultant with a B.S., a resident of the small Michigan city of Ann Arbor (site of the University of Michigan). His family background is English.

In this system, /æ/ has risen, but the mean of the non-nasal tokens does not reach the mid-line. Fronting and raising affects all environments (*ash*, *mad*, *capital*, *bad*, *axe*).

16 This conforms to the phonetic conditioning factors of Table 14.3 and Figure 14.6.

Some /o/ tokens (small dark red squares) have moved past the mid line (*concert*, *hot*, *cot*); and the most conservative are not far behind (*pop*, *soggy*, *socks*). Behind /o/, the magenta triangles of /oh/ have fallen halfway from mid to low position. A number of short /o/ words before /g/ are members of the /oh/ class: *hogs*, *jog*, *bog*.

The progress of the NCS has somewhat affected /e/, which remains as a front nonperipheral vowel but is considerably lower than in Figure 14.16. Two yellow diamonds appear back of center (*seven*, *metal*), but the rest are clustered around the mean, well front of center (*leg*, *measure*). /ʌ/ remains well centralized, with some tokens exactly at the midline intersection. /ʌ/ tokens with initial labials, usually the furthest back (*publishers*, *bucket*), are still nonperipheral.

The Northern fronting of /uw/ after coronals is well illustrated by the location of the /Tuw/ mean, around 1800 Hz, while /Kuw/ after non-coronals is completely unaffected, close to the mean for /uw/ before /l/.

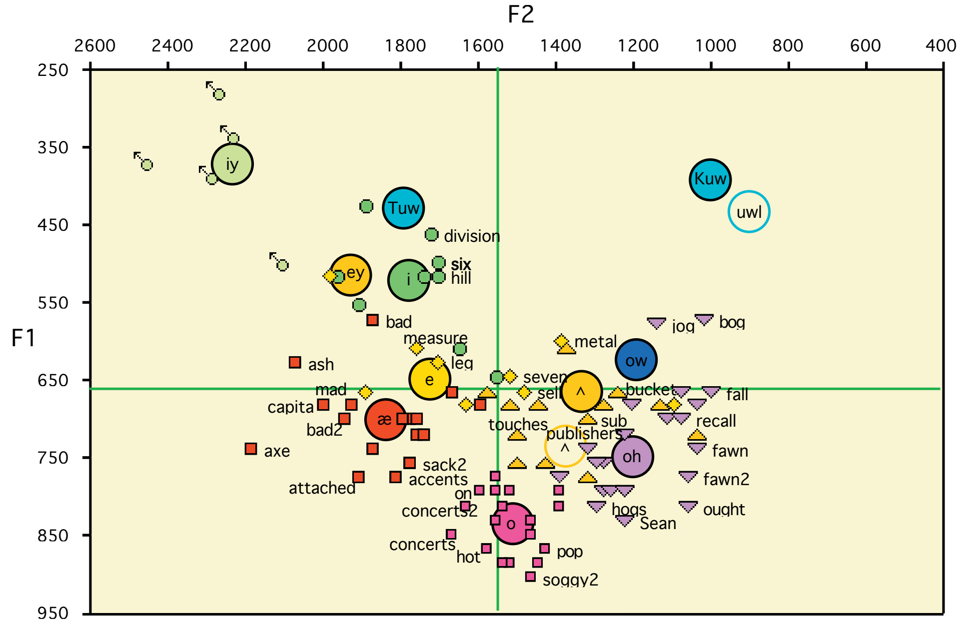


Figure 14.17. Vowel system of Steve A., 43 [1994], Ann Arbor, MI, TS 115

The vowel system of Martha F. from Kenosha: Figure 14.18

The vowel systems shown below in Figures 14.18 and 14.19 are among the most advanced examples of the NCS. Figure 14.18 represents the western half of the Inland North: the vowel system of Martha F., a 28-year-old Polish-American woman with a B.A., who teaches in a parochial school. Her mean NCS pattern was shown in Figure 14.13. To simplify the view of her vowel system, only tokens from spontaneous speech are included: minimal pairs and word lists are excluded.

In Figure 14.18, the red squares representing /æ/ are in mid front position, and the stressed monosyllables are clearly peripheral (*mat*, *sad*, *sack*, *bag*). The mean /æ/ value for vowels not before nasals is just below the mid-line. The small red squares representing /o/ are almost all front of center (*not*, *cot*, *hot*, *on*); vowels before or after labials are back of the mid line (*pop*, *mom*, *bother*). In the meantime, /oh/ has fallen considerably from the position it occupied in earlier patterns. Some tokens are in low position, parallel to /o/ (*talk*, *dawn*, *Sean*), while even the highest (*fawn*, *calling*, *boss*, *also*) are well below the mid-line.

The short /e/ class, indicated by yellow diamonds, shows both downward and backward movements. A set of five words has descended into the /o/ region: (*step*, *fell*, *hem*, *pen*, *Mexicans*). Another set of /e/ words has shifted to the back. The most extreme is *says*, which is well past the mid-line and gives the clear auditory impression of [ʌ]. Other words are squarely in mid central position (*guess*, *best*, *seven*, *setting*, *upset*). As in many advanced NCS systems, the /e/ tokens are pressed hard against the /ʌ/ distribution, so that the furthest back tokens of /e/ and the frontest tokens of /ʌ/ overlap.

The brown wedges representing /ʌ/ cover a wide range of F2 values. The furthest back tokens following labials (*mother's*, *mud*, *bunk*, *months*) (see Table 14.5, Figure 14.14)

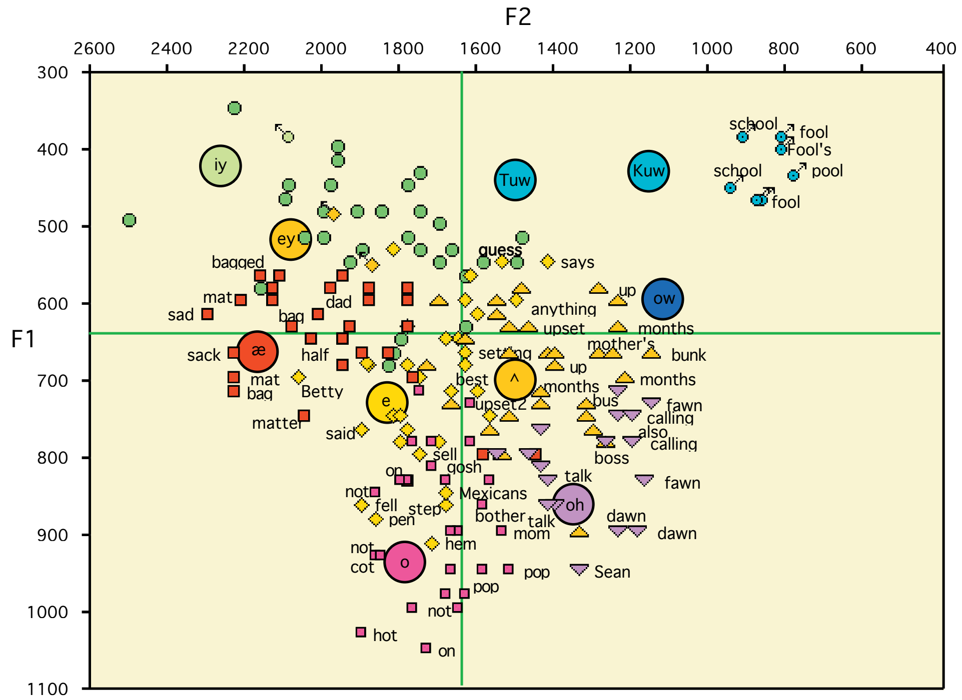


Figure 14.18. Vowel system of Martha F., 28 [1992], Kenosha, WI, TS 3

The vowel system of Sharon K. from Rochester: Figure 14.19

The most strongly developed example of the NCS in this series is that of Figure 14.19, the vowel system of Sharon K. She is a 35-year-old woman from Rochester, NY, of Italian–German background. Sharon is a high school graduate, and describes herself as a self-employed wholesaler.

In Figure 14.19, only three of the red squares representing /æ/ are below the mid-line: *wraps*, *half*, and *last*. A word like *mattress*, which would have a low front vowel in any other dialect, has a peripheral upper mid nucleus here, clearly [e], followed by a slight inglide. The distribution of the /æ/ nucleus overlaps with /ey/.

As in Figure 14.18, /o/ is well front of center, and only a few conservative tokens like *Rochester* remain behind. The magenta tokens of /oh/ are now in low back position, well separated from /o/ (*boss*, *caught*, *saw*, *talk*). A lone token of /oh/ remains in mid back position: *halters*, in contrast with *taller* in the main distribution.[17]

17 These tokens sound as different as their measurements indicate.

The most striking development of Figure 14.19 is the backward shift of /e/ and /ʌ/. The mean value of /e/ is central and well below the mid-line, since some tokens have descended (*ten*, *pen*, *deck*) and others moved well to the rear (*death*, *seven*, *rest*, *mess*). The backing effect of fricative codas specific to /e/ can be observed here (Table 14.4, Figure 14.7). The most extreme case of lowering is the yellow diamond just below the mean symbol for /o/. This is the word *deck*; the analyst who measured this token entered the comment, "sounds like *dack*".

In Figure 14.19, /ʌ/ is a back peripheral vowel, with *tougher*, *suburbs*, *bunk*, *public* aligned directly above the backest /oh/ tokens. This further backing of /ʌ/ has eliminated the overlap of /e/ and /ʌ/ that appeared in Figure 14.17.

Another aspect of Figure 14.19 that differentiates it from the other vowel systems is the participation of /i/ in the NCS. The backing of /i/ in Figure 14.18 can be observed in both the mean value of /i/ and the distribution of the green circles. *City*, *chicken*, *six*, *sixty*, *fish* are upper mid central vowels, along with *building*, while the only token remaining in front position is *kids* (influenced bv the velar onset). Two or three /i/ tokens show lowering, (*forbid*, *minutes*). One extreme lowering of *mixed*, lower than the mean of /e/, sounds like [mækst]. One extreme case of *it* appears back of center: the analyst noted "sounds like *at*".

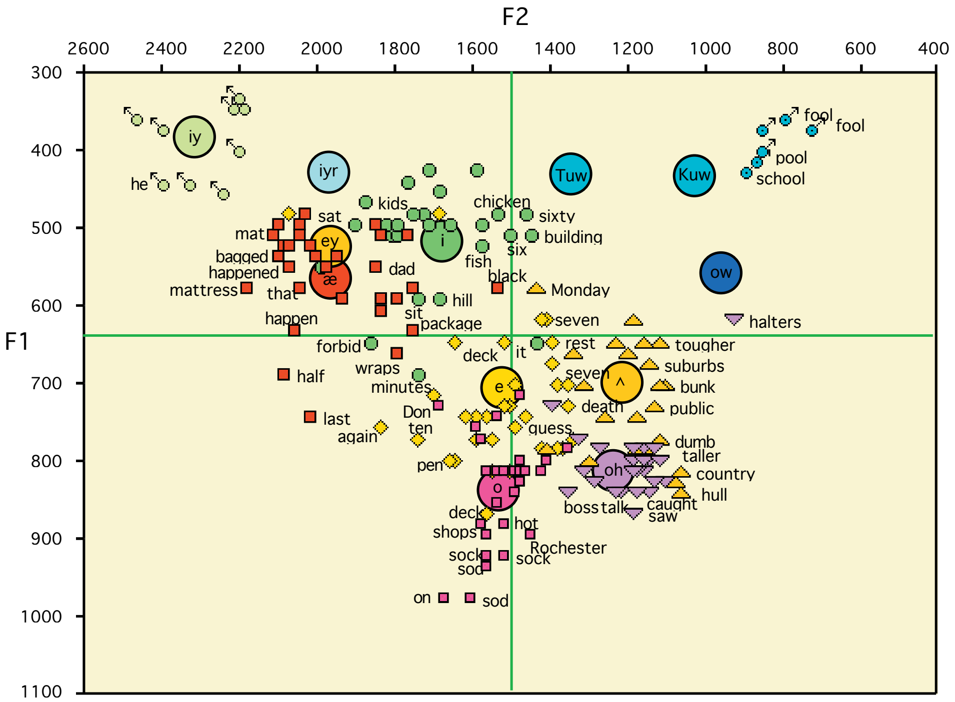


Figure 14.19. Vowel system of Sharon K., 35 [1995], Rochester, NY, TS 359

The vowel system of Libby R. from Detroit: Figure 14.20

Although Detroit is in the western portion of the Inland North, it shares with the eastern portion the more vigorous development of the NCS seen in Figure 14.19. Figures 14. 20 to 14.21 are the vowel systems of a mother and a daughter from Detroit, which give a close view of the development of the NCS in apparent time.

Figure 14.20 is the vowel system of the mother, Libby R., a 42-year-old woman from Detroit. She reports her family background as "English–German–Polish–Scots". She had two years of college, and describes her work as a sales representative in a family business. Libby R. attended a Detroit high school which was then all white, and part of the Catholic melting pot: Italian/Irish/Polish.

Libby R.'s system resembles Figure 14.18 in many respects. The /æ/ tokens are almost completely above the mid-line; only *bags* is a trifle below. /o/ has moved to low central position, and seven tokens (*not*, *Scottish*, *cot*, *hot*, *sock*) are front of center. But /oh/ has moved only partly down from mid position. The downward shift of /e/ is notable in *bed*, *Redford*, *sell*, *seven*, but there is very little backward movement of /e/ and /ʌ/. /e/ remains basically a front vowel: only one token of *sell* has crossed the center line.

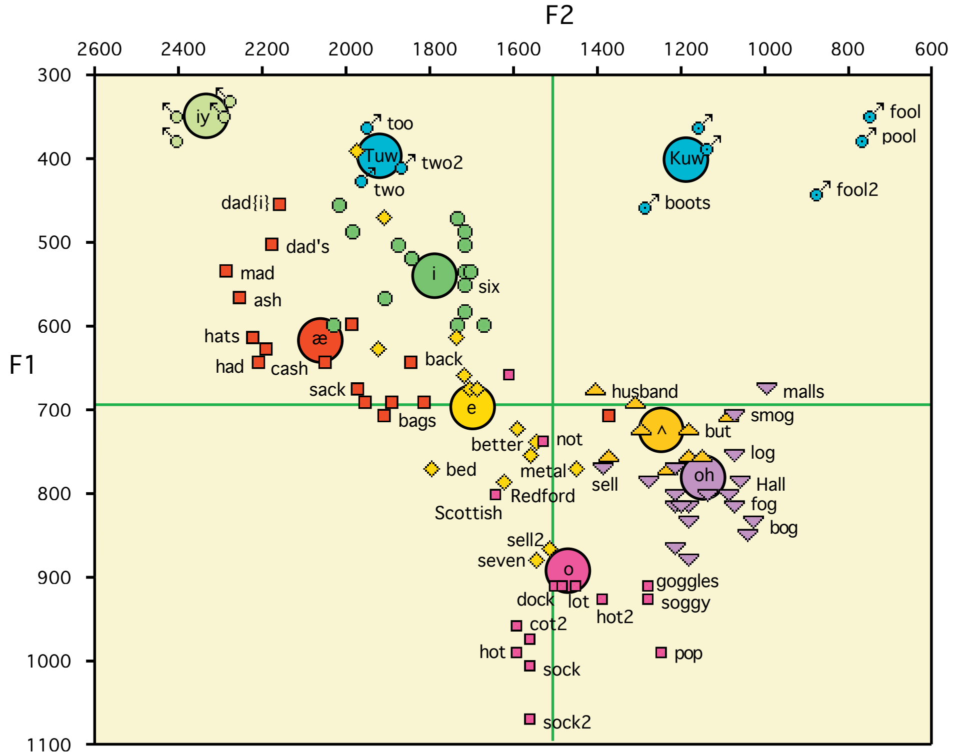


Figure 14.20. Vowel system of Libby R., 42 [1994], Detroit, MI, TS 125

The vowel system of Joanna R. from Detroit: Figure 14.21

Figure 14.21 is the vowel system of Libby's daughter Joanna, a 14-year-old high school student. Joanna's high school is not as all-white as her mother's was: she describes it as "mostly white", with a few Hispanics and Arabs. Joanna's father works as a supervisor in an auto plant.

As noted before, the general raising of /æ/ is a nearly completed change, and Joanna's mean value for /æ/ is no higher than her mother's. There are some individual tokens that have reached lower high position (*unhappy*, *dad*). Joanna's short /o/ distribution is no further front than her mother's; it is in fact not as far front.[18] On the other hand, /oh/ has descended further than in her mother's pattern, though it is not as low as that of Figure 14.19 from Rochester.

The most striking advance in the NCS in Joanna's speech is in the backing and lowering of /e/ and the backing of /ʌ/. There is a sharp contrast with her mother's system in this respect. The yellow diamonds of the /e/ distribution are

18 Joanna's system confirms the distributions seen in other systems: /o/ before apicals and voiceless velars is front of center; before labials and voiced velars it is further back.

mostly below the mid line and back of center. One group is particularly low and back: *leg*, *upset*, *seven* are almost as back as the tokens before /l/ (*sell*, *fell*, *shelter*). There is very little overlap with /ʌ/, which is for Joanna a fully back vowel: see *up*, *bucket*, *muckier*. The mean of /ʌ/ is higher and slightly backer than the mean of /oh/. The comparison of Joanna R'.s system with her mother's supports the original proposal on the ordering of the NCS changes: that the movements of /æ/ and /o/ are the earliest stages of the NCS, and that the backing of /e/ and /ʌ/ are the most recent.

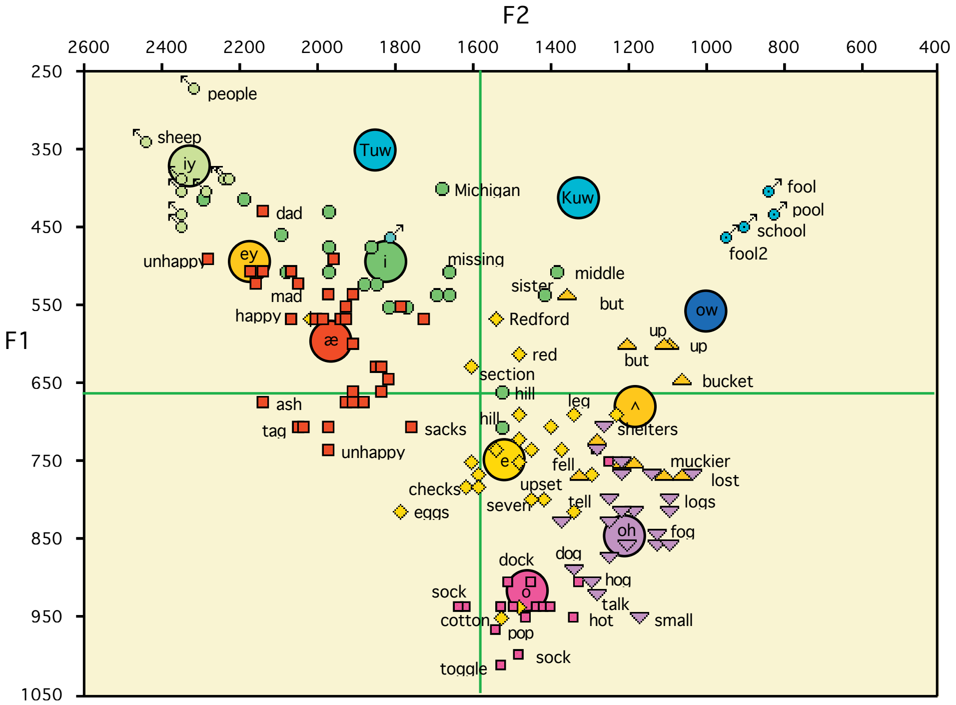


Figure 14.21. Vowel system of Joanna R., 14 [1994], Detroit, MI, TS 124

14.7. Summary of real-time evidence on the Northern Cities Shift

Apparent time data has been shown to give reliable evidence of change in real time (Bailey, Wikle, and Sand 1991), although data from earlier observations in real time has always been considered important for confirming the existence of change (Labov 1963, 1966). If change is in progress, information drawn from age distributions must be dependent on the degree of stability of individual systems in adult life. To the extent that adult speakers participate in the change after their dialects were first formed, apparent-time data will understate the extent of the change. It is now well established in a number of real-time re-studies that adults do show some participation in the change (Trudgill 1988; Cedergren 1984; Labov 1994; Boberg 2004; Sankoff 2002). Any information on earlier stages of the change will help provide a more accurate view of the trajectory of the change in real time.

The earlier observations of Fasold on the 1960s Detroit study are cited above. They indicate that the first two stages of the NCS were active at that period. During the same time period, a series of exploratory interviews was carried out in Chicago by Wald and Labov which were reported in part in LYS 1972. Figure 14.4 shows that the raising of /æ/ had reached mid front level; the most conservative token, *class*, is well above the low front area. The /o/ class has moved as far front as in any of the more advanced Telsur speakers, as seen in *shot*, *Spock*, *jobs*; the only token that is well back of center has a labial onset (*body*).

In Figure 14.4, the first two stages of the NCS match the findings of Fasold on the 1966 Detroit speakers. There is no evidence that any of the later stages were active at this time. The /oh/ class is in its original mid back position (see *ball*, *caught*). The /e/ tokens are well front of center, and none show any tendency to lower into the /o/ area (*checked*, *fed*, *test*, *met*). Furthermore, the distance between /e/ and /ʌ/ is quite large, similar to the pattern of the oldest Chicago speaker James W. (Figure 14.12).

The vowel systems of Carol M. and Mike S. in Figures 14.3 and 14.4, together with the other interviews of the 1960s, confirm the implications of the Fasold study and the apparent time data: that only the first two stages of the NCS were active in the 1960s.

14.8. The social parameters of the Northern Cities Shift

Table 14.6 sums up the data on social correlations with the elements of the NCS for the 71 speakers of the Inland North.[19] These regression analyses are based on individual vowel tokens, where the total N ranges from 800 to 1800 vowel tokens. This type of analysis gives a view of social and phonetic factors combined, and gives the greatest detail on the social parameters. It is necessarily based upon individual vowel measurements. The polarity of the numbers varies with the direction of the change. Blue numbers indicate coefficients that favor the change; red numbers those that disfavor it.

Indications of change in apparent time are significant for the fronting of /o/, the lowering of /oh/ and the backing of /e/. A female advantage is indicated for the raising of /æ/, the lowering of /oh/ and the backing of /e/, and a small effect in the other direction for the fronting of /o/. For all but the raising of /æ/, higher education disfavors the change in progress.

Table 14.6. Social parameters of NCS variables for the Inland North based on vowel tokens. Blue numbers favor the change; red numbers disfavor it [N = 1497].

	Age*25 yrs	Female	Education
F1(ae)		-39***	
F2(o)	-12*	-6	-4.6**
F1(oh)	-24***	13**	1.2*
F2(e)	68***	-48***	2.8*
F2(ʌ)	17		18

Significance: * $p < .05$, ** $p < .01$, *** $p < .001$

Table 14.7 presents the social correlates of the structural measures EQ, ED, and UD. These regression analyses are based upon the mean values of each vowel for each speaker, so that the total N is the 72 speakers of the Inland North. This is a more rigorous test of social effects, where the basic unit of measurement is properly the individual and not the vowel token. Given the order of change posited in Figure 14.1, these measures would be ordered in the sequence EQ, ED, UD.

The strongest age effect is found for ED, reflecting the high values for F2 of /e/ in Table 14.6. A gender coefficient appears for the first measure, but not the

19 These figures are distinct from those of Table 14.2–14.5, which are based on the population of the North as a whole, rather than the Inland North.

second two, reflecting the strong gender coefficient for /æ/ and /e/ in Table 14.6. The UD measure is related only to education.

Tables 14.6 and 14.7 agree to an extent with the finding of Eckert (1999) in Detroit that the oldest changes in the NCS are correlated with gender, while the more recent ones show correlations with social class. The raising of /æ/, the first element in the series, is clearly reaching a maximum and in some areas is beginning to recede; a strong female advantage is maintained. The backing of /e/, a recent change, shows correlations with both gender and education. The UD measure, involving the most recent change, is associated primarily with lower education.

Table 14.7. Social parameters of NCS variables for the Inland North based on mean values for individual speakers [N = 72]. Blue numbers favor the change; red numbers disfavor it.

	Age*25 yrs	Female	Education
EQ (relation of /e/ to /æ/)	-.30*	.33*	
ED (relation of /e/ to /o/)	100**		
UD (relation of /o/ to /ʌ/)			–16*

Significance: * p < .05; ** p < .01

14.9. Western New England

The Inland North population and settlement patterns are the product of a stream of migration westward from New England in the first six decades of the nineteenth century (Holbrook 1950; Frazer 1993). The interface of the Inland North with Western New England [WNE] is therefore of particular interest, since it seems likely that some of the linguistic features that entered into the NCS had their origins in the area to the east.

14.12

Boberg (2001) sums up the dialectology of Western New England in light of ANAE data. The main isogloss of the Northern region includes the area of Western New England, identified in Map 14.12. This is the area west of the Green Mountains that includes the major cities of Vermont, western Massachusetts and western Connecticut, as well as the city of Albany in eastern New York State.

Map 14.12 shows the central structural feature of the NCS, the ED criterion, as it extends into WNE. In addition to the dark blue symbols representing an F2 difference of less than 375 Hz, light blue symbols are added to indicate the intermediate stage: vowel systems with an F2 difference between /e/ and /o/ greater than 375 Hz but less than 450 Hz. The map shows that the area dominated by light and dark blue symbols is a distinct region encompassing the four speakers from Vermont, three from western Massachusetts, and four in Connecticut. In this respect, the area is differentiated from neighboring Eastern New England, New York and Canada. It is an *r*-pronouncing region that does not extend into *r*-less Eastern New England or southward to *r*-less New York City. On the other hand, Western New England is not included in the AE1 or EQ isoglosses, and so is distinct from the Inland North.

Much of Western New England is included in the UD isogloss. In Map 14.8, nine of the 13 speakers in the area satisfy the criterion that /ʌ/ be backer than /o/. In this case, the four exceptions are concentrated in the northern half of the WNE region, indicating a differentiation along a north/south axis which will be pursued further in Chapter 16.

Figure 14.22 shows the vowel system of a speaker from New Britain in western Connecticut, which incorporates several aspects of the NCS. There is no evidence of a low back merger; on the contrary, /oh/ and /o/ are widely separated. The raising of /æ/ (red squares) is quite extensive, though /æ/ covers a wide range and some tokens remain in lower mid position. The fronting of /o/ (small dark red squares) is also noticeable: six tokens are clearly front of center, though the main body is back of center. The range of /e/ (yellow diamonds) is considerable, from upper mid to lower mid central, with some tokens up against the /ʌ/ distribution. On the other hand, /oh/ has not lowered, and /ʌ/ is fronter (and lower) than /oh/.

The Northern character of this system also appears in the conservative position of /uw/, with no tokens coming close to mid position, and /ow/ squarely in mid-back position. It appears that this WNE system has the basic structure needed for the full realization of the NCS, and that chain shifting along these lines was well under way in this region in the 1940s, when this speaker was aquiring the language.

Chapter 16 will explore further the differences between Eastern and Western New England, and show that Western New England must be divided into a northern and a southern half, with many sharp differences between them.

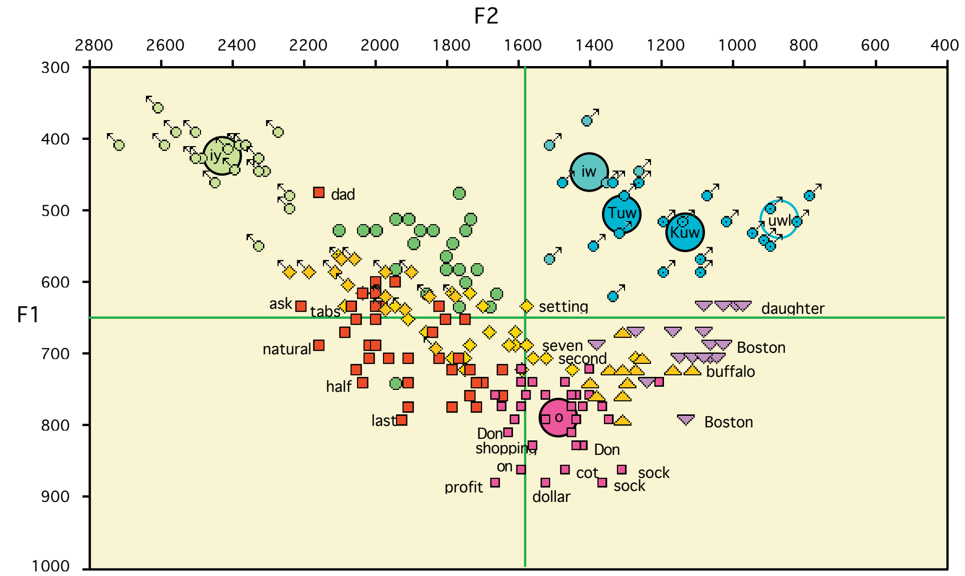
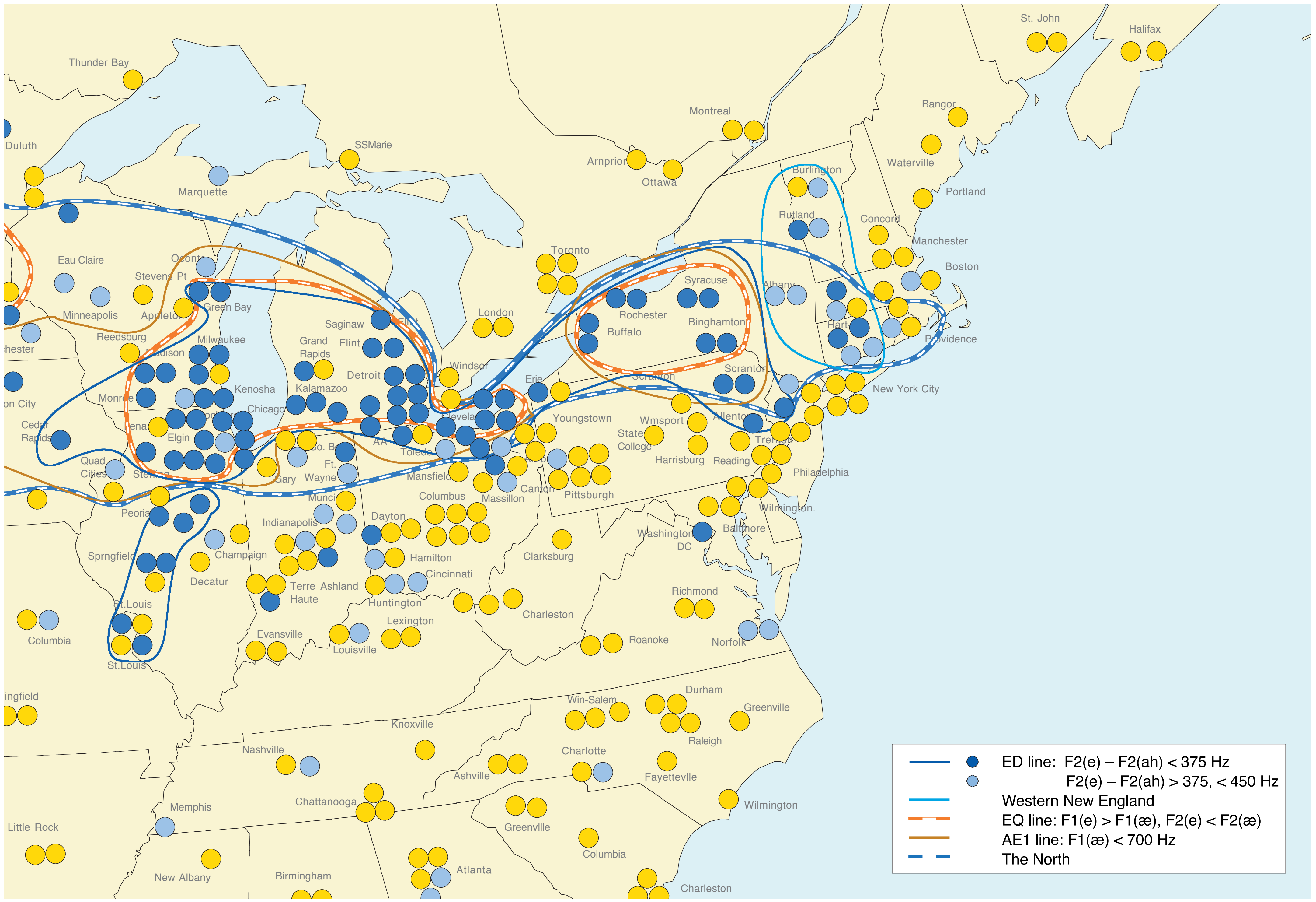


Figure 14.22. Vowel system of Jesse M., 57 [1996], New Britain, CT, TS 465

Map 14.9 displays one blue symbol outside the Inland North, indicating a vowel system with all features of the NCS. Figure 14.23 shows the relevant vowels of this unusual speaker, a 63-year-old woman from Rutland, Vermont. This is a Northern system, with only moderate fronting of /Tuw/ and no fronting at all of /Kuw/ or /ow/. The defining features of the NCS are evident. The EQ criterion is satisfied, since the relative positions of /æ/ and /e/ are reversed. The mean of /æ/ (excluding vowels before nasals) is at mid position, and among the raised vowels are *bag*, *bad*, *have*. One token of /e/ is extremely low, *neck*,[20] and quite a few others are in lower mid position. There is a notable backing of /ʌ/, with several tokens as far back as the conservative mean of /ow/.[21] The /o/ vowels are only slightly back of center.

The most remarkable feature of this system is the relatively front position of many /oh/ tokens. This speaker plainly has a full merger of /o/ and /oh/. The means of the two distributions are identical, and several tokens of *dawn* are among

20 The analyst entered the comment that the timbre of this vowel was notably low.
21 The effect of the initial labial (Table 14.5) is again reflected here.



Map 14.12. Northern features in Western New England

In this map, the ED criterion is extended to show the relation of Western New England to the Inland North. The light blue circles indicate speakers who approximate the ED criterion for the near-alignment of /e/ and /o/ on the front-back dimension, with an F2 difference greater than 375 Hz but less than 450 Hz. Seven WNE speakers fall into this classification, along with four who meet the stricter criterion, suggesting that the vowel systems of that area may have been oriented towards the NCS at the time when the westward migration first gained momentum.

the frontest vowels in the combined category – plainly unrounded and central. It appears that Phyllis P. has a unique combination of the NCS and the low back merger. Normally, the fronting of /o/ insulates the speaker from merger with /oh/, but here the merger is superimposed upon the chain shift. This may represent the result of westward expansion of the merger, or the eastward expansion of the NCS. The former possibility seems more likely, given the general principle that mergers expand at the expense of distinctions (Labov 1994: 313). This is plainly a mixed system characteristic of boundary communities. Chapter 16 will deal with this area and this speaker in more detail.

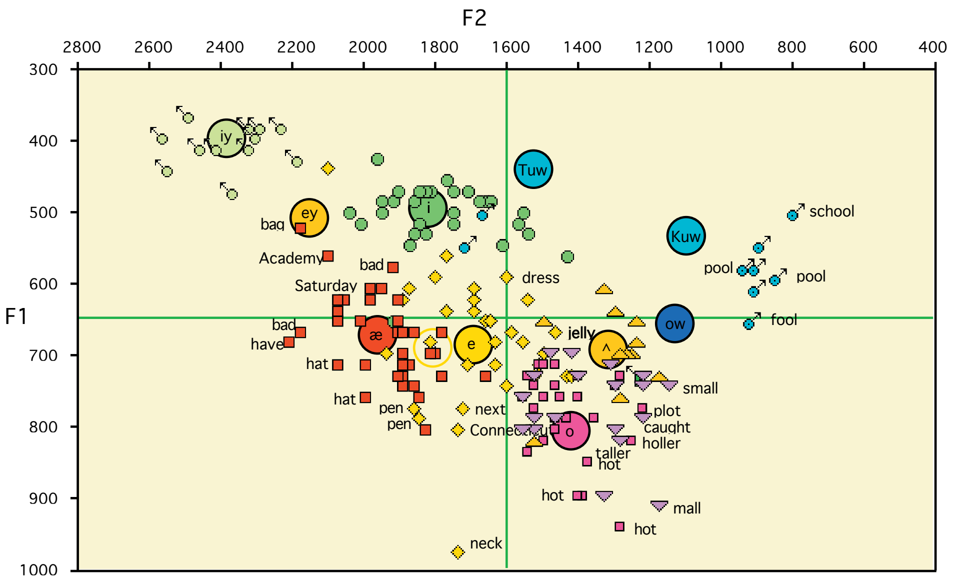


Figure 14.23. NCS in the vowel system of Phyllis P., 63 [1995], Rutland, VT, TS 434

14.10. The origins of the Northern Cities Shift

Although the basic configuration underlying the NCS can be found among Western New England speakers, the triggering event of this chain shift – the removal of all short-*a* words from low front position – is not found among the Telsur speakers in that area. It is only in New York State and westward that this phenomenon occurs. The linguistic innovations that occurred in this region appear to have been produced by massive population shifts and demographic changes associated with the westward settlement of the Inland North.

The settlement of the Inland North was closely connected with the construction of the Erie Canal. The canal was first envisaged in 1699, but plans were not activated until the beginning of the nineteenth century, under the leadership of Governor DeWitt Clinton. Until that time, Philadelphia was the largest city in the United States and the chief center of industry and trade. The prospects of shipping goods to the west by waterways were enhanced by the fact that the Hudson River, a tidal estuary, was ice-free 12 months in the year. The Erie Canal was begun in 1817 and finished officially on October 26, 1825 (Cornog 1998). New York City then became the major port of entry in the United States, and both people and goods traveled westward to Michigan and Illinois along the canal. Large numbers of immigrants participated in the construction of the canal, and extensive urban development took place in New York State, in the cities along the canal route. The city of Syracuse, for example, was a swampy area with a population of 250 in 1820; by 1850 it had grown to 22,000.

The character of the settlers of the Inland North is described in some detail in Power (1953), Frazer (1993), and Morain (1988). They traveled in large groups; sometimes entire communities migrated. Many of the settlers were powerfully motivated by missionary zeal, with the goal of civilizing and Christianizing the wilderness. They founded cities, and in each city, institutions of higher education. In this respect, they differed from the settlers of the Midland, who were primarily subsistence farmers, traveling in family units, oriented more towards developing the countryside than building cities and schools (Fischer 1985).

Figure 14.24 is taken from a study of methods of building wooden houses in the Eastern United States (Kniffen and Glassie 1966). The arrows represent the direction of streams of settlement reflected in differential methods of house construction. The New England stream of settlers originated from the port of Boston and other, smaller New England centers, then moved westward along the Erie Canal, through Ohio and Southern Michigan to Chicago and further west. A second stream of migration passed through Philadelphia, across Pennsylvania through central Ohio, Indiana, Illinois, and Missouri. They also traveled across the Appalachian mountains and moved southwards into Kentucky and Tennessee.

Close examination of the division between the two streams of migration shows that Figure 14.23 fits quite closely the North/Midland line of Map 14.9, in so far as the impressionistic character of the arrows will allow. The line separating the New England stream from the Pennsylvania stream isolates the northern tier of counties in Pennsylvania from the rest of the state. It then separates the Western Reserve area of northeast Ohio from the rest of that state. The large grey arrow extending upward into Indiana corresponds to the “Hoosier apex” of Midland influence, which results in the very narrow Northern base in that state today. The upper third of Illinois is Northern in terms of both the settlement pattern and its Northern dialect features, and the same holds true for southeast Wisconsin.

The regression coefficients of Tables 14.2–14.5 indicate no radical difference in phonetic factors affecting the vowels of the North and the Midland. The major difference is the structural consequence of the wholesale upward shift of /æ/ in the Inland North as compared to the gradual or partial upward expansion of the class in other areas. An initial question emerges from this alignment of settlement patterns with linguistic developments. Did these population movements affect the short-*a* system and trigger the NCS?

Two characteristics of the westward settlement pattern bear upon this issue. The arrows of Figure 14.24 are drawn as if the settlement came from a single area of Eastern New England – Boston. The historical accounts cited above indicate a different situation. The native-born settlers moving into New York State came from a variety of dialect areas in New England, including Maine, New Hampshire, Providence, and western Connecticut. In addtion, the great expansion of New York City after the Canal was completed ensured a flow of workers, passengers and entrepreneurs from outside of New England, up the Hudson River and westward to Buffalo. Chapter 13 showed that these settlers would have a variety of different and incompatible short-*a* systems: the nasal system of Eastern New England, the continuous nasal pattern of Western New England, the broad-*a* pattern of Boston, and the short-*a* split of New York City. The end result in western New York State was none of these, but the general raised short-*a* pattern of the NCS.

This general raising pattern appears to be the type of simplification that often occurs in situations of radical dialect mixture with rapid population growth: a koineization (Kerswill 2002, Trudgill 2004). In such a situation, it is not unusual for different conditioning factors, sub-categories and sub-rules to disappear in favor of the simplest possible treatment.

The occurrence of such a simplification of the short-*a* pattern is also made more probable by the rapid expansion of the non-native population in New York

State during the period of the Erie Canal construction. The Canal not only made possible the westward movement of diverse native-born populations, but also brought thousands of new learners of English to cities whose population was increasing tenfold. In this respect, the western New York phenomenon is comparable to the expansion of the population in coal-mining communities of eastern Pennsylvania, which led to the rapid expansion of the low back merger (Herold 1990, 1997).

A second and more difficult question is to account for the remarkable stability of the North/Midland line. The preceding section of this chapter indicates that the NCS is a twentieth-century phenomenon. The lexical markers that define the North in Carver (1987) date from the middle of the nineteenth century and are now largely obsolete. Why does the expansion of the NCS, which began in the middle of the twentieth century, stop at a line created by settlement history in the middle of the nineteenth century? There is no evidence that current-day communication patterns follow nineteenth-century settlement, or that the Inland North is united by communicative networks that exclude Midland areas.[22] This is a question for future investigations which lie beyond the immediate scope of this Atlas.

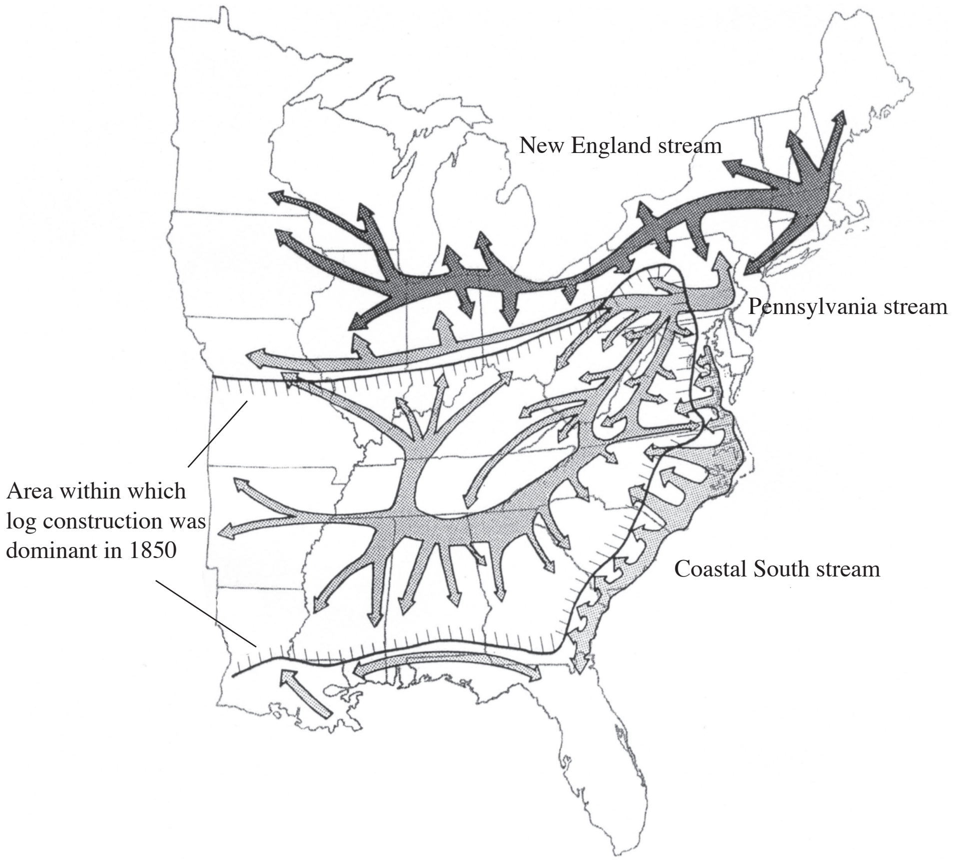


Figure 14.24. Settlement patterns based on house building practices (from Kniffen and Glassie 1966)

22 On the contrary, airline and telephone traffic centers link western New York State with New York City, while Detroit, Columbus, and Indianapolis are linked with Chicago.

15. Canada

15.1. The English-speaking population of Canada

Canada has two official languages at the national level: English and French. This bilingual status reflects the country's history as a union of originally French and British colonies. French settlements were established in eastern Canada in the early seventeenth century, at about the same time as the British colonies in Massachusetts and Virginia and well before there was a significant British presence in Canada. However, when the competition between Britain and France for control of North America culminated in the Seven Years' War, France was defeated, and French possessions in Canada were ceded to Britain by the Treaty of Paris in 1763. Following the British victory, British settlement of Canada increased dramatically, first from the British colonies in what are today the United States, then directly from Britain, so that French speakers were already a minority when Canada became an independent country in 1867.

Today, less than a quarter of Canadians speak French, though this is about double the proportion of people who speak Spanish in the United States. Like American Spanish-speakers, Canadian French-speakers are not evenly distributed across the country. Most of them live in the province of Quebec, which is over 80 percent French-speaking, and in neighboring sections of Ontario and New Brunswick. The remainder of Canada is largely English-speaking. For example, in the two largest cities outside Quebec, Toronto and Vancouver, French-speakers account for only one per cent of the population. Nevertheless, only about 60 per cent of Torontonians and Vancouverites are native speakers of English. These cities, like their American counterparts, have attracted large numbers of new immigrants from all over the world. The remainder of their populations speaks languages other than English or French, such as Chinese, Italian, and Punjabi. Just as speakers of non-official languages outnumber French-speakers in English-speaking cities, they now also outnumber the half-million English-speakers in Montreal, Canada's largest French-speaking city. In 2001, of a population of almost 30 million Canadians, approximately 17 million (59%) claimed English as their mother tongue. Outside Quebec, this proportion rises to 76 per cent.[1]

The Canadian population, English-speaking and otherwise, is heavily concentrated in a narrow band of territory along the northern border of the United States. Except for a scattering of small, isolated communities, the vast northern regions of the country are largely unpopulated and are therefore not included in the maps of Canada presented in ANAE. This permits a closer view of the major urban areas of southern Canada that are the focus of this Atlas.

In general, the English spoken in the Canadian North can be viewed as a dialect in formation, like that of Florida or some other parts of the American Sunbelt. The region's European population is too sparsely settled, too diverse in origin, and too recently arrived to have produced an identifiable, homogeneous dialect distinct from southern Canadian English, while its large Aboriginal population speaks a range of varieties influenced by non-English substrates that are beyond the scope of this Atlas. The speech of northern Canada will therefore be left as a subject for future research.

15.2. General features of Canadian English

Two general characteristics of Canadian English deserve special attention before proceeding to a more detailed analysis. The first is that Canadian English is an essentially North American variety, very similar to that spoken in the Midland and Western regions of the United States. While Canada had a longer and closer association with Britain than the United States, the linguistic effects of this association have been limited to relatively superficial levels of language, such as spelling (*centre* and *colour* for *center* and *color*) and phonemic incidence (/o/ not /ow/ in *shone*). The phonetics, phonology, morphology, syntax, and lexicon of Canadian English have much more in common with American varieties than with Standard Southern British English. For example, the vocalization of /r/ and the phonemic split of Middle English short-*a* into 'broad' and fronted classes were never adopted in Canada, while the American pattern of flapping intervocalic /t/ has become standard in Canadian English. In the realm of British-American vocabulary differences, Canadians use American words like *drugstore*, *elevator*, *flashlight*, *fries*, *gas*, and *truck*, rather than their British equivalents, *chemist*, *lift*, *torch*, *chips*, *petrol*, and *lorry*.

Avis (1954: 14) and Bloomfield (1948: 62) have argued that the North American character of Canadian English was established by the first major English-speaking settlements in Canada, which came from the United States. Nova Scotia was settled before the American Revolution by migrants from New England, while New Brunswick and Ontario were settled after it by royalist refugees, known in Canada as United Empire Loyalists, from New England and from the Mid-Atlantic colonies. This "Loyalist" theory of the origins of Canadian English is not universally accepted. Scargill (1957: 611–612) finds it hard to believe that English in Canada could have been unaffected by the much larger numbers of immigrants who came directly from Britain in the nineteenth century, and cautions against assuming that modern, Standard Southern British English is the relevant variety for comparison when classifying Canadian English as relatively more American or British. Most British immigrants to Canada would not have spoken this variety, and some features of Canadian English that seem to indicate affinity with American English may just as well have their origins in the regional dialects of northern or western Britain, or Ireland. Nevertheless, English-speaking Canada has experienced close relations with the United States from its earliest period. American influence was extended at the turn of the twentieth century by the large numbers of American pioneers who helped to settle the Canadian West, and has intensified at the turn of the twenty-first century as Canadians have experienced ever closer economic and cultural integration with the United States.

Given the North American character of Canadian English, it is reasonable to analyze dialect developments in Canada within the same phonological framework that is used for the United States. The phonological notation of Chapter 2

1 All figures from the 2001 Census of Statistics Canada.

would not be suitable for many British dialects, where the distinction between short and long vowels is not based on the presence of final glides.[2]

The second general characteristic of Canadian English is its relative homogeneity. To a large extent, a single type of English is spoken across the 3,000 miles (4,500 km) from Vancouver, British Columbia, to Ottawa, Ontario. East of Ontario, in Montreal and in Atlantic Canada, greater regional differences can be heard. Notably distinct are Newfoundland, which was settled mainly from southwestern England and southeastern Ireland and remained a separate British colony until its confederation with Canada in 1949; and Cape Breton Island, the northern part of Nova Scotia, which was settled mostly by Scottish immigrants. In addition, this chapter will show geographic distinctions between an "Inland Canada" region centered on the Prairie Provinces, and areas with more variable patterns, including the larger metropolitan areas of Vancouver and Toronto. However, Canadian English displays nothing like the dialect diversity of the United States, let alone that of Great Britain. As in the West of the United States, this homogeneity results from relatively sparse and recent settlement by intermingled groups of immigrants from different regions.

The ANAE data to follow will show that Canadian English is marked by the low back merger of /o/ and /oh/, and the innovative Canadian Shift, triggered by that merger. Canadian raising of /ay/ and /aw/, though the best known feature of this region, is widespread but not quite as consistent a marker as the Canadian Shift. It will also appear that in other respects, the core areas of Canadian English are quite conservative: the preservation of peripheral, almost monophthongal /ey/ and /ow/, and the back position of /aw/, shared with the North of the United States.

15.3. Data for acoustic analysis

Telsur's Canadian sample includes speakers from every major city in Canada (Vancouver, Calgary, Edmonton, Winnipeg, Toronto-Hamilton, Ottawa, Montreal, and Halifax), plus a number of smaller towns and cities that represent important border regions (e.g. Thunder Bay, Sault-Ste-Marie, and Windsor, ON) or traditional dialect enclaves (Arnprior, ON, Saint John, NB, Sydney, NS, and St. John's, NL). The data to be presented in the following sections are based on a total of 41 Canadian speakers, of whom 33 have been analyzed acoustically. The number of speakers from each city or town is roughly proportional to its population, ranging from six from Canada's largest city (four analyzed acoustically), Toronto, to one from some of the smaller centers.

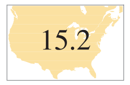
15.4. Focus of this chapter

Chapter 11 undertook the task of identifying Canadian English as a whole, and distinguishing it from neighboring areas in the United States. This was done with reference to the ongoing Canadian Shift of the short front vowels, which characterized all of Canada except the Atlantic Provinces. 23 of the 25 Telsur speakers in this region displayed the Canadian Shift (Map 11.7). These sound changes differentiated Canada from neighboring Eastern New England, the North, and the West, though speakers with the same characteristics are found scattered throughout other areas of the West. For most phonological variables, Canada is sharply differentiated from the North, and particularly the Inland North, so that the small city of Windsor shows almost no features in common with neighboring Detroit (Boberg 2000). The long western border that Canada shares with the West does not show such sharp differentiation, and a complex definition of the West was needed to distinguish it from Canada. This chapter will be concerned with mapping the internal structure of Canadian English, rather than differentiating it from the United States. The maps to follow will therefore show only the Telsur speakers from Canada, beginning with mergers and the phonemic inventory of Canadian English.

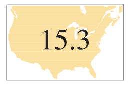
15.5. Mergers and the phonemic inventory of Canadian English

The first three maps in this chapter concern the phonemic inventory of Canadian English, based on the inquiry into minimal pairs and rhymes with 41 Telsur subjects. These data show that the low back merger of /o/ and /oh/ is generally characteristic of modern Canada as a whole. Real-time comparisons with data from earlier surveys of Canadian English suggest that it has been well established in Canada for several generations. In their nation-wide survey of over 14,000 Canadian schoolchildren and their parents, Scargill and Warkentyne (1972: 64) report an average of 85 percent of Canadians responding 'yes' when asked whether *cot* and *caught* rhyme. Allowing for a margin of error stemming from the influence of spelling on responses to written surveys, it can reasonably be assumed that the true rate of merger was very close to 100 percent at this time. The only exception to this high level of merger was Newfoundland, where the rate dropped to about 70 percent. However, Kirwin (1993: 74) says that the Anglo-Irish dialect of Newfoundland's Avalon Peninsula, in and south of St. John's, exhibits a full merger. In mainland Canada, Gregg (1957: 22) reported an invariant merger among Vancouver university students. A generation later, Woods (1993: 170) found the same to be true of Ottawa. Avis (1973: 64) and Labov (1991: 32) suggest a consistent merger across Canada. Chambers (1993: 11–12) presents literary evidence of the merger in Ontario speech in the mid-nineteenth century, and suggests that it may have been introduced by eighteenth-century Loyalist settlement from merged areas of Pennsylvania.

Map 15.1 shows the low back merger before /n/ as recorded in the minimal pair *Don* ~ *dawn* in the Telsur interviews. The merger before nasals is considerably more advanced than in other environments. It is almost uniform throughout Canada, including the Atlantic Provinces. Only one 42-year-old man in Vancouver thought that this pair sounded 'close'. Although the *Don–dawn* merger occurs at a higher rate in all merged areas, Chapter 9 showed considerably more variation in the West and in Eastern New England.

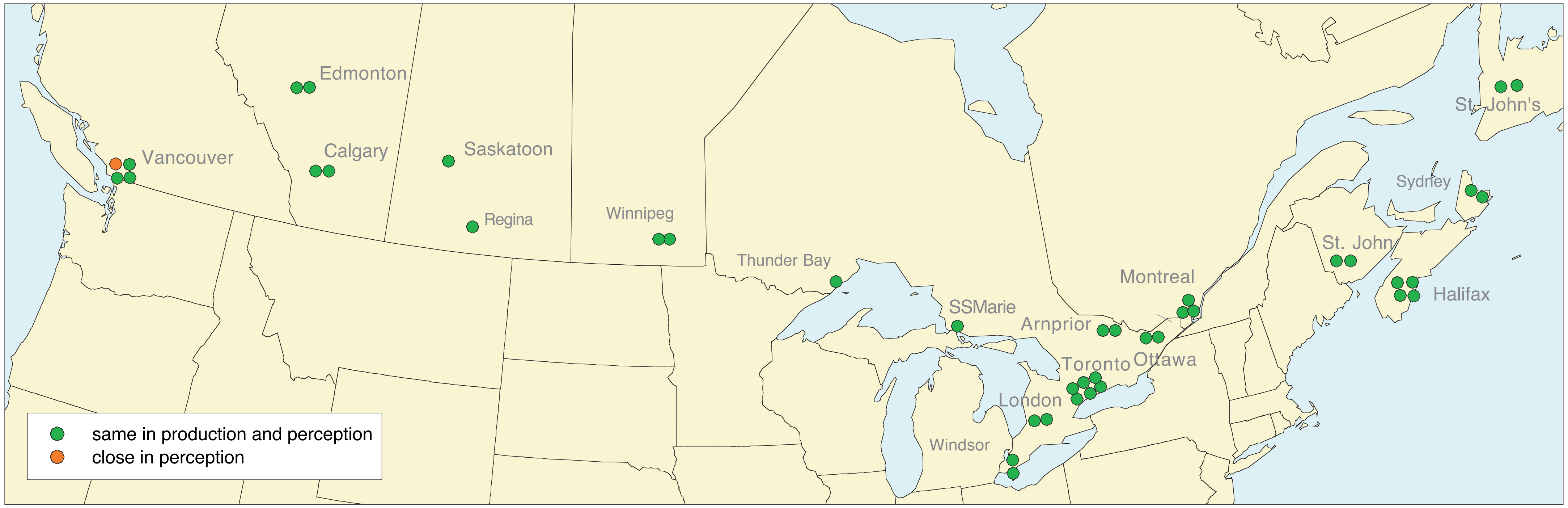


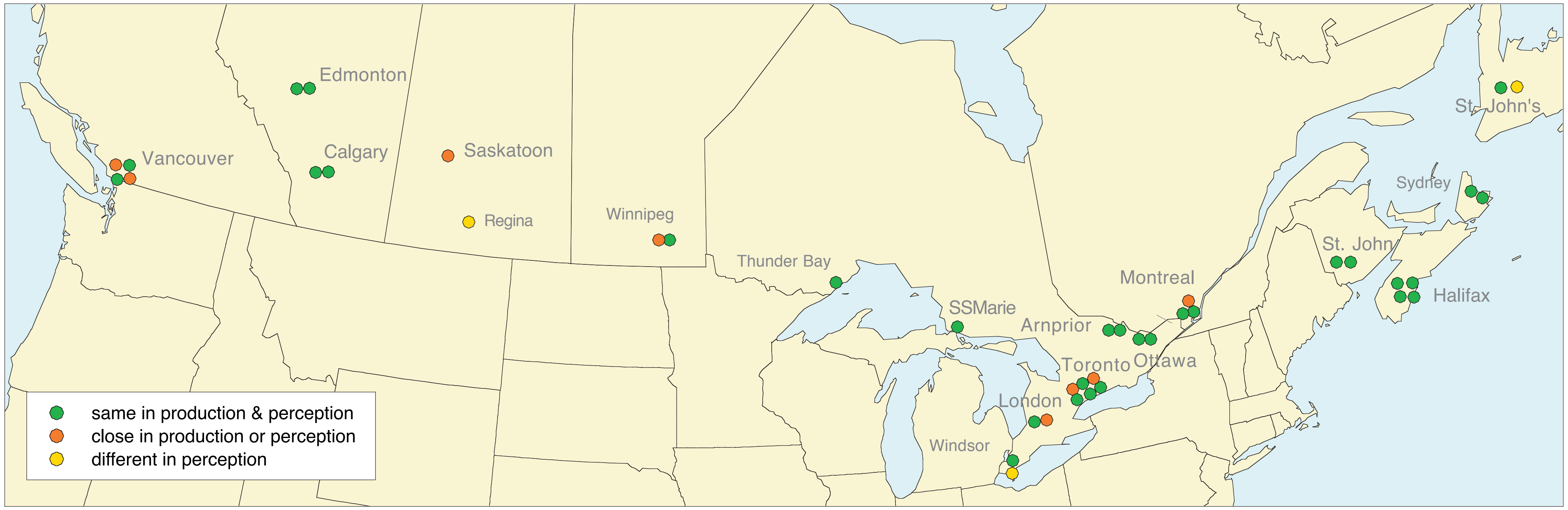
Map 15.2 is the corresponding data for the low back merger before /t/, based on the rhyming of *hot* and *caught*. In this case, only 29 of the 39 subjects were sure that these words rhymed and pronounced them in a way that clearly rhymed to the analyst. Eight subjects were 'close' in either production or production, and two thought they did not rhyme even though they said them as rhymes. Again, the evidence for merger is quite general. The Maritime provinces and Alberta show the greatest consistency in this merger, while other regions display considerable variation. On a phonetic level, the merged vowels are produced further forward in Newfoundland than in the rest of Canada, sometimes approaching the low–central position of /o/ in the Northern Cities.



As in most of North America, intervocalic /ey/ and /e/ are merged before intervocalic /r/, so that *Mary* and *merry* are identical. In the case of /e/ and /æ/ in this environment, Canada shows greater variety. Though the majority of Cana-

2 However, it will appear below that the area of Inland Canada is marked by tense peripheral long /ey/, which might well be written in broad phonetic notation as [e:].



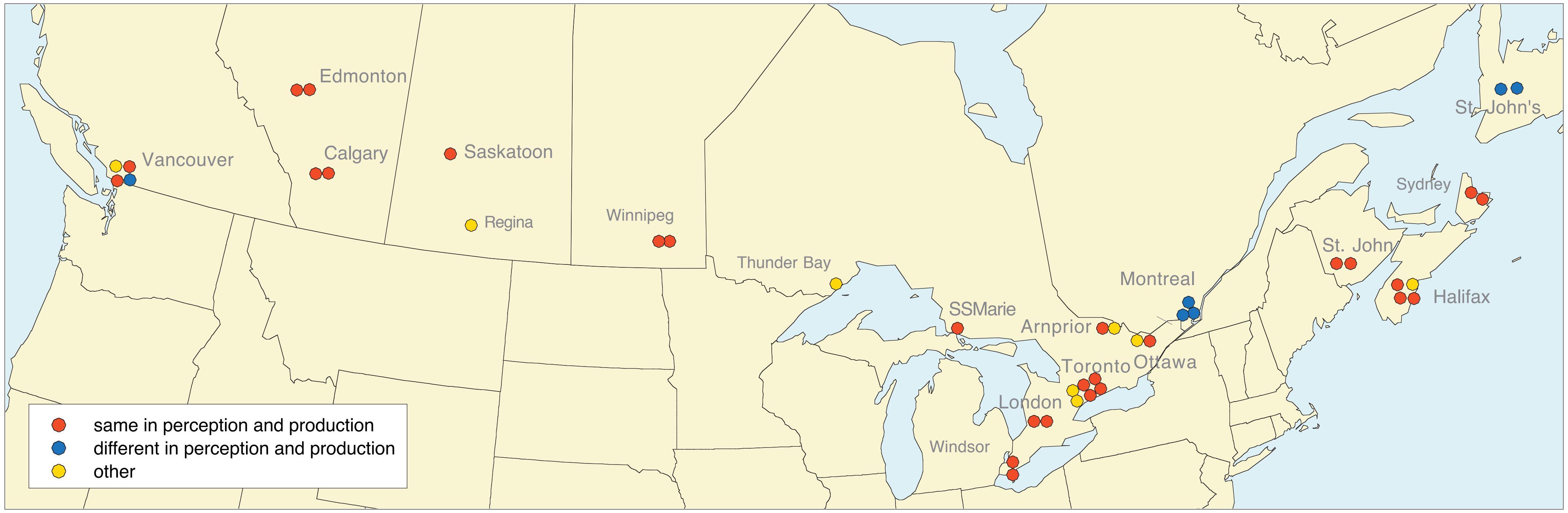


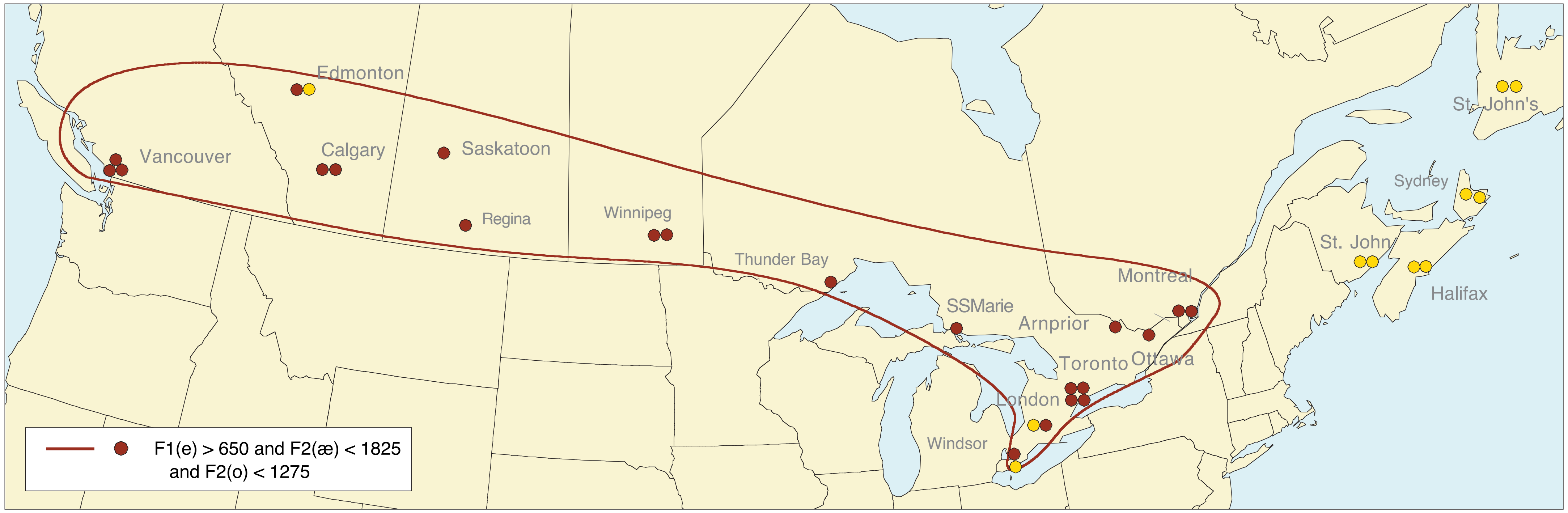
Map 15.1. above The low back merger before nasals in Canada

Map 15.2. below The low back merger before /t/ in Canada

The merger of /o/ and /oh/ is most advanced before nasal consonants, as shown by responses to the minimal pair *Don* vs. *dawn* in the Telsur interview. In Canada, results are almost uniform: only the oldest speaker from Vancouver showed any variation, thinking that the two words sounded 'close'.

There is less uniformity in the merger before /t/, as shown by this map of the minimal pair *cot* ~ *caught*. The Maritimes and Alberta show the most consistent merger, with considerable variation in other regions.





Map 15.3. above The merger of /e/ and /æ/ before intervocalic /r/

Map 15.4. below The Canadian Shift

The minimal pair *merry* ~ *marry* is generally heard as "the same" in Canada, but Newfoundland and Montreal stand out as different from the rest of Canada.

The dialect of Canada is defined phonologically as the area shown here, excluding the Atlantic Provinces. It is characterized by the Canadian Shift, a downward and backward movement of /e/ and /æ/, triggered by the merger of /o/ and /oh/ in low back position.

dians have a three-way merger, in which *marry* is identical to *Mary* and *merry*, two cities, Montreal and St. John's (NL), appear to maintain a clear distinction between *marry*, with a low–front vowel, and *merry*, with a mid-front vowel. As in the United States, this distinction is restricted geographically to the eastern half of the country, uniting the speech of Montreal and St. John's with that of Boston, New York, and Philadelphia, at least in regard to this feature.

The new and incoming mergers of vowels before /l/ discussed in Chapter 9 do not occur in Canada. The on-going merger of /i/ and /e/ before nasals, spreading northward from the South, would not seem to have reached Canada by diffusion from that region. However, there is a cluster of three speakers in the Atlantic Provinces whose contrast of *pin* and *pen* was rated as 'close' by the analyst, in Saint John and Halifax. In other areas, deviations reflect subjects' uncertainty about the meanings of 'different' and 'close'.

The relics of older distinctions that have all but disappeared, reviewed in Chapter 8, show traces in the most conservative of the Canadian subjects. Here the speakers' judgments are not to be weighed as heavily as production, since spelling can lead them to assert a distinction that is not present. The Saskatchewan subjects are particularly subject to this effect. However, the distinction of /hw/ and /w/ in *whale* and *wail* is maintained by the oldest Vancouver speaker, a 73-year-old woman. She also preserves the distinction between /iw/ and /uw/ in *dew* and *do*, as does a 46-year-old woman from London, Ontario.

15.6. The geographic distribution of phonetic features of Canadian English

The maps and other materials to follow are concerned with rotations and shifts in phonetic space that are characteristic of Canada, with a focus on those features that show the greatest geographic differentiation. They are based upon the acoustic analysis of 33 of the 41 Telsur subjects in Canada.

15.4
Map 15.4 reproduces the view of the Canadian Shift first seen in Chapter 11. It is triggered by the merger of /o/ and /oh/ seen in Maps 15.1 and 15.2, which allows a backward shift of /æ/, followed by a downward and backward movement of /e/.

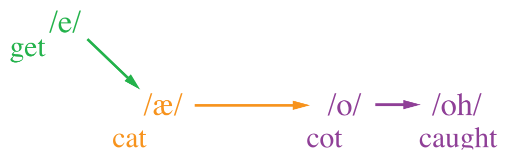


Figure 15.1. The Canadian Shift

The retraction of /æ/ was first observed in Vancouver English by Esling and Warkentyne (1993). The larger context of this development was first identified as the Canadian Shift by Clarke, Elms, and Youssef (1995), who found the phonetic effects reflected in that of Map 15.4 in word lists pronounced by young, mostly Ontarian subjects.[3] Boberg (2005) has observed the Canadian Shift in progress in Montreal, though with more retraction than lowering of /e/.

Figure 15.2 is a Meanfile diagram of the vowels involved in the Canadian shift for all ANAE dialects, with the position of the Canada dialect indicated along with other relevant dialect positions. The most striking difference between Canada and the other regions is found for /æ/: F2 for Canadian /æ/ is at 1725 Hz, lower than all other dialects except Providence. The short /e/ mean for Canada is among the two lowest of the dialect means. The merged /o ~ oh/ class is at the highest and backest level of the /o/ distribution. No shift of /i/ is indicated in the ANAE data for Canada. The contrast with the Atlantic Provinces is clear: the /i/, /e/, and /æ/ means for AP are much higher and fronter than those for the rest of Canada; confirming the fact that this areas does not participate in the Canadian Shift.

It can be observed that Canada and the Inland North are shifted in opposite directions. The red square representing the (non-nasal) means for Inland North /æ/ is higher and fronter than all other means, while Canada is lower and backer. The Inland Northern /o/ is well to the front of the /o/ distribution, while Canadian /o/ is at the back. The definition of Canada centered on the Canadian Shift is particularly apt for distinguishing it from the North.

Canada is most sharply separated from other North American dialects by the behavior of short-*a* before nasals. The highlighted square representing the Canadian mean is a good 100 Hz higher than any other, and quite outside of the range of other dialects. It is in fact located in the region of short-*a* in non-nasal environments for other dialects.

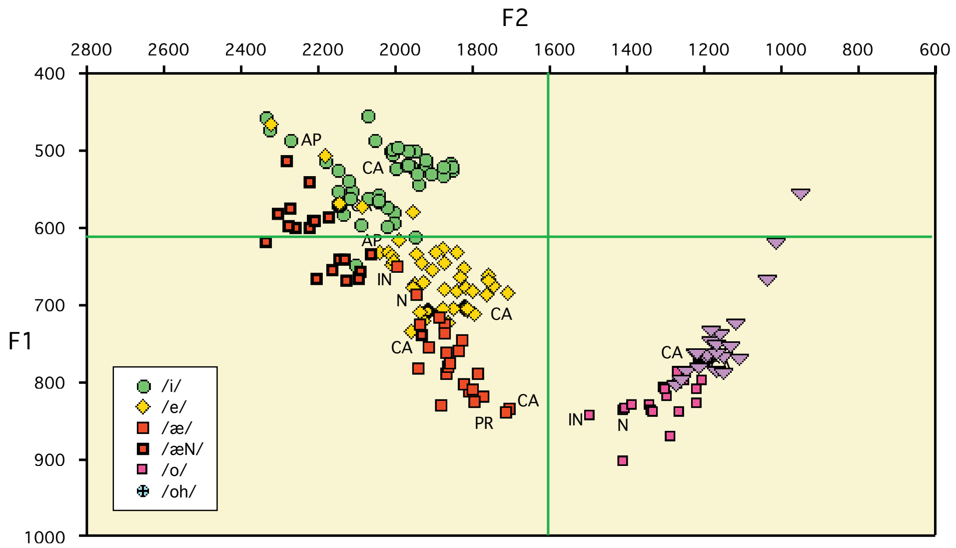


Figure 15.2. Distribution of F1/F2 means for ten regions. CA = Canada; N = North; IN = Inland North; PR = Providence; AP = Atlantic Provinces

Though the original study of the Canadian Shift did not establish an apparent time gradient that would indicate change in progress, such a gradient does appear in the ANAE data. The age coefficients in Table 15.1 are drawn from the tokens produced by the 33 Canadian Telsur participants who were analyzed acoustically. In addition to age, the analysis considered city size, education and gender among the social factors; place and manner of the following and preceding consonant; voicing of the following segment; and number of following syllables. These factors accounted for 30 to 50 percent of the variance for the sound changes in progress. It is evident that /e/ is moving backward and downward in apparent time, and /æ/ is moving backward.

3 In Clarke et al.'s version of the Canadian Shift (1995: 212), a lowering and/or centralization of wedge was also included, but ANAE data do not replicate this.

Table 15.1. Age coefficients for the vowels involved in the Canadian Shift

	Age coefficient	$p <$	N
F1(ɪ)	1.18	.04	605
F2(i)		n.s.	
F1(e)	–0.82	.00001	949
F2(e)	2.28	.00001	949
F1(æ)		n.s.	
F2(æ)	1.85	.00001	1,467
F1(o)		n.s.	
F2(o)		n.s.	

Map 15.4 therefore defines the Canadian region in terms of this sound change – the Canadian Shift – that shows evidence of progress in apparent time. It shows a high degree of homogeneity within this region (.88), but low consistency (.39). While individual elements of the Canadian Shift can be seen to affect some speakers outside this area, no other region of North America shows a high concentration of the complete set of Canadian Shift features. The dark red isogloss for the Canadian Shift region does not cover Canada as a whole, however. The Atlantic Provinces are excluded from this definition of Canadian English: there are no Telsur speakers to the east of Montreal who show the Canadian Shift in progress.

The best-known characteristic of Canadian English is "Canadian raising", the centralization of the nuclei of /ay/ and /aw/ before voiceless consonants. This produces higher nuclei in words like *right* and *out* than in words like *ride* and *loud*. Canadian Raising was first analyzed by Joos (1942), who showed that it interacts with flapping to produce apparent phonemic oppositions in some Canadian varieties contrasting raised and unraised vowels in pairs like *writer* ~ *rider*. The presence of these oppositions was re-analyzed in later, generative treatments to depend on the order of application of the raising and flapping rules to underlying forms (Chambers 1973). Canadian raising is not unique to Canada, even in a North American context: Kurath and McDavid (1961) show raising of /aw/ to be a feature of eastern Virginia; raising of both /aw/ and /ay/ was the basis of Labov's study of Martha's Vineyard, MA (1963); and studies of Philadelphia showed raising of /ay/ to be a change in progress in that city (Labov 1980, 2001; Conn 2005). Several recent studies have shown it to be at least a variable feature of Inland Northern speech, though generally affecting only /ay/, not /aw/ (Dailey-O'Cain 1997 in Ann Arbor, MI; Niedzielski 1999 in Detroit; Vance 1987 in Minnesota and western New York). Thomas (1991) demonstrated that raising has a long history in Canada, going back at least as far as the mid-nineteenth century, but recent research on urban Canadian English shows it to be recessive in major cities, particularly among young females (Chambers and Hardwick 1986). While Canadian Raising is neither a unique nor a completely consistent feature of Canadian English, it remains a common feature in most parts of Canada, and continues to be the basis of the most popular American stereotype of Canadian speech, at least as it applies to /aw/.

15.5

Map 15.5 shows the results of the acoustic analysis of /aw/ and /ay/ for 31 Canadian subjects. The blue circles represent those speakers who have distinct centralization for both /aw/ and /ay/: that is, a difference of more than 60 Hz between the mean F1 values of nuclei with voiced and voiceless codas. The light blue and green symbols are speakers who show raising for only /aw/ or /ay/, respectively. As usual, yellow circles are the residual class, with neither vowel showing raising.

The geographic configuration shown in Map 15.5 pre-figures a number of isoglosses to follow which are also centered around the prairie provinces. A split community in Alberta allows us to extend the isogloss to include Edmonton and Calgary, since no extra nodes need be added to do this (though this cannot be done for Windsor). Similarly, the variation in Toronto can be included within the isogloss, but Vancouver and Arnprior are distinctly outside the isogloss.

Map 15.5 shows that Canadian raising is a widespread feature of Canadian English, extending variably to the Atlantic Provinces more than the Canadian Shift, but not uniform enough to serve as a defining feature of the dialect of Canada.

15.6

All of the Canadians studied showed some raising of /ahr/ to at least lower–mid position, but fronting of /ahr/ establishes an east–west divide in Canadian English, as indicated in Map 15.6. In the west, the F2 of /ahr/ is consistently less than 1450 (mean = 1315), indicating a fairly back pronunciation, whereas in Atlantic Canada, the F2 of /ahr/ is almost always greater than 1450 (mean = 1507), indicating a mid-central pronunciation.[4] Central Canada shows medial values (mean = 1382), with considerable variability, though the traditional Ottawa Valley dialect region of eastern Ontario, represented here by the town of Arnprior, shows advanced fronting of /ahr/ similar to that of Atlantic Canada.

Figure 15.3 illustrates the mid–central position of /ahr/ in the vowel system of a Newfoundland speaker. Here /ahr/ is located directly below the vowel of *bird* (indicated as /*hr/). This centralization is accompanied by a strong constriction of /r/, with a shorter pre-rhotic nucleus than in other regions. A low central position of /o/ (merged with /oh/), much further forward than in most regions of Canada, can also be observed in this system.

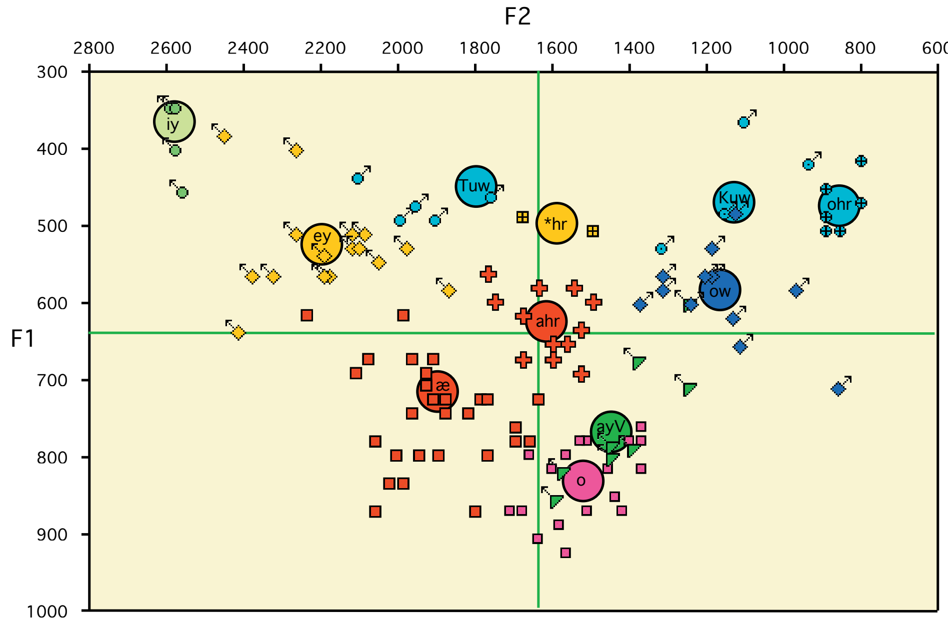
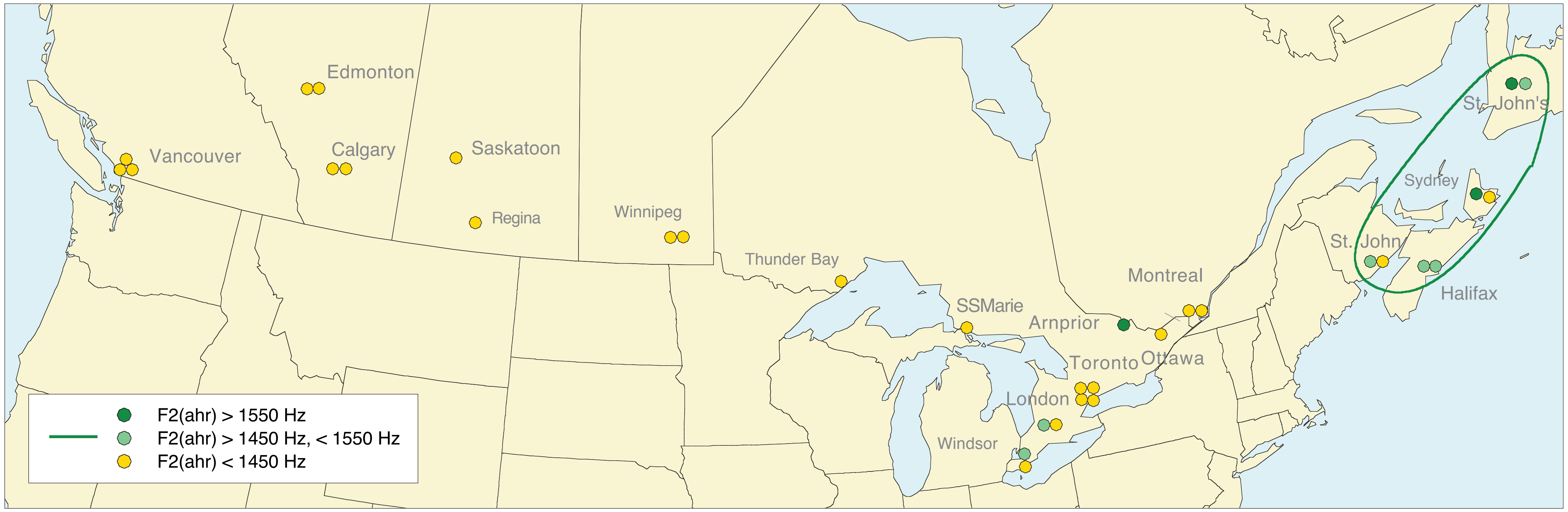


Figure 15.3. Central position of /ahr/ in system of David B., 35, St. John's, Newfoundland, TS 662

15.7. Raising of /æ/ before nasals and /g/

The raising of /æ/ before nasals differentiates Canadians by region, as Chapter 13 has already indicated. Nasal and non-nasal /æ/ are generally not as distinct in Canada as in most American varieties, except in parts of Ontario and Nova

4 The second speaker in Sydney actually has an F2 mean of /ahr/ of 1448 Hz, but is shown as green despite this 2 Hz difference.



Map 15.5. above Canadian raising

Map 15.6. below Fronting of /ahr/ in the Atlantic Provinces

The best-known feature of the Canadian dialect is Canadian raising, the centralization of /ay/ and /aw/ before voiceless consonants, defined as a 60 Hz difference between the first formant of the two allophones. It appears here as a more limited area than that defined by the Canadian Shift. The dark blue circles are the speakers with the most consistent raising in both /ay/ and /aw/.

The Atlantic Provinces are distinct from the rest of Canada in the absence of the Canadian Shift. One feature that unites Atlantic Canada is the fronting of /ahr/ in *car*, *card*, *hard*, also found in the Ottawa Valley region of Ontario, represented here by Arnprior. In a few cities, this vowel is actually front of center (dark green symbols).

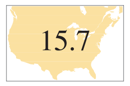
Scotia. Table 15.2 shows the Cartesian distance between /æ/ before nasals and all other /æ/ by province. All of the western provinces and Newfoundland have low values; Ontario is somewhat higher than the mean, and Nova Scotia is much higher, more than twice the mean value. The moderately low value for Montreal reflects ethnic variation in that city: Boberg (2004) shows that speakers of British and Irish ancestry tend to show the Ontario pattern of raising, while speakers of other backgrounds (like Telsur subject TS 795, who is Jewish), show little or no raising of /æ/ before nasals.

Table 15.2. Cartesian distance between /æ/ before nasals and elsewhere by province

British Columbia	241.4
Alberta	204.0
Saskatchewan	164.9
Manitoba	159.2
Ontario	374.9
Quebec (Montreal)	232.5
New Brunswick	298.9
Nova Scotia	629.4
Newfoundland	175.5
Mean	276

Map 13.5 showed that Canada as a whole, excluding the Atlantic Provinces, is aligned with a large part of the north-central United States in the organization of short-*a* words. While most of North America shows more raising before /d/ than before /g/, these areas reverse that relationship, in some areas leading to a merger of /æ/ and /ey/ before /g/. In the Maritimes, and especially in Halifax, a completely different arrangement of short-*a* is observed, more similar to that of the Mid-Atlantic United States than to the rest of Canada. Here, the raising of /æg/ forms part of a general pattern of phonetic conditioning. Most representative of this system is a 26-year-old woman from Halifax (TS 796), whose short-*a* system is displayed in Figure 15.4. This speaker exhibits a New York City-like pattern in which /æ/ is high–front before nasals, mid–front before voiced stops, (*bad*, *sad*, *cabin*, *cabbage*, *bag*, *tag*) and low–front elsewhere. Unlike the split short-*a* pattern of the Mid-Atlantic region, however, there is no evidence of morphological boundaries or auxiliary status playing a role in determining membership in tense ~ lax categories.[5] Moreover, words with /æ/ before voiceless fricatives /s, f/, the original core of the tense /æh/ word-class, remain lax in Nova Scotia. The older subject in Saint John (NB), TS 648, was found to have a similar pattern, with /æd/ and /æg/ in upper mid–front position, just below high–front /æN/.

No single linguistic definition includes Canada as a whole. Map 15.4 defines Canada as a dialect area on the basis of the Canadian Shift, which includes all of Canada except the Atlantic Provinces. Canadian raising has a wider range, including some parts of Atlantic Canada, but shows more variation within this range. Map 15.7 outlines an area of greatest consistency of these and other linguistic features that define Canada, a region that may be called "Inland Canada" by analogy with the Inland North and the Inland South. Its outer limit is the dark red Canadian Shift isogloss, outlining the area from Vancouver to Windsor to



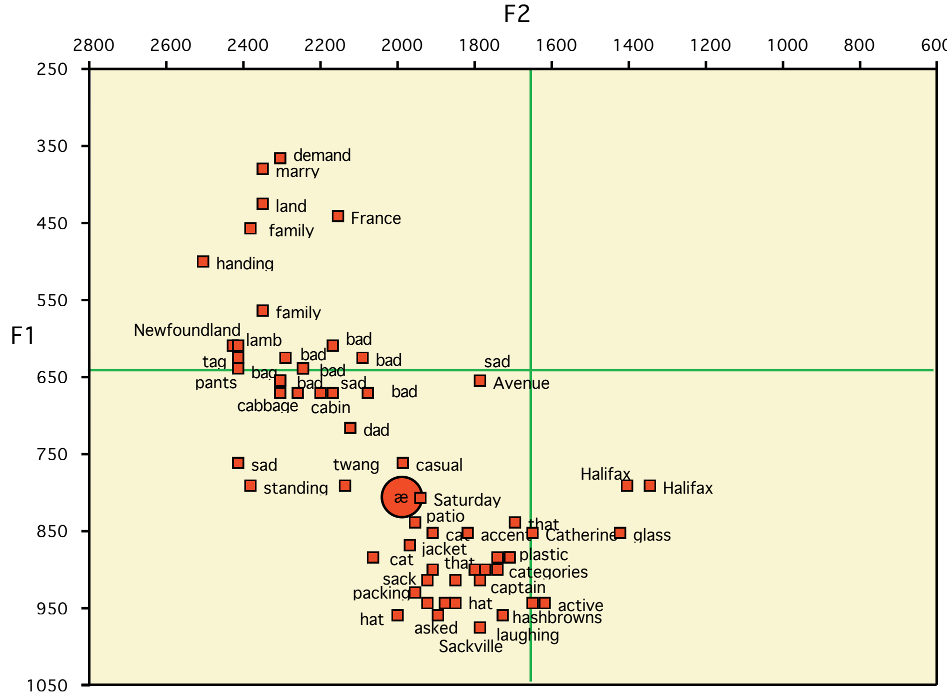


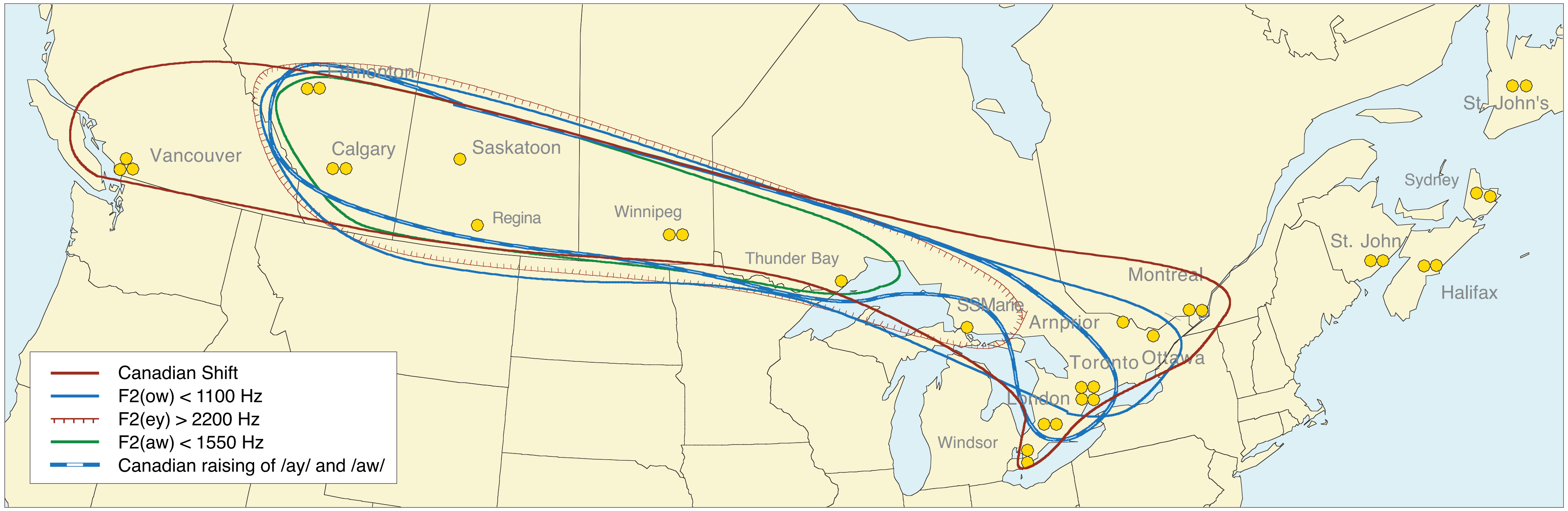
Figure 15.4. Short-*a* pattern of Cindy M., 26, Halifax, Nova Scotia, TS 796

Montreal, as in Map 15.4. Within this area there is a smaller, core region extending across the Prairie Provinces (Alberta, Saskatchewan, and Manitoba) to northwestern Ontario (Thunder Bay). It shows four other features with a high degree of consistency:

- conservative /ow/: F2 of /ow/ is less than 1100 Hz, with the minimal fronting of the nucleus (blue isogloss);
- conservative /ey/: F2 of /ey/ is greater than 2200 Hz, with minimal diphthongization of the nucleus (oriented dark red isogloss);
- conservative /aw/: F2 of /aw/ is less than 1550 Hz: the nucleus of this diphthong is a back vowel (green isogloss);
- Canadian raising of both /ay/ and /aw/ (broken blue isogloss).

While the Canadian Shift is concentrated in Canada, the other four Inland Canadian features are shared with areas of the United States, as shown in Chapters 11 to 13. The isoglosses displayed in Map 15.7 are internal to Canada, with the intent of differentiating one Canadian region from another. The major cities of Vancouver, in the west, and Montreal, in the east, are not included in the Inland Canadian region, though Toronto, the largest city in Canada, is within most of the Inland Canadian isoglossses. The Atlantic Provinces form a distinct and widely recognized dialect area. Ontario, the home of Canada's largest English-speaking population, shows considerable variation that might well be explored by research with a narrower, more local focus than the Atlas can provide.

5 The phonetic pattern resembles that of New Orleans and Cincinnati, which also echo the phonetic distribution of New York City without the NYC grammatical conditioning.



Map 15.7. Inland Canada

Within the Canada dialect area, there is a central or inland region that concentrates all of the features that define the dialect, and has in addition a conservative treatment of the upgliding vowels /ey/, /ow/ and /aw/. In these areas, /ow/ and /aw/ are back, and /ey/ is front with less of the nucleus–glide differentiation that we find in other areas.

16. New England

Chapter 11 presented a brief characterization of Eastern New England [ENE] as a dialect area centered on the city of Boston. Its defining features were displayed in Maps 11.7 and 11.12. Eastern New England was defined as the region of *r*-vocalization where short-*a* is split into /æ/ and /ah/, as opposed to the New York City area where short-*a* is split into /æ/ and /æh/.[1]

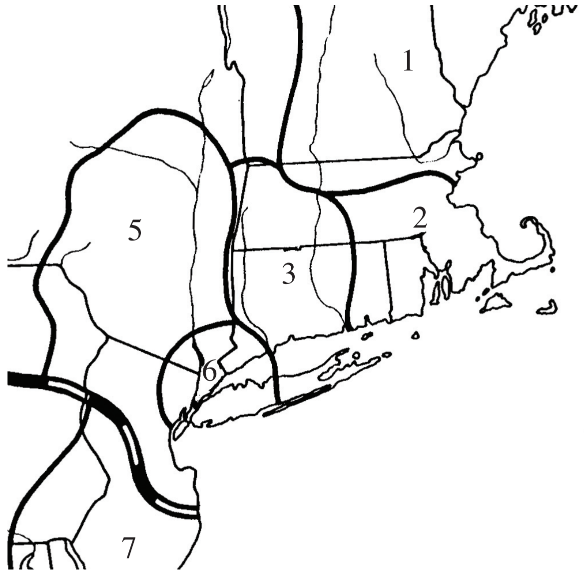
Chapter 14 presented a brief characterization of Western New England [WNE] in Map 14.12. WNE appeared as an extension of the ED measure of the Northern Cities Shift, but the WNE system is not driven by the general raising of /æ/ and lies outside of the EQ isogloss. The WNE system may be considered as an originating matrix of the NCS as a whole.

The maps in this chapter will show a New England divided into four quadrants by two intersecting isoglosses: a north–south split formed principally by the /o/ ~ /oh/ isogloss and an east–west split formed by *r*-vocalization. Northeastern New England [NENE] is the *r*-less area with the low back merger, a sizeable area centered about Boston and extending into New Hampshire and Maine. A smaller southeastern area [SENE] is also *r*-less, without the low back merger: it is centered on Providence and Narragansett Bay. Western New England is about evenly divided into an *r*-ful northwest region with the low back merger [NWNE] including the major cities of Vermont, and a more heavily populated southwestern quadrant [SWNE], a second *r*-ful area with /o/ and /oh/ distinct which is centered about Hartford in western Connecticut and Springfield in western Massachusetts. Other features of the vowel system coincide with these criteria and reinforce the four-fold division.

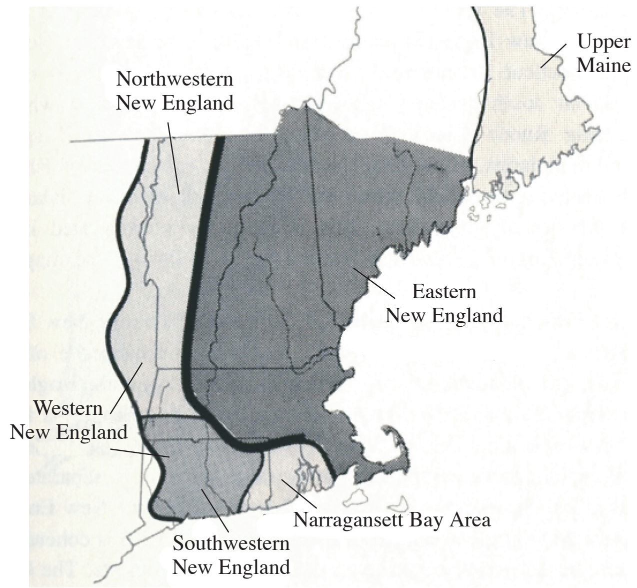
16.1. New England in earlier Atlas studies

Chapter 2 of Carver (1987) sums up the evidence of LANE and Kurath (1949) on the linguistic geography of New England. Though LANE set up seven regions largely on the basis of settlement history, Carver finds the evidence scanty: "None have more than a handful of representative isoglosses and most of these have completely faded from use". (p. 27). The lexical evidence available to Kurath (1949) led him to reduce these regions to three: Northeastern (Eastern New England north of Boston), Southeastern (the Boston area and the Narragansett Bay area centered on Providence) and Southwestern (the Connecticut Valley area centered on Hartford and extending northward to western Massachusetts). The DARE evidence was based on 45 areal isoglosses, of which only 20 were found in LANE maps. The new dialect divisions based on DARE data are somewhat different from Kurath (1949), as shown in Figure 16.1.

The two maps differ in a number of ways. The essential difference is that Kurath groups Boston and Providence together, opposing them to New Hampshire and Maine, while the DARE evidence makes Boston the center of Northeastern New England, and segregates Providence quite sharply. In the revised view based on DARE data, the major dialect area of Northeastern New England includes southern Maine, New Hampshire, Vermont east of the Green Mountains, and all but the westernmost part of Massachusetts. The Narragansett Bay area surrounding Providence is distinct from Massachusetts, expanding only a little



(a) Regions based on LANE data (Kurath 1949, Fig. 3): 1 Northeastern New England; 2 Southeastern New England; 3 Southwestern New England; 5 The Hudson Valley; 6 Metropolitan New York



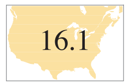
(b) Regions based on 45 DARE isoglosses (Carver 1987, Figs. 2.4, 5)

Figure 16.1. The regions of New England

1 The Eastern New England split of /æ/ and /æh/ is more fragmentary and less consistent than the New York City split. In the general treatment of U.S. dialects in Chapter 11, "split short-*a*" does not include New England.

ways beyond Rhode Island to east and west. Southwestern New England is more limited in its northward extension, including only a small part of southwestern Massachusetts. The evidence to be presented below agrees with Figure 16.2, the Carver version.

16.2. Vocalization of /r/

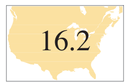


Chapter 7 found *r*-vocalization in the Eastern United States in three distinct areas: the South, New York City, and ENE. All three areas participated in the trend toward replacement of vocalized *r* with consonantal *r* that began after the end of World War II. As Chapter 7 showed, the shift towards *r*-fulness took a different form in the South than in the North. While the South shows an overall shift to consistent *r*-pronunciation, the change in the North has been essentially a change in the normative attitude towards /r/, so that the change takes place primarily in careful (superposed) varieties of speech. Map 16.1 presents this situation in ENE, where a full range of *r*-vocalization is found, from 0 to 100 percent. Even in the Telsur interviews, which are relatively formal, the majority of speakers maintain a level of *r*-vocalization above 75 percent. It is only in New Hampshire where vocalized /r/ falls to very low levels. If it were not for the very close association of New Hampshire with the rest of Eastern New England on other variables, the light red isogloss might have to exclude the two New Hampshire cities.

The light red isogloss outlines the area of *r*-vocalization, as in Map 11.7. The light blue isogloss is the area with moderate approximation of /e/ and /o/ on the front–back dimension: that is, the ED measure is between 375 and 450 Hz (Map 11.12).

The division between ENE and WNE on the basis of *r*-vocalization appears to be quite firm. The definition of ENE based on *r*-vocalization does not appear at first to be related to the definitions of the North, Canada, and the South in Chapter 11, which reflected active chain shifts in progress. However, the maps to follow will show that many of the characteristic features that sub-divide ENE lie within the subsystem of vowels before /r/, and the dynamics of this subsystem depend on whether or not /Vhr/ is merged with /Vh/. The major ENE cities, Boston and Providence, are the most consistent in *r*-vocalization. The consequences for the vowel system will be developed in the maps to follow

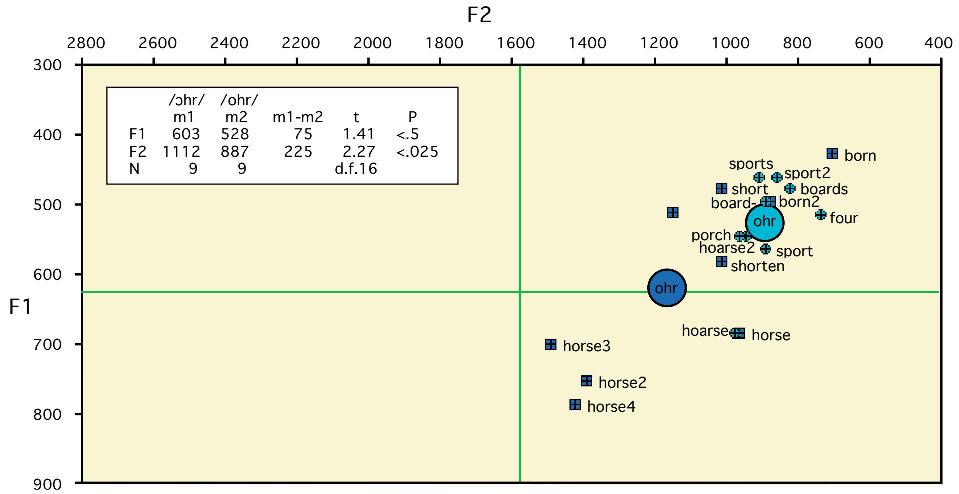
16.3. The contrasts of /ohr/ and /ɔhr/ in New England



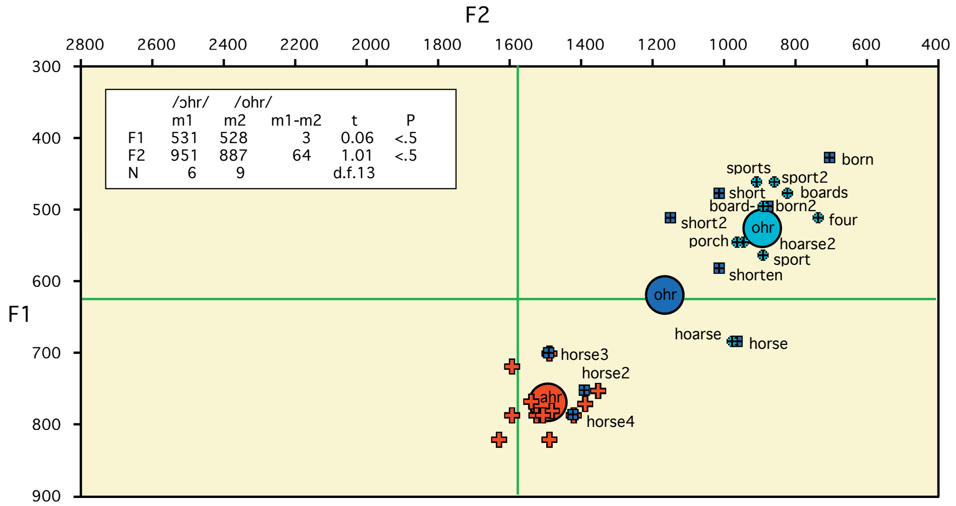
Chapter 2 showed that the initial position of North American English vowels maintained a distinction between the lower and upper mid–back rounded vowels /ohr/ and /ɔhr/ in *hoarse* ~ *horse*, *mourning* ~ *morning*, *port* ~ *storm*, etc. In Chapter 8, Map 8.2 displayed this nearly completed merger across the continent, with scattered remnants of this distinction in the South and a fairly strong concentration in New England. Map 16.2 gives a more detailed view of the situation in Eastern New England, using the same key as in Map 8.2. The blue symbols indicate speakers for whom the merger is complete. Although all of this area showed the distinction in the PEAS data of the 1940s, here the blue circles predominate in much of the region. Clearly different production of the two vowel classes is registered by the red stars; if the production seemed 'close' to the analyst, a red circle appears. Yellow circles are speakers who are intermediate in one respect or another.

The overall display shows that the distinction is maintained only in Eastern New England. In Western New England, there is only one speaker – an octogenarian in Middlebury, Vermont – who makes a distinction: all the others have a total merger. There is also a clear indication of the weakening and disappearance of this distinction in ENE. Map 16.2 follows the convention of ordering the speakers by age, with the oldest at upper left and the youngest at lower right. In Bangor, Portland, Manchester, and Worcester, there is some evidence of age-grading, with younger speakers losing the distinction. Boston and Providence are mixed, and do not show this pattern.

Figure 8.1 displayed an acoustic analysis of the /ohr/ ~ /ɔhr/ distinction for Alex S. of Providence, located at lower right in the group of six Providence subjects in Map 16.2. While the two vowel distributions overlap for him, they are significantly different (for F1, by 66 Hz, $p < .005$). Given the fluctuating character of the opposition and its gradual decay, overall statistics may be deceiving. Figure 16.2. shows the back vowels before /r/ for Joseph T., 42, of Boston. Figure 16.2a shows that /ohr/ and /ɔhr/ are clearly distinguished on the front–back dimension, significant for F2 with a *t*-test of 2.27 at the .025 level. However, several odd aspects of this distribution can be observed. There is considerable overlap in the main group of upper right, with the /ɔhr/ token *born* the highest. This may be due to a reclassification of *born* as a consequence of its labial onset. The situation is

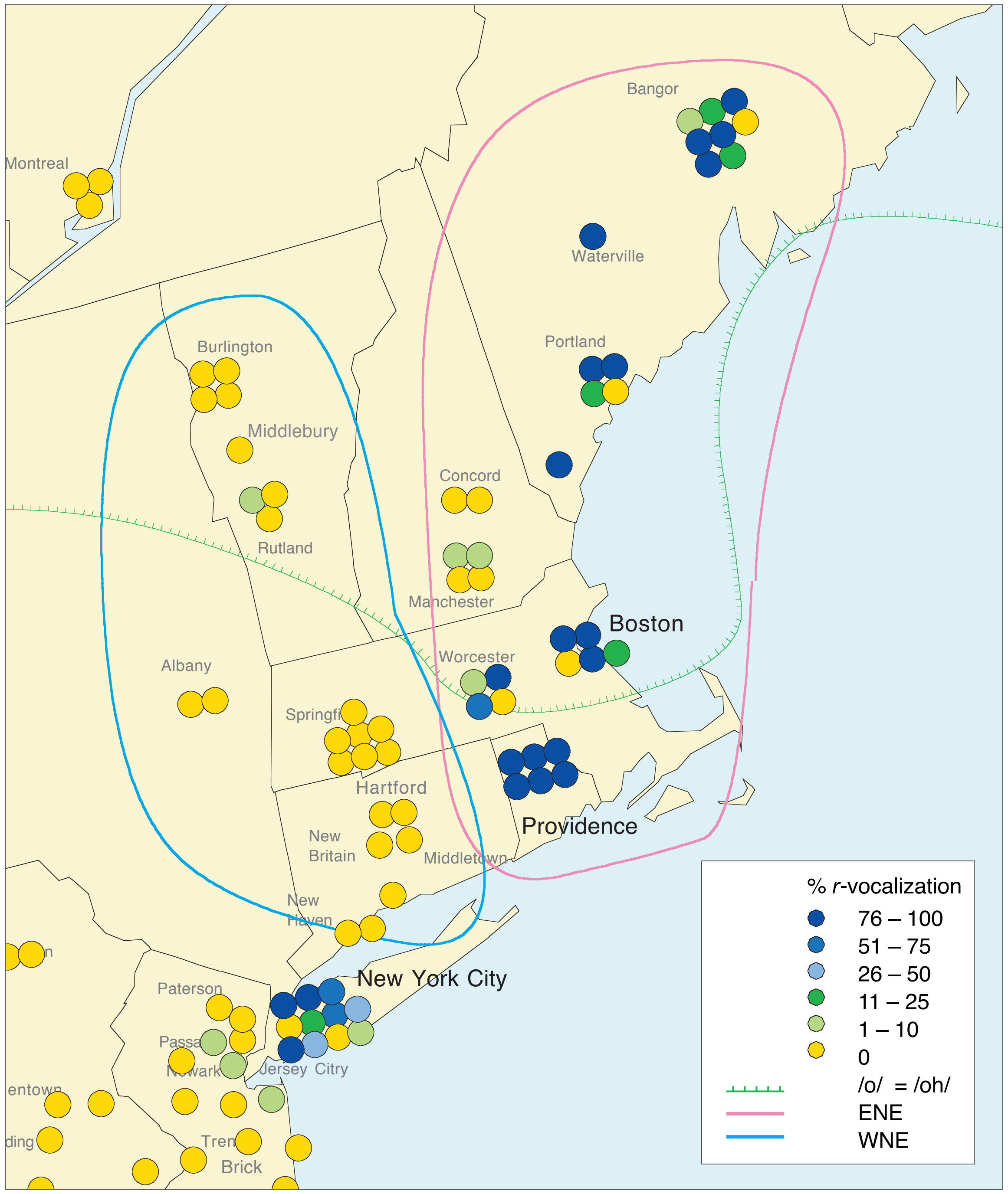


(a) Distinction of /ohr/ and /ɔhr/: F2 differences significant at the .025 level.

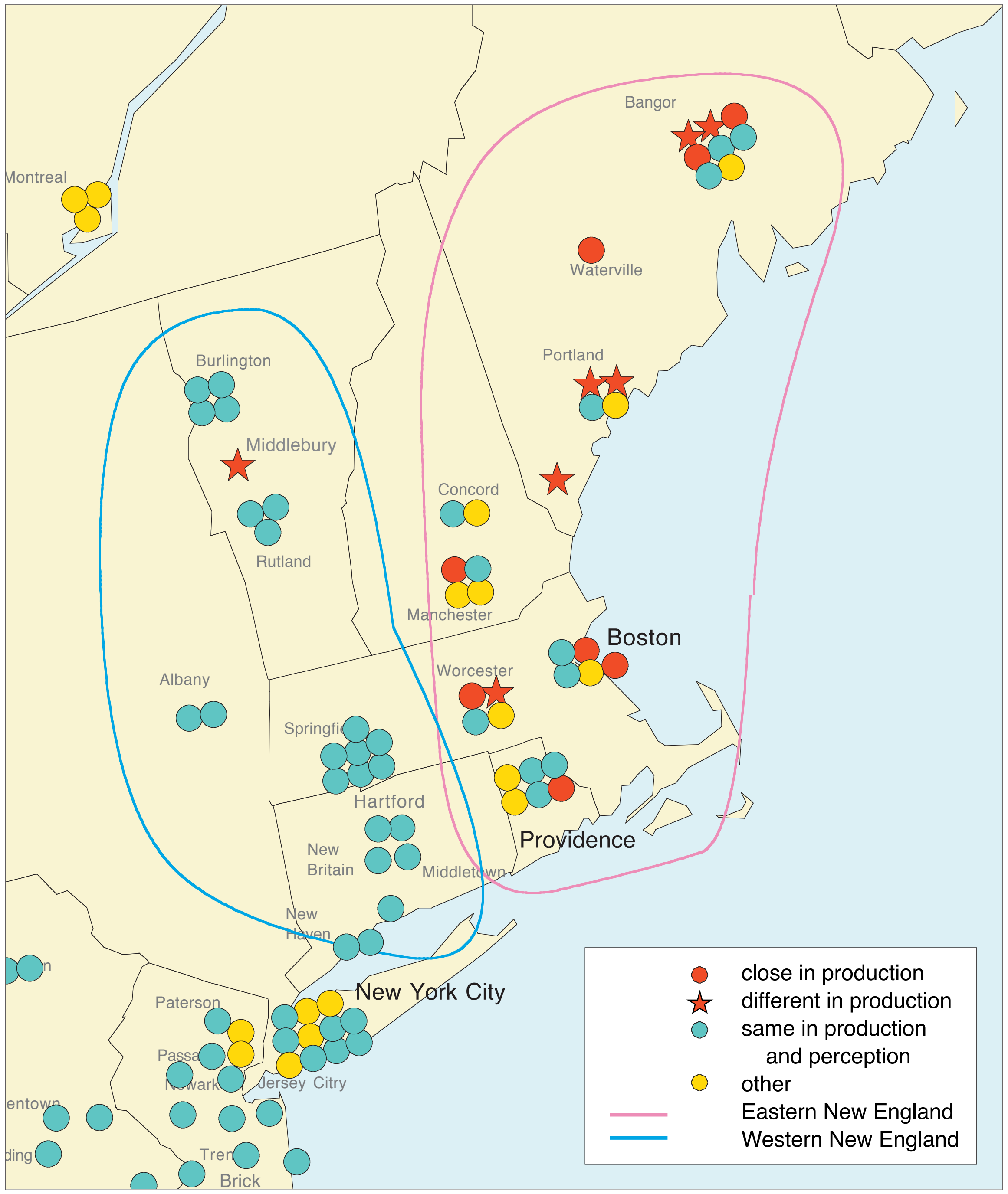


(b) Re-calculation of means with removal of three tokens of *horse* from minimal pairs, merged with /ahr/

Figure 16.2. The /ohr/ ~ /ɔhr/ distinction of Joseph T., 42, Boston, MA, TS 454



Map 16.1. *r*-vocalization in Eastern New England



Map 16.2. The distinction between /ohr/ and /ɔhr/ in Eastern New England

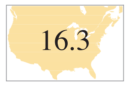
A defining feature of ENE is the vocalization of /r/ in *fear*, *fair*, *car*, *card*, *board*, etc. as shown by the pink isogloss. Although it is being replaced by consonantal /r/ in formal speech, ENE shows a high level of vocalization for most speakers. The weakening of this feature is most notable in New Hampshire and central Massachusetts; it is most consistent in Providence.

The contrast between *four* and *for*, *mourning* and *morning* was once quite general in the North and ENE, but it survives now principally in ENE. The red stars designate the six speakers who show this relic distinction most clearly. The light blue symbols show what is now the prevailing situation for most speakers – these two word classes are exactly the same.

even more difficult to resolve when we examine the tokens at lower left and right. While *hoarse* and *horse* are in identical position at lower right, at lower left there are three tokens of *horse* that are far removed from the *hoarse*2 token in the main distribution.

Adding /ahr/ to the display in Figure 16.2b clarifies the situation. The three tokens of *horse* at lower left have actually been merged with /ahr/: these are all taken from minimal pair tests, while the identical *hoarse*/*horse* tokens at lower left are elicited outside of the minimal pair framework. When the means are recalculated without the *horse*2–4 tokens, the means of /ohr/ and /ɔhr/ are almost identical. This situation reverses that of Bill P. in Duncannon, PA, of LYS Figure 9.2, who all but merged /o/ and /oh/ in minimal pairs but maintained the distinction clearly in spontaneous speech. Here the merger is characteristic of spontaneous speech. When maximal attention to speech is stimulated by the minimal pair test, Joseph T. recollects that *horse* is different from *hoarse*. But he no longer has access to the original phonetic differentiation of /ohr/ and /ɔhr/, and assigns /ɔhr/ to the next available vowel class, /ahr/.

16.4. The low back merger in Eastern New England



In the study of the low back merger in Chapter 9, a high concentration of merged tokens was found in Eastern New England, in agreement with previous studies. Map 16.3 shows the merger before nasals in *Don* and *dawn* in New England. The green symbols indicate complete merger of *Don* and *dawn* in production and perception. Their distribution follows the general low back merger isogloss, the oriented green line. Though there is a small amount of variation within the /o/ = /oh/ isogloss (eight of 35 speakers did not have a complete merger), there is only one green symbol outside of it: a 65 year old woman from Springfield, MA.

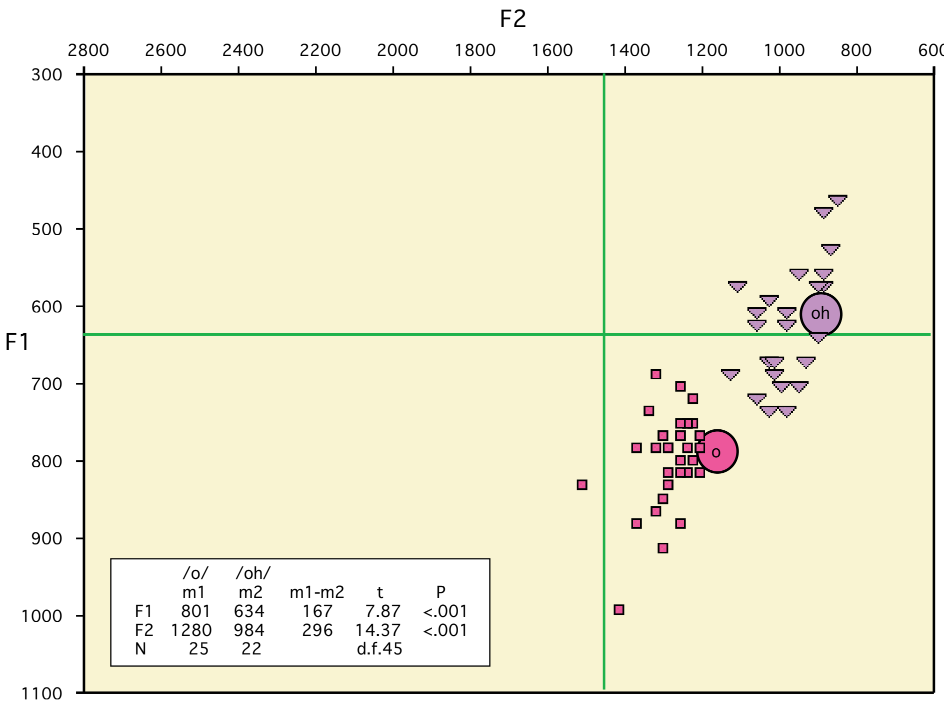


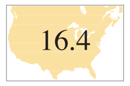
Figure 16.3. Low back distinction of /o/ and /oh/ for Alex S., 42, Providence, RI, TS 474. Bars and whiskers show one standard deviation from the mean

In ENE, the merger is confined to the area from Boston and Worcester northward, here labeled Northeastern New England [NENE]. On the evidence of this map and others to follow, Providence is assigned to a separate sub-dialect of Southeastern New England [SENE]. The typical Providence low back vowel opposition is shown in Figure 16.3. There is no overlap of the two distributions, and the means are widely separated. Similar distributions appear for the two other Providence speakers who were analyzed acoustically.

The low back merger subdivides Eastern New England in a way that agrees with the DARE map of Figure 16.1b rather than the Figure 16.1a representing LANE, Kurath (1949) and PEAS. The division of ENE shown in Figure 16.1a is based on lexical data from LANE, but it was reinforced by the report of Rachel Harris, the fieldworker in Providence, that the city of Providence shared the low back merger with Boston. This result was presented in Harris' dissertation (1937) and further reinforced by the phonological data published in PEAS in 1961. Map 15 of PEAS (*oxen*) and Maps 22–24 (*law*, *salt*, *dog*) do not differentiate Boston from Providence as an area of merger. Syllabus 21 for the cultivated speaker from Providence shows the same range of rounded low back phones for *crop*, *John*, *college* as for *frost*, *log dog*. This report of a low back merger in Providence became a sharply debated issue following the published discussion of Moulton (1968), who as a native speaker of the dialect, found no basis for a low back merger in his own experience. McDavid (1983) discusses the issue in some detail, concluding that the problem lay in the fact that Harris was a speaker of a one-phoneme dialect and could not hear the phonetic distinctions that were present in the Providence dialect. Data in several previous chapters have distinguished Providence from the NENE area centered on Boston. Map 11.14 established a clear separation between Providence and Eastern New England by means of the UD line, by Providence joined to the North by /ʌ/ backer than /o/.[2] This phonemic and phonetic arrangement of the low back vowels makes Providence more similar to New York City than to the rest of New England, though the city's nasal short-*a* system prevents us from making this classification at a broader level.

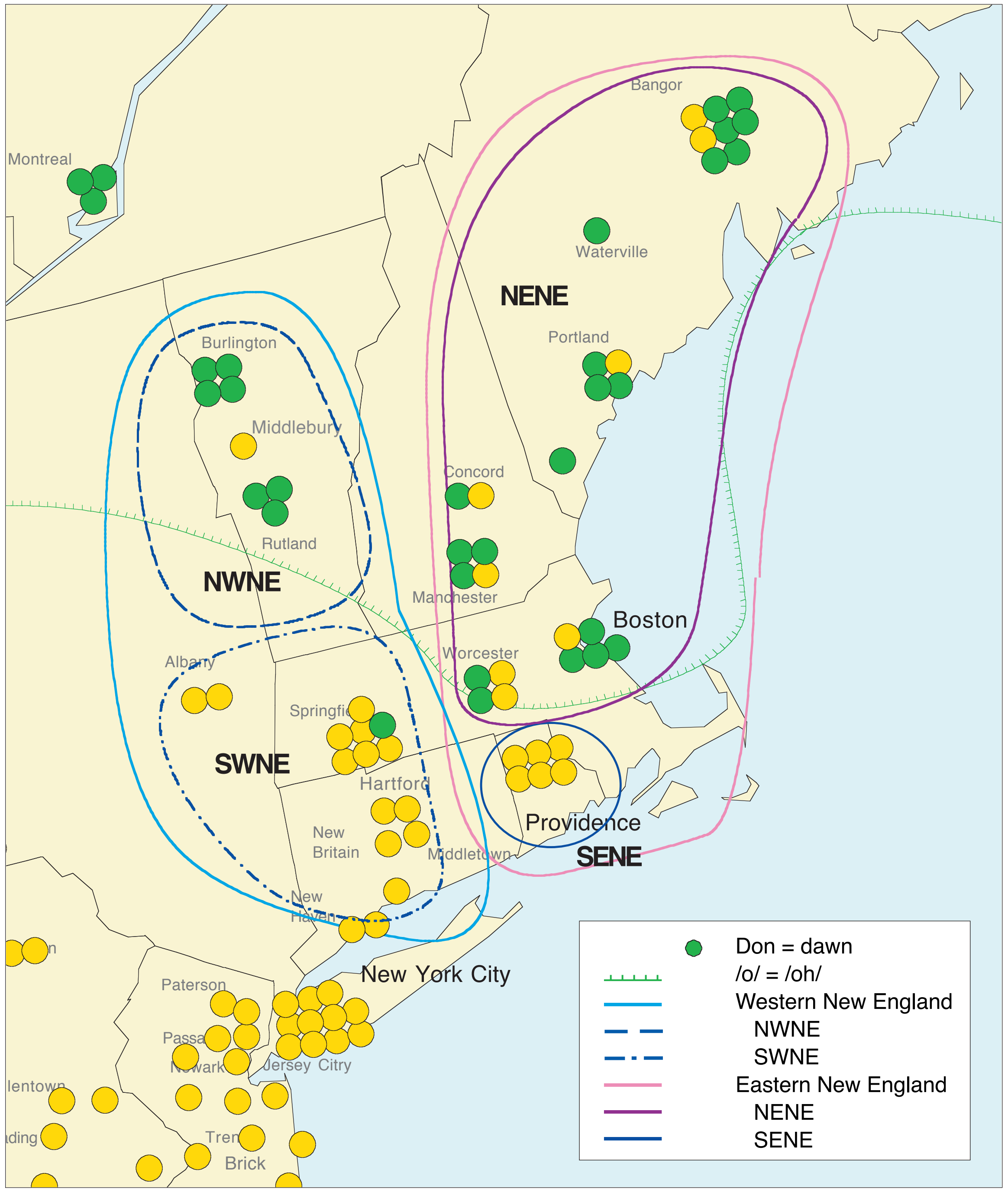
Within WNE, Boberg (2001) argued that the geographic distribution of the low back merger forces us to recognize two distinct dialect regions: a northwestern region of merger, similar in most respects to the Canadian region above it; and a southwestern region which maintains the distinction, similar in most respects to the Inland North. Boberg's division between NWNE, comprising most of Vermont, and SWNE, comprising the western sections of Massachusetts and Connecticut, is clearly substantiated by the data in Map 16.3.

16.5. The fronting of /ahr/ and /ah/

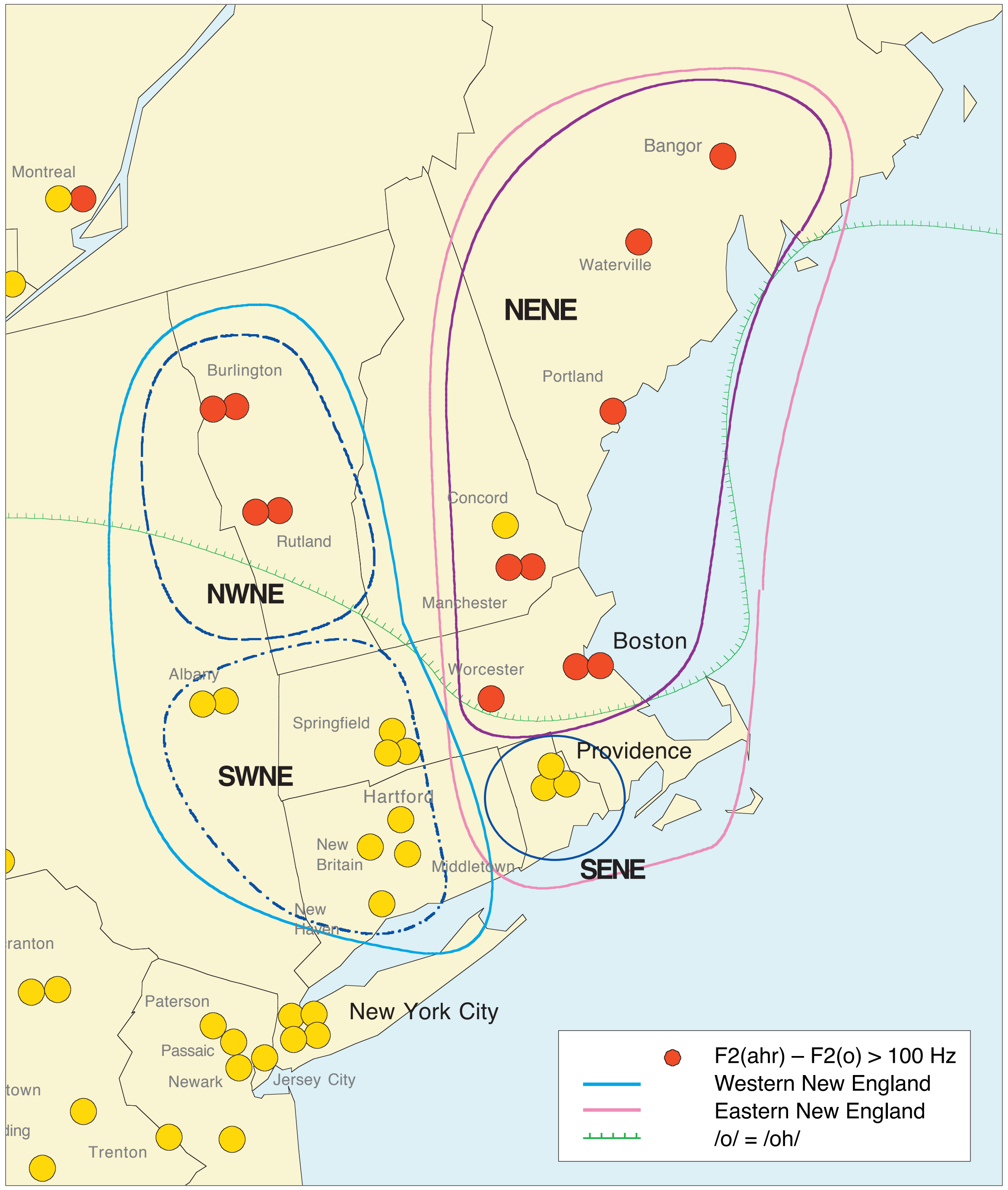


The separation of Providence and SWNE from Boston and NENE is repeated in Map 16.4, which displays the relative fronting of the /ahr/ class. For most dialects of North America, the nucleus of the /ahr/ class is identified with the /o/ class. In most U.S. dialects, /o/ is merged or very close to the /ah/ class and the nucleus is associated with /ahr/. The two sections of Northern New England are exceptional in this respect. Map 16.5 plots the difference between the second formant of /ahr/ and the second formant of /o/; red circles are speakers for whom this difference is greater than 100 Hz. All but one of the NENE and NWNE speakers who were analyzed acoustically show this feature. This division matches the geographic distribution of the low back merger, a north–south divide in which Vermont is united with NENE, and Providence with SWNE. No Providence subject shows

2 This is partly a consequence of the fact that Providence does not have the low back merger that shifts /o/ to lower mid-back.position.



Map 16.3. The low back merger in New England



Map 16.4. Fronting of /ahr/ in Eastern New England

The merger of /o/ and /oh/ is shown here by the minimal pair *Don* ~ *dawn*, which was found to be almost totally merged in Canada. In ENE., it is almost as consistent but establishes a different set of boundaries than those shown in the last map. Providence is excluded, and the northern part of Western New England is included. The NENE region shows a consistent unity for the features of Maps 16.1–16.3.

For many North Americans, the vowel of /ahr/ in *car*, *card*, etc. has shifted up and to the back, but in ENE it is located in a much more central position. This feature unites Northeastern and Northwestern New England, along with the Atlantic Provinces as seen in Map 15.6.

this relative fronting of /ahr/, nor do any of the speakers from western Massachusetts or Connecticut.[3]

The fronting of /ah/

The features that separated the Boston area from the Providence area in Maps 16.3, 16.4, 11.14, and 14.8 are not specific to NENE, but are shared by NWNE. The aspect of the vowel system that distinguishes NENE most clearly from other sections of New England is the fronting of the /ah/ class in *father*, *spa*, *pa*, *pajama*, *aunt*, *half*, etc., separating it from /o/.[4] The identification of the /ah/ class with the fronted /ahr/ class is the inheritance of the long-established *r*-vocalization of ENE, and though the *r*-less pattern is weakening, the identification of the two nuclei remains.

16.5

In Map 16.5, dark red circles show speakers with the fronting of /ah/ relative to /o/ as well as the fronting of /ahr/ relative to /o/ that was displayed in Map 16.4. The bright red circles in NWNE indicate speakers who front only /ahr/, not /ah/. There are no exceptions in NENE: all six speakers for whom we have sufficient data show the dark red symbols.[5]

Figure 16.4 displays this pattern in the low vowels of a 75-year-old woman from Manchester, New Hampshire. In her system, short-*a* vowels follow the nasal configuration shown to be characteristic of New England in Chapter 13. *Ham* and *man* are higher and fronter than other short-*a* words, followed by syllables ending in palatals and other voiceless stops. The word *can't* is assigned to the broad-*a* class in low center position; *half* might also be considered for this class, since it is quite far removed from the other words with voiceless fricative codas (*athlete*, *fast*). These /ah/ words are associated with the /ahr/ class, represented by *scarf*, *barbecue*, *hard*, etc. Both /ah/ and /ahr/ are near the normalized grand mean of 1550 Hz. The short /o/ tokens are in low back position, around 1200 Hz, and are fully merged with /oh/ (not shown here).

The distribution of the /ah/ ~ /o/ distinction in Eastern New England

Map 16.5 indicates a uniform distinction of /ah/ and /o/ in NENE that can be considered a defining property of the dialect area. But the six acoustic records in this

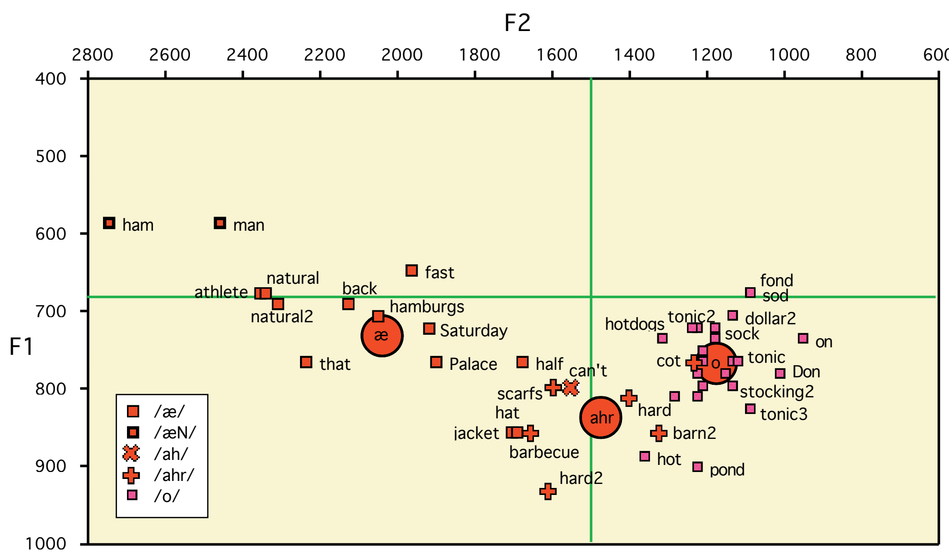


Figure 16.4. Low vowels of Adrienne M., 75, Manchester, NH, TS 447

area do not provide a dense enough coverage to make this uniformity clear. Nagy (2001) provides information on 474 subjects interviewed by University of New Hampshire students. The question posed was, "Does *father* rhyme with *bother*, like *feather* and *weather*"?[6] Massachusetts subjects showed a solid distinction, except for those most distant from Boston. In New Hampshire, the merger was reported by 20 to 60 percent, but here it was the regions closest to Boston that showed the highest percent of merger. This tendency of New Hampshire people to distance themselves from Boston is most noticeable among younger speakers (Nagy 2001, Table 1).

The east–west New England line

The evidence presented so far agrees with Figure 16.1 in the general placement of the line separating ENE from WNE, in that it passes somewhere near the Vermont–New Hampshire border, and through the middle of Massachusetts and Connecticut. In this respect, the results from LANE (16.1a) and DARE (16.1b) do not differ. However, a more detailed comparison of Maps 16.l–16.5 with Figures 16.1a, b is not possible, since LANE and DARE included data from a number of small towns and rural communities near the border that were not included in the survey of urbanized areas conducted for TELSUR. In Kurath (1949) and Carver (1987), a great deal of attention is necessarily given to the location of the boundary separating ENE from WNE. The line passes east of the Connecticut Valley cities (Springfield and Hartford), and divides the eastern part of Vermont (the northern Connecticut valley) from western Vermont (Burlington and Rutland), following the Green Mountain divide. There are no ANAE data that can relate to this level of detail, since that line is defined by rural communities that are absent from Map 16.1: a more precise contemporary delineation of the borders between the subregions of New England awaits more detailed local studies.

16.6. The conservative position of Providence

16.6

Chapter 12 identified some areas of the North that did not participate in the general fronting of back vowels, and in this respect, the city of Providence was extreme. The vowel system of Alex S. of Providence was displayed in Figure 12.8, showing the back position of /aw/, /ow/, and /uw/. Map 16.6 shows the location of the most conservative dialects in regard to the fronting of these three vowels. The blue circles are speakers for whom the mean F2 value for the nucleus of /uw/ is less than 1350 Hz (200 Hz further back than the normalized mean of 1550 Hz), the F2 mean of /ow/ less than 1200 Hz, and the F2 of /aw/ less than 1450 Hz. All three Providence speakers are so marked. Outside of Providence, there is only one such speaker in New England (in Waterville, Maine), and one in New York City. The conservative treatment of the back upgliding vowels is therefore a hallmark of the SENE dialect.[7]

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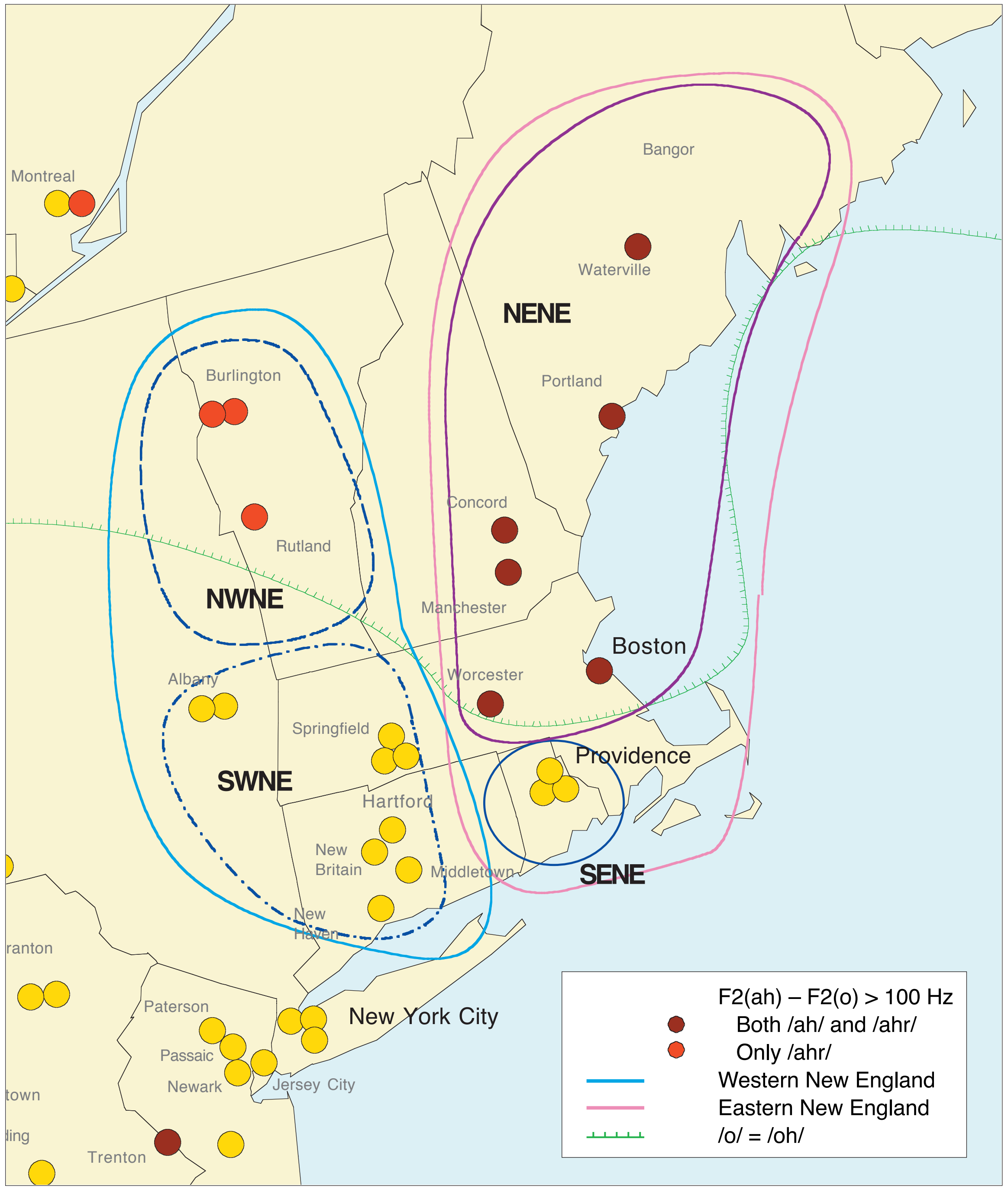
3 The other side of the coin is the fact that /ah/ is fronted towards the center of the vowel system in absolute terms; but it is the distinction between /ah/ and /oh/ that forms the structural definition of this region.

4 See Chapter 2 for the history and specific composition of this class, which incorporates the original *father* set with a large body of foreign loan words, and in Northeastern New England, a certain number of the British broad-*a* words, irregularly distributed across individual speakers..

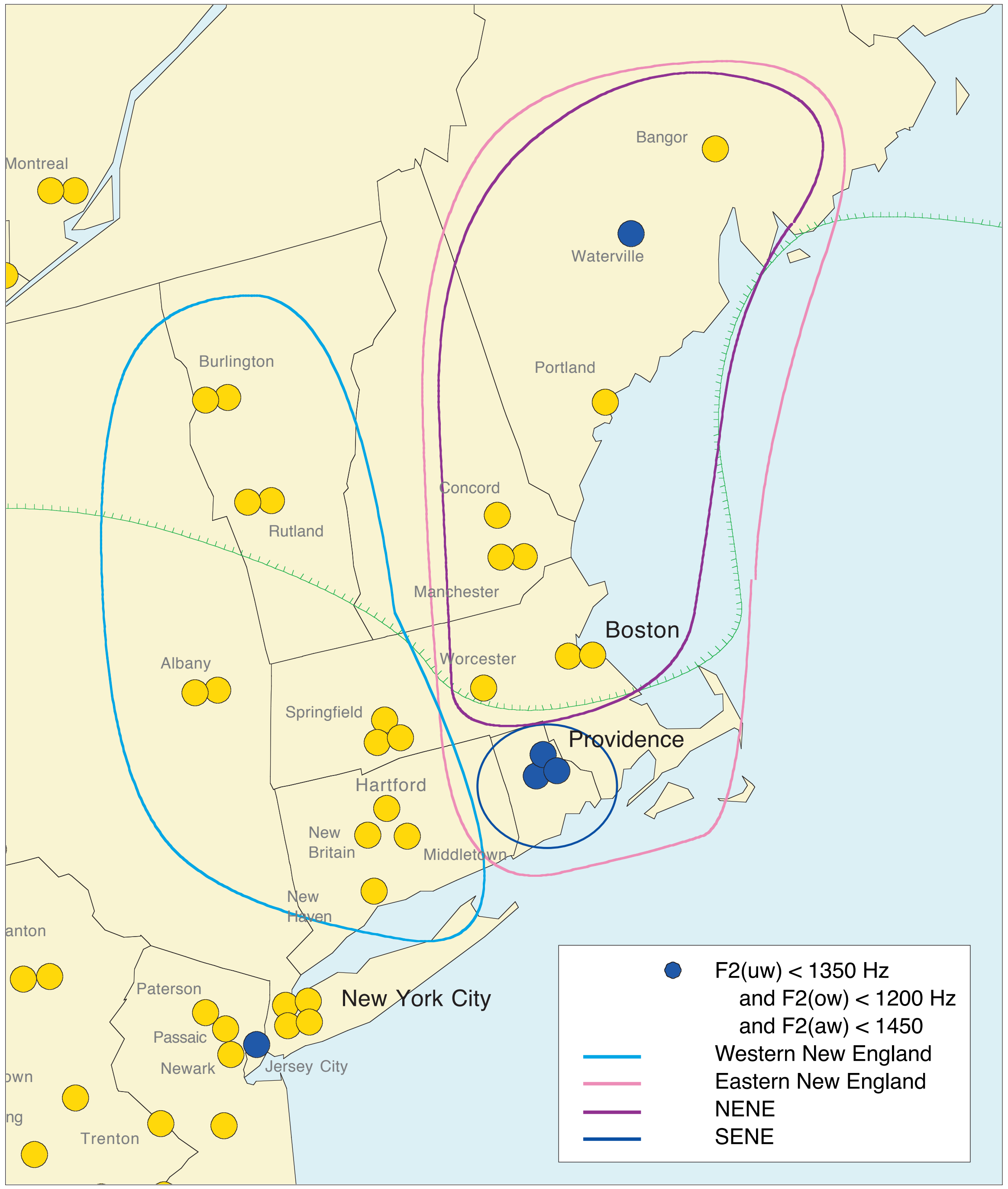
5 Since the /ah/ class was not the focus of direct elicitation, there are some speakers who did not have sufficient information on that class to be displayed here.

6 Results are currently posted at http://www.unh.edu/linguistics/NN/papers/survey.S99.html

7 There are only five other such speakers in North America: one in Rochester, NY, and four in Wisconsin.



Map 16.5. Fronting of /ah/ in Northeastern New England



Map 16.6. The conservative treatment of back upgliding vowels in Providence

Northeastern New England is particularly marked by the central position of the vowel in *father*, *pa* along with "broad-*a*" words like *can't*, *aunt*, and *half*. While this class merges with /o/ in other dialects, it is distinct here. Only in NENE does it merge with the larger /ahr/ class in *car*, *card*, etc. when /r/ is vocalized. Compare this map with Map 16.4.

In Chapter 12, it appeared that Providence was the most conservative city in respect to the fronting of /uw/ and /ow/. This map shows how Providence contrasts with the rest of ENE in this respect, and is also differentiated from SWNE at the center of a separate SENE region.

16.7. Short-*a* systems

Chapter 13 presented a range of different organizations of the short-*a* word-class characteristic of American dialects. The New England patterns are displayed in Map 16.7. As Chapter 13 indicated, the nasal system predominates in both ENE and WNE. The red circles designate those speakers for whom words with nasal codas are higher and fronter than the rest, with a clear separation that can extend from the top to the bottom of the phonological space available. Figure 13.5 shows the vowel system of Dana L. of Boston, the rightmost of the two Boston speakers in Map 16.7. The nasal short-*a* pattern is dominant in both ENE and WNE, though WNE has more speakers with the continuous variant.

Not all New England short-*a* systems show the clear separation of Figure 13.5. Figure 16.5 shows a variant of this system, with a small set of words in syllables closed by nasal consonants in high–front position, and a second set only slightly higher than the main formation of lax /æ/ words. These include /æ/ before nasals in open syllables or polysyllables. It is characteristic of New England that vowels before voiceless fricatives are low, considerably lower than vowels before voiceless stops like *that*.[8] Another variant of the nasal system is found in Maine, where the nasal group is separated exclusively by F2: that is, vowels before nasals are considerably fronter than others (orange symbols in Map 16.7). To the south is found the split short-*a* system (Figure 13.3) characteristic of NYC. To the west are the general raising patterns of the Inland North, shown on Map 16.7 as blue circles.

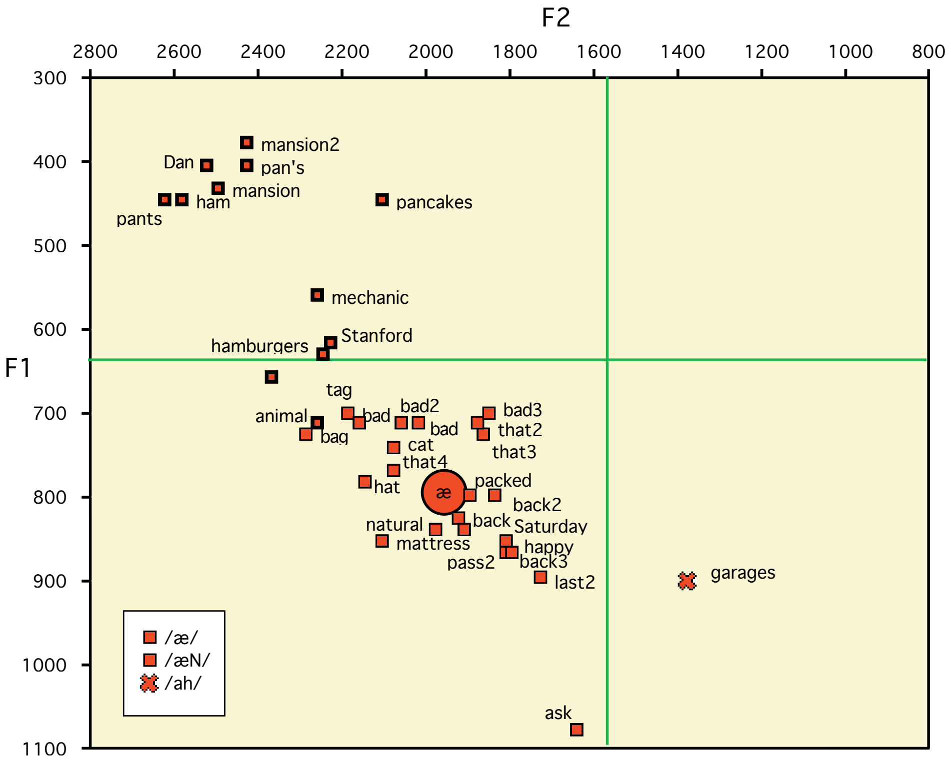
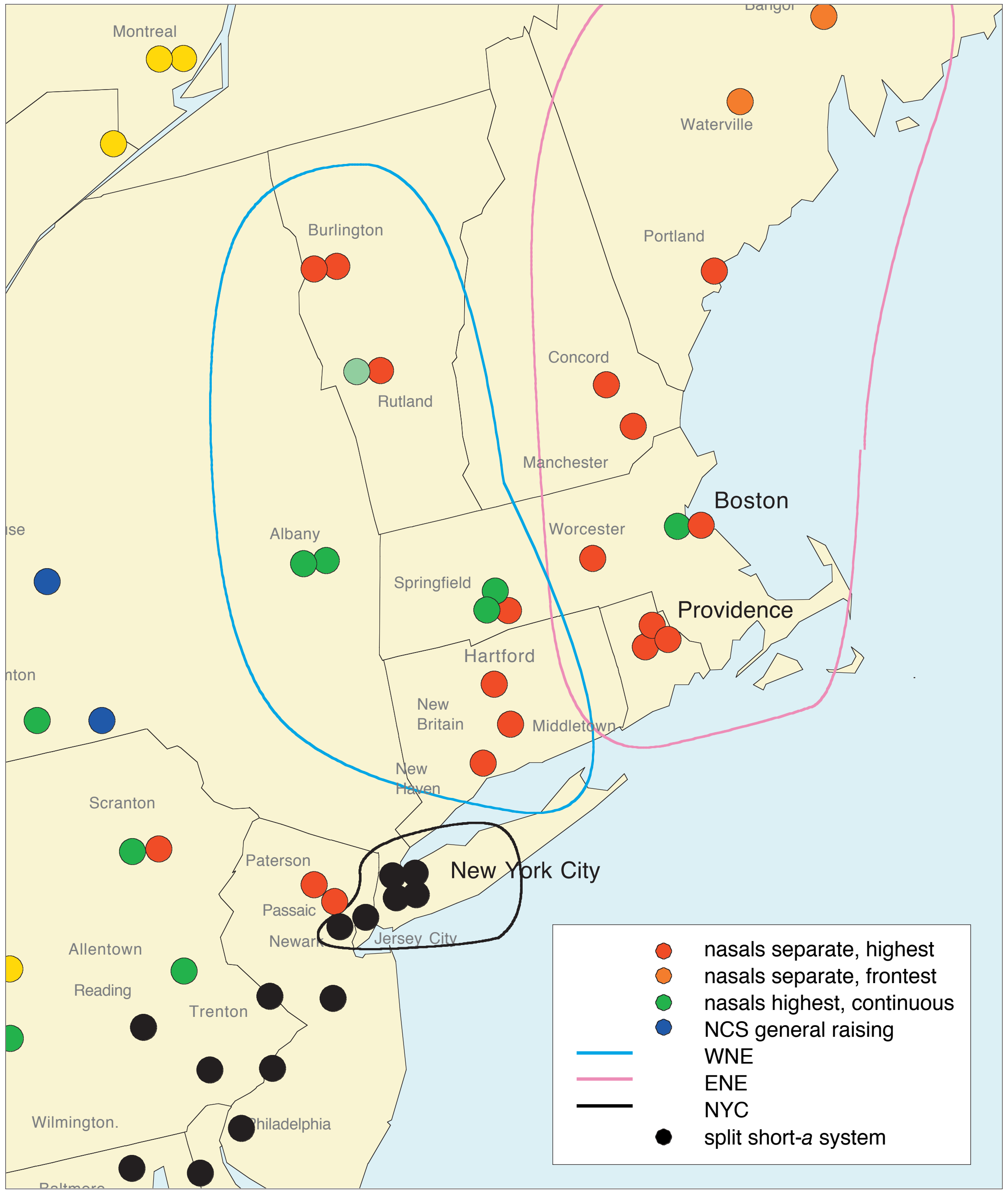


Figure 16.5. Short-*a* system of Natalie M., 45 [1998], Portland, ME, TS 724



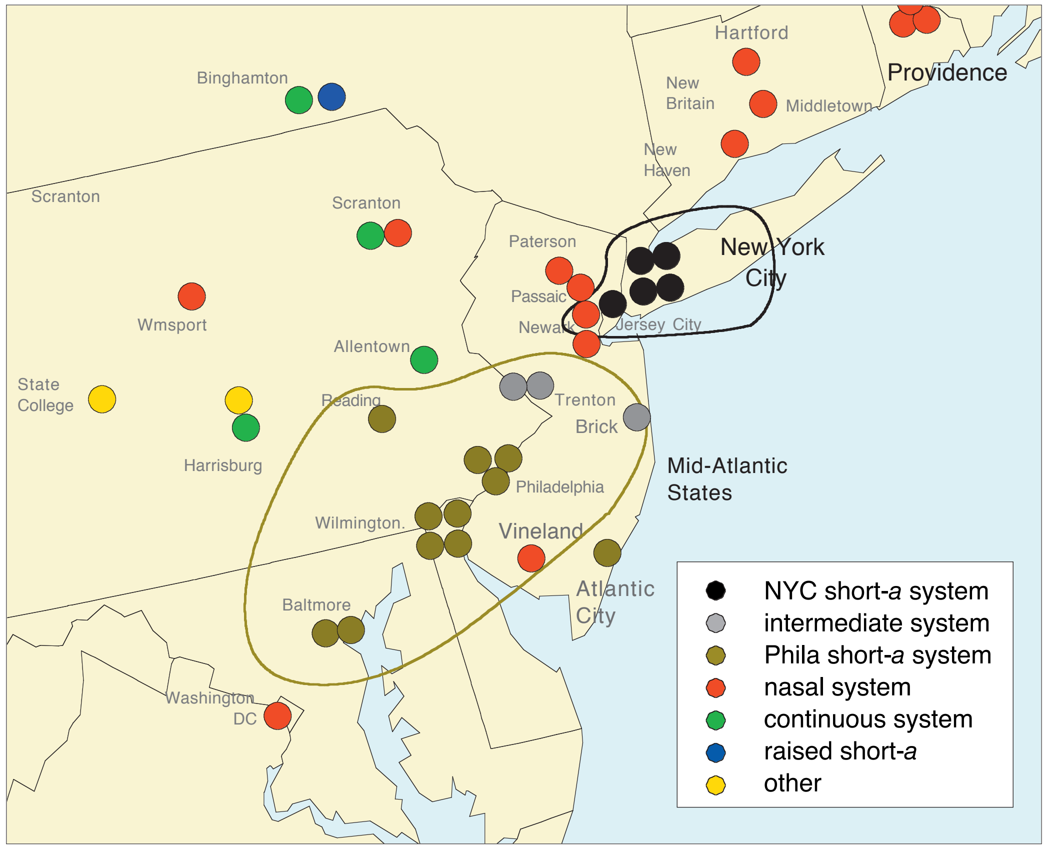
Map 16.7. The New England short-*a* system

The short-*a* nasal system is predominant in New England, where /æ/ is tensed and raised in any word ending with a nasal consonant, in *man*, *manage*, *animal*, *Spanish*, etc., but never elsewhere. Although this is the default system in many areas, it takes its most extreme form in ENE, as shown in Chapter 13 as well.

8 The word *ask* in Figure 16.5 may in fact be assigned to the /ah/ ("broad *a*") class, along with *garage*.

The dialect regions described in this chapter are united by two prominent features: a split short-*a* system and raised /oh/. Nevertheless, they are assigned to different dialect regions in Chapter 11. New York City is basically a part of the North, as shown by its conservative treatment of the back upgliding vowels /uw/ and /ow/ (Chapter 12) and the front upgliding vowels /iy/ and /ey/. In contrast, the fronting of the back upgliding vowels makes the Mid-Atlantaic region a part of the Southeastern super-region, uniting the Midland and the South (Map 11.1, Chapter 12). The NYC vocalization of /r/ affects the vowel system as a whole, and further separates it from the Mid-Atlantic states. There is also a clear difference between the NYC version and the Mid-Atlantic version of the split short-*a*. This chapter will examine each region in detail, noting their similarities as well as their differences.

The distribution of short-*a* systems in the region concerned is shown in Map 17.1. Speakers who display the New York City system, as described in Chapter 13, appear as black circles; those with the Mid-Atlantic system, exemplified by Philadelphia in Chapter 13, appear as light brown circles. An intermediate form appears in the city of Trenton and Brick township, represented by gray circles. Amongst and around these split systems there are a number of smaller cities which do not share the lexical split of the short-*a* class. Speakers with nasal systems are indicated in red. The continuous short-*a* pattern, in which vowels before /n/ are more raised than others but do not form a separate distribution, is shown as green circles. One representative of the general raising of short-*a* characteristic of the Northern Cities Shift is shown as a blue circle.



Map 17.1. New York City and the Mid-Atlantic short-*a* systems

This area shows the geography of the split short-*a* system characteristic of two distinct regions: New York City and the Mid-Atlantic region. It is not a continuous area, but is divided by a region in central New Jersey where intermediate or nasal systems prevail. The rest of the chapter will show that NYC differs from the Mid-Atlantic region in many respects.

17.1. New York City

The dialect that is the first topic of this chapter is small from a geographic point of view, but sizeable in population. The dialect of New York City is confined to the city limits and a few neighboring cities in New Jersey, an area of 530 square miles, with a population of 8,500,000. It receives considerable attention nationally compared to most other dialects, through a widely recognized stereotype and because many actors and public figures are native speakers of the dialect. It was the focus of the first quantitative sociolinguistic study of a metropolitan area (Labov 1966), and can be traced in a series of real-time records dating from 1896 to the present (Babbitt 1896; Hubbell 1940; Frank 1948; Kurath and McDavid 1961; Hubbell 1962; Fowler 1986).

One of the most startling facts about New York City is the narrow extent of its influence in the surrounding area. As the largest city of the United States, it would be expected that its dialect would have diffused to a radius at least equal in size to the region surrounding Boston, Philadelphia, or Richmond. But the Linguistic Atlas records of the mid-twentieth century show that only a small section of northeastern New Jersey is included in the New York City dialect area. A study of the relation of average daily traffic flow to dialect boundaries showed that all of the boundaries established in Kurath (1949) fall into natural troughs in communication networks, with the exception of those surrounding New York City. Vast numbers of people cross that boundary every day, but its location has remained fixed for more than two centuries (Labov 1974).[1] Although the Telsur sampling of urbanized areas cannot delimit the outer boundaries of the New York City dialect with any precision, Map 17.1 is consistent with previous reports. This geographic restriction appears to be associated with the negative prestige of the New York City vernacular, as documented in Labov 1966: Ch. 13.

Within this metropolitan linguistic area, there is no reliable evidence of geographic differentiation. The stereotype *Brooklynese* is used to refer to working-class New York City speech, whether the speaker is a resident of Brooklyn, Queens, the Lower East Side of Manhattan, or Jersey City. Many members of the public are convinced that they can recognize a Queens or Bronx or Jersey accent, but it appears that these geographic labels are in fact labels for perceived social class differences.

Chapter 11 defined the New York City dialect as the region of *r*-vocalization with a split short-*a* system. There is a structural connection between these two properties. When short-*a* is split into tense and lax classes, the tense class rises along the front periphery as an ingliding vowel /æh/, which merges with the mid (and high) ingliding vowels that have developed from the vocalized /ihr/ and /ehr/ word-classes. The words *bad* and *bared* become homonyms. With more extreme raising of /æh/, this homonymy can extend to include *beard*.

The short vowels of New York City

The short vowels of the NYC system form a symmetrical, stable set of six nuclei that match the initial position of Figure 2.2. Figure 17.1 displays the short vowels of a 65-year-old woman, Nancy B.[2] The F1 means of the front and back vowels are similar; the back vowels are slightly lower in each case. There is very little overlap; the margins of security between these vowels are at least two standard

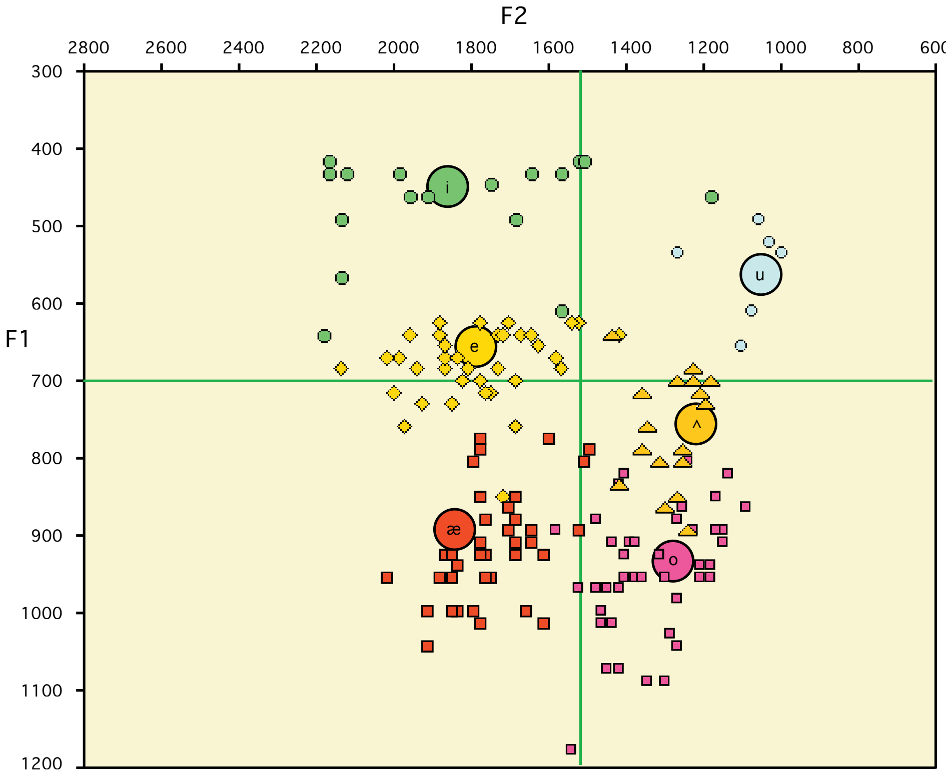


Figure 17.1. Short vowels of Nancy B., 65, New York, NY, TS 495

deviations. This is in contrast with other dialects in which the short vowels are involved in significant changes from initial position.[3]

The upgliding vowels of New York City

The conservative character of New York City upgliding vowels is illustrated in Figure 17.2, showing the Vy and Vw subsystems. The vowel tokens shown are all members of the upgliding classes; in addition, means of the mid and low short vowels are displayed. The high and mid vowels are firmly located in front and back positions, with the exception of some /uw/ tokens after coronals, which have moved to the high–front quadrant, with an F2 of around 2000. The /uw/ vowels after noncoronals show no fronting, and are close to the extreme back position of vowels before /l/ (highlighted symbols). Even more conservative behavior is seen with /ow/: here the main distribution of tokens is very close to those before /l/. With the exception of /i/, the means of the short vowels are very close to the means of a corresponding long vowel: /e/ and /ey/, /æ/ and /aw/, /u/ and /Kuw/, /ʌ/ and /ow/, /o/ and /ay/.

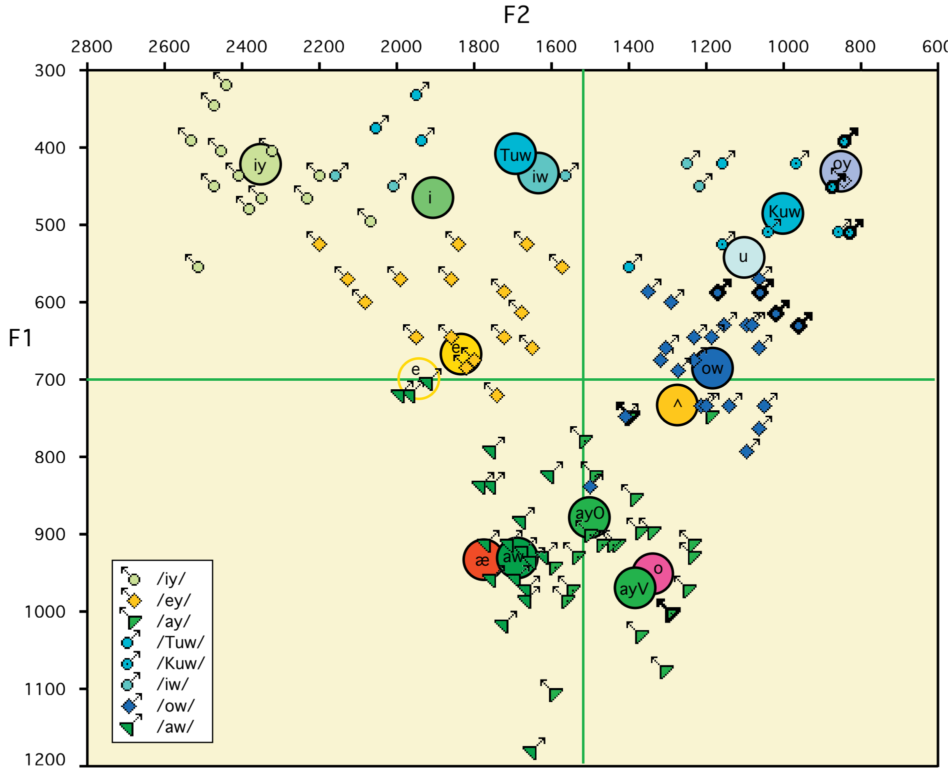


Figure 17.2. Vy and Vw vowel systems of Nancy B., 65, New York, NY, TS 495. Highlighted symbols: back vowels before /l/; Tuw = /uw/ after coronals; Kuw = /uw/ after non-coronals

1 In an unpublished paper given before the International Linguistic Association, Raven I. McDavid Jr. pointed out that the limits of the New York City dialect area coincided with the limits of the occupation of New York City by British troops in the war of 1812.

2 The low front position of mean /æ/ reflects the fact that all vowels that are raised and fronted are assigned to the long and ingliding phoneme, /æh/ (Figure 17.2).

3 The rotation of short vowels in the NCS (Chapter 14), the fronting of /ʌ/ in the Midland; (Chapters 14, 20); the retraction of short vowels in the Canadian Shift (Chapter 16); the fronting and raising of front short vowels in the Southern Shift (Chapter 18).

In only one respect does this New York City system deviate from the conservative Northern pattern: the nucleus of /aw/ is front of center, while the nucleus of /ay/ is back of center. This pattern was first seen in Maps 12.4 and 12.5, in which New York City is associated with the Mid-Atlantic States and the Midland in regard to the relative positions of /ay/ and /aw/. Labov 1966 showed that this was a change in progress at mid-century.

The long and ingliding vowels of New York City

The basic configuration of the NYC short-*a* split was displayed in Figure 13.2. Figure 13.3 shows the details of the split in the vowel system of Nancy B., the speaker studied in the two preceding figures. Figure 17.3 expands this picture by adding the other members of the long and ingliding system, /oh/ and /ah/. It displays the striking symmetry of /æh/ and /oh/. Both /æh/ and /oh/ rise along a peripheral track, and range from upper-mid to high position.

A second characteristic of the New York City system is the wide gap between the tense vowels and their lax partners in spontaneous speech, modified by a strong tendency to correct tense vowels to lax ones. General attitudes towards the New York City dialect have been strongly negative for a long period of time (Labov 1966: Ch 13), and as a result, speakers' behavior changes rapidly when attention is focused on speech. In the Telsur interview data, Nancy B. showed an unusually small number of corrections of her vernacular forms. In Figure 17.3, only three words show this effect: *bad*, *Babs*, and *bag*.[4] She shows no corrections of /oh/; minimal pairs and spontaneous speech are distributed about the same mean.

Nancy B. has a single low-back vowel, merging /o/ and /ah/ as in most North American dialects. The /ah/ class is represented by *pasta*, *croissant* and two tokens of *father*. The figures to follow will show that this merger is not uniform in New York City: for many speakers, /ah/ is a separate mid-back vowel, distinct from both /o/ and /oh/, and is joined by an irregularly distributed subset of /o/ words.

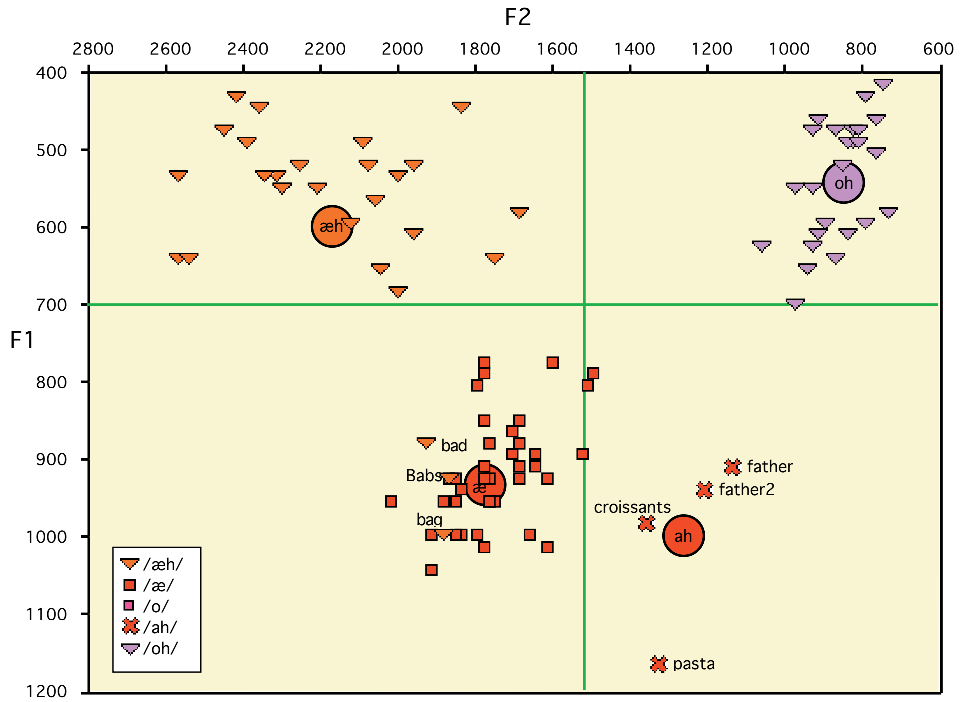


Figure 17.3. Long and ingliding vowels of Nancy B., 65, New York, NY, TS 495

Figure 17.4 displays the more extreme type of correction that is typical of New York City speakers, as reported in Labov (1966). It displays the long and ingliding vowels of a 70-year-old woman from Jersey City, who read a word list with full representation of the tense and lax short-*a* classes. Figure 17.4 shows that in New York City, word lists can give results that are heavily skewed from the norms of spontaneous speech. The highlighted /æh/ symbols represent word list tokens; the plain symbols are spontaneous speech. It is evident that the entire set of word list pronunciations is shifted downwards to occupy the same low-front position as the lax /æ/ class.

As already seen with the previous speaker, correction of /oh/ is less drastic. Here the highlighted symbols represent /oh/ in minimal pairs. While three of these tokens are among the lowest, suggesting some correction, two are among the highest and backest. Correction of /oh/ also differs from correction of /æh/ in that there is no established target for /oh/ in low-back position parallel to that provided by lax /æ/ in the case of /æh/. The correction of [se:əd] to [sæ:d] is heard as a form of the same word, while the correction of [soəd] to [sɑd] is heard as a different word.

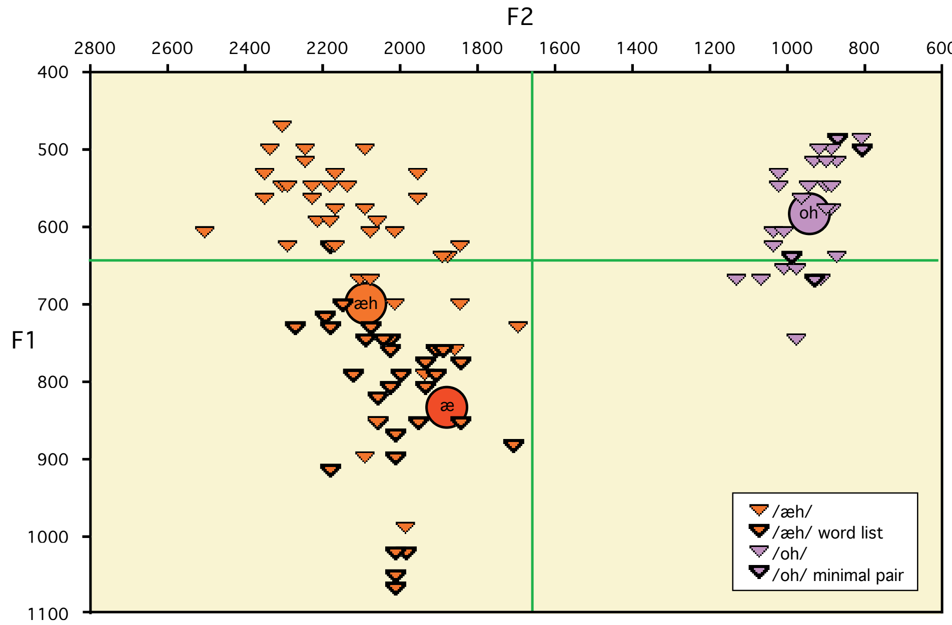


Figure 17.4. Stylistic stratification of long and ingliding vowels for Florence O., 70, Jersey City, NJ, TS 807

Although Figure 17.3 showed no distinction between /o/ and /ah/, it has been reported before that New York City speakers have a distinct lower mid back phoneme that is opposed to both /oh/ and /o/, consisting of the /ah/ class along with a selection of /o/ words determined only in part by phonetic factors (Cohen 1970; see also the case of Paul Prinzivalli, reported in Labov 1994). Figure 17.5 illustrates this configuration in the vowel system of Florence O., here including only tokens from spontaneous speech.

The split of the /o/ class is in many ways similar to the short-*a* split in the front vowels. There is strong phonetic conditioning, but there is also lexical irregularity. The /ah/ class is represented by four tokens of *father*. Along with these there

4 *Babs* as the abbreviation for *Barbara* may be lax in the vernacular. A note from the analyst on *bad* says that it seems to have been strongly influenced by the pronunciation of the interviewer.

is *despondent*, *odd*, *Don*, *bottom*, and several tokens of *job*, all words with voiced codas.[5] Vowels before voiceless stops occupy a lower position in the /o/ range, but there is also *on*, *monogram*, *gone*, *concerts*, *common*, contrasting with *despondent*. This may be viewed as a continuum, with initial labials leading, or it may be seen as further evidence for /ah/ as a separate phoneme, only partially overlapping with /o/. Unlike the case of /æh/, such lexical assignments to /ah/ appear to differ from one speaker to the other (Cohen 1970); further investigation is called for.

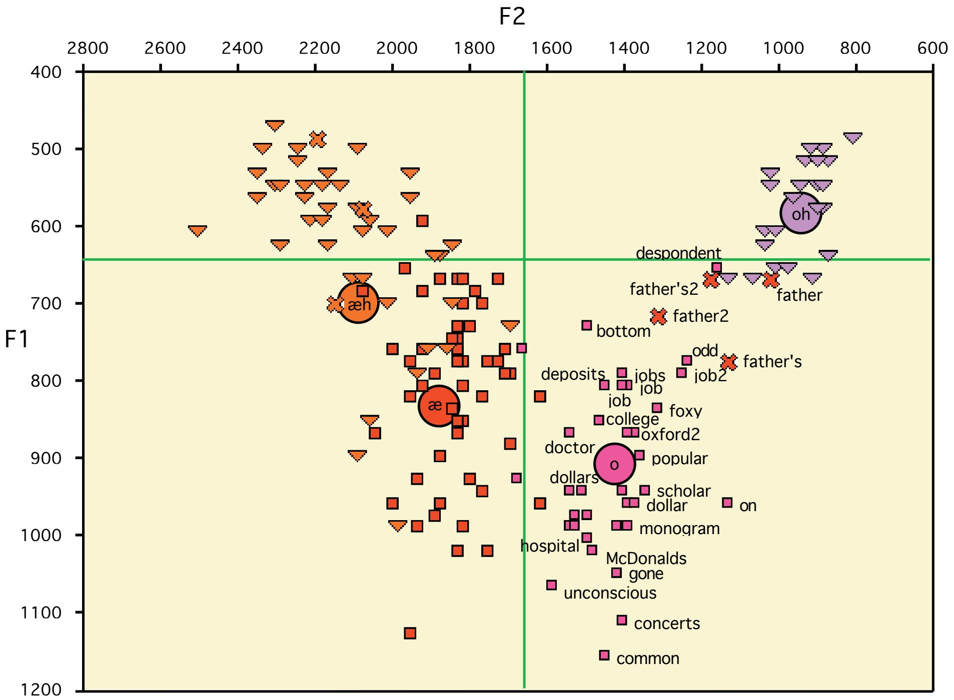


Figure 17.5. The differentiation of /o/ and /oh/ in vowel system of Florence O., 70, Jersey City, NJ, TS 807. Word list and minimal pair data excluded

Vowels before /r/ in New York City

The dialect of New York City is traditionally *r*-less. The importation of the *r*-pronouncing norm following World War II did not materially change the basic vernacular of every-day life (Labov 1966, 1994). As Maps 7.1 and 16.1, indicated, *r-lessness* persists in New York City even in the relatively monitored speech pattern of the Telsur interviews, which are strongly focused on language. The importation of the norm of *r*-pronunciation appears primarily among young college-educated speakers and in careful speech, but even there, the increase in *r*-pronunciation has been slow (see the replications of the department store study in 1984 and 1986 reported in Labov 1994: 86–94). The use of constricted /r/ by the twelve Telsur subjects in the NYC dialect area is instructive:

Age	% [r]	Age	% [r]	Age	%[r]
70	70	52	100	28	95
65	0	48	50	20	100
65	5	45	20	18	30
		43	40	18	10
		41	2		

The 52-year-old with consistent *r*-pronunciation is a dance therapist. The 20-year-old is a college student.

Figure 17.6 shows vowels before /r/ for the 48-year-old New Yorker, Pat M., 48, who has 50 percent [r] in the Telsur interview.

Among the front vowels are /ihr/ in *hear*, *hearing*, etc. and /ehr/ in *chairs*, *there*, etc. The latter vowel is evidently merged with the long and ingliding vowel /æh/ in *mad*, *pass*, *bath*, etc. Among the back vowels, the means for /ah/ and /ahr/ are not significantly different. However, /ahr/ shows a larger range, with a number of /ahr/ tokens in upper-mid position, overlapping the /oh/ class. There is no evident phonetic conditioning for this range: *card*, *hard*, *park* are in high position; *card* and *heart* are below the mean; and other tokens of *park* and *heart* are clustered at the mean value.

Traditionally, it was considered that /oh/ class words with vocalized /r/ were homonymous with the corresponding words without /r/. LYS (1972) reported that the distinction between *source* and *sauce* persisted: that even though native speakers thought they were the same, there was a significant tendency to pronounce the *source* class with a higher and backer vowel.[6] Figure 17.6 confirms this observation. Although /ohr/ and /oh/ overlap, the means are significantly different (479 Hz for /ohr/ and 520 Hz for /oh/; $p < .025$).

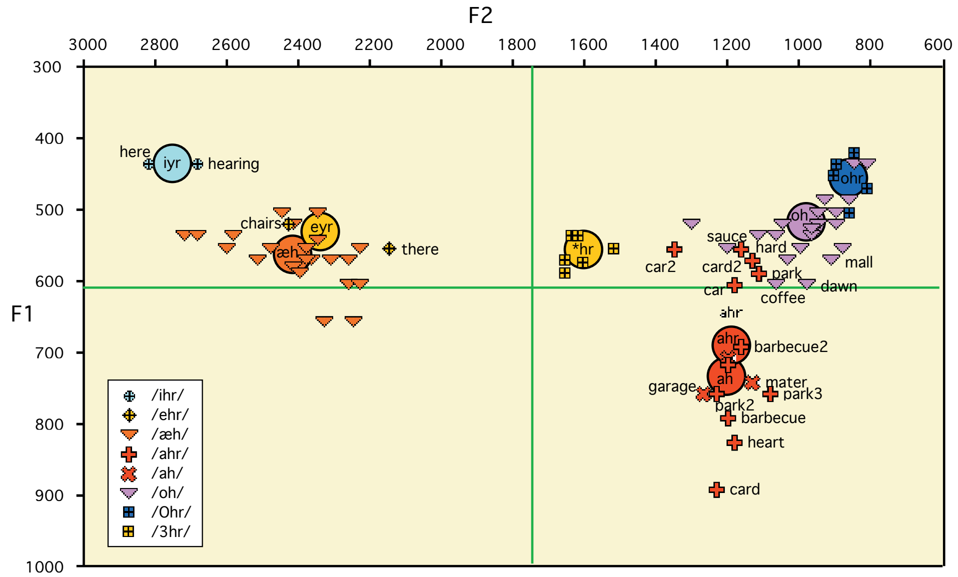


Figure 17.6. Vowels before /r/ for Pat M., 48, New York, NY, TS 800

17.2. The Mid-Atlantic states

The Mid-Atlantic dialect region was defined in Chapter 11 as an area with a split short-*a* system and no vocalization of /r/. Map 17.1 outlined this region as a set of cities with these dialect characteristics: Philadelphia, Reading, Atlantic City, Wilmington, and Baltimore. Vineland appears here as a sole exception with a nasal system, but more detailed studies of the region (Ash 2002) show other middle-sized cities and small towns in the intervening territory with the same pattern. There is a general tendency for the Mid-Atlantic short-*a* system to be eroded in favor of the default nasal system, though no such tendency has yet been reported within the major cities themselves. Since ANAE is devoted to a description of the

5 Considering the flap of *bottom* as a voiced segment.
6 This is one of the many cases of near-merger discussed in LYS (1972) and Labov (1994).

regional dialects of urbanized areas, this chapter will present the major features of the Mid-Atlantic vowel systems as they are exemplified in Philadelphia, Wilmington, and Baltimore.

Chapter 12 showed that the Mid-Atlantic region shared with the Midland an extreme fronting of /ow/ and /aw/, as well as /uw/ (Figure 12.6, Maps 12.3–12.5). As the largest and most influential American city of the eighteenth and early nineteenth centuries, and the port of entry for Midland settlers, Philadelphia undoubtedly had a strong influence on the formation of the Midland dialect. However, the definition of the Midland in Kurath (1949) does not regularly include the Mid-Atlantic area. *I want off* (for 'I want to get off') is found in Philadelphia and Wilmington, but *snake feeder* for 'dragonfly' is not (Kurath 1949, Fig. 15). *Blinds* for 'roller shades' appears in Baltimore, but not in Philadelphia or Wilmington (Fig. 16). On the other hand, a number of words that define Eastern Pennsylvania are consistently found in Philadelphia and Wilmington (Figs. 20, 22): *pavement* for 'sidewalk', *baby coach* for 'baby carriage', *hot cakes* for 'pancakes', *bagged school* for 'played hookey'. The phonological unity that we find in Baltimore, Wilmington, and Philadelphia is not reflected in the lexical patterning, where Baltimore often falls outside of the Philadelphia area.

The lexical maps of Carver (1987), based on 25 DARE isoglosses, do not include the Philadelphia area in the Midland (Maps 6.5, 12). Carver points out that the line separating the Philadelphia region from the rest of eastern Pennsylvania is not as coherent as the North–Midland line ('We would expect this boundary to be more transitional in nature, since Philadelphia is the source of the Pennsylvania German region", p. 169). All these considerations lead to the conclusion that the Mid-Atlantic region was an original source and center of the Midland region, but is now clearly separated from the rest of the Midland by developments in the Pennsylvania German cultural area and western Pennsylvania. Twentieth century developments in Philadelphia, like the shift of /aw/ from [æo] to [eɔ], did not spread to the Midland areas.

The Philadelphia vowel system

One of the most characteristic features of the Philadelphia vowel system is the fronting of back upgliding vowels except before liquids /r/ and /l/. Figure 17.7 shows the Vw subsystem of Rosanne V, whose short-*a* pattern was presented in Chapter 13. For /uw/, almost every vowel is front of the center line, including /uw/ after non-coronals, except the vowels before /l/, shown in bold. There is no significant distinction between /iw/ and the /uw/ allophones. The /ow/ vowel is fully centralized, and a number of tokens are well front of center. This is in sharp contrast with the New York City system, where /Kuw/ remains a back vowel, and /ow/ is not fronted at all (Figure 17.2).

The fronting of /aw/ is much more extreme in Philadelphia than in New York. This is one of the new and vigorous changes that is described in Labov (1980, 2001). The nucleus of /aw/ fronts to peripheral position and rises to mid or upper-mid position, while the target of the glide falls from /u/ to /ɔ/. Figure 17.7 shows that /ow/ and /aw/ are in a chain shifting relation, with some /ow/ tokens moving toward the position formerly occupied by /aw/.

Two other new and vigorous Philadelphia sound changes appear in Figure 17.8, which shows the front upgliding system of Rosanne V. The front upgliding vowels are divided into those in word-final position (iyF, eyF) and those before consonants (iyC, eyC). It is evident from the mean positions that there is a sizeable difference between these environments for both vowels, but it seen most dramatically with /ey/. As Tucker (1944) first reported, the /eyF/ tokens are open, almost in low position, while /eyC/ tokens are peripheral upper mid, overlapping both /iyF/ and /iyC/. The two allophones of /ey/ have become further separated

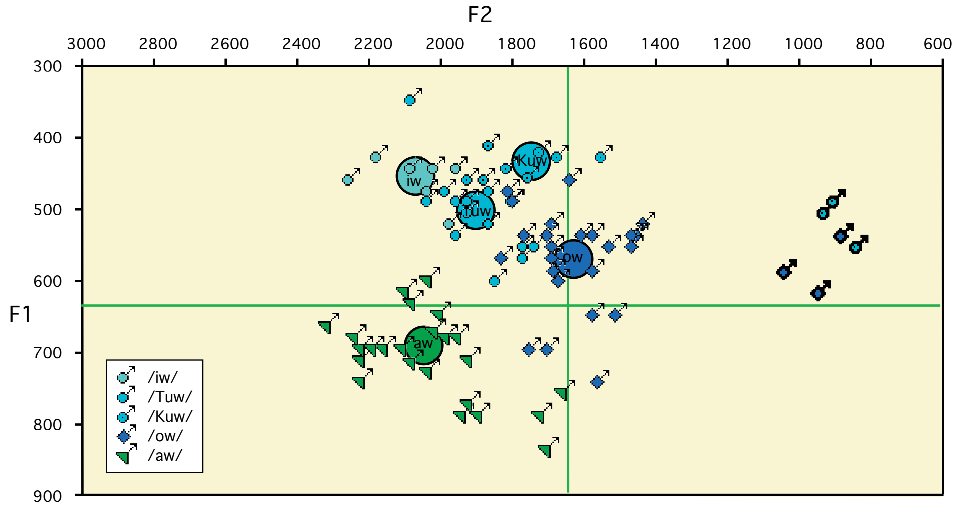


Figure 17.7. Back upgliding vowels of Rosanne V., 30, Philadelphia, PA, TS 587. Tuw = /uw/ after coronals; Kuw = /uw/ after noncoronals. Bold symbols: vowels before /l/.

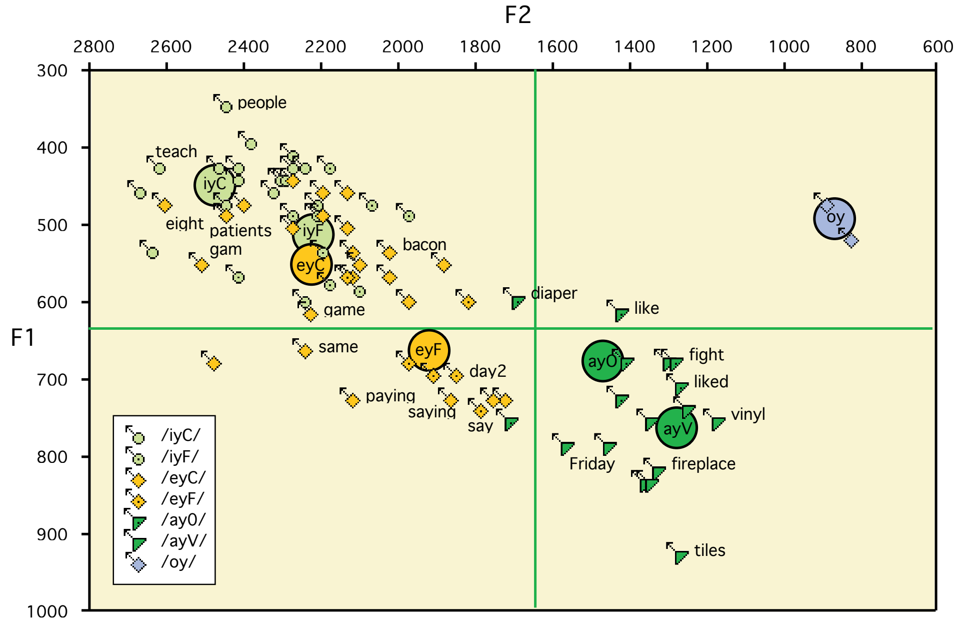


Figure 17.8. Front upgliding subsystem of Rosanne V., 30, Philadelphia, PA, TS 587

over time; apparent time distributions show a strong shift upward and frontward of /eyC/, while /eyF/ has remained open. In Figure 17.8, the words *eight*, *patients*, *baby* are squarely in the /iyC/ distribution.[7] On the other hand, *day* and *say* show low nuclei.

Figure 17.8 also shows a parallel distinction of /ay/ before voiceless consonants (ay0) and before voiced and finally (ayV). Here the preconsonantal raising is restricted to vowels before voiceless consonants, as in Canadian raising. *Like*, *fight*, *diaper* are in mid position, while /ay/ in *Friday* and *tile* is low. Sociolinguistic studies of Philadelphia show a strong shift among younger speakers, especially males, towards increasing centralization of /ay0/. Conn's re-study of

7 This overlap does lead to misunderstandings in the Philadelphia speech community. The archive of natural misunderstandings includes *snake* → *sneak*, *slave* → *leave*, *train* → *tree and*.

Philadelphia in 2004 showed that the upward and backward shift of (ay0) has continued (2005).

The Philadelphia split short-*a* system that defines the Mid-Atlantic region in Map 17.1 was described generally in Chapter 13, Figure 13.2, and exemplified by a view of /æh/ and /æ/ in the vowel system of Rosanne V., TS 587. A more detailed description is to be found in Ferguson (1975) and Labov (1989), while recent developments in the expansion of the tense class are reported in Roberts (1993), Roberts and Labov (1995), and Banuazizi and Lipson (1998). The major outlines of the tense /æh/ class are:

- Short-*a* is tense in closed syllables before front nasals and voiceless fricatives.
- Syllables are closed by inflectional boundaries, yielding tense *panning*, *passing* vs. lax *panel*, *passive*.
- Syllable closure with derivational boundaries is variable.
- Short-*a* is tense before /d/ in *mad*, *bad*, *glad*, otherwise lax before voiced stops.
- Short-*a* is lax in auxiliaries and irregular verbs with nasal codas *ran*, *swam*, *began*, *wan*[8]

As in New York city, the resultant tense class is a member of the long and ingliding subsystem. Unlike New York City, the /æh/ class (Figure 17.9) is considerably more peripheral than the /ehr/ or /ihr/ class, which in Philadelphia are terminated with consonantal /r/. The /ah/ class of *father*, *garage*, *bra* (red x's) is distinct from the /ahr/ class (red vertical crosses), unlike the situation in New York City. In Philadelphia, the /ahr/ class is shifted to mid-back position for speakers of all ages and all social classes (Labov 2001), and as shown in Figure 17.9, coincides with /oh/ rather than /ah/. Finally, we note that the /ohr/ class, with original /ohr/ and /ɔhr/ merged, is in high-back position, and is further merged with /uhr/ (not shown here).

Philadelphia exemplifies the Back Vowel Shift before /r/, which is common throughout the Southeastern super-region.

The features of Philadelphia discussed so far are general to the Mid-Atlantic dialect. As in New York City, Philadelphia speakers recognize a three-way distinction between *Mary*, *merry*, and *marry*. However, the city of Philadelphia is

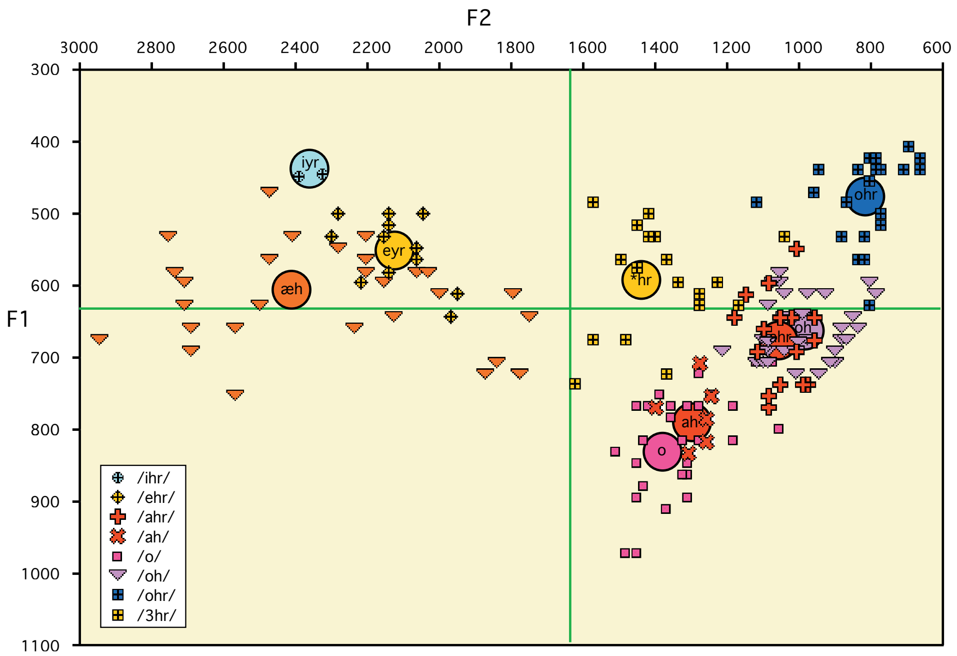


Figure 17.9. Long and ingliding vowels of Rosanne V., 30, Philadelphia, PA, TS 587

unique among American dialects in its treatment of /e/ ~ /ʌ/ before intervocalic /r/ in *ferry* ~ *furry*, *merry* ~ *Murray*, etc. Labov and Karan (1991) found that one third of their Philadelphia subjects made a clear distinction between *ferry* and *furry*, one third showed a clear merger, and one third a near-merger: that is, subjects made a small but consistent distinction in spontaneous speech which they could not recognize in minimal pair or commutation tests. Figure 17.10 shows the overlap of /er/ and /ʌr/ for Rosanne V. in two words: *cherish* located well back of center, and *thoroughfare* in a somewhat fronter position, almost at the mid-line.[9]

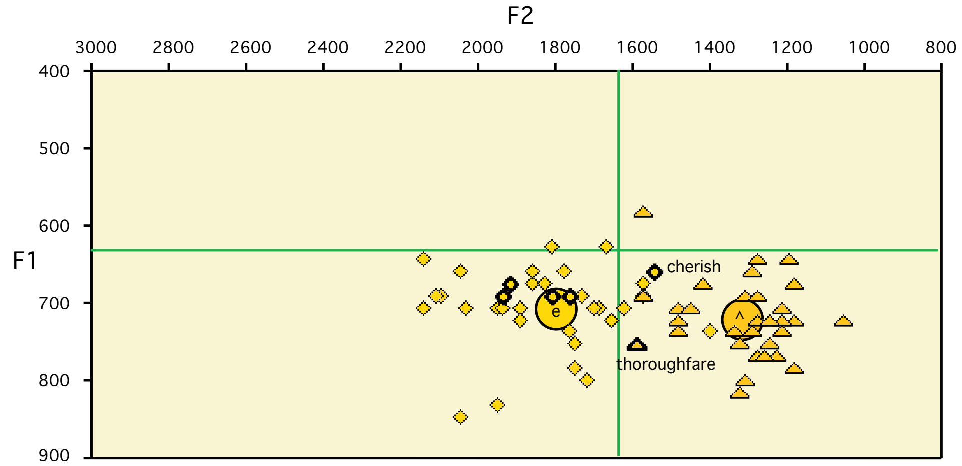


Figure 17.10. Backing of /er/ and fronting of /ʌr/ for Rosanne V., 30, Philadelphia, PA, TS 587

Baltimore

The data generated by the Telsur interviews do not show any substantial differences between Philadelphia and the neighboring cities of Wilmington and Baltimore. Only two specific Philadelphia features are limited to that city: the near-merger of /e/ and /ʌ/ before intervocalic /r/, and the raising of /ey/ in non-final position. The other cities share with Philadelphia the split short-*a* pattern, the raising of /oh/, the back shift of vowels before /r/, the merger of /ah/ and /o/, and Canadian raising of /ay/. Figure 17.11 shows the long and ingliding vowels of Mark D., 43, of Baltimore. The tense short-*a* class includes *ask*, *vast*, and three tokens of *bad*, while short-*a* in *sad* and before other voiced stops is consistently lax. The /oh/ class shows a dispersion along the peripheral back range that is characteristic of this region. Note in particular the very high-back position of *on*, showing its characteristic Midland association with the /oh/ class, in contrast with the much lower articulation of *on* as a member of the /o/ class in New York City in Figure 17.5.

An intermediate short-*a* system: Trenton and environs

Earlier investigations of the area between New York City and Philadelphia suggested the existence of a continuum, in which the tensing environments of the

8 The colloquial form of the preterit of *win*, common in Philadelphia. This completes the series of irregular verbs ending in /n/, all descended from Class III Preterit strong verbs in Old English.

9 The /e/ token even further back is *stressful*, which shows the effect of a preceding /r/ as well as the complex coda and following syllable.

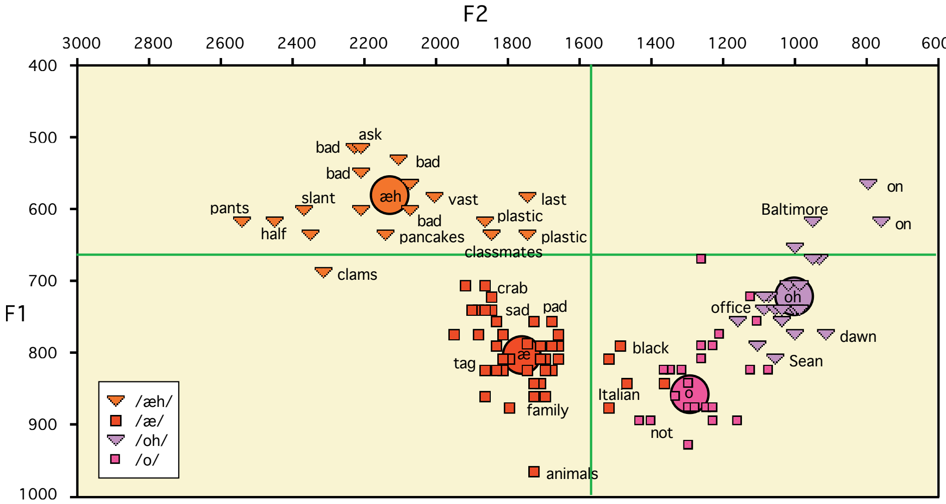


Figure 17.11. Ingliding vowel subsystem of Mark D., 43, Baltimore, MD, TS 512

New York City system are gradually deselected until one arrives at the Philadelphia subset. As indicated above, many of the intervening smaller communities display the altogether different nasal system, and there is indication that younger speakers are shifting in that direction. As shown in Map 17.1, the Trenton area does display the expected intermediate system.

In Trenton, vowels before /d/ are generally tense, as in New York City, but vowels before /g/ are lax, as in Philadelphia. Figure 17.12 is the short-*a* system of a 66-year-old woman from Trenton. In her case, style shifting has only a slight effect. Word-list vowels are not quite as front as those from spontaneous speech, though one token of *bad* is lowered almost to the /æ/ level. The two lowest /æh/ tokens, *grass* and *glass*, show the usual conservative effect of initial obstruent/liquid clusters: as the lowest and backest of the /æh/ group, these often overlap with the highest and frontest members of the /æ/ class (Labov 1989).

Two tokens of *add* that would be lax in Philadelphia are found in the /æh/ class in Trenton along with *bad*, while two tokens of *tag* and two of *bag* that would be tense in New York City are found in the /æ/ group here. Short-*a* before velar nasals is somewhat fronter than other lax members, but these tokens are plainly in the lax category, as in NYC and in Philadelphia. The Trenton system also shares with both areas the constraint on tensing in closed syllables. Short-*a* is tense in *can't*, *sandals*, *manmade* but lax in *Hamilton*. It is also tense in *laughing* where inflectional boundaries close the syllable, but lax in monomorphemic *traffic*.

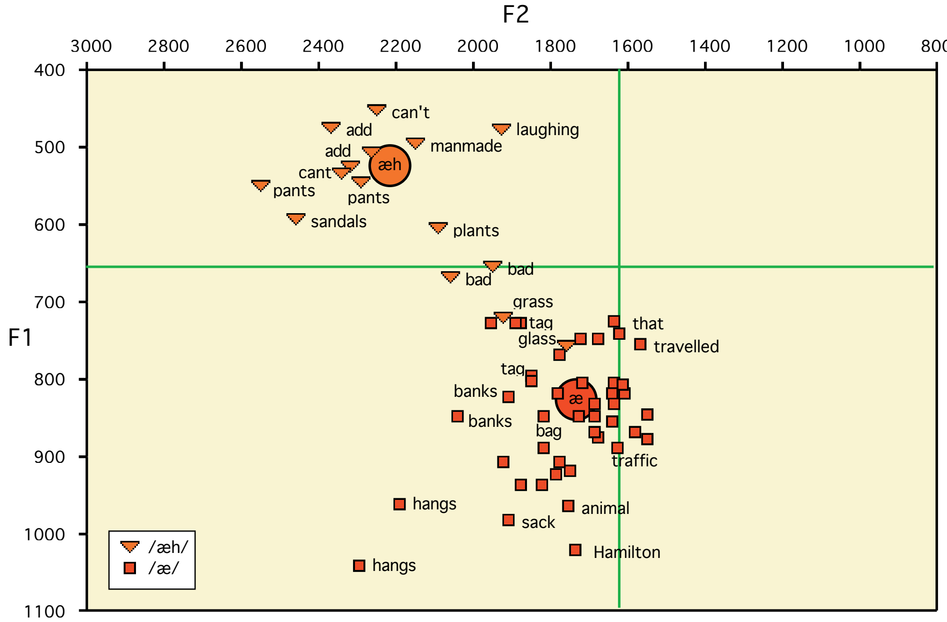


Figure 17.12. Short-*a* system of Peg M., 66, Trenton, NJ, TS 385. Highlighted symbols are word list style

18. The South

This chapter deals with the phonological structure and geography of the South. The discussion will begin with a broad consideration of the entire area known as the Southern States, ranging from North Carolina in the east to Texas in the west, and from the Ohio River in the north to the southern tip of Florida in the south. The definition of the South as a dialect region, first advanced in Chapter 11, will be developed in Section 18.3.

18.1. Earlier studies of the South

Kurath (1949) defined the south of the eastern United States on the basis of such regional vocabulary items as *lightwood* 'kindling', *low* 'sound made by a cow', *light bread* 'white bread'. He drew a major boundary around a Southern region ranging from northern Virginia to Georgia, subdivided into five areas: (1) the Delmarva peninsula; (2) the Virginia Piedmont; (3) northeastern North Carolina; (4) the Cape Fear and Peedee Valleys; and (5) the rest of South Carolina with the eastern edge of Georgia (see Map 1.1). The western boundary of this Southern region is the Appalachian mountains. Beyond the Appalachian foothills, the mountainous parts of West Virginia, Kentucky, and Tennessee and the regions further west are assigned to the Midland, not the South.

There is much support for this definition of a Midland region. Chapter 21 will map several grammatical features that are distributed across a Midland area that corresponds closely to the Kurath definition. However, the phonological evidence to be presented in this chapter will show that the southern portion of Kurath's Midland belongs to – indeed is central to – the modern Southern dialect region. The large Southern region that emerges from this re-definition appears to be undergoing a regional unification driven by the Southern Shift. Its phonological organization is reinforced by the socially recognized unity reported in studies of perceptual dialectology (Preston and Howe 1987).

Among the various dialects of North America, Southern-States English is the most widely recognized as a regional dialect by the general public. In fact, the South appears to be an exception to the general observation (Chapter 1) that Americans pay very little attention to regional dialects and show little ability to recognize them. Most Northerners can produce some kind of imitation of a Southern accent and will do so when the occasion demands. In many states, communities can be ordered on a North–South continuum, and people stigmatize the dialect of people to the south of them as "Southern". Mental maps of American dialects always include a Southern area, and college students show an ability to identify at least four degrees of "Southernness" on a north–south dimension running from Michigan to Alabama (Preston 1988, 1993, 1996; Preston and Howe 1987). Social awareness of New York City or Boston local speech does not rise to the generality or salience of the Southern speech pattern. All accounts of American dialects include a description of Southern phonological features, usually in the form of an unordered list (Krapp 1925; McDavid 1958; C.-J. Bailey 1980; Kurath and McDavid 1961; Bailey and Melo 1990; Bailey 1997; Wolfram and Christian 1975). The following is a restatement of the most general processes categorized as "Southern" in this literature, using the phonological framework of ANAE (Chapter 2). The ANAE records will show that many of these features are not limited to the Southern region, though they are characteristics of Southern phonology. Furthermore, many of the traditional distinctions have been rapidly eroded since the LAMSAS data was gathered, and have almost disappeared from the Telsur landscape (Chapter 8). The linguistic changes listed below are described as deviations from the initial position of Figure 2.2, although the South may have been differentiated from other regions from the outset.

A. Word-final consonants

(1) Vocalization of /r/ in syllable-final position, in *car*, *card*, *beer*, *board* (in the coastal South).
(2) Use of apical rather than velar nasal in unstressed *-ing* in *working*, *morning*, *nothing*, *something*

B. Southern glides

(3) Upgliding /æy/ for initial /æ/ before sibilants and nasals in *brass*, *ashes*, *aunt*, *bang*.
(4) Front glide /y/ in /yuw/ after coronal onsets in *dew*, *tune*, *Tuesday*.

C. Parallel fronting of back vowels:

(5) Fronted /uw/ and /u/ in *too*, *boots*, *put*.
(6) Fronted /ow/ in *go*, *road*, *boat*.
(7) Fronted /æw/ for initial /aw/ in *out*, *mountain*.

D. The Back Upglide Shift

(8) Fronted /æw/ for initial /aw/ in *out*, *mountain*.
(9) Upgliding /aw/ for initial /oh/ in *caught*, *law*, *off*.

E. The Southern Shift

(10) Monophthongal /ay/ before voiced segments and word-finally in *high*, *side*, *wise*, *time*.
(11) Lowering of the nucleus of /ey/ along the nonperipheral track in *day*, *made*, *chase*.
(12) The fronting, raising and ingliding of initial short vowels /i/, /e/, /æ/ in *sit*, *set*, *sat*.
(13) Breaking of front long nuclei into two nuclei with intervening glide (Southern drawl)
(14) Monophthongal /oy/.

F. Conditioned mergers and oppositions

(15) Merger of /i/ and /e/ before nasals in *pin* and *pen*, *him* and *hem*.
(16) Distinction of /ohr/ and /ɔhr/ in *horse* and *hoarse*, *fork* and *pork*.
(17) Distinction of /hw/ and /w/ in *which* and *witch*, *whale* and *wail*

(18) Merger of /uw/ and /u/ before /l/ in *fool* and *full*, *pool* and *pull*.
(19) Merger of /iy/ and /i/ before /l/ in *feel* and *fill*, *heel* and *hill*.
(20) Merger of /ey/ and /e/ before /l/ in *fail* and *fell*, *sail* and *sell*.
(21) Distinction of /erV/ and /ærV/ in *merry* and *marry*, *berry* and *Barry*.

G. Status of the low back merger

(22) Distincton of /o/ and /oh/ in *hock* and *hawk*, *Don* and *dawn*.

Chapter 7 showed that (1) the vocalization of (r) characteristic of all eastern seaboard cities except Philadelphia and Baltimore, is now retained in Boston, Providence, and New York City, but not in the South (Map 7.1). The sociolinguistic literature shows that (2) (ing) variation is general to the English-speaking world, though Houston (1985) finds that /in/ occurs with a much higher frequency in the South than elsewhere. Item (3) /æy/ has almost disappeared throughout North America. Item (4) /yuw/ was once common in Eastern New England and the South according to Map 163 of PEAS; today it has almost vanished (Map 8.3).

The general fronting in group C (5–7) includes the forward movement of /uw/, which is now common throughout North America (Chapter 12). In the PEAS record of the 1940s (Map 17), centralization of postcoronal /Tuw/ appears throughout the South, except for central and western North Carolina. The fronting of /ow/ (6) receives very little mention as a Southern feature in the literature cited in PEAS. Map 20 of PEAS does show centralization of final /ow/ in eastern North Carolina, but fronting appears more consistently in Philadelphia and western Pennsylvania.

Of the various conditional mergers only (15) /in/ ~ /en/ is distinctly Southern in its distribution, but as this chapter will show, it has spread beyond the Southern region. The distinctions represented by items (16) and (17) were never unique to the South: PEAS Maps 44, and pp. 175–176 show that these two distinctions opposed the North and the South to the Midland. Chapter 8 of this volume indicated that the contrasts are now almost gone in both areas. The mergers before /l/ are discussed in Chapter 9: though some are concentrated in the South, none are unique to the South. The distinction before intervocalic /r/ (21) is found in much of the Midland and North outside of the South. Although the low back merger (22) has been reported to be making headway in some areas of the South (Feagin 1993), the South remains as one of the three regions that resist this merger (Chapter 9).

It therefore appears that the two chain shifts listed under D and E remain as the defining characteristics of Southern States English. As in Chapter 14, we define a dialect by the dynamic processes that determine the overall direction of sound change, rather than by static or recessive features of traditional speech.

Much dialectological work on Southern-States English has emphasized differences among Southern dialects. The subdivisions of the South in Map 2 of PEAS are inherited from the lexically defined boundaries of Kurath (1949). The PEAS discussion of regional phonology in the South does not make use of these subdivisions, but substitutes a discussion of three regions – the Upper South, the Lower South and the South Midland (pp. 18–22) – on the basis of the syllabi of cultured informants. The Upper South is essentially the Virginia Piedmont region, centered on Richmond, and its most distinguishing feature is the centralization of /ay/ and /aw/ before voiceless consonants (Maps 27, 29). The Lower South is divided into the Low country, centered on Charleston, Savannah, and Columbia, and the Up country further inland. The most distinctive regional features in the Low country are tense monophthongal forms of /ey/ and /ow/, often ingliding.

The South Midland area is discussed in PEAS on the basis of four cultivated speakers, in Farmington and Charleston, West Virginia, Lexington, Virginia, and Asheville, North Carolina, forming an area that overlaps the "Southern Core" to be identified in this chapter. Efforts will be made to relate the development of the unique chain shifts of the Southern region to these earlier records. The task is complicated by the conservative character of the LAMSAS transcriptions, which make it difficult to distinguish between real-time change and the reluctance of the transcribers to recognize forms they did not expect. For example, the raising and fronting of the short front nuclei /i, e, æ/ is never found in LAMSAS records. The IPA symbols for lax vowels [ɪ, ɛ, æ] are used consistently for the nuclei of these phonemes, and the only variation shown is in the presence or absence of an inglide. We might infer that this part of the Southern Shift is absent in the Low country because the inglide does not appear there in LAMSAS records, and infer that it is present in the Upcountry by the frequency of the schwa glide in those records. This is, however, an uncertain and indirect way of detecting the presence of tensed nuclei.

Other distinctive subregions of the Southern region noted in previous literature are the Outer Banks of North Carolina (Labov, Yaeger, and Steiner 1972; Wolfram 1999; Wolfram, Cheek, and Hammond 1994) and its characteristic backing and raising of /ay/; the New Orleans dialect with its striking similarities to New York City; and central Texas, identified with the merger of /ahr/ and /ohr/. Most of these local Southern dialects appear to be rapidly receding, while the more general Southern pattern, centered on the Southern Shift, seems to have expanded and consolidated in the past half-century.

The initiating process of this general Southern pattern is the deletion of the glide of /ay/ in *guy*, *high*, *wide*, *rise*, etc. Studies of the early history of Southern English (Montgomery and Melo 1990; Bailey 1997) suggest that this diphthong was all but intact in mid-nineteenth-century Southern English. However, recent recordings made by Poplack in Brazil of the descendants of Confederate soldiers show substantial evidence of glide deletion in their speech (Poplack, Labov, and Baranowski 2004). Acoustic analysis showed seven clear monophthongs out of 20 tokens for one 60-year-old man, including one before voiceless stops; his brother showed three monophthongs out of 24 tokens. This suggests that glide deletion began in some areas of the South as early as the first half of the nineteenth century.

The two chain shifts labeled D and E are the only elements in the list that are unique to the Southern region, if we define the South to include the Appalachian region which was assigned to the Midland by Kurath. In fact, it is within the Appalachian region that we have located the *Inland South* in Chapter 11, where the most advanced exponents of the Southern Shift are to be found. The cities of the coast, on the other hand, remain increasingly peripheral to this new Southern phonology.

This chapter will first examine the geographic distribution of four traditional features of Southern English which were shared with a number of Northern dialects, and as Chapter 8 showed, are in the last stages of retreat. The geographic and phonological definition of the South will then be presented on the basis of the chain shift processes that are unique to the South.

18.2. Relics of older Southern phonology

Kurath's definition of the South on the basis of regional vocabulary (1949) was reinforced by Kurath and McDavid's treatment of pronunciation in the eastern United States (1961). Among the general phonological features that distinguished the Southern area were three which were not present in the neighboring Midland areas (but also found in the North): the distinction between /hw/ and /w/ in *whale* and *wail*, etc., the distinction between /ohr/ and /ɔhr/ in *horse* and *hoarse*, *mourning* and *morning*, *for* and *four*, *pork* and *fork*; and the retention of the /j/ glide in the /iw/ class of *tune*, *new*, *suit*, etc. (items 4, 16, and 17 above). Chapter 8 reported the decline of these distinctions throughout North America: they have all but disappeared today.

Map 18.1 shows all of the Telsur speakers who maintain one or more of these distinctions in the production of the minimal pair tests. The dark purple symbols are the speakers who maintain all three distinctions. Red, green and blue symbols represent the cases where two of the three are distinct, and light pink, grey and blue are speakers who keep only one such pair distinct. The purple isogloss surrounds all the communities in which at least one speaker maintains one distinction.

These vanishing distinctions are clearly concentrated in the South. The purple isogloss covers most of the South as defined in Chapter 11 by glide deletion before obstruents, with the exception of a dozen points along the northern sector, in which no trace of the relic distinctions appear. Outside of the South we see only a few widely scattered points. A small concentration of light blue points appears in Maine, reflecting the distinction of *whale* and *wail*.

Within the South there is no clear concentration of any one type of symbol. In general, the most conservative areas are to be found in the eastern part of the region. The six speakers who maintain all three distinctions, though widely separated, are all in the Southeast. The ages of these most conservative speakers are shown in red numbers; all but one are over 60.

Table 18.1 shows the rate of disappearance of these relic features by the mean ages of those who make none, one, two or all three of the distinctions. It includes data from 100 Southern speakers who provided information on all three variables.

Table 18.1. Mean age by number of distinctions made for three relic variables by 100 Southern subjects

Number of distinctions	Number of subjects	Mean age
None	49	31
One	12	37
Two	33	47
Three	6	67

The relative rates of disappearance of the three distinctions can be seen in the number for each who report 'same' in both perception or production, and those who report 'different' in both, as shown in Table 18.2.

Table 18.2. Numbers of Southern speakers who are consistently the same or different in perception and production for three relic variables

Opposition	Same	Different
/ohr ~ ɔhr/	80	7
/iw ~ uw/	70	16
/hw ~ w/	62	23

This view of the geography of relic features points to the South as the most conservative region in North America. The South is also marked by many vigorously maintained phonological features. The maps to follow will show a consolidation and geographic expansion of major features of Southern phonology. But the apparent time data will also suggest a slight decline of the most characteristic features of Southern phonology among younger speakers in most urban areas.

18.3. The Southern Shift

This section will define the Southern region by the active rotation of vowels termed the Southern Shift. The original view of the Southern Shift presented a combination of three common vowel shift patterns (Labov, Yaeger, and Steiner 1972; Labov 1994). The most widely attested chain shift in the languages of the world is the movement of back vowels upward along the back diagonal. Since this has not been identified as specifically Southern, it was not listed among the Southern chain shifts, but it does occur in the form of the Back Chain Shift before /r/, discussed in the last chapter as a Mid-Atlantic feature. In the South, it is found only in the vowel subsystem before syllable-final /r/, as shown in Figure 18.1.

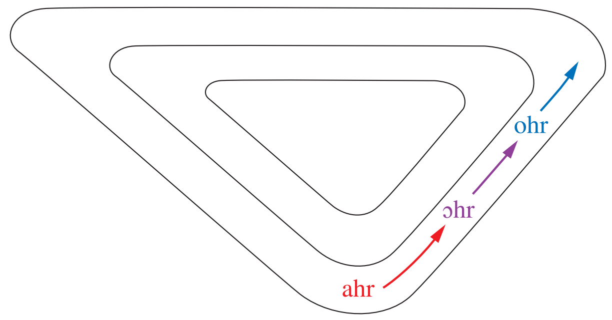


Figure 18.1. Back chain shift before /r/

In the Mid-Atlantic dialects, merged /ɔhr/ and /ohr/ advance to high position, producing a further merger with /uhr/. In the South, this does not happen. /owr/ develops a strong upglide but the nucleus remains in upper mid position. As seen in the last section, /owr/ and /ohr/ are now merged for some 80 percent of the Southern speakers. The merged vowel remains distinct from lower mid-back /ahr/ by means of a contrast of height, but also by breaking in the mid vowels – a back upglide followed by an inglide – which is not heard in /ahr/.

A second pattern that was incorporated in the earlier view of the Southern Shift was the fronting of back upgliding vowels which was found in Chapter 12 to be a general characteristic of Midland and Southern phonology (Figure 18.2). For many Southern speakers, /uw/ reaches a position in the high–front quadrant, directly behind /iy/. Chapter 12 showed that this is not specific to the South, but is a process that is affecting to one extent or another almost all North American dialects. Though the average values for the fronting of /ow/ are maximal in the South, the fronting of /aw/ reaches its most advanced form in areas of the Midland, and the pattern of Figure 18.2 appears in much the same form throughout the Midland and the South.

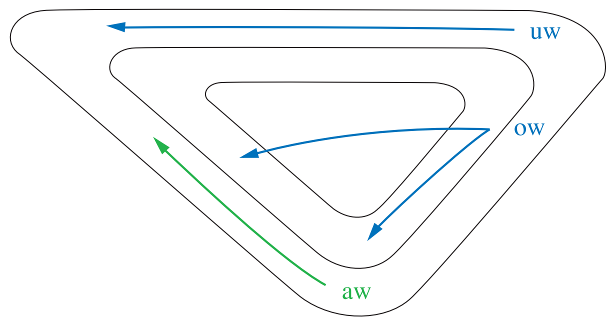
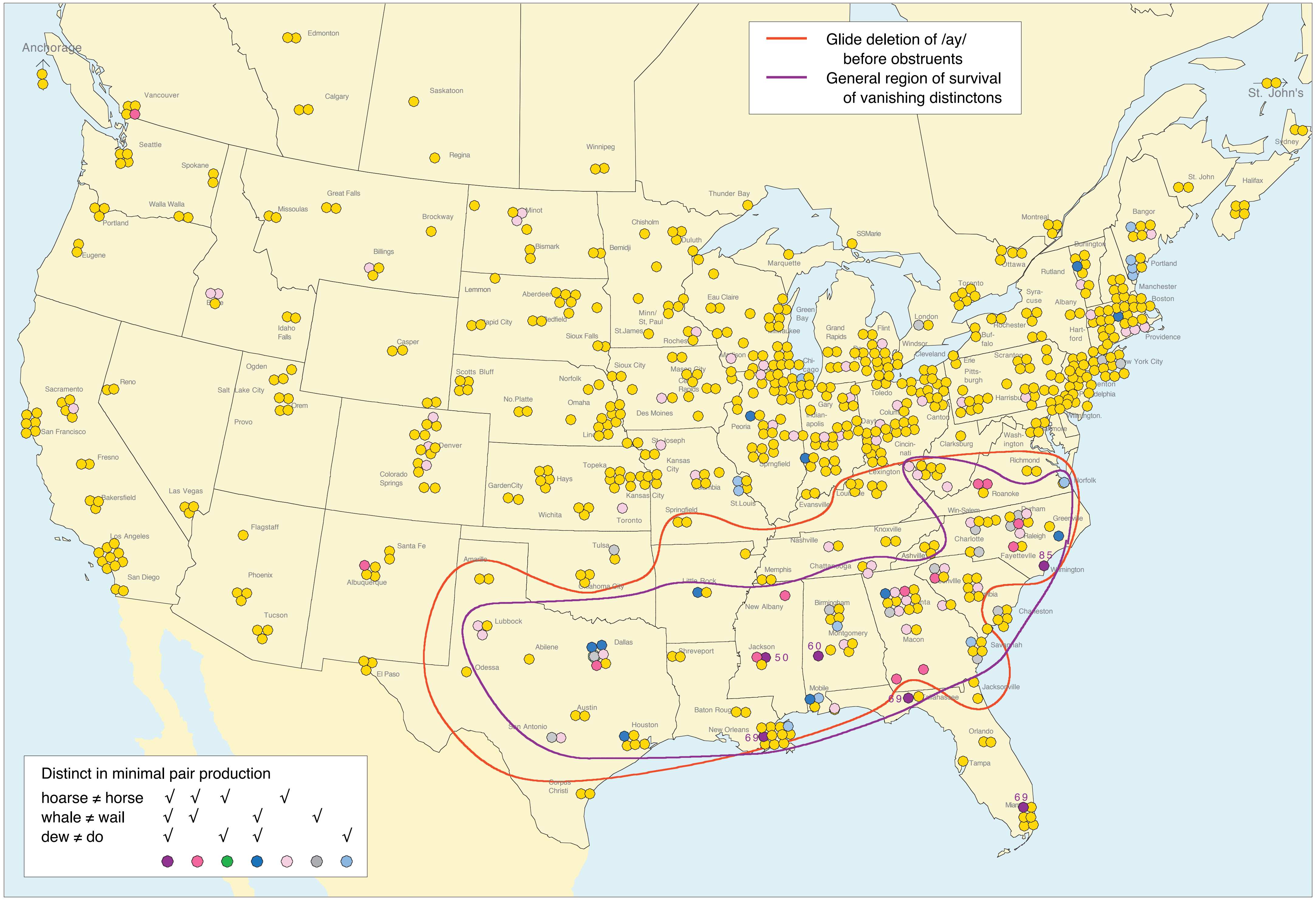


Figure 18.2. Parallel fronting of back upgliding vowels



Map 18.1. Relics of older Southern phonology

The South is the most conservative area of North America in regard to the retention of phonemic distinctions which are undergoing extinction. The purple isogloss encloses the area of scattered remnants of the distinction between /ohr/ and /ɔhr/ in *four* and *for*, *mourning* and *morning*; between /w/ and /hw/ in *witch* and *which*, *wail* and *whale*; between /iw/ and /uw/ in *dew* and *do*, *tune* and (*car*)*toon*. No other section of the country shows as great a tendency to preserve these rapidly disappearing distinctions.

The pattern that is specific to the South is the Southern Shift as first shown in Figure 11.4, and in greater detail in Figure 18.3.[1] It is a chain shift pattern that can apply only to systems that have several front upgliding vowels as realizations of the long vowel system, together with several short front vowels.[2]

The triggering event is a change in the front upgliding diphthong /ay/. In most of the languages and dialects affected by this process, the nucleus of /ay/ moves back and upward along the peripheral path as route 1 in Figure 18.3. This is the path followed in most southern British dialects, Australia, New Zealand, and South Africa (Labov, Yaeger, and Steiner 1972, Trudgill 2004).

For the great majority of Southern-States speakers, /ay/ follows route 2 in Figure 18.3. Glide deletion is effectively a movement of /ay/ out of the system of upgliding vowels into the subsystem of long and ingliding vowels; that is, /ay/ becomes /ah/. This is followed by the centralization and downward shift of the nucleus of /ey/ along the nonperipheral front path, developing a low central, nonperipheral nucleus. Thus when *buy* is realized as [ba:], *bay* will be realized in the most advanced forms as [ba$^{\text{ɪ}}$]. This nucleus is usually non-peripheral but in the most advanced cases it has a low peripheral nucleus identical with that of *buy* in dialects not affected by the Southern Shift. In a consequent movement, the nucleus of /iy/ follows a parallel shift from high front to mid-front nonperipheral position.

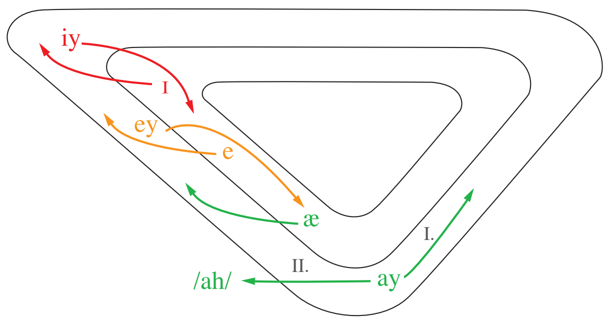


Figure 18.3. The Southern Shift

The Southern Shift also involves a complementary movement of the short front vowels in the opposite direction: /i/ and /e/ shift to the peripheral track and rise until their mean position may be higher than the nuclei of /iy/ and /ey/ in Northern dialects. These peripheral short vowels develop prominent inglides in the American South. In the most advanced forms, *sit* will be heard as equivalent to *see it* in Northern and Midland dialects, and *set* as equivalent to *say it*. The low short vowel /æ/ follows a parallel path, similar to that observed in the Northern Cities Shift. In the South, the fronting of /æ/ can be as extreme as in the North, but the nucleus does not rise as high since it is aligned in a series behind /e/. For many Southern speakers, lengthened /æ/ is broken – the nucleus descends to low front position and is followed by a high front glide and an ingliding second nucleus, the configuration that constitutes the Southern drawl (Chapter 14).

Stage 1 of the Southern Shift: glide deletion

18.2

Map 18.2 is a thematic map in which the size of the red circles is proportional to the percent glide deletion in *side*, *time*, *guy*, etc. The vowel class mapped here as /ay/ includes only the vowels before voiced consonants and in word-final position (special case of /ay/ before voiceless segments (ay0) is displayed in Map 11.5). The large red circles are heavily concentrated in the Southern States, with a scattering of small red circles in Pennsylvania, Delaware, Maryland, Ohio, Illinois, and Kansas. Within the central areas of the Southern States only Atlanta and Austin stand out as exceptions with little or no glide deletion.

Map 18.2 clearly shows that the majority of speakers throughout the Southern States maintain a high degree of glide deletion. Diphthongal /ay/ is found along the eastern seaboard of the Southern States, where several cities appear to be peripheral to the South as here defined. One Norfolk speaker has glide deletion only before /l/ in *miles*. None of the three speakers in Charleston show any trace of this feature.

One subject from Savannah and those from Jacksonville have more than 20 percent glide deletion but none of the other seacoast cities show the high rates found in the central areas of the South. The only speaker located on the eastern seaboard with a high rate of glide deletion is in Wilmington, NC. The Telsur subjects from Atlanta, the largest city in the eastern half of the South, show almost none. This absence of Southern features is typical of that metropolis, the result of massive immigration from outside of the South.

The region of glide deletion has a Southern limit. It is absent in the Telsur subjects in the rest of Florida. The Tallahassee speaker has only 7 percent, which is a single occurrence in *time*. Glide deletion is also minimal in Corpus Christi in Southern Texas. New Orleans and Houston show only a small percentage. The western boundary of the Southern region is clear: it includes Lubbock and Odessa in Texas but not El Paso. The northern limit includes Amarillo but not Oklahoma; it includes Arkansas and southern Missouri and otherwise follows the Ohio River.

18.3

The red isogloss of Map 18.3, the AYM line, defines the South as a linguistic region. It was initially constructed as the outer limit of communities where more than 20 percent of /ay/ tokens are monophthongs. This minimum rate of 20 percent, which is a useful criterion for several other Southern features, coincides with a qualitative criterion: whether glide deletion takes place before obstruents or not. Map 18.2 (and 11.3) showed that a number of communities north of the red isogloss display a low percentage of /ay/ glide deletion – in all but three cases, less than 20 percent. In every case, this low percentage of glide deletion took place only before resonants – liquids and nasals – in *fire*, *mile*, *time*, etc.

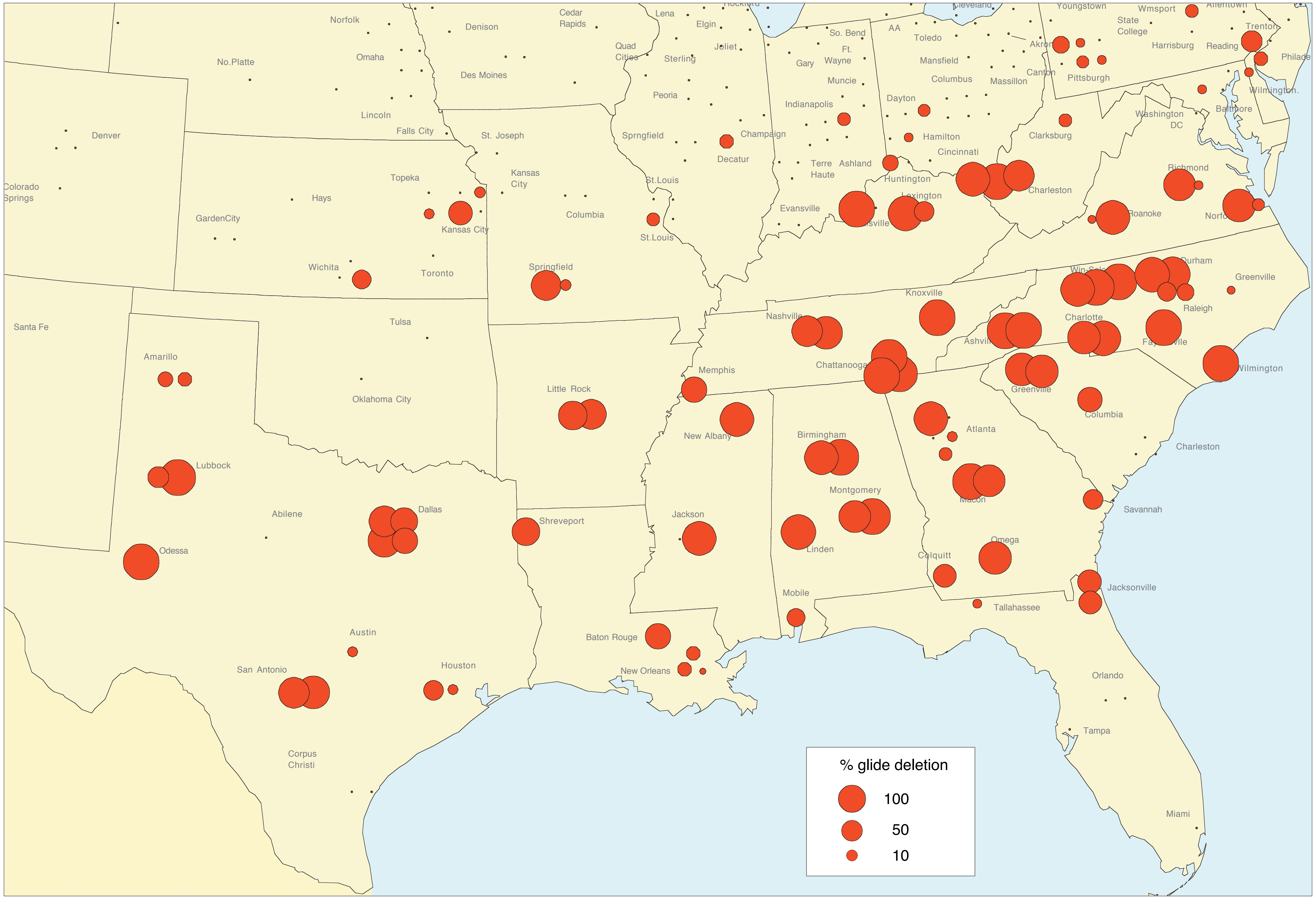
Map 18.3 displays the structure of glide deletion in the South in more detail than previous maps including both voiced and voiceless environments. The strongest development of this process is found in the Inland South and the Texas South (as first defined by Map 11.6). This is shown in Map 18.3 by the dark brown symbols, which indicate a high level of glide deletion in all environments, including voiced and voiceless. The predominant Southern pattern is not this across-the-board level of glide deletion, but rather the situation indicated by the orange circles. For these speakers, there is a major difference between voiced and voiceless environments, so that a majority of /ay/ tokens show glide deletion before voiced obstruents, but only a small minority before voiceless obstruents. Such differentiation is not uniform in most communities, since it is a sociolinguistic variable; glide deletion before voiceless obstruents is generally considered to be an uneducated or lower class variant, stigmatized by the stereotyped use of /ah/ in "nahs whaht rahss" (Feagin 1994).

A number of light red symbols in Map 18.3 are all located on the periphery of the Southern region as defined by the AYM line. For these speakers, the difference between voiced and voiceless environments is moderate since their overall level of glide deletion is low.

18.4

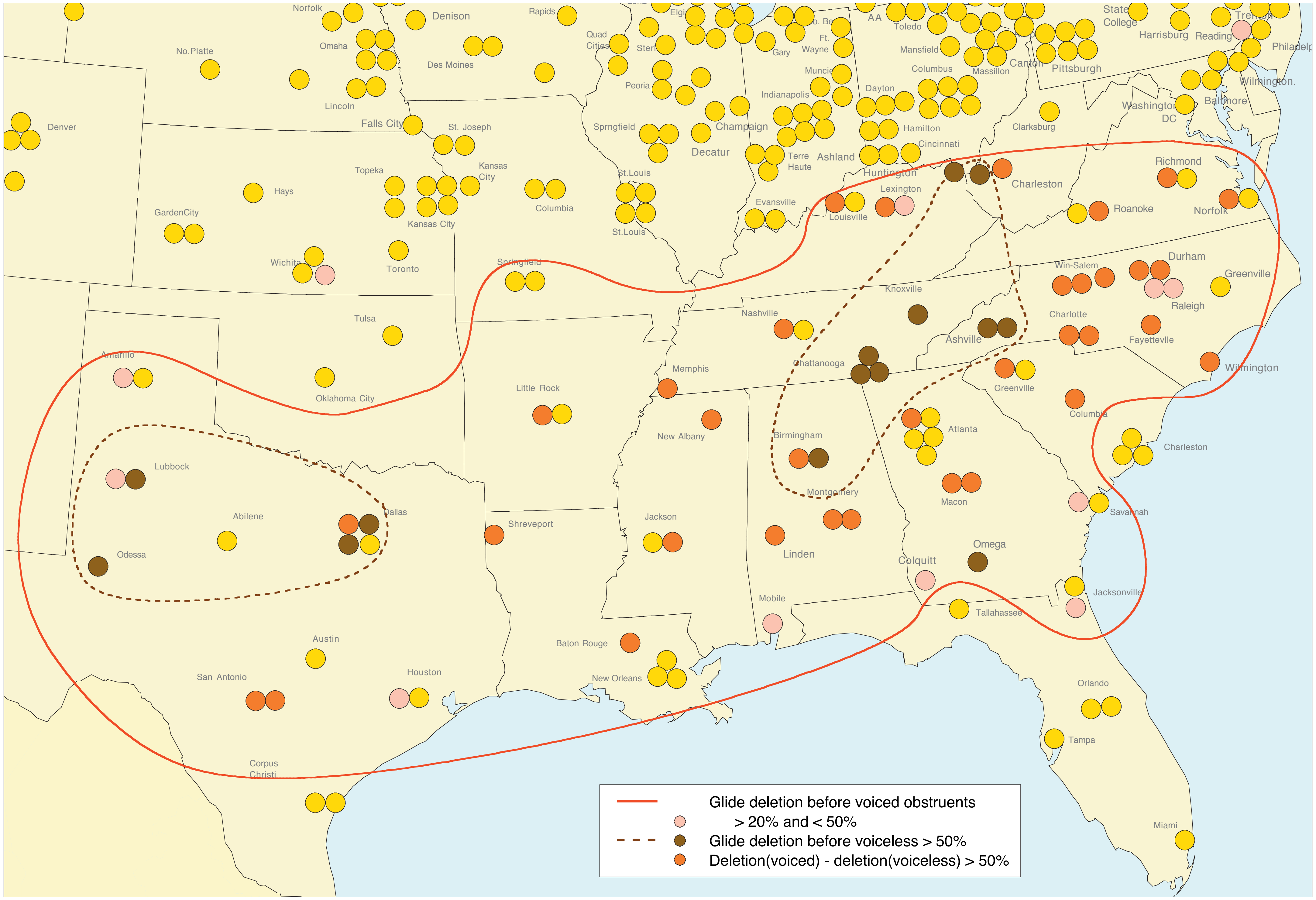
Map 18.4 compares the present distribution of glide deletion with the data published in PEAS in 1961 for the Eastern United States, preceding the Telsur data by about 50 years. The dark red isogloss shows the regions in which PEAS records monophthongal /ay/ in *nine* in Map 26: an Upper South area in Virginia

1 This was referred to as "Pattern 4" in earlier accounts (LYS 1972)
2 A configuration that is characteristic of West Germanic languages (Kim and Labov 2002).



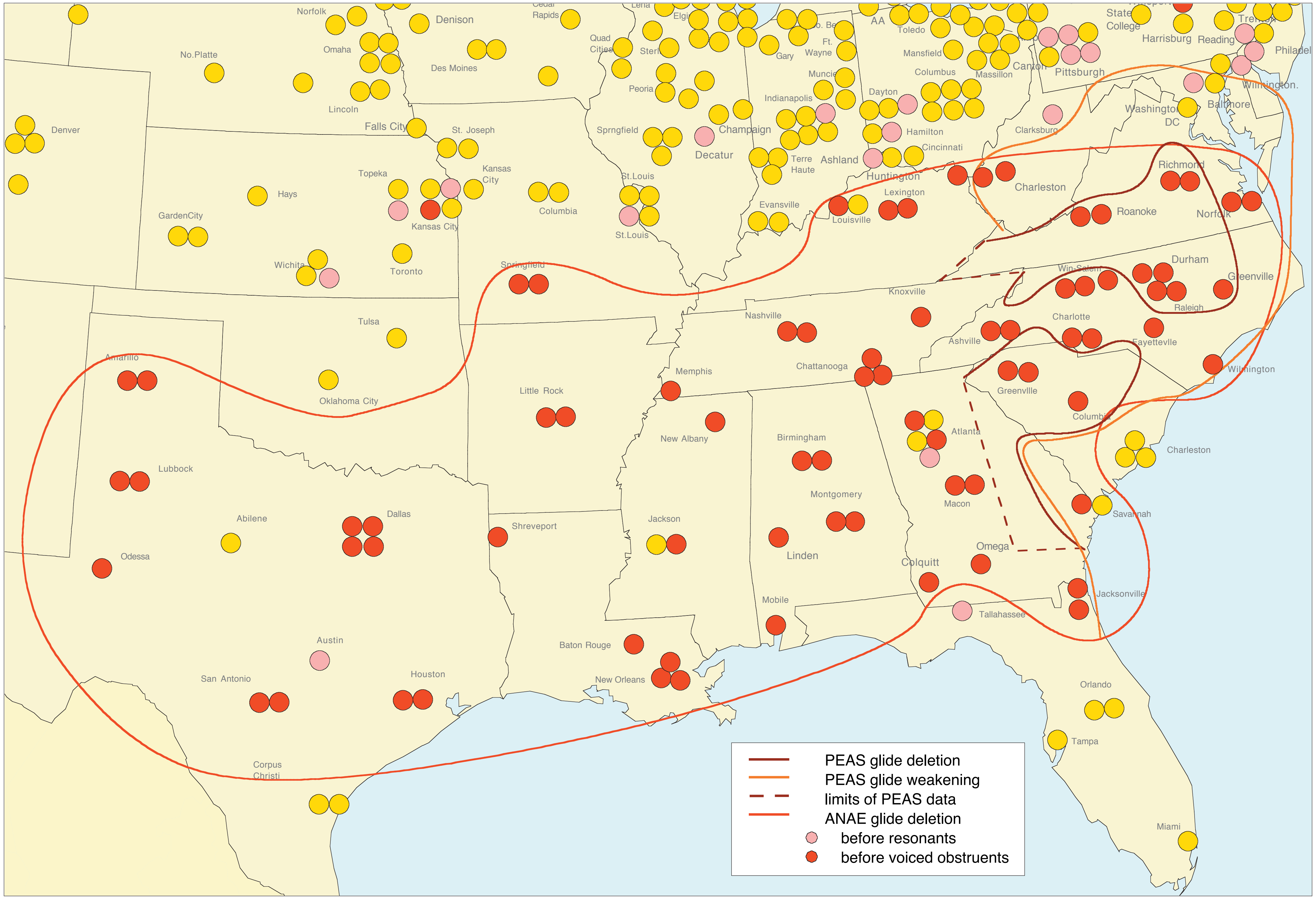
Map 18.2. Percent glide deletion of /ay/

This thematic map shows the percent glide deletion of /ay/ before voiced consonants and in final position, by the size of each red circle. The highest percentages are found in the interior of the Southern States, with a concentration in the eastern Appalachain area and in central Texas. Small circles in the peripheral coastal areas, and in the Midland areas on the northern edge of the area, indicate speakers who show glide deletion only rarely, and usually before resonants, as in *mile*, *iron*, *time*, etc.



Map 18.3. The South defined by glide deletion of /ay/ before voiced and voiceless consonants

The outer limits of the South were defined in Chapter 11 by the criterion of any degree of glide deletion of /ay/ before voiced obstruents in *wide*, *rise*, *five*, etc. This map provides more information about the frequency of deletion before voiced and voiceless consonants. The process is carried furthest by the speakers represented with brown circles, who delete the glide of /ay/ most of the time in all environments. These are concentrated in the Inland South and in central Texas. The orange circles are the speakers who show glide deletion most of the time before voiced consonants, and much less often before voiceless. The light orange symbols indicate speakers who show deletion less than half the time.



Map 18.4. The geographic diffusion of /ay/ glide deletion in the southeastern U.S.

Glide deletion in /ay/ seems to have spread quite widely since the Linguistic Atlas data of the eastern U.S. was gathered in mid-twentieth century. The dark red isogloss shows where glide deletion was recorded then, and the orange isogloss the extent of "glide weakening". The red circles show that glide deletion is now found throughout this area, except for the city of Charleston. We can also note an increase in glide deletion before resonants /l, r, m, n/ (light red circles) on the periphery of the South.

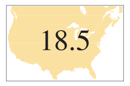
and upper North Carolina, and a Lower South area in Piedmont South Carolina and eastern Georgia. As noted above, glide deletion before resonants outruns glide deletion before obstruents, and is now found in areas of Maryland, Pennsylvania and Ohio (light red circles) where it does not appear in PEAS. The PEAS maps do not deal with glide deletion before obstruents, which must have been even more restricted than the case of *nine* shown in Map 18.4.

The orange isogloss indicates the surrounding area where PEAS recorded weakened or shortened glides, of the form [a$^{\varepsilon}$] instead of [a^{i}]. This area includes all of the South in the eastern U.S. except for coastal South Carolina and adjoining Georgia.

The red circles in Map 18.4 indicate (as in Map 11.3) the Telsur speakers who show some instances (from 20 to 100 percent) of clearly monophthongal /ay/ before voiced obstruents. Charleston is still excluded, and one of the two Savannah speakers. Otherwise, the area of the South shows glide deletion throughout, with the exception of the largest city, Atlanta. Glide deletion has spread to all the interior areas of North Carolina, and diffused eastward towards the Atlantic Coast. From recent work done on the Outer Banks by Wolfram and his associates, we know that the diphthongal raised /ay/ → /oy/ that is the hallmark of that relic area is still maintained, but some diffusion of glide deletion from the predominant mainland pattern is evident (Wolfram, Schilling-Estes, and Craig 1994). It seems clear that glide deletion is extending to small town and eastern rural areas as well as the urbanized areas shown here.

It is important to note here that the ANAE view of this process is focused on the Telsur sample of urbanized areas. We may expect to find more widespread glide deletion in rural and small-town areas outside of the AYM line. Nevertheless, the consistency of the pattern displayed in the main Southern States areas contrasts sharply with the comparative absence of glide deletion in the peripheral areas.

Stage 2 of the Southern Shift: reversal of /ey/ and /e/

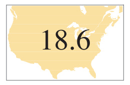


Map 18.5 examines the second stage of the Southern Shift in greater detail than Map 11.4. It considers four possible relations of /ey/ to /e/. In Q[uadrant] 1, the most conservative situation, /e/ is lower and backer than /ey/. In Q2, /e/ has moved to a fronter position, but is still lower. Q3 shows the converse situation: /e/ is higher but still backer than /ey/. The full development of Stage 2 is Q4, where /e/ has reversed its original relation to /ey/, being both higher and fronter. Of the two intermediate stages, there are eight cases of Q3 within the South, and only four of Q2. The general theory, that peripheral nuclei raise and non-peripheral fall, predicts that Q2 would be more common.

The temporal sequence of Stage 1 and 2 is reflected in the geographic pattern, shown in Map 18.5. The isogloss delineating the territory of Stage 2 is entirely contained within that delineating Stage 1, showing that Stage 2 speakers – those who have reversed the positions of /e/ and /ey/ – are a proper subset of Stage 1 speakers – those who have deleted the glide of /ay/. Stage 2 is not found in western Kentucky or Tennessee, southeast Texas, the eastern coastal portion of the South, or northern Virginia. In the southeastern area of the South, Atlanta, Savannah, Macon, and Jacksonville are not included. Thus the areas that formerly had the greatest concentration of wealth and influence in public life, and were the seat of the earlier *r*-less dialect (McDavid 1964) are those that participate the least in the Southern Shift.

The /e/ ~ /ey/ isogloss includes 36 of the 61 speakers within the /ay/ isogloss. Within it are found only four exceptions, and outside it only one speaker shows the reversal of /e/ and /ey/. This geographic configuration confirms other evidence that the two stages form a chain shift, in which Stage 2 is triggered by Stage 1. The logic of the chain shift is particularly compelling since the two stages are different kinds of phonetic processes, and cannot be covered by a single rule or constraint: that is, Stage 2 is not a generalization of Stage 1, but a consequence of the removal of the /ay/ from the subsystem of front upgliding vowels.

Stage 3 of the Southern Shift: reversal of /i/ and /iy/



Map 18.6 displays the data for /i/ and /iy/ that correspond to the data on /e/ and /ey/ in Map 18.5. The same four relations between the short vowel and the front upgliding vowel are displayed. The third stage covers a much smaller area than the second stage, and is nested within in it. Only eleven speakers show the relative reversal of /i/ and /iy/. The /i/ ~ /iy/ isogloss encloses an oval area along the Appalachian chain and down to include a large part of Alabama. This area, the *Inland South*, will assume increasing importance in the geography of the Southern region as the discussion proceeds.

While Stage 2 cannot be viewed as a generalization of Stage 1, this Stage 3 can be viewed as a generalization of Stage 2, extending a change in the mid vowels to an analogous change in the high vowels. However, the path of the transition is different for the two stages. The main intermediate step in Stage 2 in the eastern area of the South is Q3, with /ey/ lower but fronter than /e/ – in other words, change of height first. But the main intermediate step in Stage 3 is Q2, where /iy/ is backer but remains higher than /i/ – exchange of peripherality first, then exchange of height.

The Southern Shift in superposition

The mechanism of the Southern Shift can be viewed most directly in the superposed view of all Telsur speakers provided by a Plotnik Major diagram. Figure 18.4 shows the normalized means of the four front upgliding vowels /iy/, /ey/,

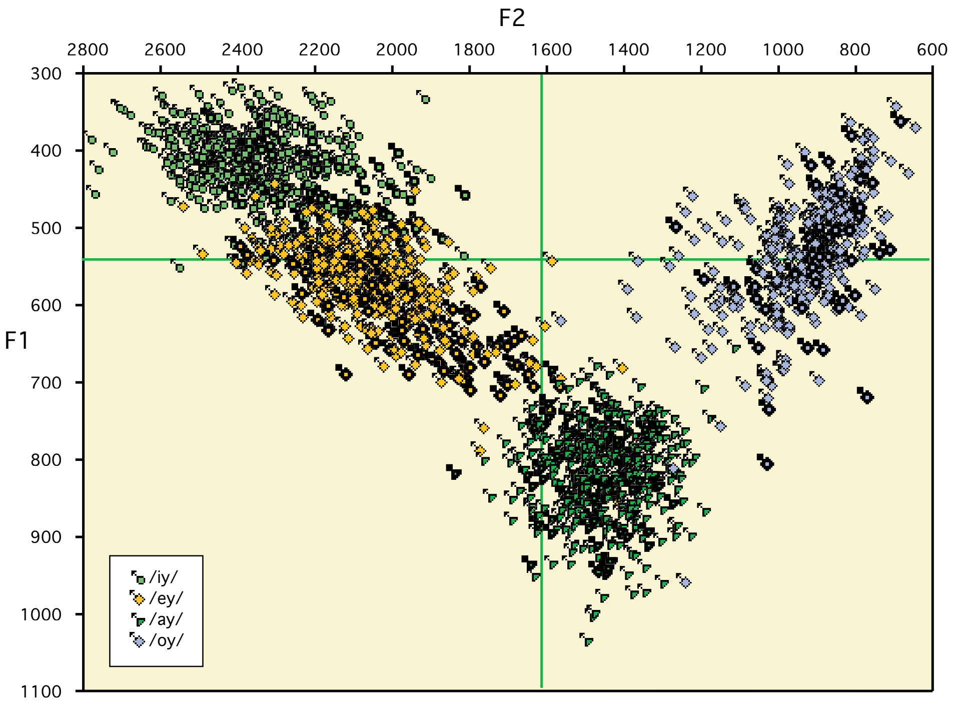
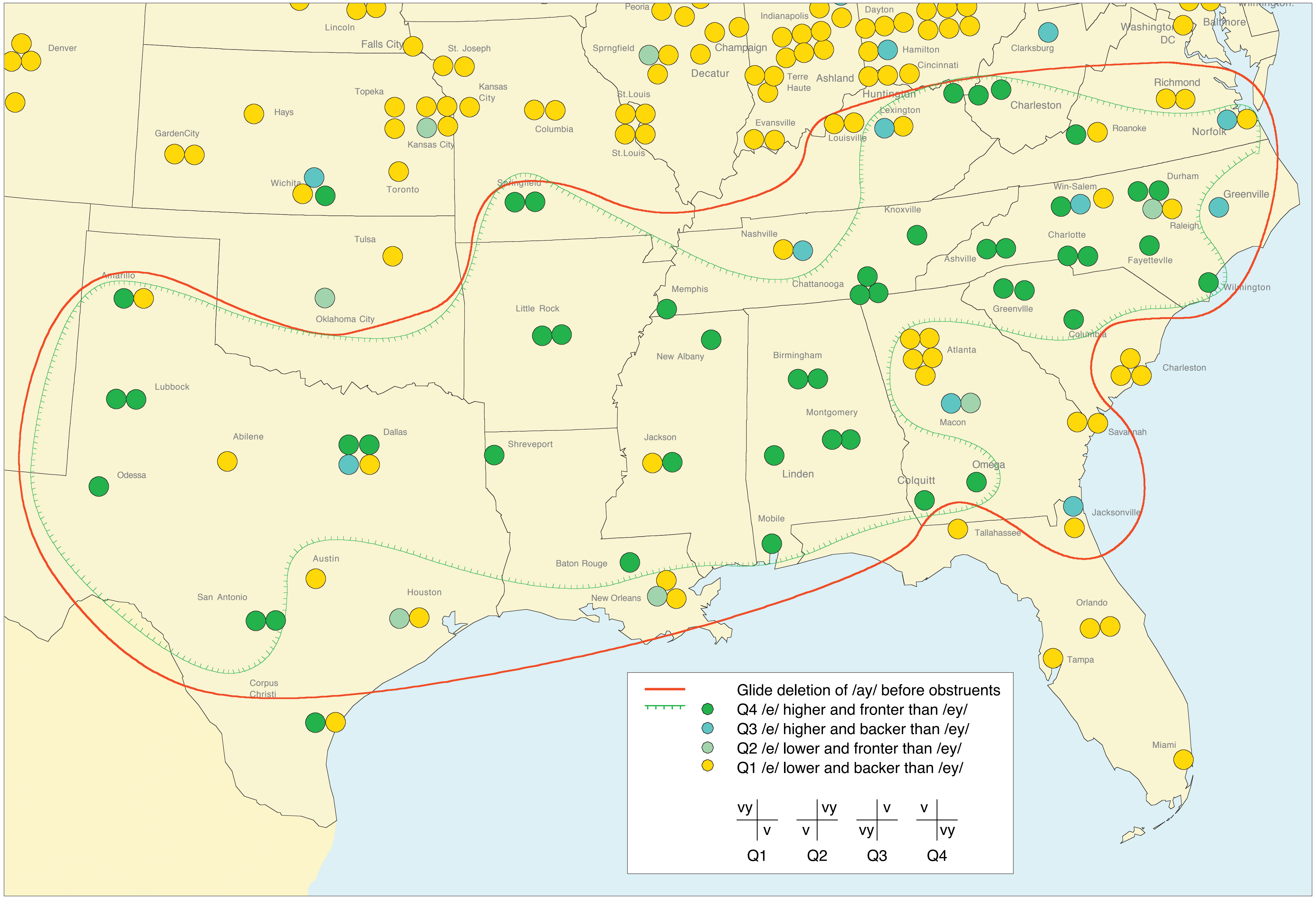
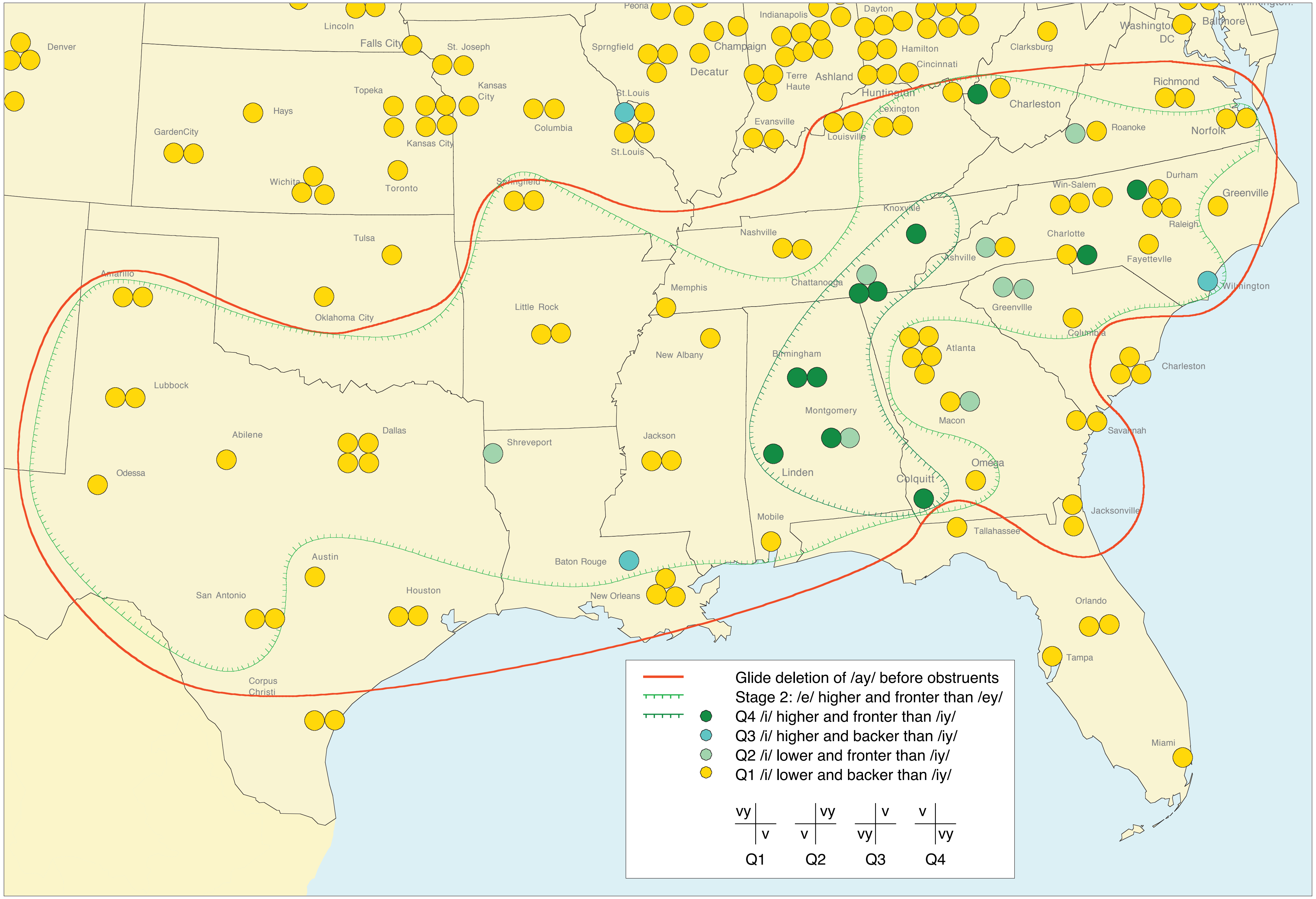


Figure 18.4. Superposition of /iy, ey, ay, oy/ normalized means for 402 Telsur speakers. /iy/ and /ey/ means for speakers in the South (including Inland South and Texas South) are highlighted. /ay/ values do not include vowels before voiceless segments



Map 18.5. The second stage of the Southern Shift

The second stage of the Southern Shift involves the reversal of the relative positions of /ey/ in *bait* and /e/ in *bet*, so that the nucleus of /ey/ is lower and more central than the nucleus of /e/, which becomes higher and fronter. This has happened in the vowel systems of all the speakers shown with green circles. Stage 2 covers most of the South as defined by the red isogloss, but there are some marginal areas which are not affected. The most common intermediate stage is shown with light blue circles, where /e/ has moved up and /ey/ has moved down, but /ey/ is not fully centralized.



Map 18.6. The third stage of the Southern Shift

Stage 3 of the Southern Shift extends the process of Stage 2 to the high vowels /iy/ and /i/, so that /i/ becomes higher and fronter than /iy/. It is limited to a comparatively small area outlined by the dark green isogloss and the dark green symbols: the Appalachian area of Knoxville and Chattanooga, but extending southward to cover most of Alabama. The light green symbols show an intermediate stage where /i/ has become fronter than /iy/ but is not yet higher. The western section of the South has not reached this level of expansion of the Southern Shift.

/ay/, and /oy/ for 439 subjects. The symbols for speakers from the South are highlighted. No /ay/ tokens are highlighted, so that any highlighted symbols in the /ay/ area represent /ey/ means of Southern speakers. The figure thus displays the effects of Stage 2. It is evident that (a) the /ey/ tokens of most Southern speakers are considerably lower and backer than the main distribution of /ey/, and (b) a number of the Southern /ey/ means fall squarely within the general area occupied by /ay/. This does not of course imply merger since the Southern /ay/ is removed from the subsystem of front upgliding vowels.

As shown in Map 18.6, the number of speakers with Stage 3 completed is limited, so that only a small number of /iy/ mean values for individuals overlap with the /ey/ distribution. The most visible cases, less peripheral than the /ey/ tokens, are labeled: Linden (Georgia) and Birmingham (Alabama), both from the Inland South.

Another view of the Southern Shift is provided by Figure 18.5, which shows the mean values for 21 dialects as defined in Chapter 11, and adds /i/ to the display. Five dialects in the southern states show a marked lowering and centralization of /ey/, with the Inland South (IS) leading. Among the high vowels, the Inland South is the only dialect which shows a distinct lowering and centralization of /iy/, in line with the findings of Map 18.6. The IS mean for /iy/ is embedded in the upper range of the /ey/ tokens, lower than the IS mean for /i/.

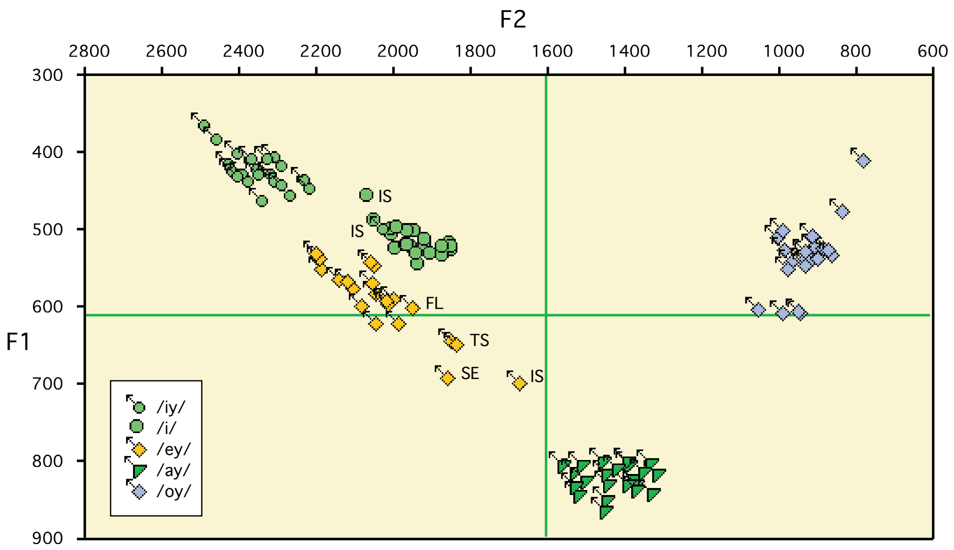


Figure 18.5. Means of Vy vowels for 21 dialects. IS = Inland South; TS = Texas South; S = South; SE = Southeast. FL = Florida

Glide deletion of /oy/

Among the Southern features listed in the introduction was the glide deletion of /oy/. The /oy/ class is the least frequent among the North American English phonemes, in spontaneous speech or in the Telsur interviews. A total of 743 tokens were measured. Of these, only 28 showed glide deletion. All but one were from speakers in the South, and 23 were before /l/, in *oil*, *boil*, *spoil*, *toilet* (or after /l/, in *employment*). The only other environment in which glide deletion was noted was before /s/: *moisture* (2), *oyster* (2), and *voice*.

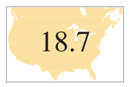


Figure 18.1 did not indicate that /oy/ is involved in the Southern Shift directly, but it seems likely that it is linked to /ay/ as a simple generalization of glide deletion. The glide deletion of /oy/ is not as salient a feature of the South as the glide deletion of /ay/, but it is well recognized by Southerners. The study of cross-dialectal comprehension by Labov and Ash (1997) obtained data on comprehension of a monophthongal token of *spoiled* [spɔ:ld] spoken by a young woman from Birmingham. Subjects in Chicago, Philadelphia, and Birmingham all heard this token as an isolated word, in a phrase, and in a sentence. It was the only item that all Birmingham subjects (high school and college) recognized perfectly in the isolated word context. Thirty to 40 percent of subjects from Chicago and Philadelphia failed to recognize this word.

Glide deletion of /oy/ before /l/ actually forms part of the Back Upglide Chain Shift and adds another element to the chain shift in that environment. This third link applies primarily to contexts before /l/:

foil	→	*fall*	→	*foul*	→	[fe:ol]
/foyl/	→	/fohl/	→	/fawl/	→	/fæwl/

The social distribution of the Southern Shift

The Southern Shift is reasonably stable, and is strongly represented in the speech of many younger Telsur speakers. It is not in the terminal stages of disappearance like the features displayed in Map 18.1. However, regression analyses of the social factors involved show that the Southern Shift differs considerably in its social distribution from the Northern Cities Shift as described in Chapter 14. The measures of the Southern Shift to follow apply to the 83 Telsur speakers within the AYM isogloss: representatives of the Inland South, Texas South, and the South dialect as a whole, but not the marginal speakers who show no glide deletion of /ay/.

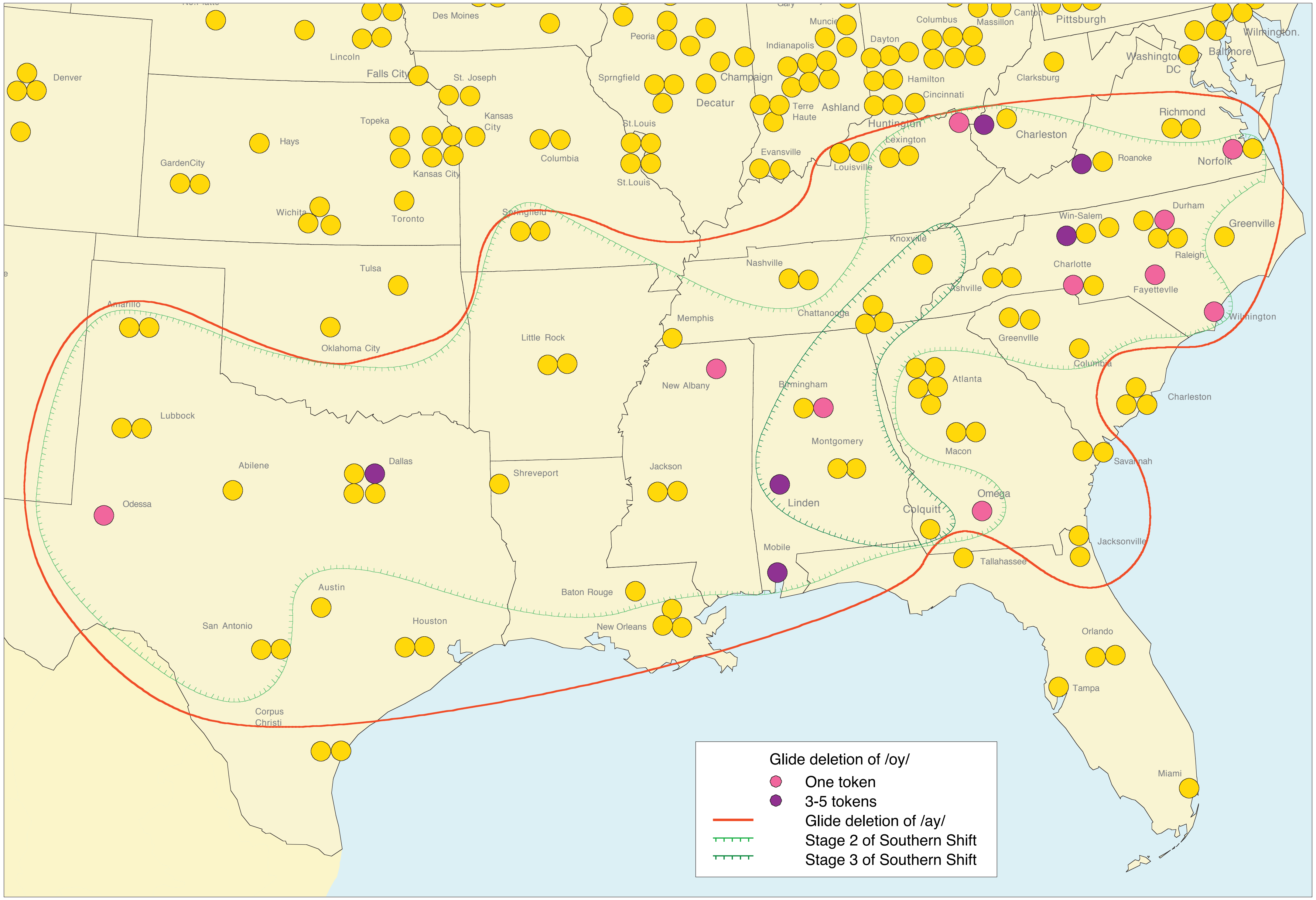
Since Stage 2 of the Southern Shift is defined by the relative position of the means of /e/ and /ey/, the analysis of social factors is necessarily based on mean values of the 83 Southern speakers rather than their individual speech tokens as units. The treatment of the Southern Shift is confined to the first two stages, since the reversal of /i/ and /iy/ does not involve enough speakers. The regression analyses of the social factors considered the age, population of the speech community, occupational index, education, and gender of each speaker. Of these five, the first two are significantly correlated with both stages of the Southern Shift, while the last three are not.[3]

In Table 18.3, Stage 1 is measured by the percent glide deletion of /ay/ before obstruents and finally. Stage 2 is measured as the sum of two differences: F2(e) – F2(ey) and F1(ey) – F1(e). Given the reversal of the relative positions of /e/ and /ey/ in Stage 2, both differences will be positive if Stage 2 is complete. This holds for 58 percent of the speakers in the South, but for only 1.6 percent in the rest of North America. In Figure 18.6 this measure of Stage 2 appears as a bimodal distribution, with the Southern speakers showing a positive mode at 250 and the balance of the continent a negative mode of –450.

Both age coefficients in Table 18.3 are positive, indicating that older speakers have more advanced forms of the Southern Shift than younger speakers. These are sizeable effects. The age range among the Southern speakers is from 14 to 74, or 60 years. The age coefficient of 12.8 for /ay/ indicates that for each successive generation of 25 years the percent of glide deletion falls by 12.8. For each younger generation, the Stage 2 measure falls by 137.5 Hertz.

The effects of city size are negative for both measures, indicating that the smaller the city, the more advanced the shift. It is not significant for /ay/ glide deletion, but it does reach significance for the Stage 2 measure. This effect is independent of the effect of two large cities, Atlanta and Dallas–Forth Worth. It holds

3 The size of the SMSA, or standard metropolitan statistical area, was also significantly correlated with all variables, but in a weaker relation than the size of the city itself.



Map 18.7. Glide deletion of /oy/

Glide deletion of /oy/ is much less widespread than for /ay/. Though it is more common in the eastern section of the South, it is not concentrated in any one geographic area. The dark purple circles indicate the speakers who show more than one example of /oy/ glide deletion. It is most frequent before /l/.

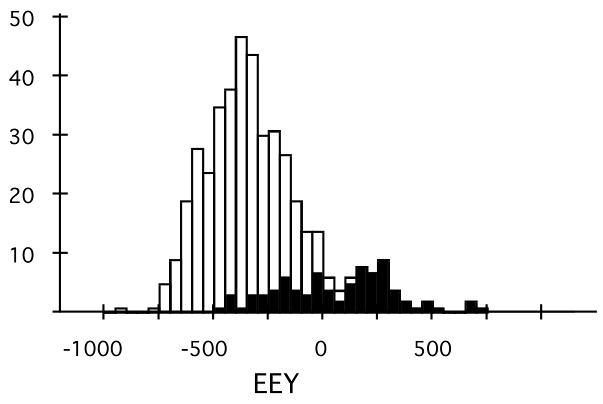


Figure 18.6. Distribution of the Stage 2 measure, F2(e)–F2(ey) + F1(ey)–F1(e). Solid bars show speakers from the South, within the AYM isogloss

equally well for cities smaller than 1,000,000 and larger than 50,000. In sum, these figures show the two main stages of the Southern Shift are most advanced among older speakers living in smaller cities. In the perspective of apparent time, the Southern Shift is slowly receding, in contrast with the steady advance of the Northern Cities Shift and other sound changes in progress studied in Chapters 12, 14, and 15.

Table 18.3. Regression coefficients for the first two stages of the Southern Shift [N = 83]. Stage 2 distance: F1(e)–F1(ey) + F2(ey)

Variable	Age (* 25 yrs)	p	City size (*100,000)	p
Stage 1: % /ay/ glide deletion	12.7	.027	–2.0	.086
Stage 2: /e/ – /ey/ distance	137.5	.001	–20.0	.016

The total effect of social factors on the progress of the Southern Shift is not great: the factors found to be significant account for only about 15 percent of the variance. Even within the South, geographic factors are more influential. The geographic differentiation shown in Maps 18.3, 18.5, and 18.6 is a larger factor in the development of the Southern Shift than the social factors of Table 18.3. Table 18.4 adds the effect of membership in the Inland South, the area where the Southern Shift is most developed. The effect of this factor is considerably larger than the first two.

Table 18.4. Addition of geographic factor "Inland South" to Table 18.3

Variable	Age (* 25 yrs)	p	City size (*100,000)	p	Inland South	p
Stage 1: % /ay/ glide deletion	13.4	.01	–1.4	.214	38.0	.0006
Stage 2: /e/ – /ey/ distance	143.0	.0002	–15.0	.052	313.0	<.0001

Since the Inland South was defined as the most advanced region in the Southern Shift movements, it is not surprising to find that there is a significant effect of membership in the Inland South. Table 18.4 allows us to weigh the geographic factor against the social factors. The amount of variance accounted for by this geographic factor is larger than that of the social factors combined. In each case, the level of significance of the geographic factor is greater than that of either age or city size. However, social factors do survive in this analysis and point in the same direction.

A regression analysis for glide deletion before voiceless consonants shows large and significant effects for the two geographic areas where this feature is most concentrated: the Inland South and the Texas South. No significant correlations with gender, education or city size are found, however.

Internal conditioning of the Southern Shift

The major geographic difference between voiced and voiceless environments for glide deletion of /ay/ raises the question as to whether the Southern Shift operates on the phonemes /iy, ey, ay/ as a whole or whether specific allophones are related by chain shifting. Table 18.5 addresses this question through a regression analysis of all of the individual tokens measured for these phonemes as produced by the 83 speakers in the South, with numbers of tokens for each vowel indicated. It shows the effects according to the level of significance. The black asterisks are effects that operate in the direction of the Southern Shift, while the red asterisks indicate the environments that disfavor the Southern Shift (e.g. negative coefficients for F2 of /ey/ indicate a favoring of the Stage 2 centralization and therefore appear in black).

Table 18.5. Significant regression coefficients for internal factors for three elements of the Southern Shift. * p < .05; ** p < .01; *** p < .001. Black symbols favor the direction of the change; red figures disfavor the change.

	/ay/ [N = 1397] % Monophthongal	/ey/ [N = 2003] F1	F2	/iy/ [N = 1351] F1	F2
Internal factors					
Coda					
Stop		***			
Fricative				**	
Nasal		***		***	
/r/		***	***		
Labial	***		q		
Labiodental	*	***	***	*	
Interdental				**	
Apical	*	***	***	*	
Palatal		*	***		
Voiced		*			
Onset					
Nasal		***		***	***
Labial			***	***	***
Coronal			***	***	***
Palatal		*	***	*	***
Liquid			***		***
Velar				*	
Obstruent/liquid		*	***		***
Following syllables				*	
Social factors					
Female		***			
City size (100,000)	***	***	***	***	***
Age	***		***		***
Inland South	***	***	***	***	***

The crucial question is whether higher frequencies of glide deletion for certain allophones of /ay/ lead to higher frequencies of lowering only in the corresponding allophones of /ey/ and /iy/, rather than to lowering of /ey/ and /iy/ as a whole, regardless of allophonic environment. If so, the environmental coefficients for /ay/, /ey/ and /iy/ should be similar. An inspection of the table gives a negative answer. The only aspects of the following environment that significantly favor glide deletion are following labial, labiodental and apical consonants.[4] There is no resemblance between the environments that favor glide deletion and those that favor lowering and centralization of /ey/ and /iy/. In this case, the unit of chain shifting is not the allophone but the phoneme.

On the other hand, there are no disagreements among the three external factors involved. The only inconsistency is in the effect of age, which is not significant for F1 of /ey/ and /iy/. In the other three cases, age is positively correlated with the Southern Shift, registering the recession in apparent time noted in Table 18.4. These results indicate that the major phonetic development in the recession of the Southern Shift is the reversal of the original exchange of tense–lax relations in the F2 dimension.

18.4. The Back Upglide Shift

18.8

One of the most distinctive features of the Southern States vowel system, first mentioned in Chapter 2, is the presence of a back rounded upglide in the long open-*o* class, which is labeled /oh/ in the initial position of North American vowel systems. For most of North America, this /oh/ class is a member of the long and ingliding subsystem that occurs in both free and checked position. It is normally realized as a long monophthong in low back to lower mid position. In the northeastern area from Providence to Baltimore, it ranges from low to upper mid or lower high position, with an inglide that is realized with increasing frequency as it rises to upper mid position. In the South, this word-class is frequently realized as a diphthong with a back upglide, as displayed in Map 18.8. Many members of the word-class are derived from back upgliding diphthongs (*law*, *hawk*, *thought*) or syllables with lateral codas that developed unrounded back upglides when vocalized (*salt*, *talk*, *all*). The Southern glide may not then be a new development, but a continuation of an older form. If so, the back upglide would have been generalized to other members of this miscellaneous word-class that originally had no glide, derived from the lengthening of short-*o* (*lost*, *off*, *dog*). In any case, the existence of the back upglide puts into question the validity of the /oh/ notation (or any monophthongal equivalent) for Southern States phonology. Acoustic and auditory analyses of this class show that for most Southern speakers,

(1) the nuclei of /o/ and /oh/ generally coincide on the F1/F2 plane, so that the back upglide is the feature that distinguishes the two classes;
(2) when the back upglide is present, the nucleus is shifted to the front, and is often heard as unrounded.

Thus a phonetically realistic phonemic notation for the Southern form is /aw/. There is no possibility of confusion with the historical /aw/ in *house*, *out*, etc.; in the South and the Midland, this is firmly to shifted front of center. The opposition of a front /aw/ to a back /aw/ suggests a phonological shift, with the front vowel now identified as /æw/. These relations can be captured as the *Back Upglide Shift*. As indicated above, it involves /oy/ as well for allophones, primarily before /l/:

/oy/ → /oh/ → /aw/ → /æw/

In PEAS, the back upglide appears throughout the Southern States for *law*, *salt* and *dog* (Maps 22-24). One exception is the Charleston–Savannah region, extending to Columbia, where only monophthongs are shown. In the areas that show diphthongs, the back upglide is most consistent in *dog*, and least consistent in *law*. This runs counter to the possibility that the glide is an historical continuation of the *law* class, and suggests a more recent Southern innovation.

Map 18.8 expands the view of the back upglide provided in Map 11.2 and adds information on the fronting of /aw/ to /æw/. Three levels of back upglide frequency are shown. The outer isogloss, in light purple, encloses all the communities in which any frequency of /oh/ → /aw/ is found. It includes most of the Southern region and is the only Southern isogloss that goes beyond the AYM line to include one city in Oklahoma, Tulsa, and one in northern West Virginia. Beyond the AYM line, one can observe a scattering of low frequency cases of /oh/ → /aw/ in the neighboring portions of the Midland. On the other hand, back upglides are not found in west Texas, so that the Texas South region of Amarillo, Lubbock, and Odesssa is not included. The back upglide is also absent in New Orleans, emphasizing again that this community is only marginal to the South.

The magenta isogloss surrounds all those (magenta) symbols that have at least 20 percent back upglides. It forms a compact area in which 31 of 50 speakers within the isogloss are marked in this way. An even more compact area is enclosed by the inner isogloss surrounding points that show more than 50 percent back upglides, with 15 out of 19 interior points so marked. This consistent pattern is again focused on the Inland South area identified in Maps 18.5 and 18.6, the region in which the Southern Shift is most highly developed.

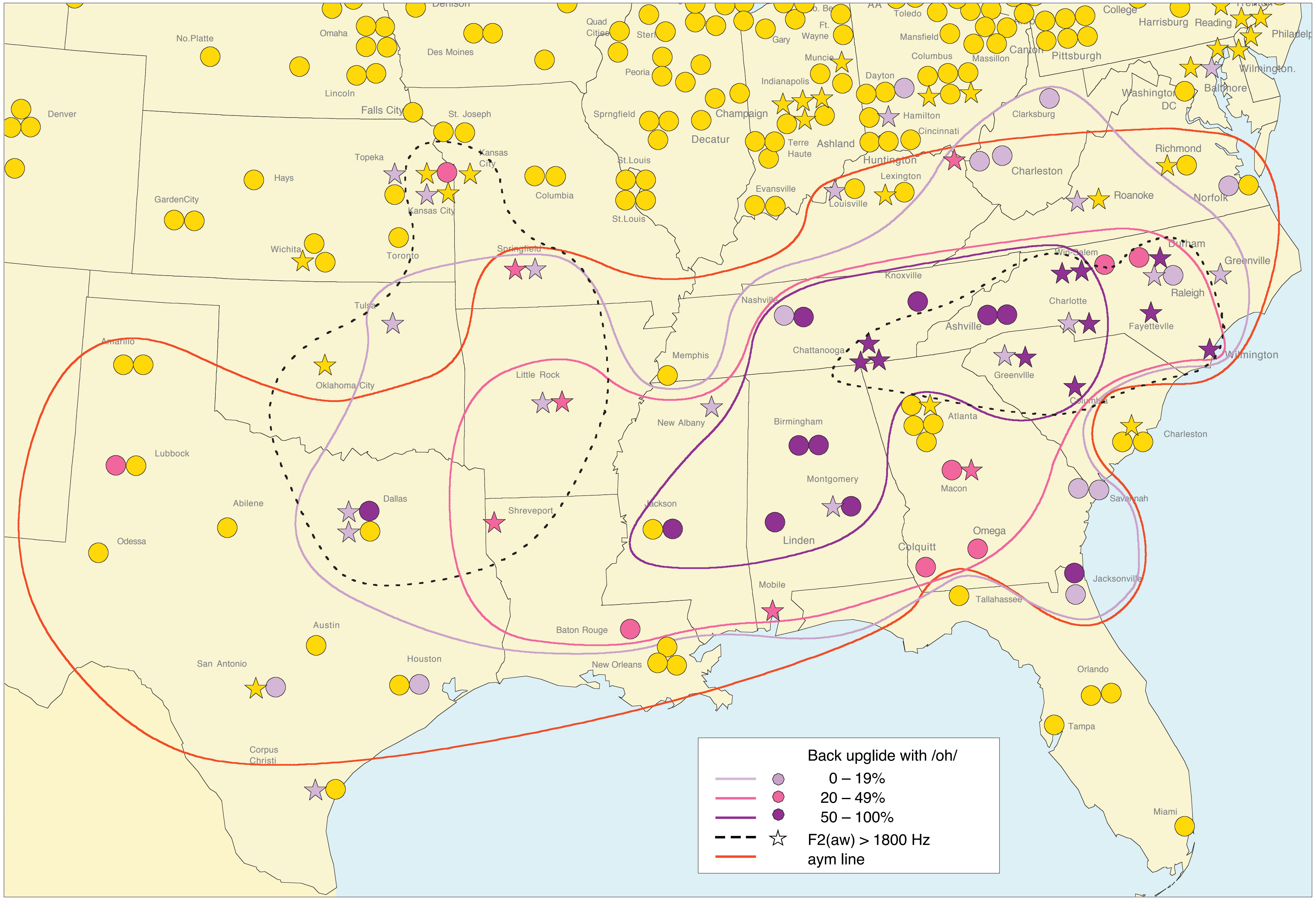
The relation between the shift of /oh/ to /aw/ and fronting of initial /aw/ in *out*, *loud*, *down*, etc. to /æw/ is indicated by symbols with stars in place of circles. All speakers shown with star symbols instead of circles have a mean F2 of /aw/ greater than 1800 Hz. The black dashed isogloss outlines the areas where this is the predominant pattern. There are two areas of extreme fronting of /aw/: one covers part of the Inland South, and extends further into North Carolina; the other covers part of the Texas South, and extends northward into Arkansas and southern Missouri. A clustering of stars appears in the Kansas City area, which is outside of the South, but as noted in Chapter 12, is a strong center for the fronting of /aw/. As the light magenta symbols indicate, the back upglide is moderately represented in that area as well.

It has been pointed out that /o/ in the South is in a lower back mid position. Table 18.6 shows the percent of /o/ tokens with inglides as noted by the analyst. The presence of such inglides in the South then suggests that from a structural viewpoint, /o/ may retain the identity of /oh/ while /oh/ is converted to /aw/.

Table 18.6. Number and percentages of inglides recorded for /o/ by region

Region	N	No. of inglides	% of inglides
W. PA	432	13	3.0
ENE	269	6	2.2
South	2,102	38	1.8
Canada	704	8	1.1
West	1,266	5	0.4
North	3,358	4	0.1
Midland	1,841	1	0.1
Mid-Atlantic	360	0	0.0
NYC	166	0	0.0

4 As Map 18.1 showed, glide deletion is favored before resonants in the peripheral areas not included within the AYM line. A regression analysis of all North American speakers outside of the South shows that following liquids strongly favor glide deletion, along with labial codas, but within the South liquids do not have this effect.

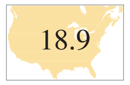


Map 18.8. The Back Upglide Chain Shift

In the South, the vowel class of *caught*, *hawk*, *dawn* is distinguished from the class of *cot*, *hock*, *Don* by the presence of a back upglide. This feature is most widespread in the eastern, interior regions of the South. It usually involves the unrounding of the nucleus, so that /oh/ becomes /aw/. At the same time, the /aw/ of initial position is strongly fronted to /æw/. Speakers indicated by stars show the most extreme fronting and raising of the class of *out*, *down*, *house*. The combination of these two changes forms the *Back Upglide Chain Shift*, concentrated most strongly in the intersection of the dashed black and dark purple isoglosses.

In Chapter 11 it was noted that the nuclei of /o /and /oh/ occupy almost identical positions in the Southern States, and that it is the presence of the back upglide that differentiates the two classes. We would expect this pattern to show a complementary geographic distributon to that of the lowback merger, and it does: the /oh ~ aw/ isoglosses do not include the points in Virginia, West Virginia, and Kentucky where Chapter 9 reported an expanding merger of /o/ and /oh/. The low back merger has also been reported for young middle-class speakers from Anniston, Alabama (Feagin 1993).

18.5. Overall view of the South



Map 18.9 superimposes all of the Southern isoglosses that have been presented so far. Three of these isoglosses combine to identify the most advanced representatives of the Southern dialects: speakers with more than 50 percent monophthongization of /ay0/, those with more than 50 percent back upglides with /oh/, and those with a relative reversal of /i/ ~ /iy/ as well as /e/ ~ /ey/. These isoglosses overlap most clearly in the areas originally identified in Map 11.6, named the "Inland South" and the "Texas South". Three cities – Knoxville, Chattanooga, and Birmingham – form the central speech communities of the Inland South, but it extends to include two cities in the western Carolinas – Asheville and Greenville. The Texas South area is not marked by as many converging features, but does show the full development of glide deletion to include voiceless as well as voiced environments.

18.6. Southern Shift vowel systems

A leading exponent of the Southern Shift is Thelma M., of Birmingham, Alabama (Telsur 341). She was 31 years old when interviewed in 1995, of English–Irish background, and works as an administrative assistant in a research lab at a Birmingham hospital. Thelma is a lively, forthright and engaging speaker, a personality typical of the leaders of linguistic change (Labov 1994: Ch. 12). Figure 18.7 is a Plotnik vowel chart that provides a concrete exemplification of the Southern Shift of Figure 18.3. Vowels before nasals are not shown for the short front vowels, since /i/ and /e/ are merged before nasals and not used in mean calculations.

In Figure 18.7, Stage 1 of the Southern Shift is represented by the highlighted /ay/ tokens, which are all monophthongal. All /ay/ before voiced codas and final are monophthongal, and most of those before voiceless codas. Diphthongal tokens of *night*, *pipe*, and *quite* are further back than the main distribution, in contrast with the monophthongal *night* which is slightly fronted along with the main distribution.

Stage 2 is well represented with the mean of /e/ much higher and fronter than the mean of /ey/. One outlier of /i/ in *guess* overlaps with the /i/ distribution; more typical are peripheral *eggs* and *edge*. The mean value of /ey/ is back of center and considerably lower. The downward shift of /ey/ is most notable in *shame*, *same*, *age*, and *maintenance*, which overlap the /ay/ distribution. It is clear that this extreme lowering is favored by following nasals, quite the reverse of the effect on raising and fronting of short vowels. The nonperipheral position of /ey/ is indicated by its relation to the means of /æ/ and /aw/.

Stage 3 of the Southern Shift is also well developed. /i/ is in high front peripheral position. The highest vowels show the merger of /iy/ and /i/ before /l/ in *ill*, *grill*, *Mobile*, *heel*, and *peel*. Otherwise, the high front peripheral vowels are all the short /i/ of initial position: the leading tokens are *is* and *kids*. In contrast, the /iy/ distribution is much lower and more central. Vowels in word final position – *see*, *me*, *three* – are the most extreme, almost mid-central.

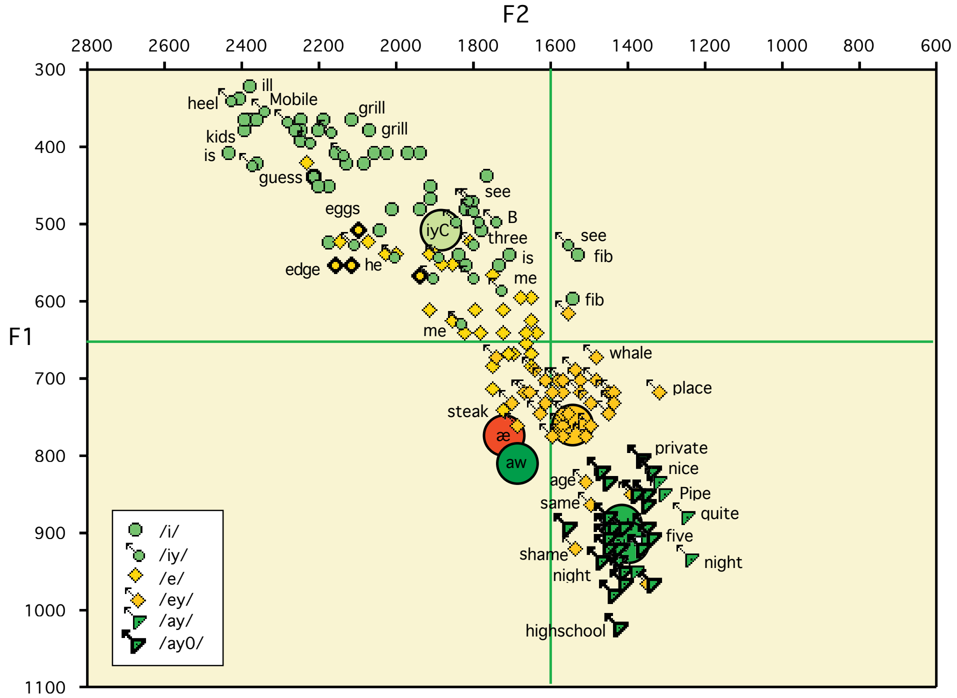


Figure 18.7. The Southern Shift in the system of Thelma M., 31 [1995], Birmingham, TS 341. Short front vowels before nasals not shown. Highlighted /ay/ tokens are monophthongs

The fronting of back upgliding vowels in the South

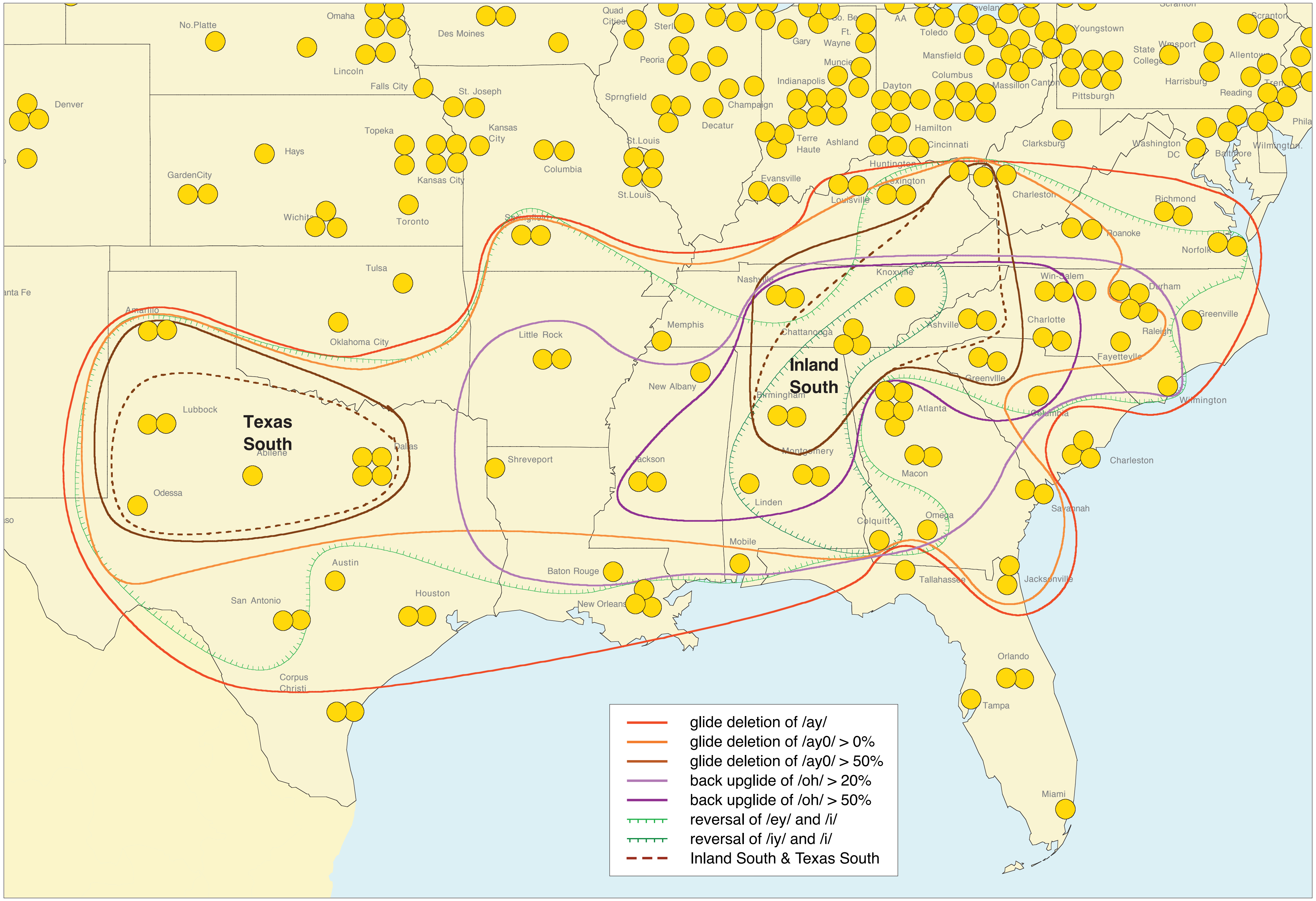
Chapter 12 showed that the fronting of /uw/ was general to most of North America, and that the fronting of /ow/ was strongly entrenched in the Midland region (including Pittsburgh and the Mid-Atlantic States) as well as the South. Figure 18.8 shows the pattern of fronting of /uw/ and /ow/ that is characteristic of the South, as exemplified in the vowel system of the same speaker, Thelma M. of Birmingham.

Although the two most strongly fronted vowels are members of the /iw/ class, *Tuesday* and *shoes*, the means of /iw/, /Tuw/, and /Kuw/ are not far apart. The differential between vowels after coronal consonants and others is not evident here; words like *Hoover* are well front of center.

A number of glide target measurements are displayed in Figure 18.8. It is evident that the glide has fronted as well as the nucleus. Only one word, *dew*, shows a glide much backer than the nucleus; in most other cases, the glide is entirely a matter of closure of height alone, with no front–back component. As a result of such glide fronting, the /uw/ of Birmingham speakers will be heard as /iy/ in many cases. Thus in the CDC experiments, judges from Chicago or Philadelphia frequently transcribed Birmingham *bouffed* as *beefed* (Labov and Ash 1977).

The fronting of /ow/ is quite marked, but even the most extreme tokens are not shifted to front of center. In this respect, the South is generally not as advanced as Midland cities like Columbus, Pittsburgh, or Philadelphia (Figure 12.11). As usual, vowels with velar and nasal onsets (*go*, *know*) are the most advanced.

Most striking in the Southern pattern is the generalization of fronting to vowels before /l/. In Figure 18.8, the vowels in *fool* and one vowel in *school* are clearly fronted, a phenomenon that is found only in the South (see Figure 12.7). This applies equally to /ow/ before /l/, where the distance between the main distribution and vowels before /l/ is small.



Map 18.9. Overview of the South

This map brings together all of the features of the Southern vowel system, superimposing the isoglosses from previous maps. It is evident here that the heaviest concentration of Southern features in the eastern section of the South is found in the Inland South, located in the Appalachian area, and in central Texas in the western part.

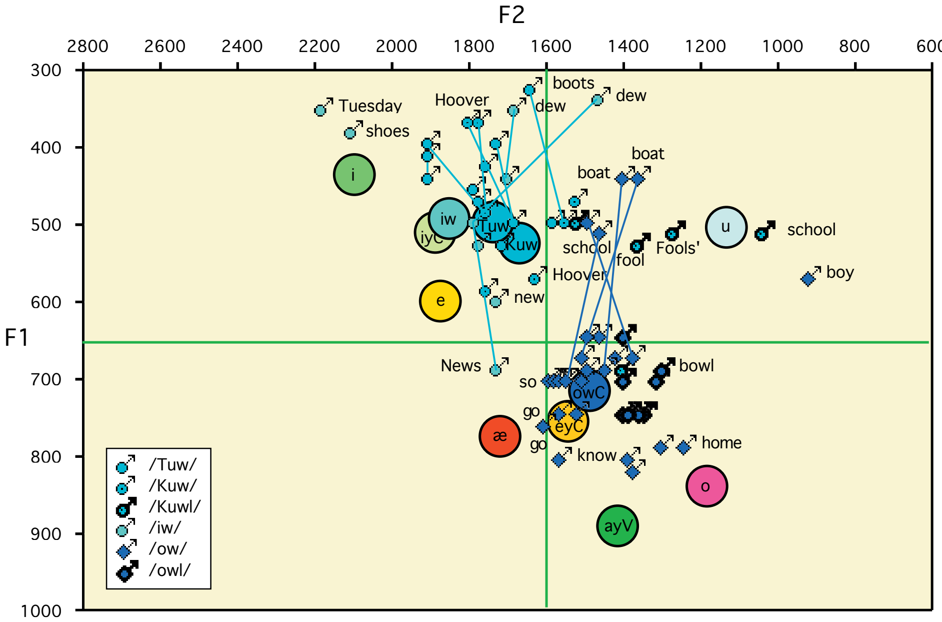


Figure 18.8. The fronting of back upgliding vowels in the system of Thelma M., 31 [1995], Birmingham, TS 341. Highlighted vowels are before /l/

The back upglide chain shift in the South

Figure 18.9 displays the vowels involved in the Back Upglide Shift for Thelma M. In mid-back position are four tokens of /oy/, two before /l/. The highlighted token, *spoil*, has undergone glide deletion so that it is now a member of the long and ingliding series, best represented as /oh/. However, it is at a considerable distance from the initial position of the /oh/ class, in low-back position, so that the immediate consequences for chain shifting are not present.

A majority of the magenta /oh/ tokens are highlighted, indicating the presence of a back upglide. These are concentrated in the low central region. This group includes *fawn*, *dawn*, *all*, and the originally short-*o* word *dog*, which reinforces the inference that the back upglide is not the remnant of an historical diphthong or vocalized /l/, but a later development (Map 18.7). The nucleus that precedes this glide is frequently unrounded, so that /aw/ is a plausible representation for this phoneme. On the other hand, vowels that do not show a back upglide, not highlighted in Figure 18.9, are normally rounded, and the nucleus is further back on the F2 dimension. In Figure 18.9, /aw/ has shifted front of center, with tokens before nasals in mid front position.

Figure 18.10 shows that the phonetic development of Southern /æw/ is comparable to that of /æ/, in that both vowels frequently exhibit Southern breaking, or drawling. (See the discussion of drawled short-*a* in Chapter 13; spectrogram for *past* in Figure 13.14 and trajectories for all short-*a* in Figure 13.15.) Here the nuclei are shown as green symbols, the end points of the medial glide [j] as black symbols, and the final end-points of the trajectories in white. Trajectories for *downtown*$_2$ and *town* are connected with dashed lines. In contrast, *out*$_3$ shows a simple back upglide, moving from low front to a mid back glide target. This development of /æw/ is not parallel to the fronting of /uw/, since the endpoint of the glide shows no tendency toward fronting.

Figure 18.11 is the vowel system of a second exemplar of the Southern Shift: Lucy C., of Chattanooga. She was 35 years old when interviewed in 1996, and a second-grade teacher. Her background is similar to that of Thelma M. in many respects, but differs in having experienced early contact with African-Americans.

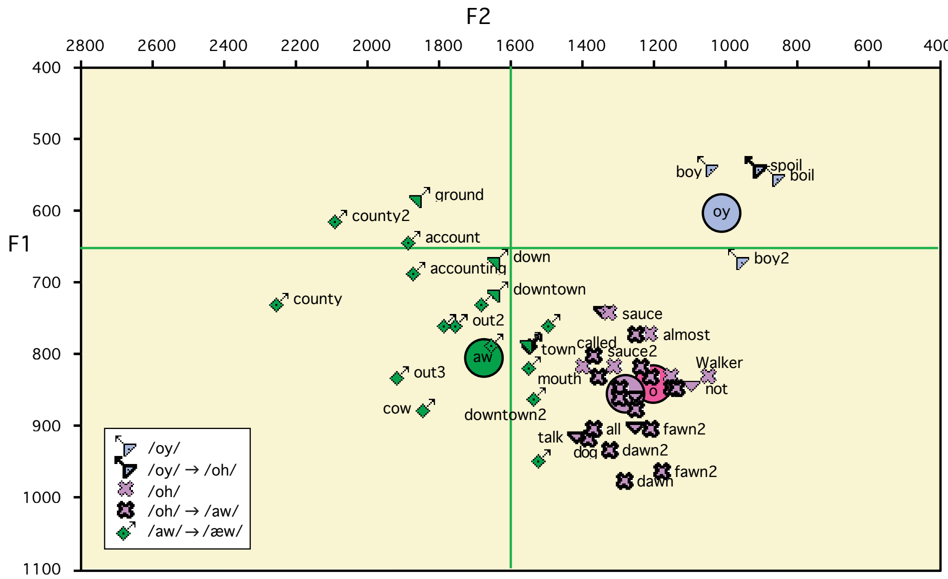


Figure 18.9. Back upglide shift in the vowel system of Thelma M., 31 [1995], Birmingham, TS 341

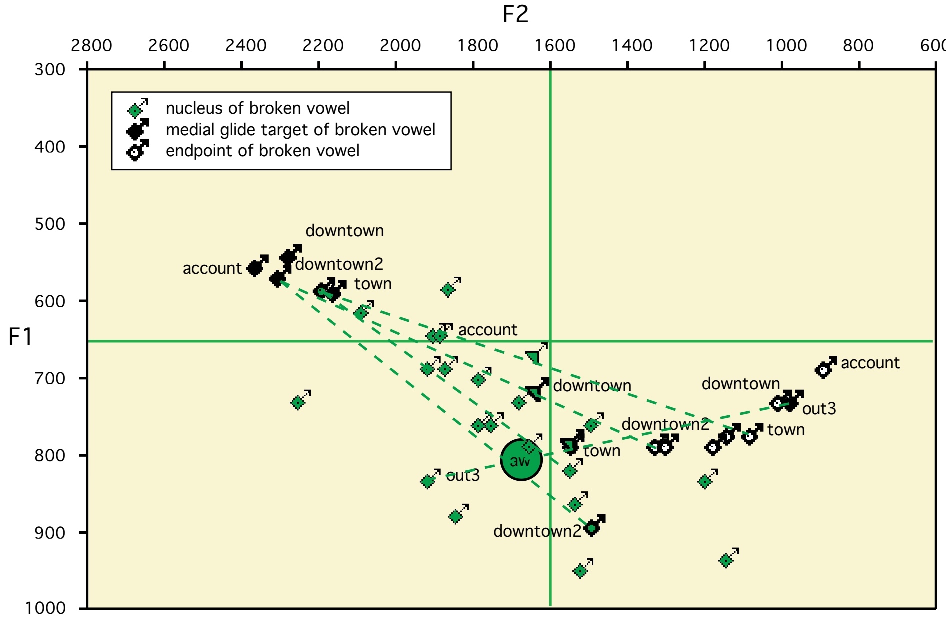


Figure 18.10. Nuclei, medial and final glides of /æw/ in vowel system of Thelma M., 31 [1995], Birmingham, TS 341

While Thelma M. attended a high school that was 95 percent white; Lucy C'.s high school was 90 percent black. However, she is no less typical of the advanced speakers of the Southern Shift:

Stage 1: glide deletion is general before voiced segments, and almost as high before voiceless segments: ten out of twelve vowels before voiceless consonants are monophthongs.

Stage 2: the relative positions of /e/ and /ey/ are strongly reversed. The most extreme tokens of /ey/ are close to /ay/, as in *say*, *day*, *bacon* while the most advanced tokens of /e/ are in upper high position and are broken, with inglides following the nuclei, as in *wed* and *death*.

Stage 3: /i/ and /iy/ are also reversed, though in a less extreme fashion. Some tokens of /iy/ remain in upper high position as with *east*, *evil*, while others are lowered to mid-central position, *see*, *street*. Again, the high front position is occupied by the merger of /i/ and /iy/ before /l/: *pill*, *heel*, *hill*.

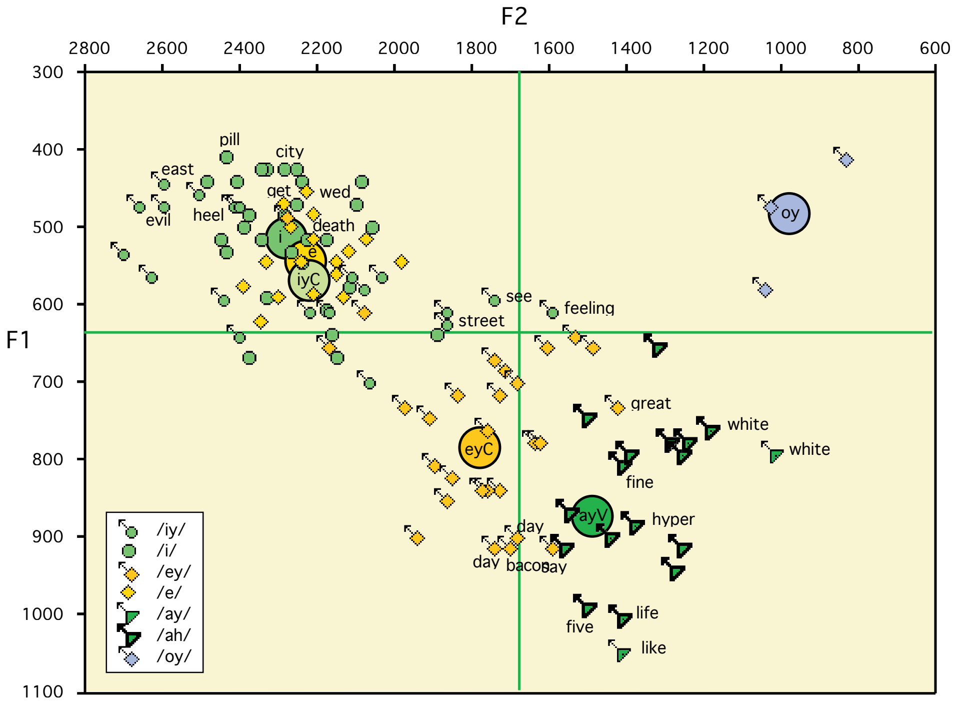


Figure 18.11. The Southern Shift in the vowel system of Lucy C., 34 [1996], Chattanooga, TN, TS 612. Highlighted /ay/ tokens are monophthongs

18.7. The Charleston dialect

One of the most distinctive Southern dialects is that of the city of Charleston, South Carolina. The traditional city dialect is described in the dissertation of O'Cain (1972) and in syllabi 135, 136 of PEAS. In the PEAS maps, the Charleston dialect appears to cover a region at least 50 miles in diameter, extending southward along the Atlantic coast to include the city of Beaufort.[5] The major features of this dialect were diametrically opposed to the Southern Shift as described in this chapter, and differ in many other respects from the main body of Southern dialects. As displayed in the PEAS syllabi 135–137, and discussed by O'Cain, the Charleston dialect

- had no glide deletion of /ay/;
- had tense nuclei for /ey/ and /ow/. The /ey/ nucleus is an upper mid tense [e] followed by an inglide. This is paralleled by the realization of /ow/ as [oə]. These ingliding vowels are similar to those heard in the Gullah dialect of the Sea Islands surrounding Beaufort;
- had no back upglide with /oh/;[6]
- had a palatal upglide in the mid-central vowel in words with historical final /r/ (*thirty*, *sermon*), as in traditional New York City and New Orleans dialects;
- showed a merger of /ihr/ and /ehr/ in *cheer* and *chair*, etc.;[7]
- showed Canadian raising of both /ay/ and /aw/.

Figure 18.12 shows one of the three Telsur speakers from Charleston, with a vowel system characteristic of all three. The most marked feature of the dialect, tense (and ingliding) /ey/ and /ow/, has disappeared. The nucleus of /ey/ is lax (mean 1995 Hz), not far from the lax /e/ (mean 1922 Hz), and it is followed by a front upglide. Instead of an upper mid-back ingliding /ow/, there is a strongly fronted /ow/.[8] The wide distance between the main distribution of /ow/ and the tokens of /ow/ before /l/, highlighted on Figure 18.12, shows the extent of the change, since in the traditional Charleston dialect, these would be quite close.

The mid-central rhotic vowel in *her*, *bird*, etc. shows no trace of a palatal upglide in the Charleston speakers of the 1990s. There is moreover no trace of the merger of /ihr/ and /ehr/ In Figure 18.12, /ihr/ is in high front position, next to /iw/, while /ehr/ is in mid-central position.

The modern Charleston dialect is not markedly Southern in character.[9] Its affinities with the Midland dialect are apparent in several areas of the vowel system. There is no trace of Southern breaking with /æ/ or /aw/. Instead, Charleston /æ/ shows the nasal system, in which all short-*a* tokens before nasals are raised, but no others (Chapter 13). The strong fronting of /uw/ is characteristic of the South, and especially the absence of a strong differentiation of vowels after coronals and after non-coronals. Yet similar fronting is also found in many Midland cities, like Columbus. And unlike the South in general, Charleston shows no tendency towards fronting of /uw/ and /ow/ before /l/: as Figure 18.10 shows, all vowels before /l/ are firmly in back peripheral position.

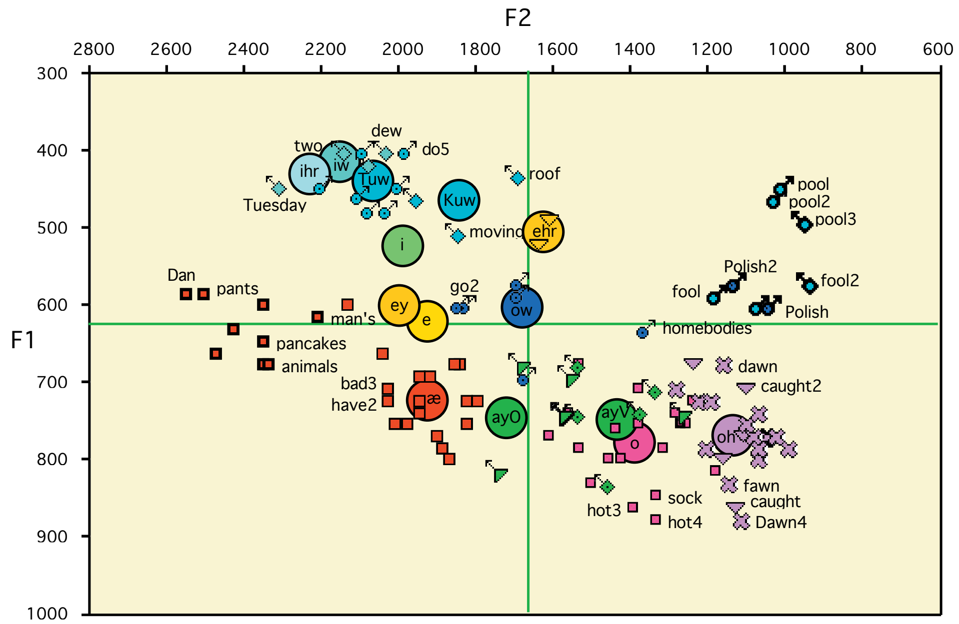


Figure 18.12. Vowel system of Peggy C., 40 [1996], Charleston, TS 500. Highlighted /æ/ are before nasals. Highlighted /ow/ and /uw/ are before /l/

5 Syllabus 137 of PEAS for Beaufort is quite similar to 136 and 137 for Charlston. A former sheriff of Beaufort, William McTeer, was interviewed by Labov in 1965. The analysis of his speech by Baranowski (2005) shows all of the features of the traditional Charleston dialect described by O'Cain.
6 One of the PEAS educated speakers has one upglide, with *dog*.
7 This is characteristic of one of the two educated speakers in the PEAS syllabi, and the Beaufort speaker as well.
8 The mean would be well front of center, if it were not influenced by the outlier *homebodies*. As noted in Chapter 12, *home* is a lexical exception to the fronting of /ow/ in almost all dialects.
9 Baranowski reports (2003) that modern Charlestonians frequently say that they are not usually identified as Southerners by their accent, though they feel that Charleston is culturally Southern.

A sociolinguistic study of 90 Charleston speakers has recently been carried out by Baranowski (2005). He has found the traditional Charleston dialect intact among a small number of upper class speakers, but the non-Southern pattern similar to that of Figure 18.12 for the great majority of Charlestonians. Baranowki confirmed the view provided by the three Telsur speakers of Charleston as a leading exponent of the Southeastern pattern similar to Midland developments in Columbus and other cities on the margins of the South.

18.8. The City of New Orleans dialect

The New Orleans dialect has been shown to be marginal to the South in many respects, and marked by several features that are distinctively northern. It is most noted for the palatal upglide with mid-central vowels [əɪ], resembling to the traditional (and stigmatized) New York City vowel in *third*, *first*, *sermon* which is commonly associated with the stereotype "toity-toid". The same phonetic form is found in Charleston, Savannah, throughout South Carolina, and eastern Georgia (PEAS, Map 25). But as this section will show, the New Orleans parallels to the New York City dialect go considerably beyond this.

The relation between the New York City and New Orleans speech patterns is the product of a long and intimate history of contact. Berger (1968) cites two historians to document this history. Of economic relations, Foner writes:

> In the ante-bellum period, roughly between 1820 and 1860, financial, commercial and social relations between the city and the South were at fever pitch: New York banks underwrote the plantation economy, cotton was shipped routinely from New Orleans, Charleston, Savannah and Mobile to be trans-shipped to England, and Southern planters regularly combined business with pleasure in the Big Apple of the 1800s. ". . . down to the outbreak of the Civil War, New York dominated every single phase of the cotton trade from plantation to market." (Foner 1941)

It appears that the ties between New York and New Orleans went beyond normal businesss relations. Many descriptions of commercial and social relations between New Orleans and New York are found in the five-volume history of The Older Merchants of New York City by John Scoville (1885). The community of Sephardic Jewishbankers was particularly prominent in these exchanges. Korn's history of The Early Jews of New Orleans deals with social and business relations from 1718 to 1812. References to New York City are found on 55 pages, more than any other city.

There is some indication that New Orleans is being drawn into the southern orbit. Map 11.3, which defined the South on the basis of glide deletion before obstruents, included New Orleans within the South, although Map 11.2 had shown only a small percentage of glide deletion. One New Orleans speaker had a single case of glide deletion in *five*, and a second a single case of glide deletion in *side*, so that red symbols appear for both in Map 11.3, and the city is consequently included within the red AYM isogloss. In all succeeding maps of Southern features, New Orleans lies outside the defining isoglosses: in Maps 11.2 and 18.3 there is no glide deletion before voiceless obstruents; in Maps 11.4, 18.5, and 18.6, there is no evidence of Stage 2 or 3 of the Southern Shift; in Map 18.7, no glide deletion of /oy/; in Maps 11.2 and 18.8, no back upglide with /oh/. The overview of Map 18.9 shows only one isogloss including New Orleans, the original AYM line.

Figure 18.13 displays the front upgliding vowels of the youngest of the three New Orleans speakers. Only one token shows glide deletion – before the resonant /l/ in *miles*. The absence of the Southern Shift is evident in the peripheral placement of /iy/ and /ey/, and the great gap between /ey/ and /ay/. The one vowel that approaches the /ay/ distribution is in *places*, conditioned by an initial obstruent/liquid cluster.

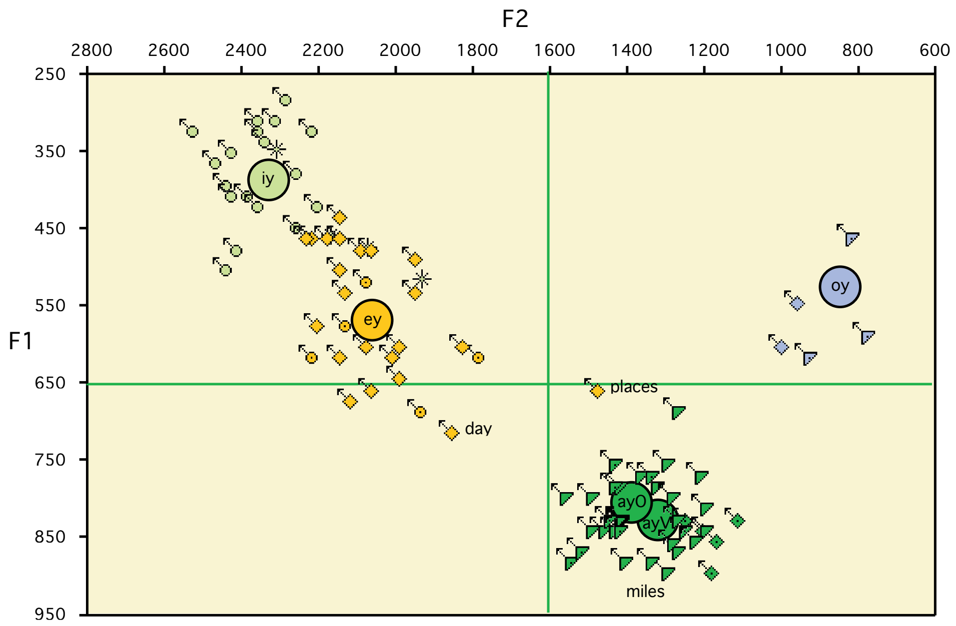


Figure 18.13. Front upgliding vowels of Edith G., 38 [1996], New Orleans, LA, TS 608

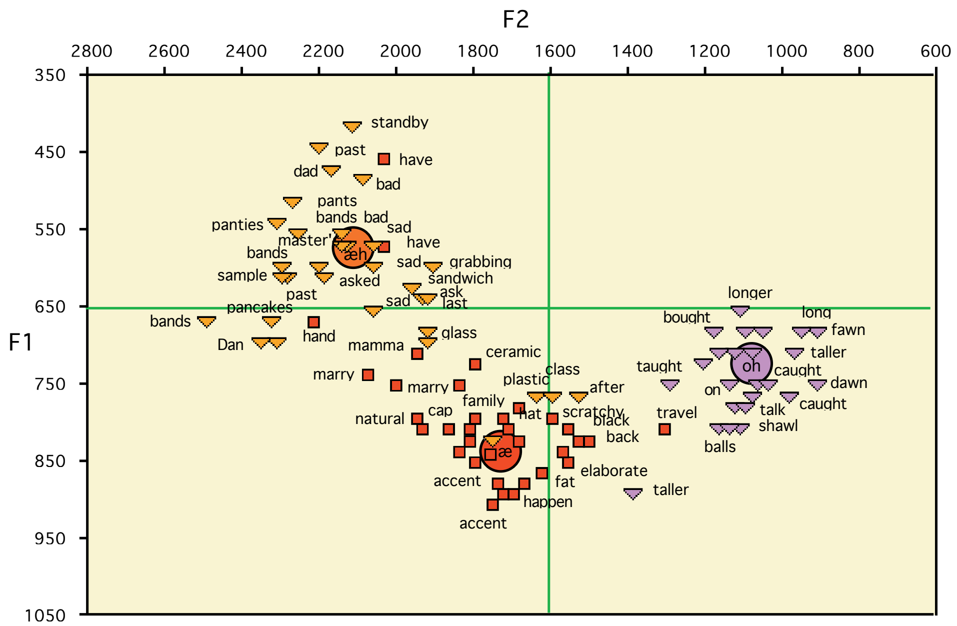


Figure 18.14. Long and ingliding vowels of Edith G., 38 [1996], New Orleans, LA, TS 608

Figure 18.14 shows the long and ingliding vowels of the same speaker, showing a close resemblance to the New York City pattern. The short-*a* class is divided into two groups, following the definitions of the NYC /æh/ class in Figure 13.2, 13.3, and to 17.3, in which the tensed /æh/ class includes front nasals, voiced stops, and voiceless fricatives in closed syllables, but excludes function words. There is almost a complete separation of the orange triangles, representing the /æh/ class, and the red squares, representing the lax /æ/ class. As in New York, vowels in open syllables are always lax (*mammal*, *ceramic*, *family)*, unless the syllable is closed by an inflectional boundary, as in *grabbing*. Three orange symbols are at the upper edge of the lax distribution (*plastic*, *class*, *after*); these are accounted for by the normal influence of segmental environment. Among the tense vowels are found two red squares, both tokens of *have*. These are also New

Orleans deviations from the New York pattern, where auxiliaries are always lax. The other two New Orleans speakers analyzed acoustically show the same New York City tense–lax pattern, with the same specific minor deviations from it.

This extraordinary coincidence of the New York and New Orleans short-*a* patterns reinforces the coincidence of the palatalized mid-central vowel. New York and New Orleans are further identified by the relatively high position of /oh/. In Figure 18.14, /oh/ is in lower-mid position, as opposed to the low-back position found in most other Southern dialects. The auditory impression is clearly that of a Mid-Atlantic type of ingliding /oh/. Unlike other Southern dialects, New Orleans /o/ and /oh/ have distinct nuclei: the means are separated by 110 Hz F1 and 250 Hz F2.

Labov 2005 traces the diffusion of the NYC short-*a* system to Albany, north Jersey, Cincinnati and New Orleans, and finds a similar pattern of adaptation of the segmental conditioning without the more abstract grammatical and syllabic factors.

18.9. Atlanta

Atlanta is the third largest city in the South, after Dallas and Houston, with a population close to a half million in an MSA of over four million. All of the maps of Chapters 11 and 18 show that Atlanta is an exception to the predominant linguistic pattern of the South. The dialect levels recorded in Map 11.6 assign a "1" to three of the Atlanta speakers and a "0" to two. Only two of the five show any degree of glide deletion before obstruents, and the other stages of the Southern Shift are absent. The MSA grew by more than a third in the 1990s. Much of this growth has come from the in-migration of people from outside the South, which seems the most likely explanation for the non-Southern character of modern Atlanta. Similar effects can be seen in other fast-growing Southern urban areas, but appear to be particularly advanced in the Georgia metropolis.[10]

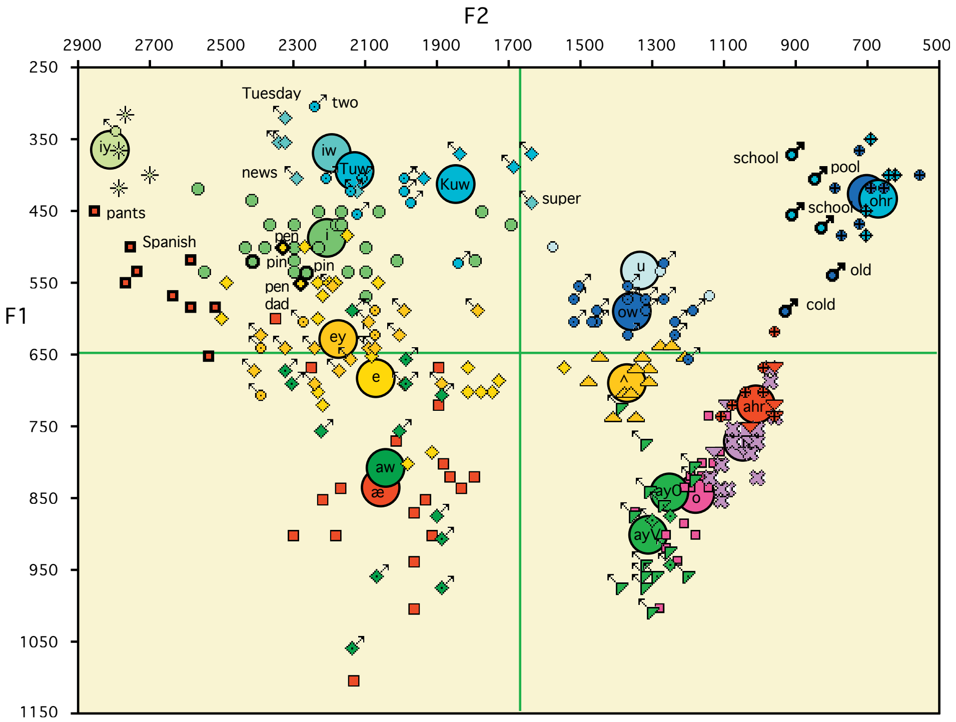


Figure 18.15. Vowel system of Malcolm C., 27 [1999], Atlanta, TS 711. Bold red squares are /æ/ before nasals; bold blue figures are vowels before /l/.

Figure 18.15 is the vowel system of one Atlanta speaker, a 27-year-old man with a high-school education, of mixed Spanish–English–Irish background, who works as a bagger and stockboy in a supermarket. The major features of the Southern Shift are absent: there is no glide deletion of /ay/; /iy/ is fronter and higher than /i/, and /ey/ is fronter and higher than /e/. There is no back upglide with /oh/. There are no broken vowels in the /æ/ or /aw/ class. The short-*a* class is a clear example of the default nasal system, with all vowels before nasals higher and fronter than the main body. These include vowels in open syllables, as in *Spanish*.[11]

In spite of the absence of the criterial features of the South, Figure 18.14 does show the general features of the southeastern super-region, which includes the Midland and South (Map 11.11). The merger of /iw/ and /Tuw/ occurs in a strongly fronted position (>2200 Hz), and the non-coronal class /Kuw/ is well front of center. On the other hand, there is no trace of fronting of /uw/ or /ow/ before /l/, and in this respect Atlanta again resembles the Midland. The merger of /i/ and /e/ before /n/ (Map 9.5), is evident in the close approximation of two pairs of *pin* and *pen*. This too is typical of the Southeastern super-region.

Finally, one can note the firm merger of /ohr/ and /ɔhr/, with /ahr/ shifted up to lower mid position. This configuration of back vowels before /r/ is again typical of the Southeastern region.

18.10. Settlement history of the Inland South

Chapter 14 showed that the geographic configuration of the Northern Cities Shift reflected the settlement history of the Inland North. Figure 14.24, based on Kniffen and Glassie's studies of the distribution of log cabin housing styles, traced the same sharp discontinuity between the North and the Midland that we find in the opposing development of vowel systems.

The area of the South in which the Southern Shift is most developed is defined as the Inland South in Map 18.9, an Appalachian region extending across eastern Tennessee, western North Carolina and Northern Alabama. Figure 14.24 showed that this region was populated by a settlement stream originating in the largely Scots-Irish areas of the Delaware Valley, moving southward along the valleys between the Appalachian mountain ranges. It is most often identified by cultural geographers as the Upland South. Figure 18.16 provides the substantive basis for Figure 14.24. It shows the distribution of the techniques of log-cabin construction that were studied by Kniffen and Glassie, and later traced in greater detail in Jordan-Bychkov 2003. Half-dovetail log-notching is perhaps the most effective way of securing corner joint stability in building log cabins, as opposed to saddle-notching, V-notch or square notch. It is a modification of the Pennsylvanian full-dovetail with the double advantage of being easier to construct and allowing better drain-off in wet weather. It was not used in the Northern area, where log cabin construction was primarily for temporary dwellings prior to the construction of frame houses. Figure 18.16 shows that the heaviest concentration of half-dovetail log notching was in the Inland South.

10 The 2000 Census reports growth of 1,152,248 people in metro Atlanta, or 38.9%, from 2,959,950 in 1990 to 4,112,198 in 2000. This is actually the 2nd highest rate of growth among the largest U.S. metro areas, after Phoenix (45%), and higher than Dallas (29%) or Houston (25%). The largest city of the South, Dallas, also shows considerable variation as the result of inmigration from other areas. Thomas (1997) reports that glide deletion of /ay/ is much weakened in large Texas cities.

11 One non-nasal word, *dad*, shows a relatively tense nucleus with an inglide.

Secondary concentrations of Upland South settlement are the product of further migration to the Ozarks and to east Texas, as seen in the figure. Map 18.9 indicated that the strongest development of Southern States phonology is found somewhat to the west of this area, extending from Dallas to Lubbock and Odessa. The particular feature most characteristic of that area is however the completion of Stage 1 of the Southern Shift, with full glide deletion before voiceless consonants, and not Stage 3 of the Shift, which is confined to the Inland South.

The ANAE studies of Southern States phonology are based upon the speech of urbanized areas, while this settlement history traces the material culture of the rural population. Table 18.5 shows that all three stages of the Southern Shift are disfavored by city size, in sharp opposition to the Northern Cities Shift. We are therefore studying the widespread distribution of a phonological pattern that originated in rural settlements of the Irish and Scots-Irish migrants. In fact, Jordan-Bychkov defines the Upland South as that contiguous region in which persons of German, French, Spanish, or African ancestry do NOT constitute majorities or pluralities. This differentiates it from the coastal South, where Africans frequently formed such pluralities; from Louisiana, where the French population did so; from the rest of Texas, where Hispanic and German populations are large; and from the (North) Midland, in which German ancestry predominates.

The maps in this chapter document the fact that this originally poor and rural population is the originating center of the widespread Southern Shift, which has expanded to influence all but the marginal coastal areas of the South. The rapid replacement of *r*-less by *r*-full pronunciation (Chapter 7) also shows a re-modeling of coastal Southern phonology to a pattern originally identified with the less affluent Piedmont and mountainous areas (McDavid 1964). It has been suggested that this expansion of Inland South influence is the result of the growth of economic power in the Inland South, and the relative decline of coastal cities, but an investigation of these factors is beyond the scope of this Atlas.

Figure 18.16. Distribution of half-dovetail log notching in the South (from Kniffen and Glassie 1966, Fig. 28)

19. The Midland

An overview of the Midland area was presented in Chapter 11. The Midland was first defined by Kurath (1949) on the basis of its lexicon and its settlement history as the area originally centered around Philadelphia and expanding westward to include most of Pennsylvania and the Appalachian area (Figure 1.1). Kurath divided it into two subregions: a North Midland centered on Pennsylvania; and a South Midland comprising the Appalachian highlands. Shuy (1962), Davis (1949), and Carver (1987) established the northern boundaries of the Midland through Ohio, Indiana, and Illinois in the form of the North/Midland lexical isogloss shown in Map 14.11. This lexical isogloss coincides with the bundle of phonological isoglosses that define the Northern Cities Shift and other phonological features of the Inland North. It reinforces the status of the North/Midland boundary as one of the two major dialect divisions of the United States.

The other major division is the southern boundary of the Midland, but here there is not the same agreement between lexical and phonological isoglosses. On the one hand, the Midland character of the Appalachian region is well established by both lexical and grammatical features (Chapter 21). On the other hand, phonological criteria adjoin this part of the Midland firmly to the South. Both the Southern Shift and the Back Upglide Shift characterize the regional dialect of the South as a whole, and both are centered in such cities as Birmingham, Knoxville, and Chattanooga, which lie within Kurath's South Midland. The approach to dialect definition of this Atlas, based on active changes in progress, leads to a definition of the Midland corresponding to Kurath's North Midland: the region between the Ohio River and the North.

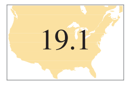
The Atlas data do not justify the labeling of any one dialect as "General American", a term promoted by John Kenyon to indicate a conservative Inland Northern dialect (Frazer 1993; Donahue 1993). As Chapter 14 shows, the Northern Cities Shift has changed the Inland North dialect in such a way that it is now strikingly different from other North American dialects. The Midland dialect as described in this chapter would have a much stronger claim to be the lowest common denominator of the various dialects of North America. Many features of the Midland are the default features – that is, the linguistic landscape remaining when marked local dialect features are eroded.

19.1. Geographic distribution of Midland features

This chapter will accept the boundaries of the Midland that were developed in previous chapters, and examine the internal character of the Midland area. The maps to follow show only the Telsur speakers within the Midland boundaries. Two major cities of the Eastern United States might have been included in a "Midland super-region" for both historical and structural reasons: Pittsburgh and Philadelphia. They are in fact included in the southeastern super-region of Map 11.11. The Philadelphia dialect is treated in Chapter 17 as part of a Mid-Atlantic region, on the basis of the sound changes that define Philadelphia, Wilmington, and Baltimore. Pittsburgh is distinctly different from the rest of the Midland in some features, but shares others; the maps of this chapter will show Pittsburgh as an area distinct from the Midland and a separate section will deal with the special developments of that dialect.

The Midland does not show the homogeneous character that marks the North in Chapter 14, or defines the South in Chapter 18. Many Midland cities have developed a distinct dialect character of their own: Philadelphia is the most extreme example. This chapter will begin with a consideration of those features that are general to the Midland as a whole, and then focus on particular cities. Since Pittsburgh, Cincinnati, and St Louis are quite distinct from the rest of the Midland, each deserves a separate section.[1]

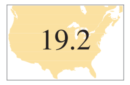
The low back merger in the Midland



The Midland is distinguished from the surrounding territories by the status of the low back merger, in which the vowel class of /o/ merges with /oh/. The Telsur minimal pair data includes four allophones: before /n/ (*Don ~ dawn*), before /t/ (*hot ~ caught*), before /l/ (*dollar ~ taller*) and before /k/ (*sock ~ talk*).[2] Map 19.1 shows the combined status of all minimal pairs. If all are different in production and perception, the symbol is blue; if all are the same in production and perception, a green symbol appears. If both perception and production show a mixture of 'same' and 'different', or are both 'close', an orange symbol appears, and all other transitional states are marked with light orange. These data separate the map into three areas. Western Pennsylvania is dominated by the merger; the Saint Louis corridor maintains the distinction; and the rest of the Midland is predominantly in a transitional state.

Not shown here, but available in Maps 9.1 and 11.1, is the contrasting situation in adjoining regions. To the east, the north, and the south, the distinction is generally maintained; to the west, it is lost. The Midland is the only area where the low back merger is consistently transitional; indeed, this can be seen as one of the region's defining features.

The fronting of /ow/



A general characteristic of the Midland area is the fronting of the nucleus of /ow/, as first shown in Maps 11.8 and 12.3. The Midland shares this feature with the southeastern super-region (Map 11.11), and is differentiated by it from the North and the West. Map 19.2 shows the distribution of various levels of /ow/ fronting within the Midland. This map is more homogeneous than Map 19.1, where the St. Louis corridor and Western Pennsylvania were opposed to the rest of the Midland. The great majority of Telsur speakers within the Midland show some degree of fronting of /ow/. Extreme fronting of /ow/ is registered by a mean value greater than 1550 Hz (the center of the normalized distribution). The strongest concentration of such extreme fronting, shown by dark blue symbols, is found in the largest cities, particularly Columbus, Ohio.

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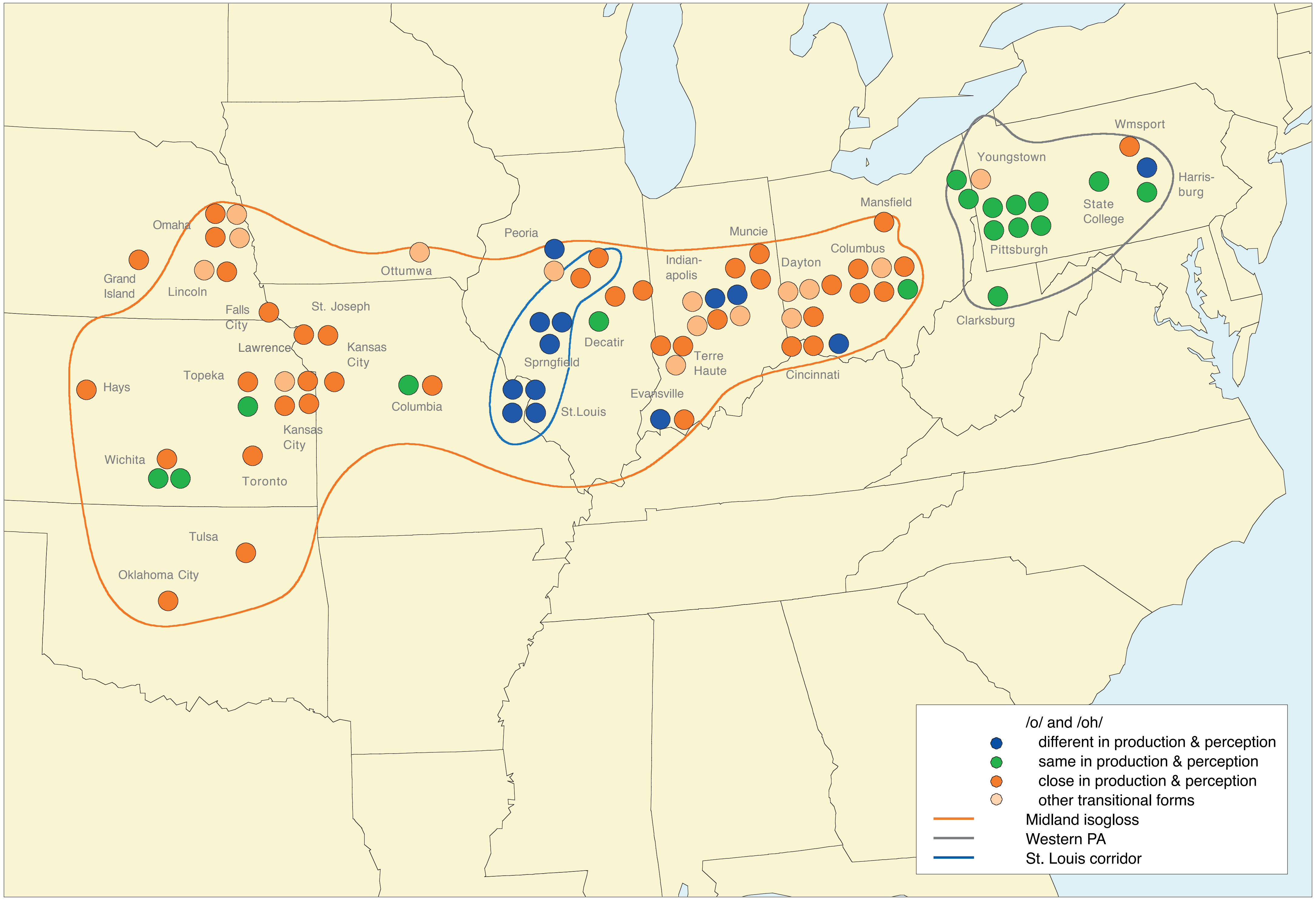
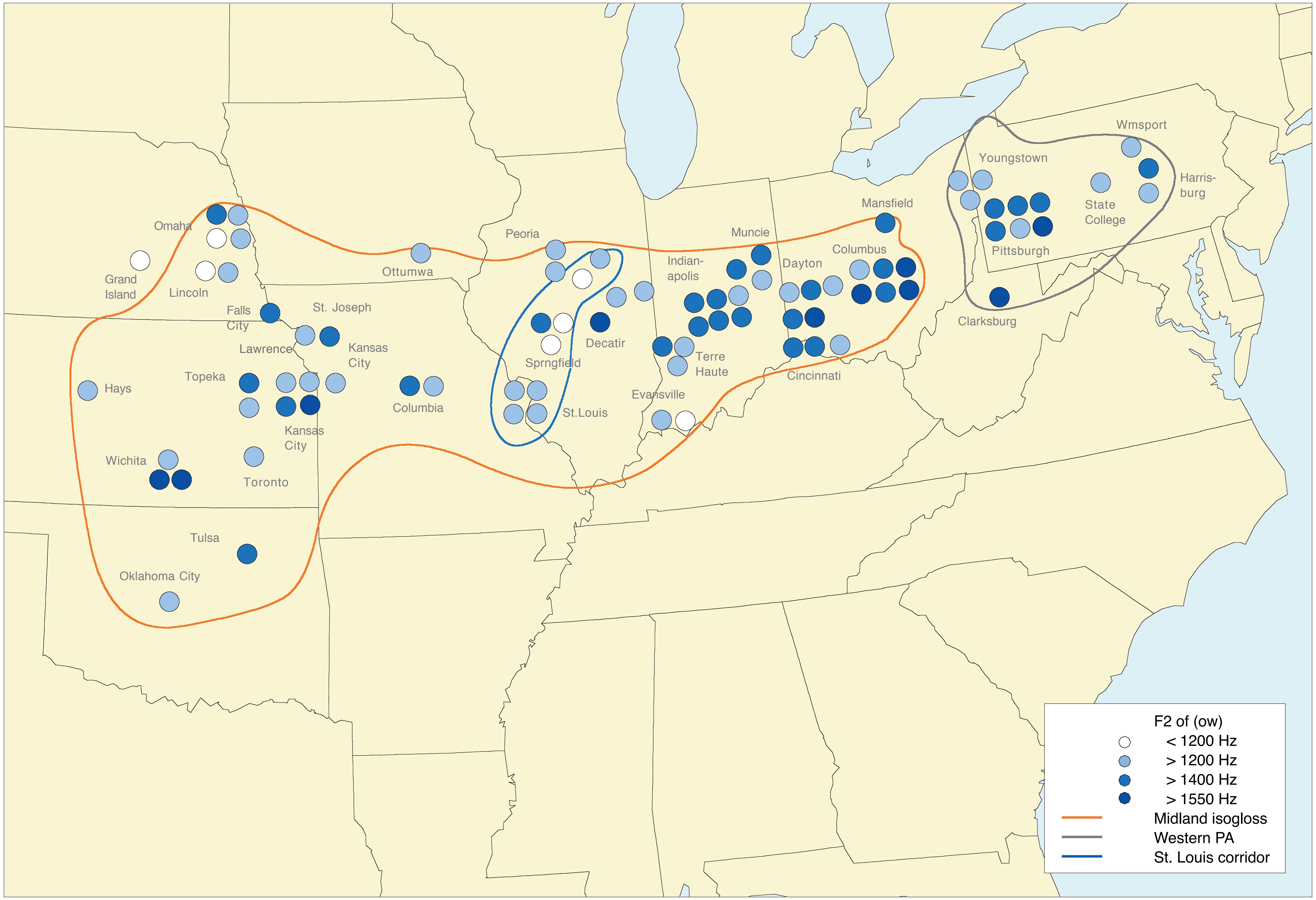
1 In order better to understand the heterogeneous character of the Midland as a whole, a larger number of Telsur interviews than normal were conducted in Pittsburgh, Columbus, Indianapolis, and Omaha.

2 In some but not all interviews, allophones before /d/ are included.



Map 19.1. The low back contrast in the Midland

One of the most characteristic features of the Midland is the close approximation of /o/ and /oh/ in *cot* and *caught*, *hock* and *hawk*, without a full merger. The dark orange symbols represent those speakers for whom these two word classes were 'close' in both production and perception. In contrast, western Pennsylvania shows a full merger (green symbols). In the Midland proper, the only solid area of contrast for /o/ and /oh/ is found in the St. Louis corridor, running from St. Louis to Chicago along Route I-55.



Map 19.2. The fronting of /ow/ in the Midland

The Midland area shows a strong tendency for the nucleus of /ow/ to be fronted to central position or even further. Columbus, Ohio shows the greatest tendency in this direction (three of six speakers show dark blue symbols, indicating an advance beyond the central position of the normalized system). Wichita, Kansas is almost equally strong in this development. Pittsburgh, Cincinnati, and Indianapolis show a predominance of less extreme centralization, with the F2 of /ow/ just behind the center of the vowel system (greater than 1400 Hz but less than 1550 Hz).

Table 19.1 gives the results of a regression analysis of F2 of /ow/ in the Midland. It shows that fronting is an active change in progress (in apparent time), led by women. The fronting of /ow/ is also correlated with size of MSA (Metropolitan Statistical Area), with a 27 Hz advantage for each million of population. (The social factors are extracted from an analysis that includes a wide range of phonetic factors as well.)

Table 19.1. Social factors from the regression analysis of fronting of /ow/ in the Midland [N = 1234].

	Coefficient	Probability
Age (x 25 years)	–54	< .0001
Female	29	< .01
MSA size (in millions)	27	< .0001
r^2 adj (with 12 phonetic factors) .60		

The relations of /ay /and /aw/

19.3 Chapter 12 showed that the sharpest delineation between the North and other areas is in the relative position of /aw/ and /ay/, as determined by the general fronting of the nucleus of /aw/ in all but the Northern regions. Map 19.3 displays the internal structure of the Midland in this phonetic dimension. Like /ow/ fronting in Map 19.2, /aw/ fronting is a general Midland feature, including the St. Louis corridor and Western Pennsylvania. The fronting of /aw/ is again concentrated in the largest cities: in this case, Indianapolis and Kansas City, where the mean F2 value of /aw/ is greater than 1750 Hz. It should be noted that this measure is based on the main body of /aw/ before oral consonants, since the pre-nasal tokens are excluded from the calculation of the mean for /aw/ as well as for the short front vowels /i, e, æ/. In many areas, /aw/ before nasals is distinctly fronter and higher than other tokens of /aw/, but the extreme fronting in Map 19.3 is independent of this allophonic effect.

Table 19.2 reports the analysis of social factors in the same format as Table 19.1. It is evident that the fronting of /aw/ is also a change in apparent time, but a less vigorous one. Women are not leading men in this variable. These results indicate that the fronting of /aw/ may be an earlier process than the fronting of /ow/. The analysis of the vowel systems of whites born in the nineteenth century by Thomas (2001) shows the nucleus of /aw/ consistently located front of center.

For /aw/ fronting, the size of the MSA population is a major factor. In addition, the analysis shows a sizeable educational cline: speakers with less education show more fronting.

Table 19.2. Social factors in the regression analysis of fronting of /aw/ in the Midland [N = 950].

	Coefficient	Probability
Age (x 25 years)	–30.5	<.001
Female		ns
MSA size (in millions)	42.8	<.0001
Education (yrs of schooling)	–6.5	<.0001
r^2 adj (with 12 phonetic factors) .33		

Glide deletion in the Midland

Map 11.3 drew a sharp line between the South and the Midland by tracing the distribution of /ay/ glide deletion. Many speakers in the Midland exhibit glide dele-

19.4 tion before resonants, in words like *time*, *tire*, *mile*, but only one produced a form with glide deletion before obstruents, as in *five*. Map 19.4 shows the location of these speakers. Those who used more than 20 percent deletion before resonants are indicated with dark red circles, and the one case of deletion before obstruents with a red star. This Telsur speaker, Roger W., is a 39-year-old man from the small city of Lawrence, in between Kansas City and Topeka, with a 10th grade education, and has worked in construction and the steel industry. His production of /ay/ tokens shows the distribution set out in Table 19.3.

Table 19.3. /ay/ tokens of Roger W., 39 [1993], Lawrence, Kansas City, TS 260

	diphthongs	shortened glides	monophthongs
before resonamts	*behind* *mine* *line*	*nine*	*time* *sometimes*
before obstruents	*Friday*	*five*	*five* *five*

The red star on Map 19.4 indicates the presence of a pattern that deviates from other Midland speakers. It suggests that there may be other such speakers, of lower socio-economic status, who show Southern glide deletion. Nevertheless, it is not accidental that only one of 87 Midland Telsur speakers shows glide deletion before obstruents, and the contrast with the South is sharp.

The Midland shows a gradation of Southern features from north to south, largely in the fine-grained phonetics of the short vowels and the degree of opening of the mid diphthongs. In Map 19.4, the Midland is divided into a northern and southern portion by drawing an isogloss (the narrow orange line) for the northern limit of glide deletion before resonants. There are 38 speakers north of the line who show no trace of glide deletion, almost 40 percent of the sample population.

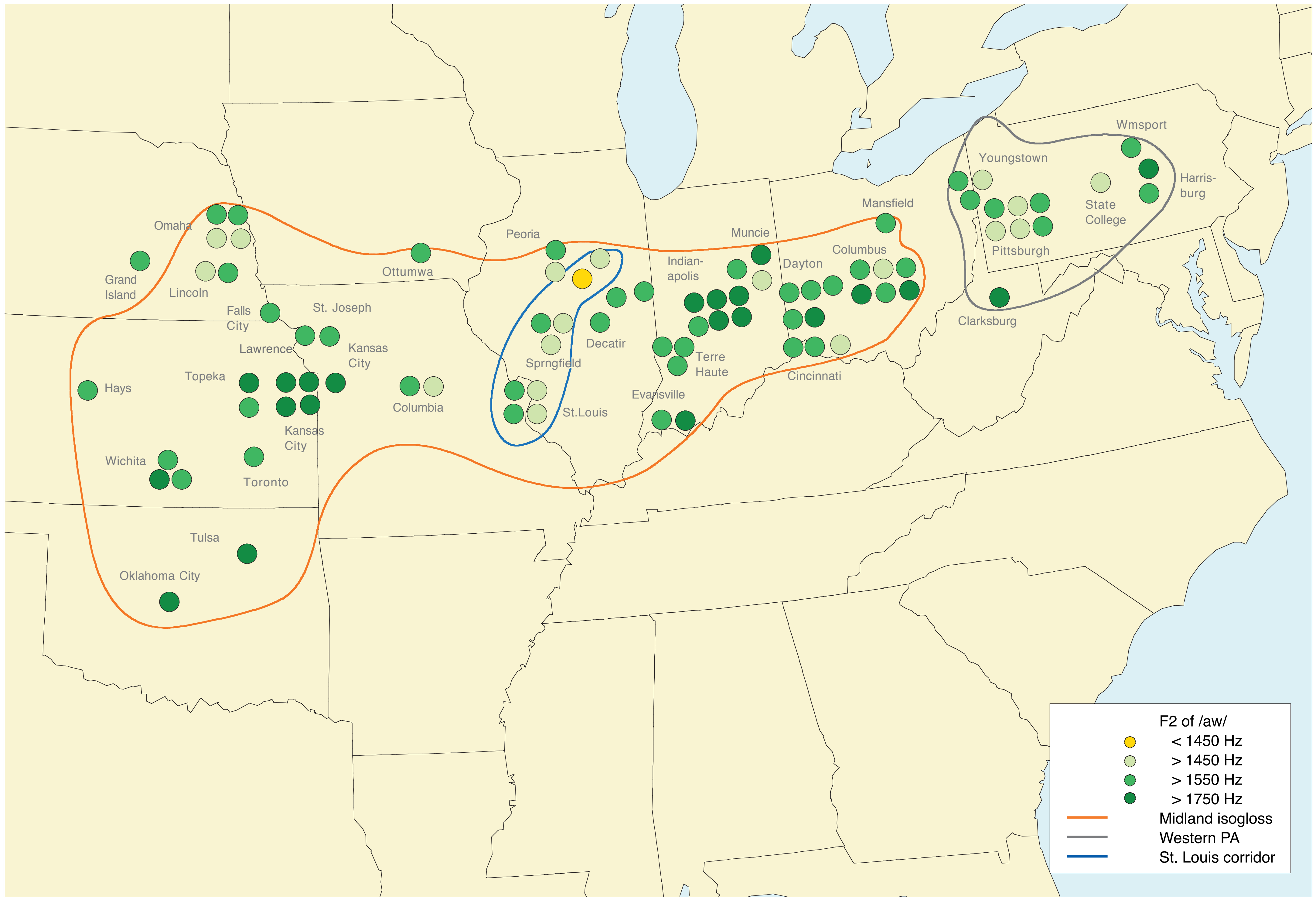
The fronting of /ʌ/ in the Midland

19.5 Maps 11.14 and 14.8 presented a division between the North and the Midland by the relative fronting of /ʌ/ and /o/, with no exceptions, and Table 11.2 showed that in the Midland /ʌ/ is shifting strongly to the front among younger speakers. Map 19.5 gives more detail on the distribution of /ʌ/ in the Midland. The orange symbols show speakers whose mean value of /ʌ/ is greater than 1450 Hz, but less than the general of 1550 Hz, the center of the vowel space; the medium brown symbols represent mean values that are front of center, that is, greater than 1550 Hz; and the dark brown symbols show the greatest degree of fronting, an F2 mean greater than 1650 Hz. It is evidently an urban phenomenon: The big cities – Kansas City, Indianapolis, Columbus, Pittsburgh – show the strongest fronting, and usually among the younger speakers (located to the left).

To summarize the findings so far, the Midland can be described phonologically as the area where the low back merger is in transition, where /ow/ and /aw/ are strongly fronted, where glide deletion occurs only before resonants and where wedge is moving strongly to the front.

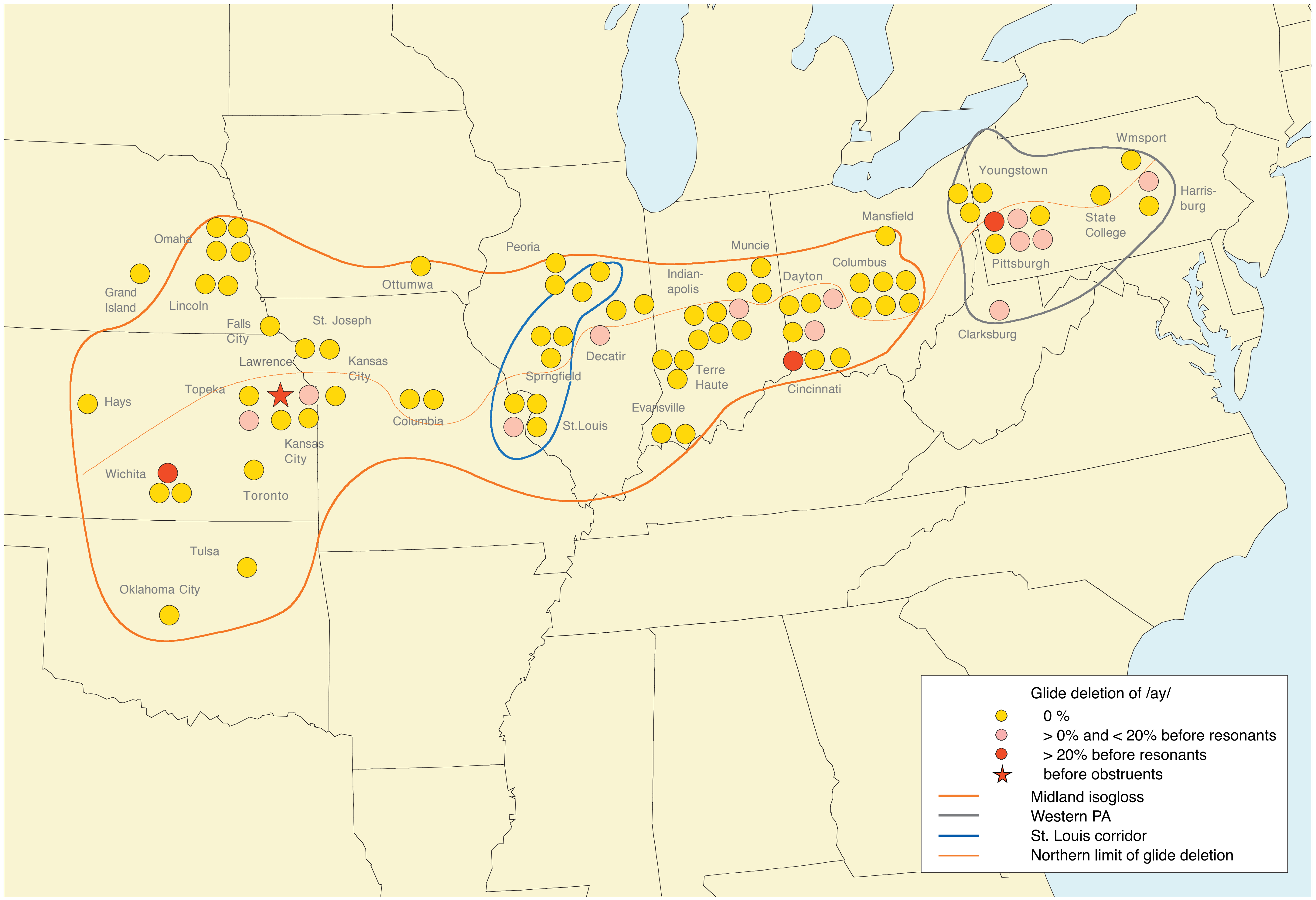
19.2. The Midland vowel systems: Columbus and Kansas City

Figures 19.1–19.3 are vowel charts of a Midland speaker who exemplifies the general patterns seen in of Maps 19.1–19.4. Figure 19.1 shows the low short vowels of Danica L., a 37-year-old woman from Columbus, Ohio. She is a high-school



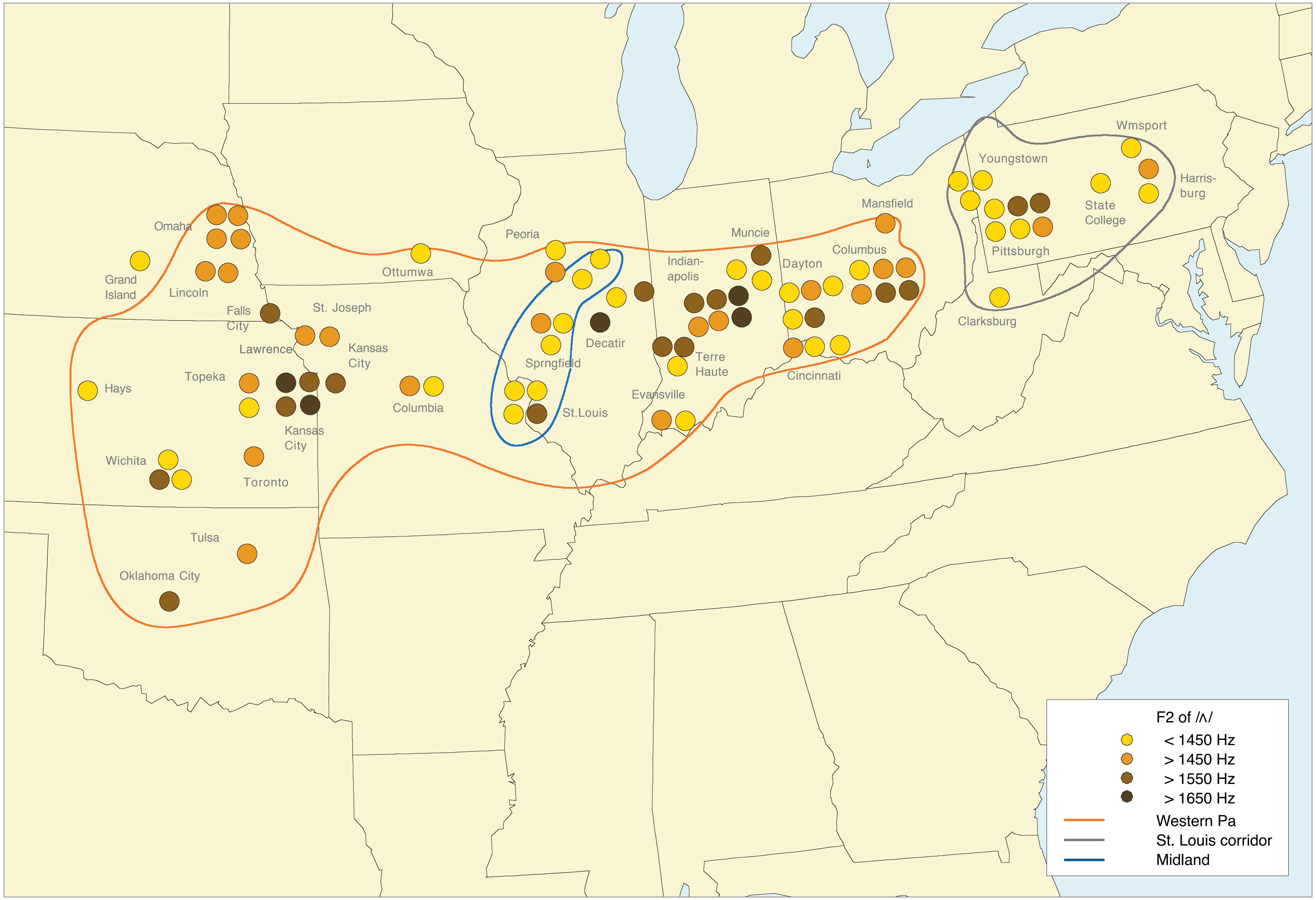
Map 19.3. The fronting of /aw/ in the Midland

A tendency parallel to the last map is seen in the shift forward of the nucleus of /aw/ in *south*, *now*, *down*, etc. Here the heaviest concentration of extreme fronting is found in Kansas City and in Indianapolis, but the entire area has /aw/ well front of central position. The main concentration of light green symbols, indicating /aw/ in central position, is found in the St. Louis corridor, while eastern Nebraska and western Pennsylvania are divided between speakers with /aw/ in central and front-of-center positions.



Map 19.4. Glide deletion of /ay/ in the Midland

The light pink and red symbols show the widespread tendency for Midland speakers to delete the glide of /ay/ before resonant consonants: before /l/ in *mile* and *while*; before /r/ in *tire* and *iron*; and before nasals in *time* and *line*. Only one Telsur speaker shows any glide deletion before obstruent consonants in *wide*, *five*, etc., as shown by the red star in Kansas City, Kansas. The Midland territory is divided by the"South/Midland" isogloss, which separates speakers who show glide deletion before resonants, and those who do not.



Map 19.5. The fronting of /ʌ/

Chapter 14 showed that the vowel of *but*, *bunk*, *rub*, etc. is shifting towards the back in the Northern region. In the Midland, this vowel is moving in the opposite direction, towards the front of the vowel system. Though this is sometimes heard as a rural characteristic, it is strongest in several large cities as shown here: Kansas City, Indianapolis, Columbus. Note that the dark brown symbols are frequently at lower right, where the youngest speakers are placed.

graduate who had been working for an insurance company, but was unemployed when interviewed. The short-*a* tokens on the left follow the pattern of the nasal system (Figure 13.6). All vowels before nasal consonants are in upper-mid position, including those before velars (*banking*) and in open syllables (*Spanish*).

In the back, /o/ is close to, but statistically distinct from /oh/.[3] The highest and backest token is *on*. As indicated in the discussion of the North/Midland line in Chapter 14, the Midland is characterized by the tensing of *on*: the most prominenet short-*o* word before a front nasal to migrate to the /oh/ class (Map 14.2).[4] At the other end of the distribution there are two tokens of *caught* – one from a minimal pair. They are close to one token of *cot* (*cot*2), and lower than the other token. The two realizations of the pair *taller–dollar* are differentiated only by F2.

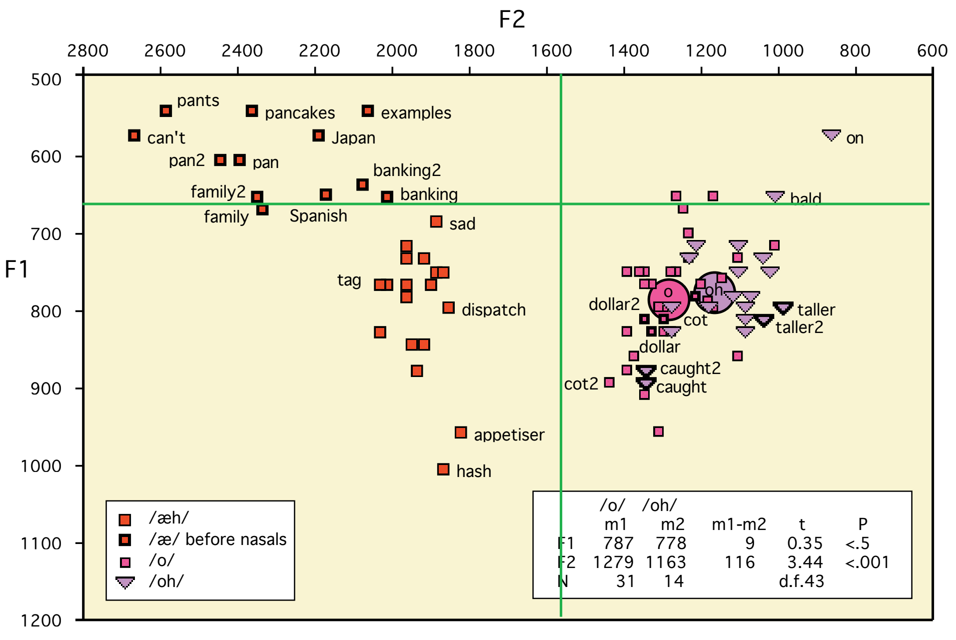


Figure 19.1. Low short vowels of Danica L., 37 [1999], Columbus, OH, TS 757

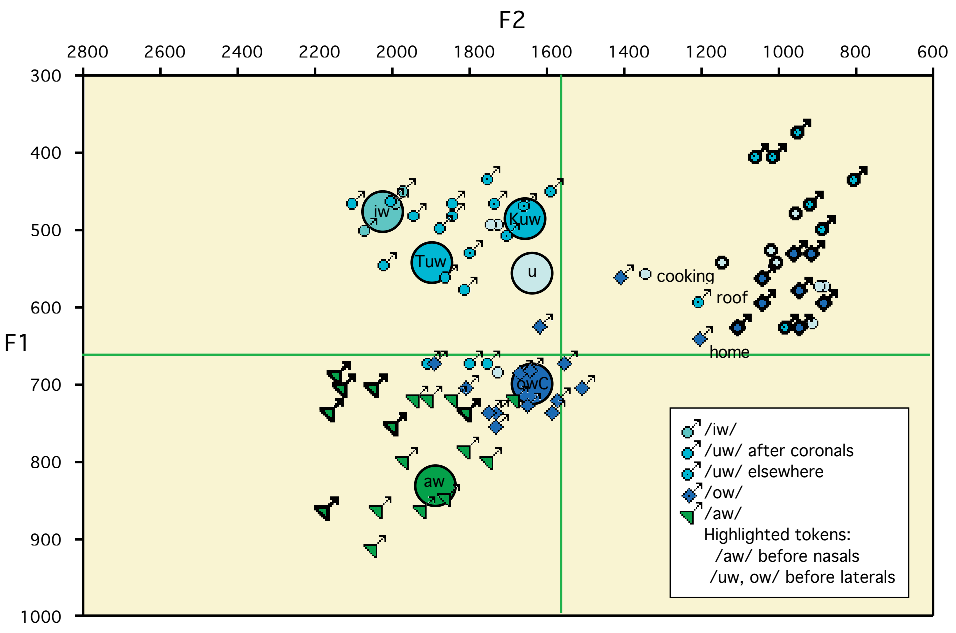


Figure 19.2. Back upgliding vowels of Danica L., 37 [1999], Columbus, OH, TS 757

In the minimal pair tests, this speaker judged *hot* and *caught*, *sock* and *talk* as ‘different’, but *taller* and *dollar* as ‘the same’. Both the distribution of tokens and the fluctuations in perception are typical of the transitional state of the low back merger in the Midland.

Figure 19.2 illustrates the development of the back upgliding vowels for the same speaker. Fronting of these nuclei is extreme. Almost all vowels of the type Vw are well front of center, and there is only a short distance between /uw/ after coronals and non-coronals. The mean of /u/ is also front of center. The strongly fronted realization of *good* is characteristic of this dialect: the auditory impression is of a front, non-peripheral unrounded vowel. In contrast with the South, where /uw/ and /u/ are markedly fronted before /l/ (Map 12.7, Figure 12.7, Figure 18.6), Midland systems show no such tendency. In Figure 19.2, all vowels before /l/ (highlighted) are in back peripheral position.

As noted above, Midland vowel systems contrast sharply with the North in the behavior of /ʌ/. (Maps 11.14, 14.8, 19.5.) Figure 19.3 gives a detailed view of /e/, /ʌ/, and /u/ for the speaker of the two previous figures. The fronting of /ʌ/ is most evident in *stuff*, *doesn't*, and *tough*, overlapping with the backer tokens of /e/, while the fully stressed canonical /e/ tokens are relatively front.[5]

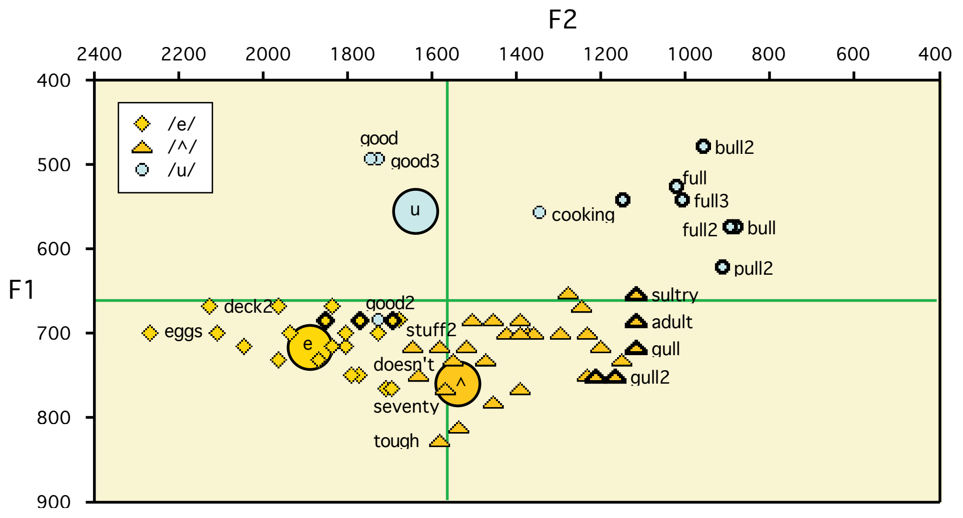


Figure 19.3. Fronting of /ʌ/ in the vowel system of Danica L., 37 [1999], Columbus, OH, TS 757. Highlighted vowels are before /l/

The more westerly section of the Midland is represented by a speaker from Kansas City, Kansas. Figure 19.4 charts the low-front short vowels of Sonya O., a 40-year-old woman from the upper-middle-class Overland Park suburb, on the Kansas side of the metropolitan region. She is an employee benefits broker with a B.A. and differs in both education and occupational level from Danica L. Nevertheless, the configuration of Figure 19.4 reproduces quite closely the structural relations of Figure 19.1. The /æ/ pattern is again a simple nasal system identical

3 As before, the lexical class of short-*o* will be shown as /o/, although it is merged with /ah/ in the same manner as in the Northern dialects of Chapter 14, since the main issue here is the degree of contrast with /oh/.

4 Map 14.2 does not show most speakers from Columbus, since the /o/ ~ /oh/ distinction is not stable enough in Columbus to make a clear decision about the phonemic status of /o/ in *on*, but the high-back location of *on* in Figure 19.3 leaves no doubt as to its /oh/ status for this speaker.

5 The most front /e/ is *egg*, which remains a member of the /e/ class, showing no tendency to develop the front upglide that marks a shift to the /ey/ class.

to that found for Danica L. in Columbus. In minimal pair tests, the Kansas City speaker produces and perceives /o/ and /oh/ as 'the same'. The low back vowel /o/ is statistically different from /oh/, particularly on the front-back dimension. Yet as in Figure 19.1, the two vowels are quite close, with considerable overlap between them. The tendency of subjects to hear such small differences as 'the same' has been encountered in a wide variety of other situations (Labov 1994: Ch. 12; Di Paolo and Faber 1990).

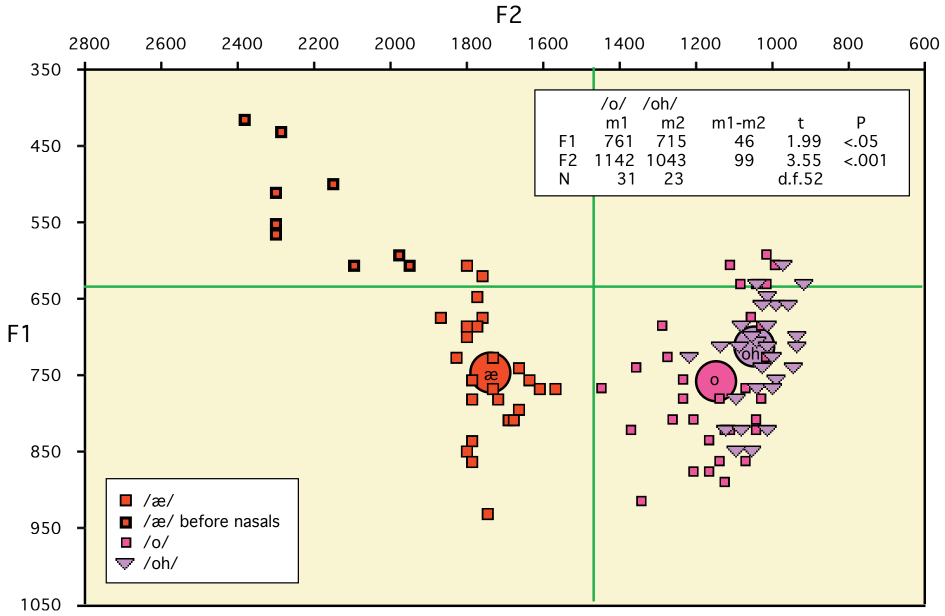


Figure 19.4. Low short vowels of Sonya O., 40 [1994], Kansas City, KS, TS 152

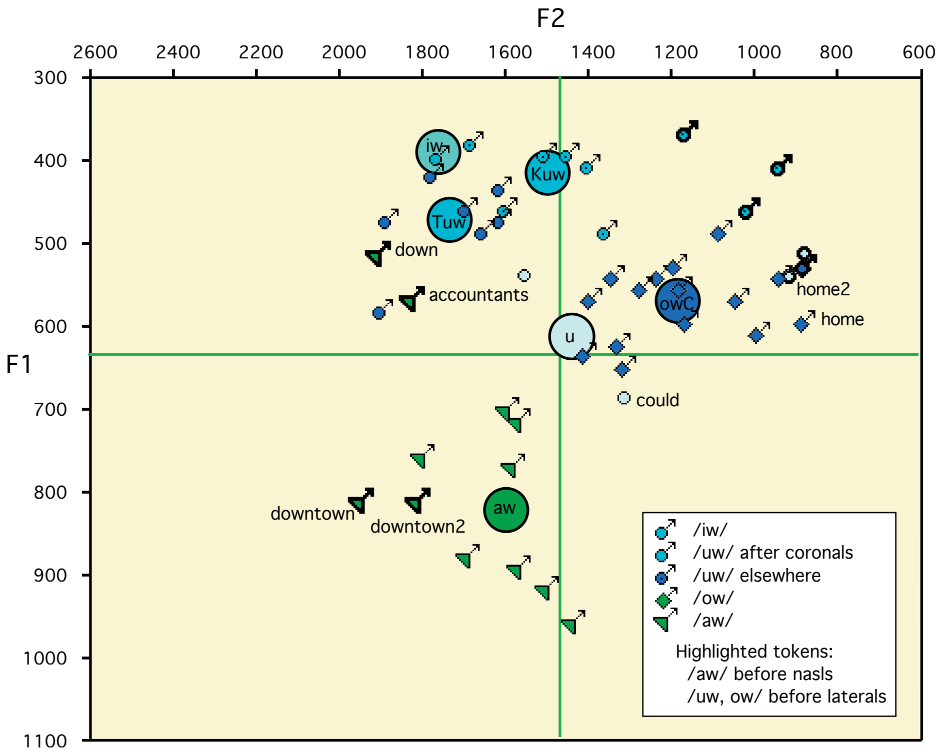


Figure 19.5. Back upgliding vowels of Sonya O., 40 [1994], Kansas City, KS, TS 152

Figure 19.5 displays the back upgliding vowels of Sonya O. The pattern is similar to that of the Columbus system in Figure 19.2 in most respects: strong fronting of /uw/, and little difference between the means of /uw/ with coronal onsets and non-coronal onsets, and strong fronting of /aw/ with vowels before /n/, raised in some cases to upper mid position. This extreme fronting and raising of /aw/ is characteristic of Kansas City, which shows even stronger /aw/ fronting than Southern cities, and leads other Midland speech communities in this respect. On the other hand, the fronting of /ow/ is not as extreme as in Columbus.

19.3. Pittsburgh

At the center of the western Pennsylvania dialect area is the city of Pittsburgh. The city itself is of moderate size, with a population of 370,000, in a Metropolitan Statistical Area of 2,380,000. As in the case of Philadelphia, some features of Pittsburgh are common to the larger region of western Pennsylvania, while others are specific traits of the city dialect. In an effort to understand better the special linguistic character of the city, thirteen complete Telsur interviews were conducted. The speakers range in age from 29 to 66, but are heavily concentrated in the mid thirties. As usual, women predominate (nine of the thirteen). The ethnic group most strongly represented is German, as in most Midland cities: eight of the thirteen speakers had German family background. Occupations included postal carrier, electricity inspector, office managers, clinical care assistant, and dental hygienist, so that the occupational index ranged from 26 to 74. None of the specific Pittsburgh features studied here showed social stratification in the Telsur sample. They are generally shared across this age, ethnic and social range.

The low back merger in Pittsburgh

In preceding chapters, Pittsburgh and western Pennsylvania are shown as a consistent center of the merger of the low back vowels /o/ and /oh/ (Maps 9.1, 11.1) The fourteen Pittsburgh speakers all exemplified the merger in minimal pair tests and spontaneous speech. Exceptions in minimal-pair responses for the five allophones examined were limited to two cases: a 44-year-old woman who thought that *sock* and *talk* sounded 'close', although they clearly rhymed in her pronunciation, and a 39-year-old woman who pronounced *taller* and *dollar* with slightly different vowel qualities, though she judged them to rhyme. Pittsburgh therefore contrasts sharply with the Midland cities in the completeness of the low back merger.

The Pittsburgh chain shift

The city dialect of Pittsburgh incorporates a chain shift unique among North American dialects. It is similar in several respects to the Canadian Shift discussed in Chapter 15, triggered by the low back merger of /o/ and /oh/. As in Canada, the Pittsburgh merger takes place in lower mid-back position, so that both /o/ and /oh/ are realized as [ɔ]. But instead of a backward movement of /æ/, Pittsburgh shows a downward movement of /ʌ/ into the vacant low central position, as shown in Figure 19.6.[6]

6 It is possible that Pittsburgh /o/ never occupied the low-central position, but since it is surrounded by dialects in which /o/ is unrounded to [ɑ], Figure 19.6 represents the most likely sequence of events.

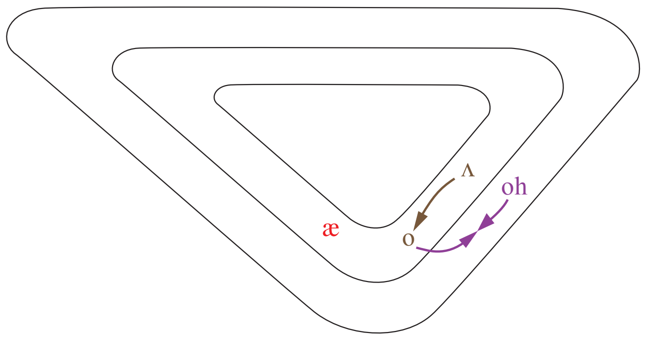


Figure 19.6. The Pittsburgh chain shift

Figure 19.7 shows the placement of /ʌ/ in the system of Keneth K., a 35-year-old retail manager from Pittsburgh. /ʌ/ is located squarely between /æ/ and the merged /o ~ oh/.[7] Eleven tokens of /ʌ/ are placed in low-central position, including *sun*, *fun*, *duck*, *mother*. A majority of the very low vowels are before nasal consonants, as indicated by the highlighting. There is no tendency for /æ/ to shift back to low central position, which is fully occupied by /ʌ/. The low back merger is evident, with both /o/ and /oh/ in mid back position.

The short-*a* vowels of the Telsur Pittsburgh speakers exhibit the clear division between nasal and non-nasal allophones that is common to the Midland and other areas (Map 13.3, 13.6, 19.1, and 19.4). In Figure 19.7, the short-*a* tokens before nasal consonants, including those in open syllables (*mammal*, *satanic*), are clearly separated from all others. Vowels before velar nasals (*dangling*) are lax, however, as in Philadelphia and New York City. The relatively high position of short-*a* before /d/ is a general feature of the city's short-*a* system, and for one of the seven speakers, /æ/ before /d/ is tensed, along with the pre-nasals (*dad*, *sad*).

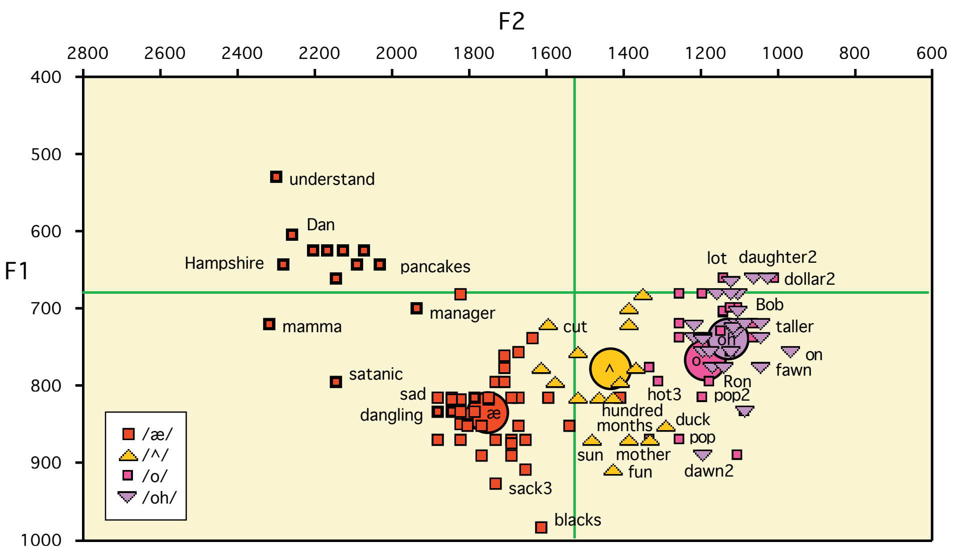


Figure 19.7. The Pittsburgh chain shift in the vowel system of Kenneth K., 35 [1996], Pittsburgh, PA, TS 545. Vowels before nasal consonants are highlighted

The pattern of Figure 19.7 is found in all seven of the Telsur Pittsburgh speakers analyzed acoustically. The generality of the Pittsburgh chain shift can be seen clearly in the Meanfile diagram of Figure 19.8, which displays the mean values of /æ/,[8] /ʌ/, /o/, and /oh/ for all 20 of the dialects defined in Chapter 11. Note in particular the wide separation between the mean positions of /ʌ/ in Pittsburgh (PI) and the rest of the Midland (M), where /ʌ/ is fronted but not lowered (cf. Figure 19.3). In the Midland context, then, the lowering of /ʌ/ stands together with the completed low back merger and the monophthongization of /aw/ (see below) as one of the distinguishing characteristics of Pittsburgh speech.

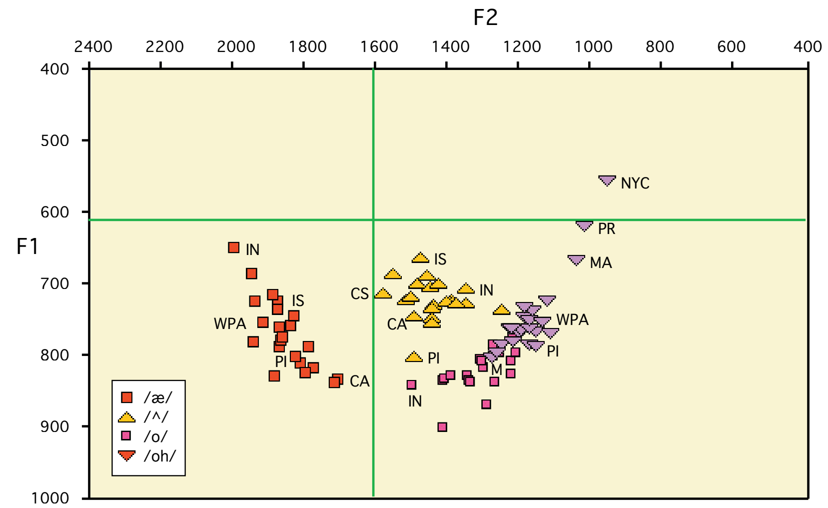


Figure 19.8. Mean values of low vowels for 20 dialects. PI = Pittsburgh; WPA = Western Pennsylvania; CA = Camada; PR = Providence; IS = Inland South; M = Midland; IN = Inland North

Table 19.4 shows the mean F1 of North American dialects, in descending order, to illustrate the extent to which the Pittsburgh system is skewed by the chain shift. The Pittsburgh dialect [PI] has the highest value for F1 of /ʌ/ by a good margin (and the Inland South, the lowest value). The means for Western PA (outside of Pittsburgh) are in the main distribution of /ʌ/ values, suggesting that the Pittsburgh chain shift is specific to the city. Figure 19.8 is a meanfile diagram that shows that the Pittsburgh mean for /æ/ is well towards the front, and shows none of the tendency to backing exhibited by Canada and Providence. In the low back region, the PI mean for /o/ is well to the back (along with that for Western PA), further back than the mean values for the Midland, and at the opposite pole from the fronting of /o/ characteristic of the Inland North.

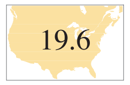
Table 19.4. Mean F1 of /ʌ/ by dialect

Dialect	F1 in Hz	Dialect	F1 in Hz
Pittsburgh	787	Middle Atlantic	721
ENE	768	West	712
Atlantic Prov	746	Charleston	712
Providence	736	Inland North	706
Canada	736	North	701
Cincinnati	730	Midland	695
WNE	728	NYC	692
Boston	727	South	687
St. Louis	726	Texas South	673
Western PA	725	Inland South	664
Florida	723		

7 As in many other cases, there is a statistical difference between the overall mans of /o/ and /oh/, but this is due to the difference in the allophonic distributions of tokens in the two historical classes: /o/ has many more tokens of the type of *hot*, and /oh/ of the type of *fawn* (Herold 1990). However, the near-minimal pairs like *Don–fawn*, and *collar–taller* confirm the subjective impressions of speakers and analysts that /o/ and /oh/ are completely merged.

8 As noted previously, mean values for /æ/ do not include short-*a* before nasal consonants.

Glide deletion of /aw/ in Pittsburgh



The best-known feature of the Pittsburgh dialect is glide deletion of /aw/ in *house*, *down*, *South*, *hour*, etc. Monophthongal realization of /aw/ is common in southern England, notably London (Sivertsen 1960; Kerswill and Williams 1994; Williams and Kerswill 1999), but no other North American city has extensive glide deletion of this vowel. Map 19.6 shows all occurrences of such glide deletion in North America. Only Pittsburgh shows a concentration of marked symbols. Fourteen other Telsur speakers produced examples of monophthongal /aw/, with only one (in Dallas) at a level greater than 20 percent. These monophthongal occurrences shown in Table 19.5 are concentrated in the most favorable environments, as in the occurrence of glide deletion of /ay/ outside of the South. Favoring environments include function words (*out*, *about*), and vowels before resonants (*hour*, *town*) and voiceless fricatives (*house*, *South*).[9]

Table 19.5. Occurrences of glide deletion of /aw/ outside of Pittsburgh

	No glide	Shortened glide
Winston-Salem, NC	about, hours	powder
Chattanooga, TN	hour	South
Omega, GA	house	
Memphis, TN	South	
Birmingham, AL	about, hour	South, South, house
Linden AL	out, without	doubt
Champaign, IL	about	about
Allentown, PA		town
Columbia, MO	out	
Dallas, TX	out	
Anchorage, AK	out	south
Las Vegas, NV	town	
State College, PA	re-routing	

Glide deletion of /aw/ in Pittsburgh is a well recognized stereotype of the local dialect, often referred to in newspaper articles with the spelling "dahntahn". The history of this variable in Pittsburgh is explored by Johnstone et al. (2002) through five generations of 114 working-class white males. Glide deletion is absent for those born before 1900, and is highest for speakers born between 1920 and 1949. A decline is noted for those born after 1950; it is possible that the phenomenon is in recession.

The highest users of glide deletion in Pittsburgh among the Telsur subjects are the speaker studied in Figure 19.7, Ken K. (TS 545), and his father Henry K., 61 (TS544). Henry K. shows glide deletion in *cloudy* and *couch* as well as the more favored environments *out*, *house* (3), *mountains*, *down* (4), *downtown* (3), *town*, *sound* (2), *hour* (2), *tower* (2). Ken K. has 14 tokens of glide deletion, but they are all in favoring environments (*out* (2), *South* (3), *pounding*, *town* (2), *down*, *sound* (2), *downtown*, *vowel*, *sauerkraut*). The Pittsburgh speakers who have less than 20 percent glide deletion show the same pattern as the Southern speakers in the list given above.

The relevant back upgliding vowels of Henry K. are shown in Figure 19.9. at double the scale of previous figures. Monophthongal tokens of /aw/ are highlighted. There is a significant tendency for the monophthongal vowel to be shifted forward, as in the case of /ay/ glide deletion: 8 of the 12 tokens front of center are monophthongal, while 11 of 15 back of center are diphthongal. There is considerable overlap with /ʌ/ ($p < .05$). This is surprising, since the logic of chain shifting would predict that the loss of the glide for /aw/ would preclude the lowering of /ʌ/ and the potential homonymy of the two monophthongs (e.g. *found* = *fund*). The glide deletion of /aw/ might be followed by the lowering of the nucleus of /ow/, following a pattern with back upgliding vowels analogous to the Southern Shift. However, the lowering of /ow/ is minimal in Figure 19.9 and for other Pittsburgh speakers as well, while the lowering of /ʌ/ is general in Pittsburgh.

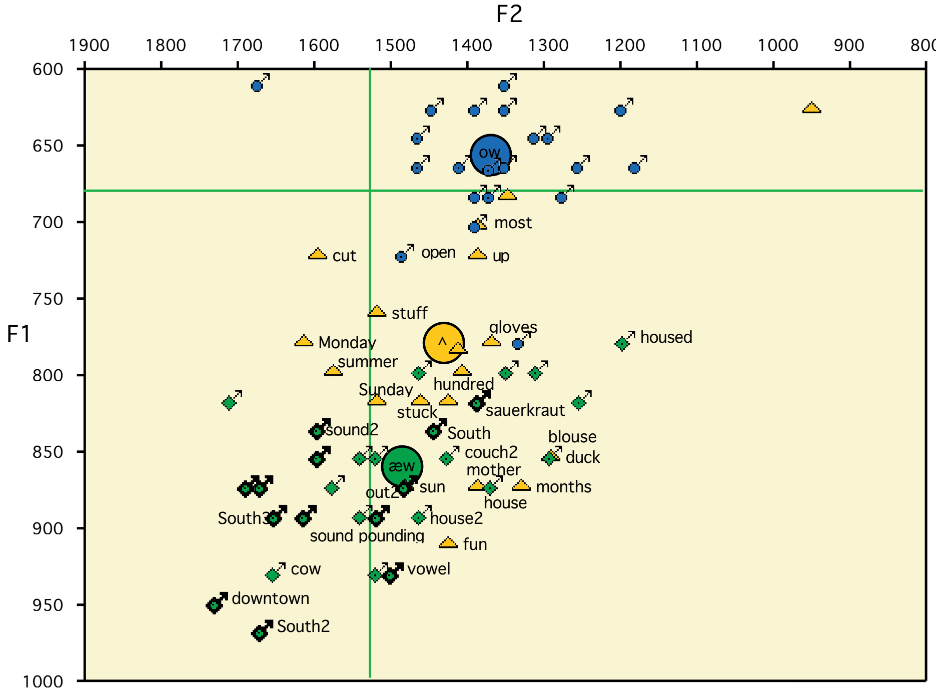


Figure 19.9. Glide deletion of /aw/ and lowering of /ʌ/ for Henry K., 61 [1994], Pittsburgh, PA, TS 544. Highlighted tokens of /aw/ show glide deletion

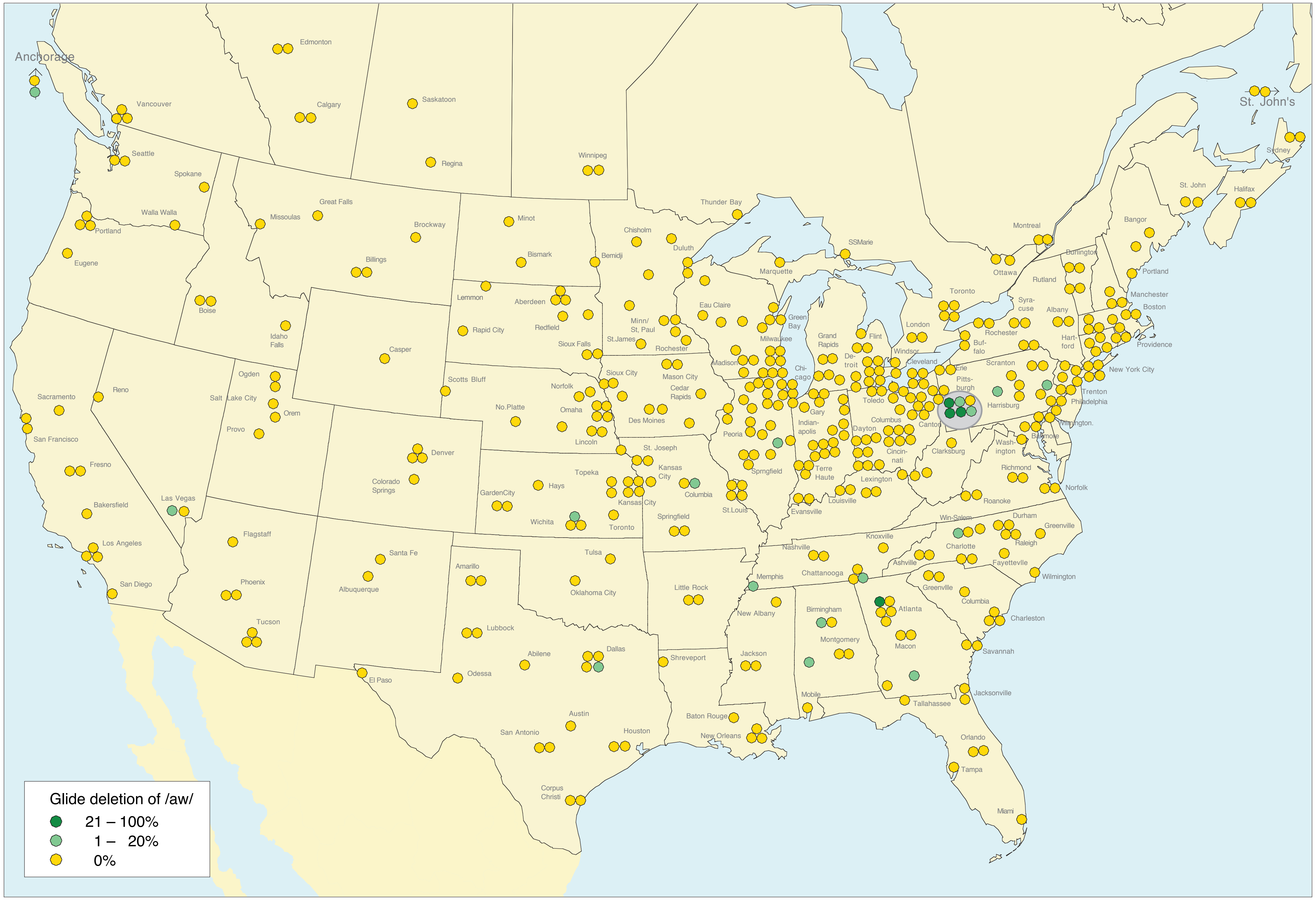
The solution to the problem posed above is that /aw/ remains a part of the long and ingliding vowel subsystem after glide deletion, (/aw/ → /ah/), and does not coincide with vowels in the short subsystem. Figure 19.10 shows the durations of 17 tokens of monophthongal /aw/ pronounced by Henry K., and 15 tokens of wedge. There is considerable range for both vowel classes, but the durations do not overlap. The mean duration for /ʌ/ is 98 ms, and for glide deleted /aw/, 208 ms: a difference of 6 standard deviations. The longest token of /ʌ/ (*sun* at 147 ms) is shorter than the shortest token of aw (*out*, at 157 ms). Compensatory lengthening of the nucleus has clearly taken place.

The shift of the short vowels under the Pittsburgh chain shift is therefore independent of the subsystem of back upgliding vowels. A shift downward of /ow/ to the position of /aw/ is a second and distinct possibility, parallel to the downward shift of /ey/ after the glide deletion of /ay/. There are a few tokens of /ow/ that overlap with /aw/, but this shift does not seem to be in progress, possibly because there are signs that the glide deletion of /aw/ is receding.

In addition to the Pittsburgh chain shift, the city shares with many other areas the Back Chain Shift before /r/, which is triggered by the general merger of /ohr/ and /ɔhr/. We then have: /ahr/ → /ohr/ → /uhr/, with a final merger of /ohr/ and /uhr/.[10] This is exemplified in Figure 19.11, the back vowels before /r/ of a 62-

9 The same pattern is found in the one Atlanta speaker with greater than 20 percent glide deletion, who shows deletion in *outside*, *throughout*, *south*, *amount*, *town*, *down*, and *hours*, and a shortened glide in *south* (3), *out*, *down*, *sound*.

10 The /uhr/ class is quite small in most dialects, and the Telsur data is marginal in quantity. For most dialects, the most common word *sure* has a mid-central vowel, and there is a lexical migration of original /uhr/ words into the /ohr/ class (*poor*, *tour*), leaving only the less common words *moor*, *boor*, *lure*, etc. in the /uhr/ class.



Map 19.6. Glide deletion of /aw/ in North America

The deletion of the glide of the diphthong /aw/ in *south*, *out*, *down*, etc. is characteristic of the city of Pittsburgh. It is not absolutely unique to that city. The scattering of light green symbols elsewhere shows a small tendency in this direction in various cities of the South and the Midland, often in less stressed words. Glide deletion of /aw/ is also found in the working-class vernacular of London and elsewhere in the south of England.

year-old woman from Pittsburgh. The low-central vowel /aw/ is added to show the distance that /ahr/ has moved.

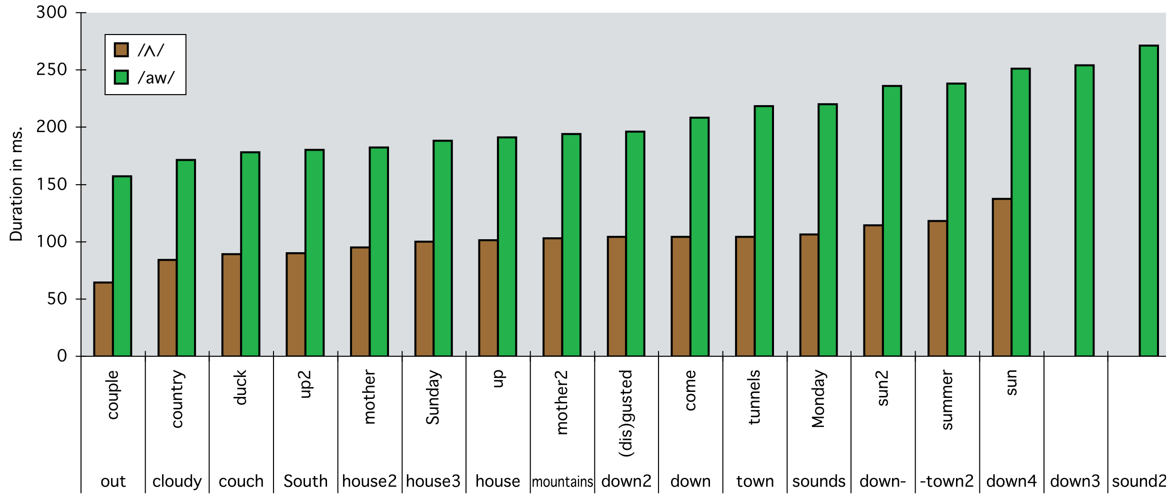


Figure 19.10. Durations in ms. of monophthongal /aw/ and /ʌ/ for Henry K., 61, Pittsburgh, PA, TS 544

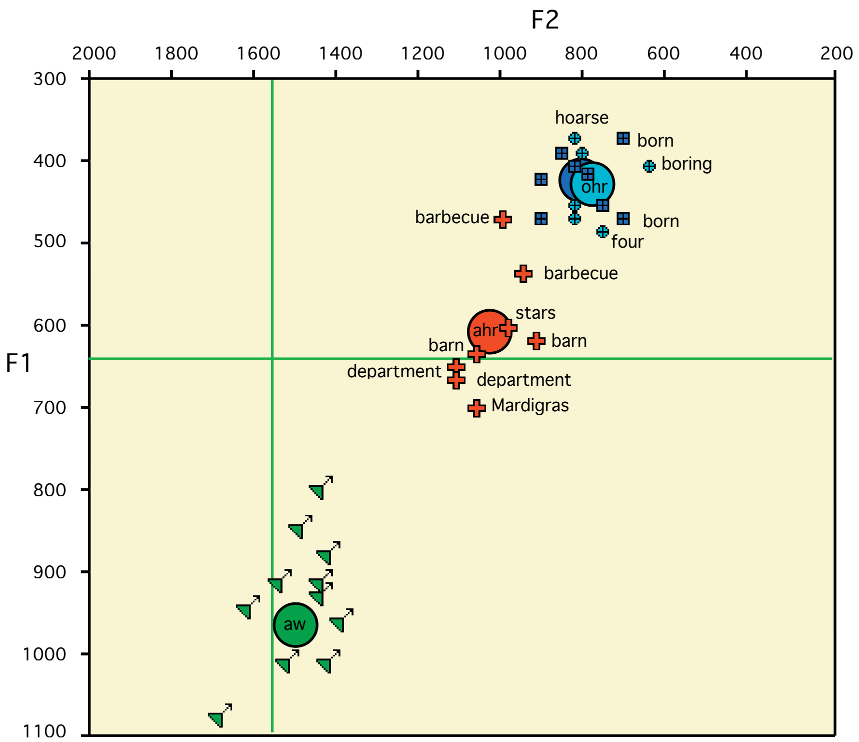


Figure 19.11. The back chain shift before /r/ in the vowel system of Cecila S., 62 [1995], Pittsburgh, PA, TS 356

19.4. Cincinnati

The dialect of the city of Cincinnati exhibits a vowel system distinctly different from those of other Midland cities, particularly in the short-*a* pattern. Instead of the predominant nasal system of the Midland, Cincinnati speakers have a distribution of tense and lax vowels that closely resembles the phonetic pattern found in New York City (Figures 13.2 and 13.3). In the Cincinnati pattern, as first identified by Boberg and Strassel (2000), vowels before voiceless fricatives and voiced stops are fronted and raised, in many cases to a higher degree than vowels before nasals. Figure 19.12 shows the low vowel system of George K., a 61-year-old retired office manager. There is a clear separation between lax short-*a* words, in low-front position, and tense short-*a* in mid position. Vowels that would be tense in NYC are orange triangles; those that would be lax in NYC are shown as red squares. The tense group shows two oral codas besides nasals: /d/ (*mad*, *sad*, *dad*) and /ʃ/ (*ash*, *hash*, *cash*). The pattern is distinct from the tense–lax split of the original Midland cities that are now grouped as Mid-Atlantic, in that the back voiceless fricative /ʃ/ is included in the tense set, along with all vowels before /d/. It replicates the New York City pattern with two exceptions: vowels before the voiced velar stop /g/ (*tag*, *bag*) are in the lax set,[11] and short-*a* in open syllables is tense (*manatee*, *Catholic*).

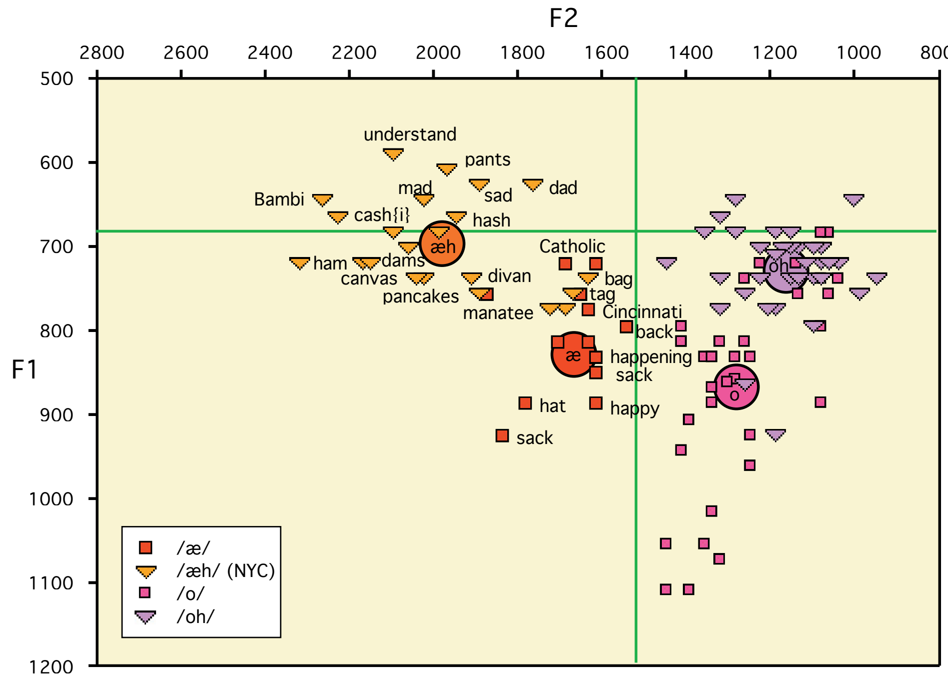


Figure 19.12. Low vowels of George K., 61 [1994], Cincinnati, OH, TS 118. Highlighted symbols are vowels before nasal consonants

The distinction between /oh/ and /o/ is much clearer in Figure 19.12 (and in Figure 19.13 below) than in the other Midland vowel systems examined earlier in this chapter. The means of /o/ and /oh/ are quite far apart; the few short /o/ words found in the /oh/ region are almost all examples of /-ond/ (*bond*, *pond*), a word-set that is often tensed in Midland cities and may actually be assigned to /oh/ as an underlying form. Nevertheless, Boberg and Strassel (1995) found that younger Cincinnatians frequently show a more general overlap of /o/ and /oh/, indicative of an ongoing merger that would bring Cincinnati into line with other Midland cities.

Figure 19.13 is the vowel system of a second Cincinnati speaker, a 58-year-old woman who worked as an accountant in a Savings and Loan firm. Short-*a*

11 In the various speech communities neighboring New York City, the laxing of short-*a* before /g/ is one of the most common differences from the New York City pattern.

tokens are again divided into the same lax and tense categories as in NYC and are assigned the same symbols: orange triangles for the tense /æh/ set and red squares for the lax /æ/ set. The separation of the two sets is in general quite clear. The highest vowels are before voiced stops and voiceless fricatives (*sad*, *cash*, *dad*). Vowels before nasal consonants are more peripheral, but not higher. These tense vowels are long and often glide towards the center of the vowel system. The glide targets for tense /æh/ are indicated with square pink symbols. The targets are not the low second morae of Northern breaking (Figure 13.11), but the centering inglide typical of NYC.

There are also several clear differences from NYC:

- vowels before /g/ are lax (*tag*, *bag*); these are tense in NYC.
- the same tensing pattern is found in open syllables (*passive*, *fascinated*, *Catholic*, *davenport*) as in closed syllables, whereas open syllables are lax in NYC.
- the word *and* is tense; such function words are regularly lax in NYC.

The resemblance between Cincinnati and NYC is thus limited to the immediate phonetic environments for tensing as in Figure 13.2, and does not extend to the grammatical constraints or more complex phonetic conditions. The short-*a* systems of New Orleans and NYC are more closely related, since the main difference found between them concern the tensing of the function word *have* (Figure 18.11).[12] In any case, Boberg and Strassel (2000) show that this marked feature of Cincinnati speech is in recession among younger speakers, who are moving towards the general default pattern of the Midland, the nasal system. This development can be seen as parallel to the abandonment by younger Cincinnatians of the distinction between /o/ and /oh/, mentioned above. Both trends serve to further distance Cincinnati speech from the vowel systems of the Mid-Atlantic region, at the same time increasing its similarity to the surrounding Midland pattern. Medium sized cities like Cincinnati and Charleston, S.C. (Chapter 18) appear to be retreating in their most marked local features, and shifting towards the pattern of their larger regions. This does not indicate an overall decline in dialect diversity so much as a regional consolidation of the diverse directions of sound change in North America.

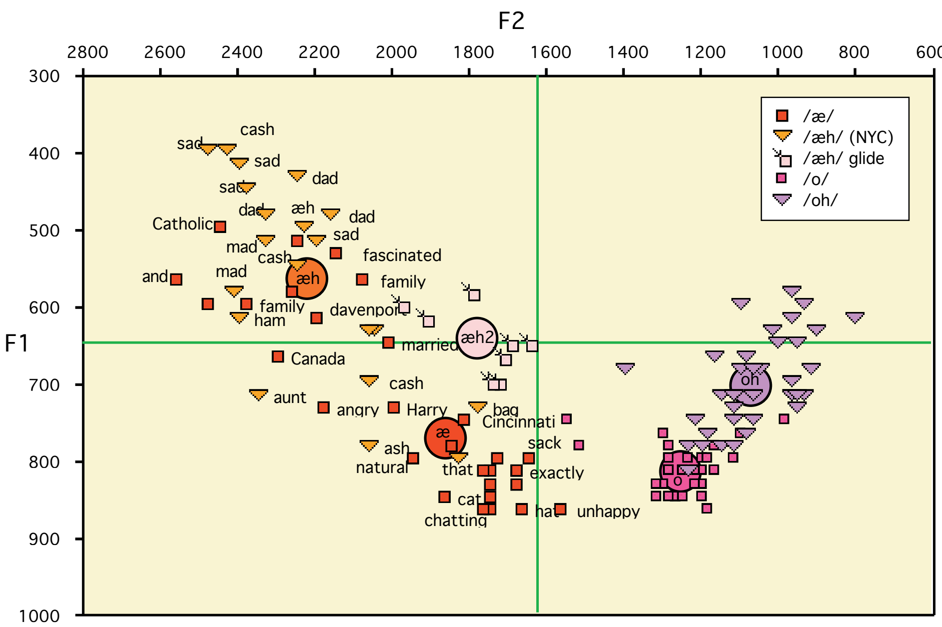


Figure 19.13. Low vowels of Lucia M., 58 [1994], Cincinnati, OH, TS 118

19.5. St. Louis

Chapters 11 and 14 portrayed the city of St. Louis as a northern enclave in the Midland area, connected by a corridor along Route I-55 through Illinois to Chicago (Figure 19.14). The corridor includes Telsur subjects from St. Louis, Springfield, Bloomington, and the small town of Fairbury. The populations of these communities are given in Table 19.6. The city of Peoria, some 30 miles to the northwest of I-55, shows variable alignment with the defining features of the corridor.

Figure 19.14. The corridor from St. Louis to Chicago along Interstate Highway I-55 [Map from Yahoo Maps]

This alignment of St. Louis with the Inland North appears in its resistance to the low back merger (Maps 11.1, 11.2, and 19.1) and in the several indices of the Northern Cities Shift:

- the general raising of /æ/ (Map 11.1, 14.3, 14.4) ;
- the EQ measure of the reversal of /æ/ and /e/ (Map 14.6), ;
- the ED measure of the alignment of /e/ and /o/ (Maps 11.2, 11.7–11.11, 14.7);
- the UD measure of the relative fronting of /o/ and /ʌ/ (Map 14.8).

The St. Louis corridor is not completely aligned with the Inland North dialect area by these criteria. Map 14.9 shows that only one St. Louis speaker has all features of the Northern Cities Shift combined, and Map 14.11 shows that only four of the eight isoglosses that define the Inland North are extended to include the corridor.

12 A similar resemblance of phonetic conditioning is found in Albany, where short-*a* before voiced stops and voiceless fricatives is included in the tense set, along with vowels before nasals in open syllables. Thus the basic phonetic conditions for tensing are exported form NYC more easily than the grammatical conditions and the open syllable condition.

Table 19.6. Populations studied in the St. Louis corridor

	City size	Metro. statistical area
St. Louis	396,000	2,548,000
Springfield	140,000	296,000
Peoria	113,000	346,000
Bloomington	51,000	139,000
Fairbury	3,600	3,600

In a number of other respects, St. Louis is more or less aligned with the Midland. Map 14.2 indicates that the entire St. Louis corridor is firmly adjoined to the Midland in the use of /oh/ for the word *on*. In this chapter only one map shows a separation of the St. Louis corridor from the Midland – Map 19.1 for the low back merger.[13] Map 19.2 indicates that St. Louis participates moderately in the fronting of /ow/, along with the Midland and the Southeastern super-region generally. All four St. Louis speakers have a mean F2 of /ow/ higher than 1200 Hz, but none have an /ow/ that is fully central. Map 19.3 shows that the St. Louis corridor has a mean F2 for /aw/ close to the central value of 1550 Hz, and three of the nine speakers are beyond 1550 Hz. None of the subjects in the corridor display the extreme fronting found in Indianapolis and Kansas City. In Map 19.4, one St. Louis speaker shows glide deletion of /ay/ before resonants, though none of the others in the St. Louis corridor do so. Finally, the youngest St. Louis subject participates in the fronting of /ʌ/.

This portrait of St. Louis is consistent with the overview provided in Murray (2000), reporting a series of dialect studies of the city (Lance 1974, Johnson 1976, Murray 1986, 1987, 1993, 1994, Faries and Lance 1993). Murray summarizes the mixed settlement history of the city that gave rise to the present assemblage of diverse inguistic features. As the "gateway to the West", St. Louis drew settlers mostly from the South up to 1850, but after the Civil War, attracted more from the North and the Midland. In the twentieth century, St. Louis was subject to the massive migration to the big cities of rural African-Americans, especially from the Gulf States. Murray's overview of the linguistic features of St. Louis is informative:

> ... St. Louisans typically pronounce an intrusive /r/ in *wash* and *Washington*, yet favor /e/ in *catch*, /oh/ in *fog* and *on*, /i/ in *creek* (Southern)) ... they favor *dove* (Northern) as the preterite of *dive*, prefer *want off* and *wait on* (Midland) over the more general *want to get off* and *wait for* ... use *hadn't ought* (Northern) only slightly less frequently than general *oughtn't*, and most often express fifteen minutes before the hour as *quarter to* (Northern/Southern) ... St. Louisans tend to eat *string beans* and *corn on the cob* (Northern/Midland), dispose of *pits* from their cherries (Northern) and *seeds* from their peaches (Southern/Midland), carry water in *buckets* (Southern) and groceries in *bags* (Northern), and wheel their infants in *baby buggies* (Midland). (Murray 2000: 347)

Murray's real-time comparisons of St. Louis speakers from 1982 to 2001 lead to the conclusion that the dialect pattern of the city is shifting in the direction of the Inland North, particularly in pronunciation. At the same time, many lexical and grammatical features of Midland origin remain stable.

The most notable feature of the traditional St. Louis dialect, is the merger of /ahr/ and /ɔhr/ in *are* and *or*, *card*, and *cord*, *farm* and *form*, etc. with /ohr/ remaining altogether distinct in *ore*, *core*, and *port*. A similar merger is found in central Texas and Utah, but there the merger takes place primarily in low position, while in St. Louis, it is /ahr/ that rises to merge with /ɔhr/. While the merger appears to be receding in St. Louis in Murray's surveys and other data, it is well exemplified in the Telsur speakers shown in Figures 19.15–19.18.

In Figure 19.15, the back Vhr system of Judy H., 57, shows a complete overlap of /ahr/ and /ɔhr/, and a complete separation of /ɔhr/ from /ohr/. The two tokens of *mourning* are lower than the other /ohr/ vowels, but they are considerably higher than the two tokens of *morning*.

Figure 19.16, the back Vhr vowels for another woman of about the same age, shows the same pattern. The popular stereotype for this St. Louis merger is that it involves a reversal of /ɔhr/ and /ahr/, as in the phrase *Put the harse in the born*. Given a merger, some tokens of /ahr/ are apt to be higher than some tokens of /ɔhr/, as in Figure 19.16 where *barn*$_2$ is above *born*$_1$. However, one can see here that the means of these vowels are at the same height, as the *t*-tests for Figures 19.15 and 19.16 show.

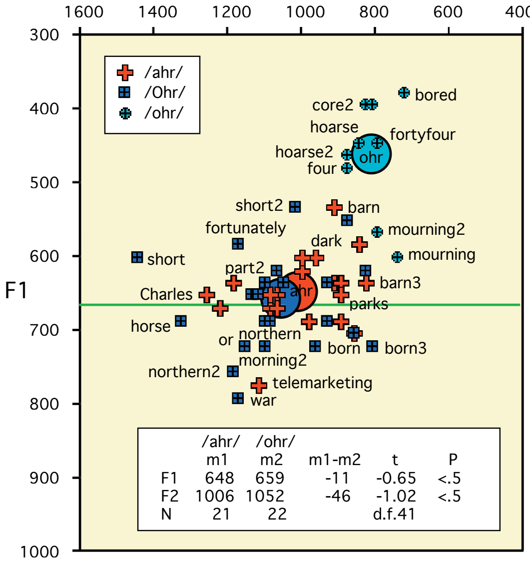


Figure 19.15. Back vowels before /r/ for Judy H., 57 [1994], St. Louis, MO, TS 109. /ɔhr/ = "Ohr"

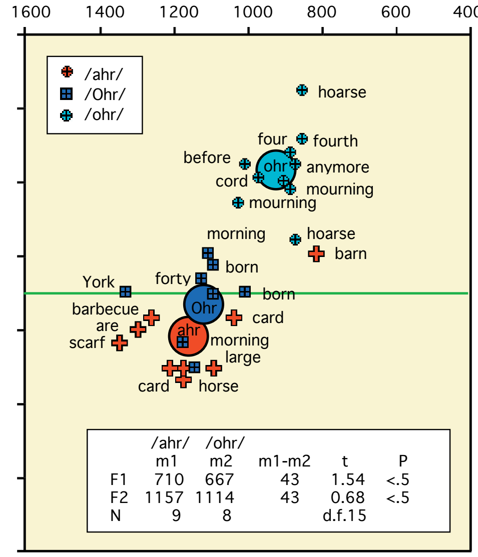


Figure 19.16. Back vowels before /r/ for Joyce H., 53 [1994], St. Louis, MO, TS 167. /ɔhr/ = "Ohr"

Figure 19.17 shows the traditional St. Louis merger for a somewhat younger man, with some overlap of /ohr/ and /ɔhr/. Again, it is a low token of *mourning* that stands out from the rest of the /ohr/ class. Three exceptionally low tokens of /ɔhr/ – *born*, *corn*, *morning* – might support the popular notion of a reversal of /ahr/ and /ɔhr/, but other tokens show that the two word-classes are truly merged.

Figure 19.18 shows the corresponding part of the vowel system for the youngest Telsur speaker from St. Louis, Rose M. It shows the recession of the St. Louis pattern of back vowels before /r/ in favor of the system found in the rest of North America. The merger of /ahr/ and /ɔhr/ is in effect reversed for most vowels, and the distinction between /ohr/ and /ɔhr/ has all but disappeared. A close inspection shows some evidence remaining of the original situation: *Arch* is close to the combined /ohr/ ~ /ɔhr/ mean, and one token of *or* is found with the /ahr/ tokens. The latter is a common relic of a recessive merger of /ahr/ and /ohr/: while the general merger has disappeared in most of the Appalachian–Ozarkian region, the function words *or* and *for* often remain lower and fronter (closer to /ahr/) than the rest of the /ohr/ class, which has merged with /ohr/.

13 Resistance to the low back merger is tightly linked with the Northern Cities Shift, and may not be considered a separate feature.

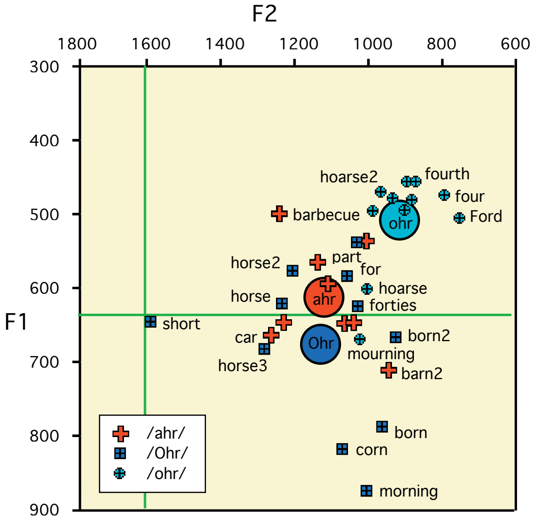


Figure 19.17. Back vowels before /r/ for Martin M., 48 [1994], St. Louis, MO, TS 111. /ɔhr/ = "Ohr"

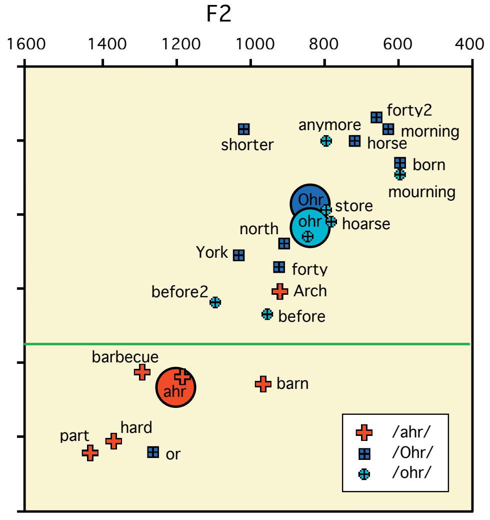


Figure 19.18. Back vowels before /r/ for Rose M., 38 [1994], St. Louis, MO, TS 161. /ɔhr/ = "Ohr"

The difference in age between Rose M. and Joyce H. is only 15 years, but the structural gap between the two speakers aligns with the general report that the traditional St. Louis merger is disappearing among younger speakers. Social class differences do not seem to be prominent here. Rose M. is a former dancer who is now a costume seamstress; Martin M. is a manufacturer's representative; Joyce H. is a secretary; Judy H. is the wife of an account manager for a telephone company.

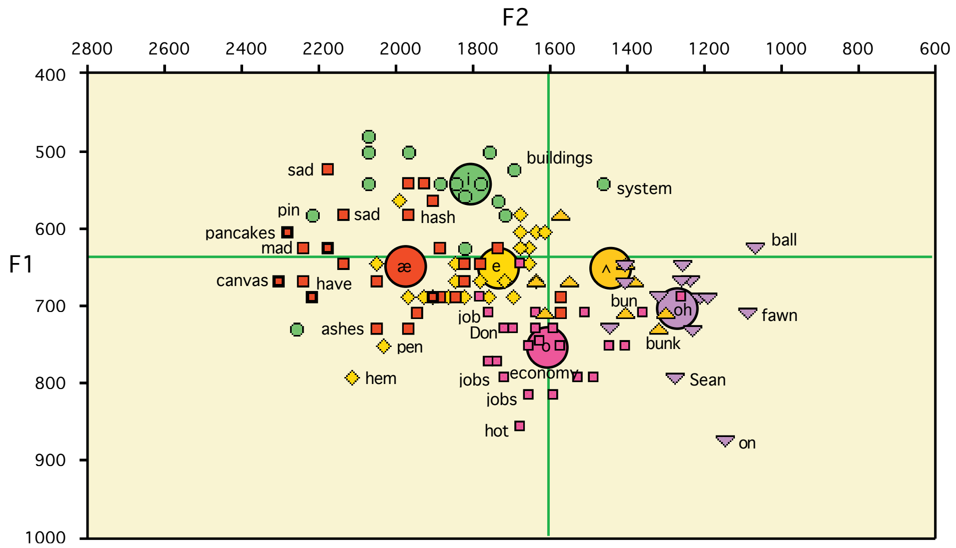


Figure 19.19. Northern Cities Shift in the vowel system of Martin H., 48 [1994], St. Louis, MO, TS 111

In St. Louis as in Cincinnati, unique local features are giving way to broader regional patterns. The difference between these two cases of regionalization is that while Cincinnati's regional identification is clearly with the Midland, St. Louis shows the influence of the competing regional models from the North.

The dynamics of the Northern Cities Shift in St. Louis are illustrated by Figures 19.19 and 19.20. In Figure 19.19 one can observe the general raising of *sad*, *mad*, *have*, and *hash* to about the same level as *canvas* and *pancakes*. The /ah/ tokens have moved front of center, as seen in *job*, *jobs*, *Don*, *not*, *top*, *economy*. The downward shift of /oh/ is most evident in *Sean* and *on*. The short-*e* class is not backed to any great extent, though there are some very low tokens before nasals (*pen*, *hem*). Several /ʌ/ tokens are placed well to the back (*bunk*).

Figure 19.20 displays the mean values for the vowel system of the same speaker. The effects of the St. Louis back vowel merger before /r/ can be seen: the mean for /ɔhr/ actually lower than the mean of /ahr/. The Northern Cities Shift vowels are connected at lower left to show the characteristic rotation. One can also observe the Midland-type orientation of the back upgliding vowels. Post-coronal /uw/ (Tuw) is merged with /iw/, and is shifted to the non-peripheral front position, and /uw/ not after coronals (Kuw) is fronted to high center position. On the other hand, /ow/ is only moderately fronted, about halfway to the mid-center position characteristic of Columbus (Figure 12.11). Though /ah/ is slightly higher than /o/, the two vowel classes are in effect merged, and the three vowels with /a/ nuclei are aligned in center position: /aw/, /ah ~ o/, and /ay/.

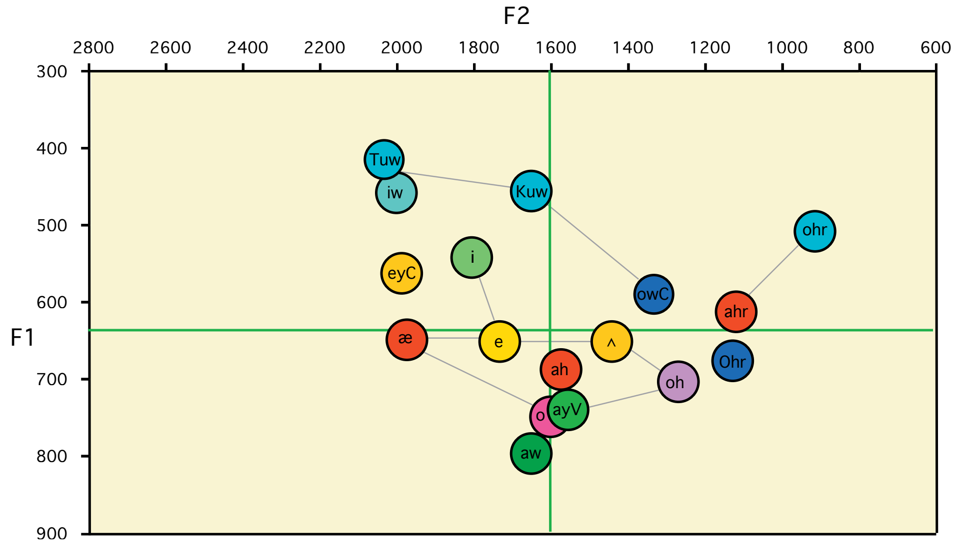


Figure 19.20. Mean vowel positions for Martin H., 48 [1994], St. Louis, MO, TS 111

20. The West

20.1. The definition of the West

20.1

Map 20.1 shows the borders of the West and its neighbors. This was the last dialect defined in Chapter 11 (Map 11.10); a fairly complex definition was required to separate the West from Canada, the North, the North Central region, the Midland, and the South. The heart of this definition is that the West is an area where the low back merger predominates (as distinct from the North and the South); and where /uw/ is fronted but /ow/ is not (as distinct from the Midland where both are fronted); but other restrictions were also required. The end product was a dialect area with low homogeneity (.56) and moderately low consistency (.62).

The situation can be clarified if we consider the relations of the West to each of its neighbors separately. The distinction from the South is simple and clear. There are no instances of glide deletion before obstruents among the Telsur speakers in the West.[1] The West differs from the Midland in the conservative treatment of /ow/ and in the completeness of the low back merger. However, these boundaries are not sharp. Map 20.2 shows that the centralization of /ow/ can be found variably in the West. As for the low back merger, Map 9.2 shows that there are six speakers in western Kansas who fall into the Midland area and have the low back merger in all allophones; the rest of the Midland displays in that map a predominance of the (orange) transitional symbols. The West is also distinguished from the North on the basis of the low back merger, but here again there is a sizeable intermediate area. More than a few speakers in the transitional zone between West and North show a complete low back merger.

As noted in the discussion of Map 11.13, the North Central area is specifically differentiated from the West in its conservative treatment of /uw/.

The differentiation from Canada is the most problematic because of the high degree of similarity between the varieties of English spoken in most of Canada and the western U.S. Map 11.7 showed that the Canadian Shift does not extend into the West across the Canadian border: there are no points near the Canadian border that are marked with dark red symbols in that map. However, there are nine dark red symbols within the isogloss defining the West in Map 11.10. Even when the dialect conditions for the West are superimposed, five of these points remain dark red – they satisfy the criteria for the Canadian Shift, but not the criteria for the West. The low homogeneity of the West as defined here is due to this tendency towards the Canadian Shift as well as speakers with incomplete low back merger. Historically, this heterogeneity results from a mixture of Northern, Midland, and Southern settlement.

The fronting of /ow/ in the West

20.2

The characterization of the West as an area where /uw/ is fronted but not /ow/ is generally valid, as our overall comparison of dialects will show. But Map 20.2 indicates that this criterion is not a homogeneous feature of the West.

The northeastern corner of the West shares the conservative treatment of /ow/ that is a property of the North, indicated by the dark blue circles: these are associated with an F2 of /ow/ that is less than 1100 Hz. There is also a slight fronting of /ow/ (F2 above 1100 and below 1200 Hz) indicated by pale-blue circles in the central area of Nevada and Utah. An even more common pattern is a moderately fronted /ow/, indicated by the turquoise circles that are keyed to an F2 of 1200 to 1300 Hz. This forms a belt in the western, southern, and eastern portions of the West. Although there is considerable variation in all three of these portions of the West, the moderate fronting pattern is heavily concentrated in this area: 16 of the 19 turquoise symbols in the West are located in the area between the oriented light blue isogloss and the turquoise isogloss. There are only three red symbols registering the full centralization characteristic of advanced speakers in the Midland and the South – in San Diego.

/aw/ in the West

20.3

The West is also differentiated from surrounding regions by the behavior of /aw/, the third back upgliding vowel, though this criterion shows the same variability as with /ow/. Map 20.3 shows that the West is characterized by a relatively conservative treatment of /aw/. Thirty-three of the Western speakers are designated by green circles, which represent a central location for the nucleus for /aw/ between 1450 and 1650 Hz. Canada and the North generally show much backer nuclei for /aw/, and the South much fronter, with some clear exceptions: Vancouver and Winnipeg in Canada show the same degree of fronting as the West, and three Western cities (Seattle, Los Angeles, and Tucson) feature at least one speaker who attains the more extreme degree of fronting seen in the South. The position of /aw/ is less useful in distinguishing the West from the Midland: although some Midland communities (like Kansas City) show extreme fronting and raising of this nucleus, other Midland speakers share the central position of /aw/ with the West. However, a central location for /aw/ is one of the most uniform features of the West, even if it is not exclusive to this region, just as glide deletion before resonants appears in the belt of South Midland territory just outside the South.

Southern features in the West

20.4

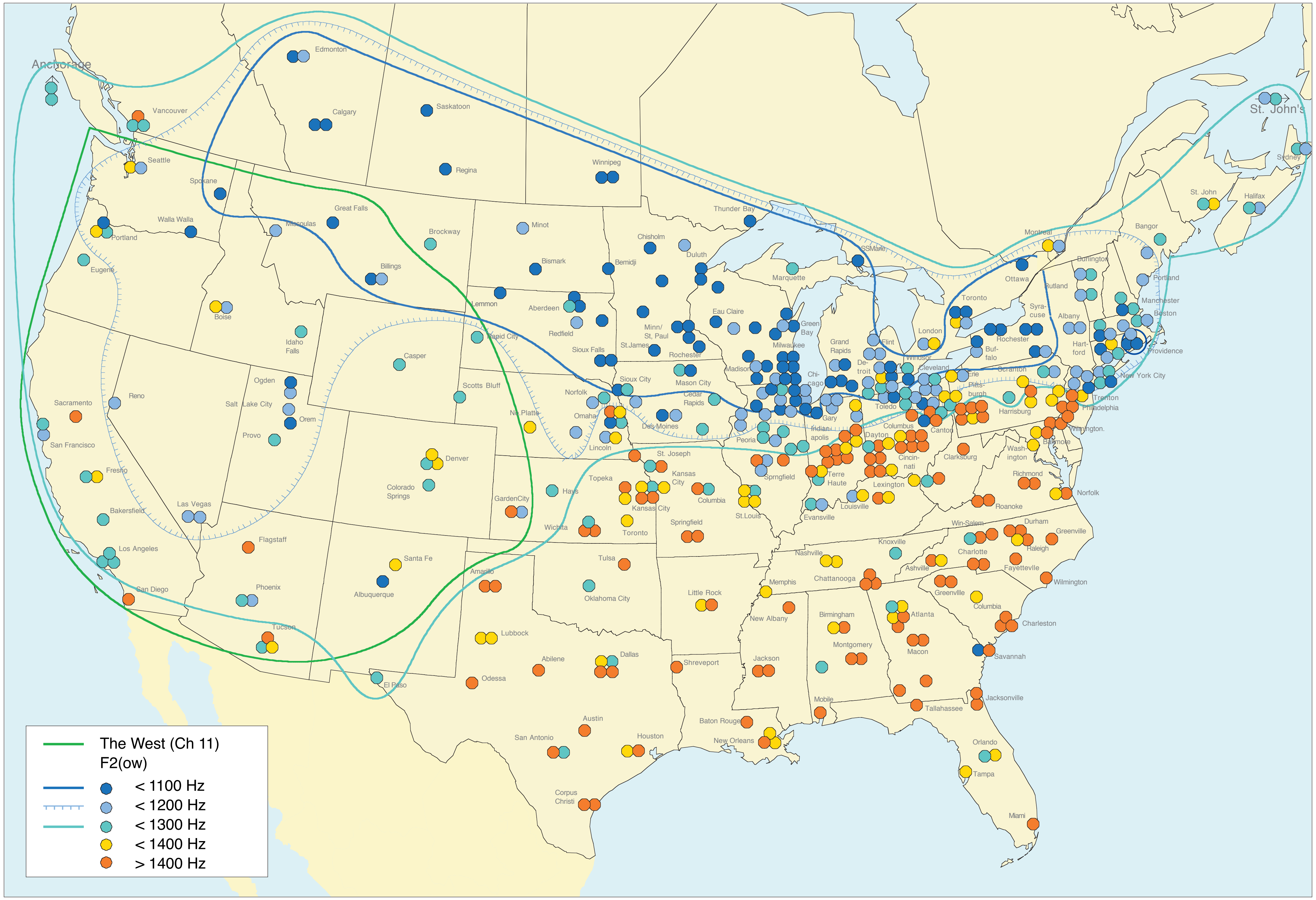
It is well known that settlement of the southwestern United States involved contributons from the South, with a strong component from Texas and Oklahoma. The phonological consequences of this settlement pattern are not enough to extend the South westward beyond Texas, but effects are found in several scattered remnants of Southern speech. Map 20.4 shows a "Southwest" region that is marked by such some representation of Southern features.

Map 20.4 carries over the extreme fronting of /aw/ from Map 20.3 with red circles. Two of these appear in the Southwest. In addition, the pink symbols show

1 The separation from the South on the basis of the low back merger is not so clear. Four Telsur speakers in West Texas show a complete merger, consistent with the reports of the progress of the low back merger in the Texas survey of Bailey et al. (1991).

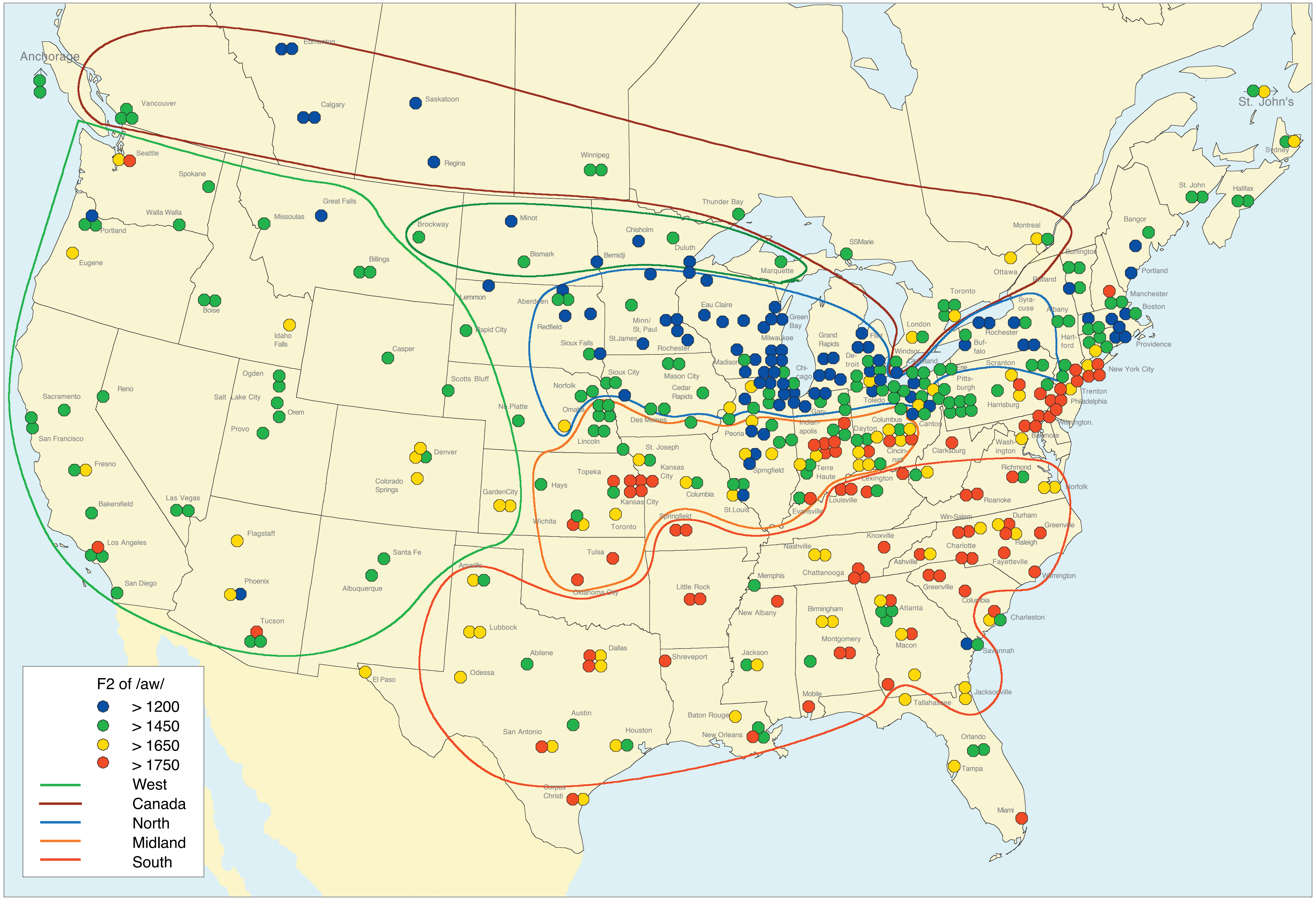
Map 20.1. The West and its neighbors

The West as defined in Chapter 11 has five neighbors: Canada, the North, North Central, the Midland, and the South. This chapter presents the main features that distinguish the West from each of its neighbors, and examines any degree of phonological differentiation within this large territory. The West is essentially an area with the low back merger, where /uw/ is fronted much more than /ow/, without Southern glide deletion, the Canadian Shift or Canadian raising.



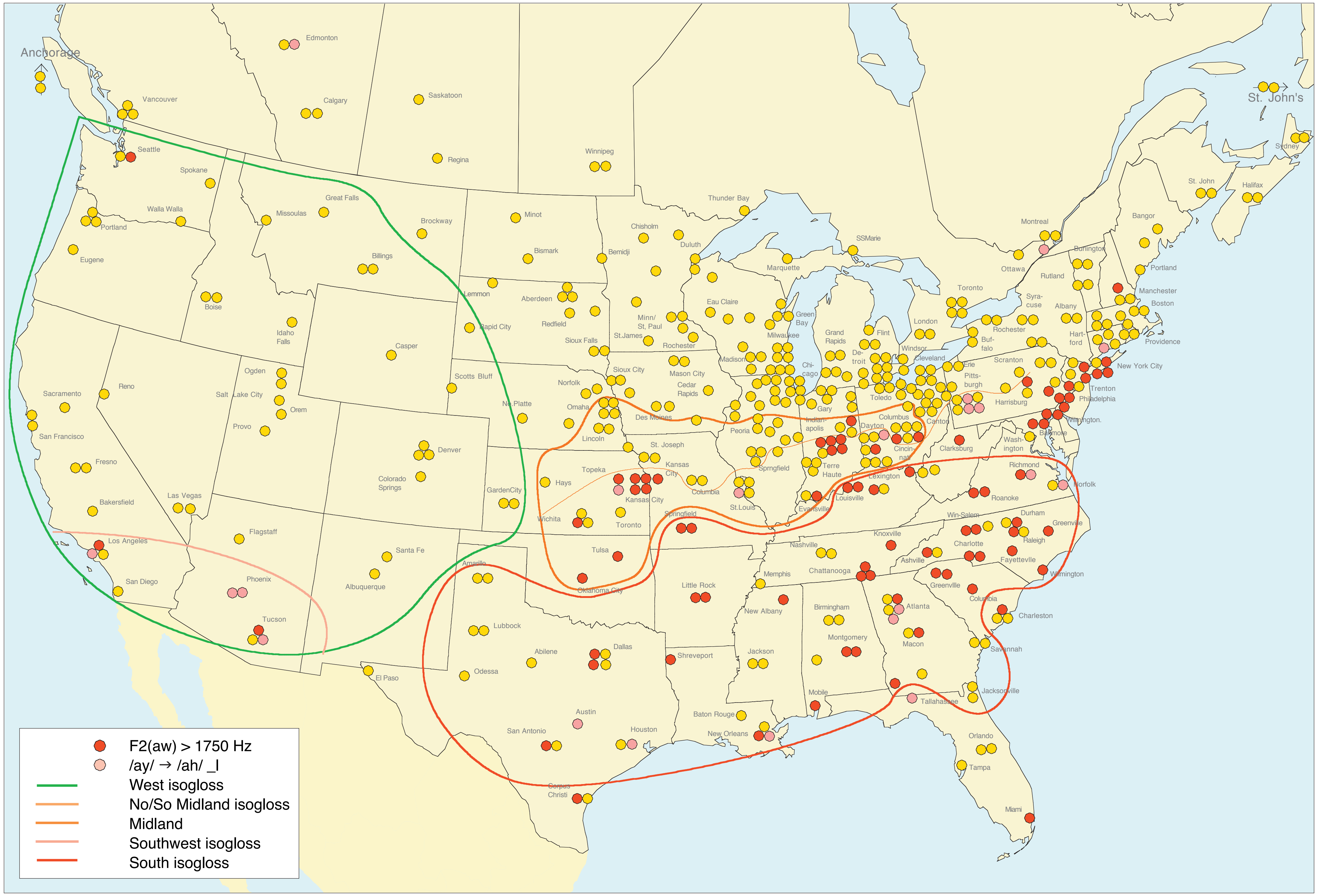
Map 20.2. Differential fronting of /ow/ within the West

The West is generally conservative in the realization of /ow/ in *go*, *boat*, *road*, etc., but it is not homogeneous in this respect. There are three waves of /ow/ fronting that divide the territory roughly into three regions. The strongest Northern influence is shown by the backest versions of /ow/ (dark blue circles), and the most fronting is found in the southeast, adjacent to the South (yellow and orange circles).



Map 20.3. Fronting of /aw/ in the West

The West is differentiated from its neighbors in the realization of /aw/ in *now*, *about*, *South*, etc. The green circles show a central position for /aw/ (hovering about a value of 1550 Hz for the second formant). The dark blue circles shown in the neighboring territory to the north and east represent a value considerably less than this, indicating a back position for this nucleus. The yellow and red circles to the south and east show a position of /aw/ well to the front, again contrasting with the West.



Map 20.4. Glide deletion of /ay/ in the Southwest

Westward migration from Texas and Oklahoma has influenced the southern portion of the West, but not strongly enough to make this a subsection of the South or even a distinct southwestern region. A few speakers show the strong fronting of /aw/ characteristic of the Midland and the South, and a few show glide deletion of /ay/, but only in the most favoring environment: before /l/. These southwestern speakers resemble the Midland regions of Kansas or Ohio more than the South.

glide deletion of /ay/ before resonants. The mixture of red and pink circles is confined to the southern half of the Midland, outlined by the North/South Midland line. It continues in the southwest, where the resonants are always /l/:

Phoenix: *while*, *miles*
Tucson: *nylons*
LA: *miles*

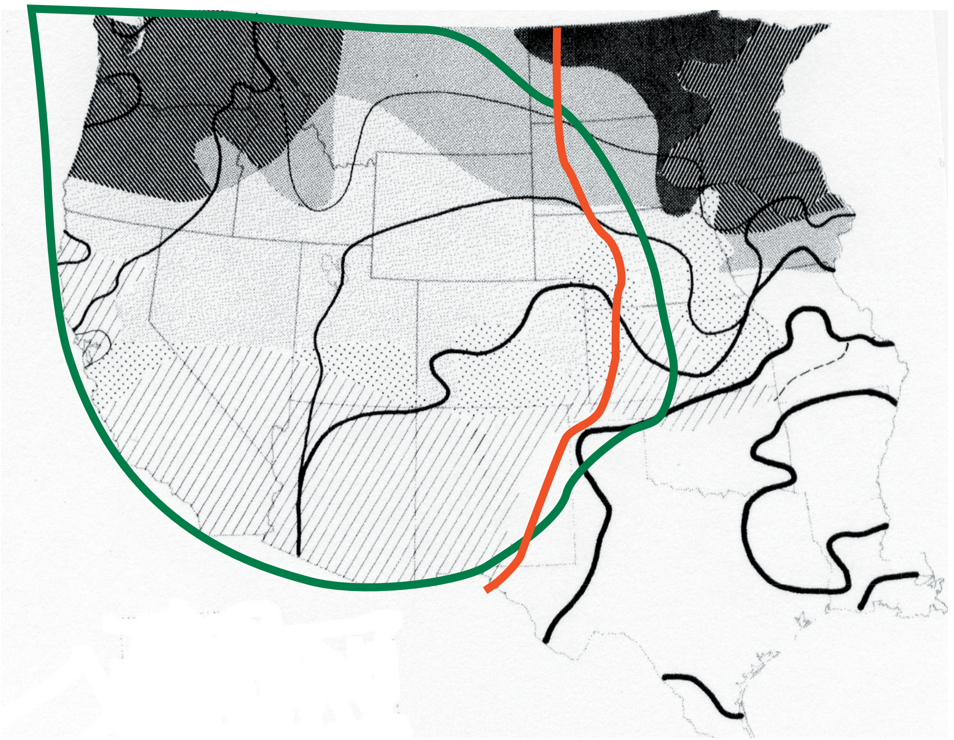
Although this is a limited display of glide deletion in both frequency and environment, it is not accidental that it appears within the light red boundary that delimits a "Southwestern" section of the West.

The DARE subdivisions of the West

Carver (1990) applies data from DARE records to the problem of tracing subdivisions of the American West. His overall view is similar to that which emerges from Maps 20.1–20.4, emphasizing a lack of homogeneity and uniqueness. He attributes these traits to the recent date of English-speaking settlement in much of the region:

> Western speech is both extremely young and still undergoing the modifications and leveling processes of a region in social flux. But this in itself contrasts its speech with that of the rest of the country. (Carver 1990: 205)

Map 20.5 superimposes the West isogloss of ANAE (green) and the West isogloss of Carver's Map 7.2 (red) on Carver's Map 7.7, which shows the extensions of both Northern and Southern lexical markers into the West (black). The region to



Map 20.5. Lexical subdivisions of the West. The lexical distributions that lead Carver (1986) to identify subsections of the West do not have any clear phonological correlates. The green line is the definition of the West used in this chapter; the red line shows the eastern limit of 17 Western words. The black lines are Carver's subdivision of the West.

the west of the red isogloss is the area of 17 specifically Western lexical items, such as *corral*, *canyon*, *jerky*, *sourdough*. The shaded areas (taken from Carver's Map 7.4) represent the extension of various layers of Northern words into the West. According to Carver, northern vocabulary is the dominant feature of the West, though it is most heavily concentrated in the northern sections. The black isoglosses represent the northwestward spread of Southern lexical layers. However, none of the subdivisions of the West that might be made on the basis of vocabulary corresponds to any of the divisions that might be made on the basis of phonology in Maps 20.2–20.4. The most distinctive western subregion to emerge from Carver's analysis is the Pacific Northwest, centered on Seattle and Portland, but there is nothing in the ANAE data to support the identification of this region as phonologically distinct from the rest of the West.

20.2. The position of the West among North American dialects

The description of the West in Chapter 11 and in this chapter makes it plain that this region lacks the high levels of homogeneity and consistency that was found for most other dialects. The West shows trends or tendencies that differentiate it from its neighbors, but many of its characteristic features are also found in quite distant regions, like western Pennsylvania. At present, the leading characteristics of the West must be treated in a statistical manner, and not in the discrete manner in which, for example, glide deletion defines the South.

Figure 20.1 is a Plotnik Meanfile diagram that plots the normalized mean values of 22 North American dialects for 12 vowel classes.[2] It labels the mean symbol for the West, highlighted for each vowel, with a few other dialects labeled for comparison. In regard to the mean positions of the tense front vowels /iy/ and /ey/, the West is close to the highest and frontest, but not so extreme as Canada. The West's means for the short vowels /i/, /e/, /æ/, and /o/ do not stand out from the others, but are found slightly below the center of the main distribution.[3]

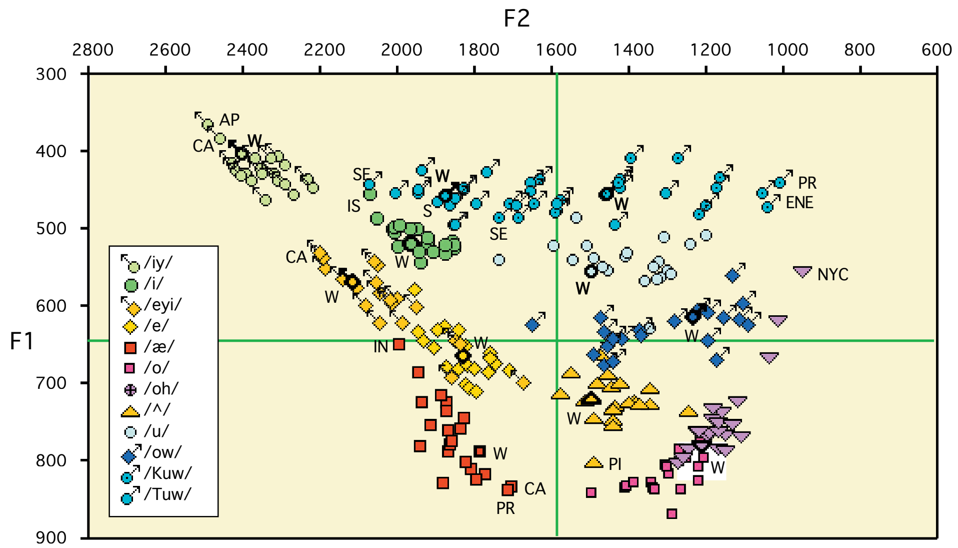


Figure 20.1. The position of the West among North American dialects. W = West, IN = Inland North, CA = Canada, AP = Atlantic Provinces, PR = Providence, ENE = Eastern New England, PI = Pittsburgh

2 The number of phonemes represented by these vowel classes varies across dialects, as the figure suggests.

3 In the group of /u/ vowels, the West is shifted somewhat towards the fronter part.

The West does not participate strongly in the Canadian Shift, as reflected in the intermediate position of Western /æ/, considerably less back than Canada and Providence. The status of the low back merger in the West is shown by the coincidence of the /o/ and /oh/ means (the mean symbol for the West for /o/ lies directly below the /oh/ symbol). But the characteristic configuration that distinguishes the West from other dialects is the combination of a relatively front position for /Tuw/ – about equal to the South, but behind the Southeast and the Inland South – and a relatively back position in the /ow/ distribution. Thus Figure 20.1 illustrates the definition of the West as the area of low back merger with strong fronting of /uw/ but little fronting of /ow/. It does not of course, illustrate the absence of Canadian raising and the Canadian Shift that distinguish the West from Canda.

Figure 20.2 is the characteristic Western vowel system of a 24-year-old man from Las Vegas whose pesonal background illustrates the mixed character of the Western population. He identifies his family background as "Jewish/French/Cherokee/German/English" and attended a high school that he says was evenly mixed "White/Hispanic/Black/Asian". He was currently working at a car wash.

The low back merger of /oh/ and /o/ is clearly illustrated in this figure. Both /Tuw/ and /Kuw/ are well fronted except before /l/, but /ow/ is not. The short-*a* shows a nasal system, more or less continuous, with the main body of non-nasal /æ/ in low front position. The mean for /æ/ (non-nasal) is back enough to qualify for the Canadian shift, at 1645 Hz. But /e/ shows no strong lowering: the mean of 585 Hz is well below the 660 Hz criterion for the shift.

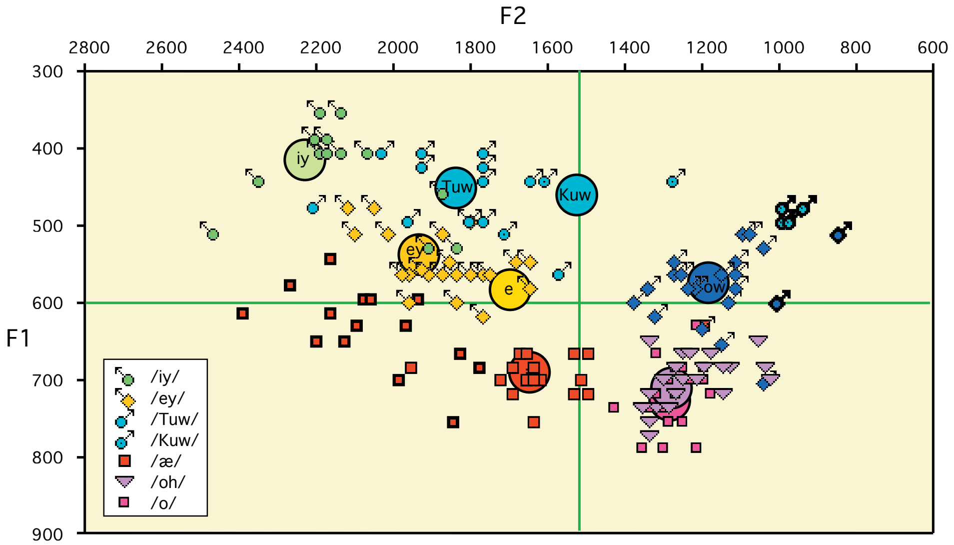


Figure 20.2. The Western vowel system of Ernest P., 24, Las Vegas, NV, TS 323. Highlighted /æ/ are before nasals. Highlight /ow/ are before /l/

20.3. The merger of vowels before /l/

In one respect, the Telsur interviews do not fully reflect the results of previous sociolinguistic work in the West. LYS reported a tendency toward the merger or near-merger of high tense and lax vowels before /l/ in several areas of the West, including Albuquerque and Salt Lake City. A case of the near-merger of /ul/ and /uwl/ in Albuquerque was examined in detail (LYS 1972: s. 6.3). In these near-mergers, speakers tended to label a minimal pair as 'the same', even though they consistently made a difference in production. Di Paolo (1988) examined the relations of /il/ ~ /iyl/ and /ul/ ~ /uwl/ in Salt Lake City in perception and production, finding strong evidence of these near-mergers in that community. Di Paolo and Faber (1990) examine back vowels before /l/ for eighteen Salt Lake City subjects in considerable detail. As in most cases of near-merger, widespread individual variation appears (cf. Labov 1994: Ch. 12). In the vowel charts provided by Di Paolo and Faber, 14 of the 18 speakers show distinct distributions of /uwl/ and /ul/ tokens, although there is a strong tendency (especially among teenagers) to make categorial judgments that ignore these phonetic differences.

None of the five Telsur subjects from Utah showed a complete merger of /uwl/ and /ul/ in production. However, evidence for a near-merger appears in the vowel system of a 23-year-old woman from Provo (Figure 20.3). Among the front vowels before /l/, *heel* and *feeling* are much higher than /i/ in *hill*, *Brazil*, and *building*, but *deal* is at the level of short /i/, and *field*(*s*) is level with *skills*. Among the back vowels the pattern is similar. Although there is no overlap between /uwl/ and /ul/, the phonetic distance between them is less than the difference between vowels not before /l/. Four tokens of /uw/ are in high back position (*fool*, *school*), but three other tokens are in lower high position, no higher than *full*. The small difference in backing between these lowered tokens of /uw/ and /u/ is typical of the situation reported in LYS (1972): in cases of near-merger, the phonetic difference is usually limited to F2, less than 200 Hz, which does not appear to be sufficient to maintain a reliable phonemic contrast from the perceptual point of view.

The minimal pair test with this subject produced a clear distinction in both production and perception. The pair produced were $fool_2$ and $full_2$, which was judged as different and are clearly separated in both height and backing on Figure 20.3.

Maps 9.6 and 9.7 examined the merger of /iy/ and /i/ and /uw/ and /u/ before /l/ for all of North America. A heavy concentration of the merger of /u/ and /uw/ before /l/ was found in Western Pennsylvania, closely linked to the vocalization of /l/ that is characteristic of that area. The merger of /iy/ and /i/ before /l/ was strongest in the South. The West did not show more than a light scattering of speakers who displayed a merger of either of these pairs. However, a study of all minimal pair responses for the West compared to all other areas shows one significant difference. The 88 subjects from the West had twice as great a tendency as others to judge the two pairs as 'close'.[4] Thus there may be a general trend in the West that renders these two distinctions less salient than in other areas.

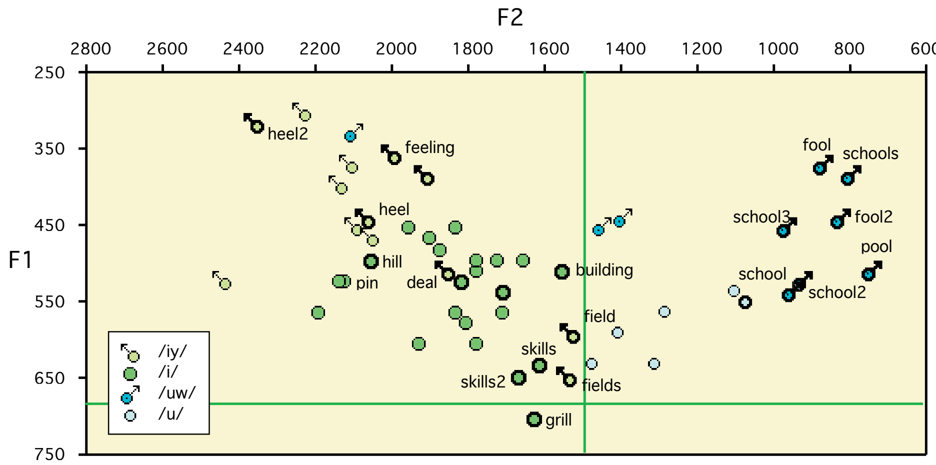


Figure 20.3. High vowels before /l/ for Jessie M., 23 [1995], Provo, UT, TS 332. Vowels before /l/ are highlighted

4 For /uwl ~ ul/, the West showed 17 'close' judgments out of 88, while all other areas showed 57 out of 578 (chi-sq = 8.99, $p < .005$). For /iyl ~ il/, the West showed 12 'close' out of 88, and others 57 out of 578 (chi-sq = 6.33, $p < .02$).

Figure 20.4 displays a similar pattern of near-merger of /uwl/ and /ul/ for a 14-year-old girl from Albuquerque. Here the word *school* shows the same variation as in Figure 20.3, with some tokens high and others at the level of /u/. The two tokens from the minimal pair test, *full*$_2$ and *fool*$_2$, are both in high back position, and these were rightly judged as 'close' by the speaker. Figures 20.3 and 20.4 therefore replicate quite closely the earlier observations in Albuquerque and Salt Lake City, but they are a minority pattern in the ANAE data: no area of the West is dominated by the tendency to merge vowels before /l/ that was reported in earlier studies.

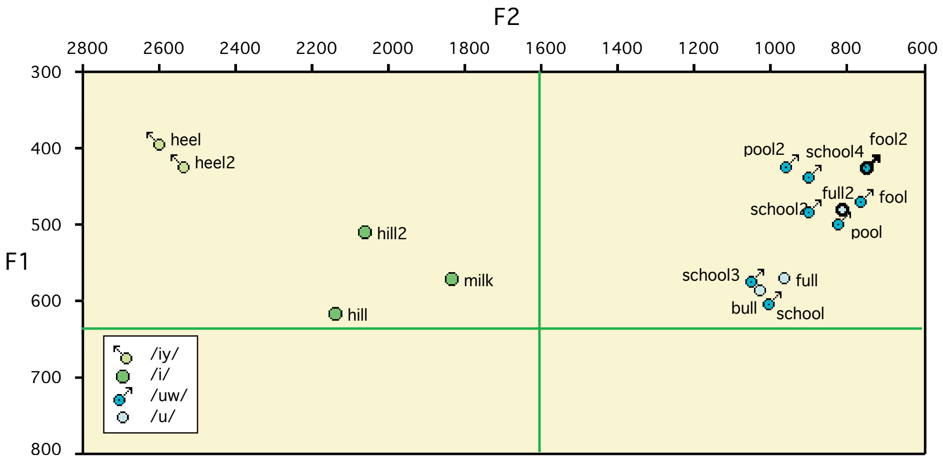


Figure 20.4. High vowels before /l/ of Kate A., 14 [1996], Albuquerque, NM, TS 515. Minimal pairs are highlighted

Part F Other views of regional differences

21. Lexical and grammatical maps

ANAE is a phonological atlas, concerned with the geographic distribution of the sound systems of North American English. Information on the distribution of particular words, and the incidence of phonemes in those words, can be obtained from LANE, LAMSAS, LAGS, LAUM, and DARE. The Telsur interview did inquire into a small number of grammatical variables, and several vocabulary items, as a way of correlating ANAE findings with these other studies. This chapter will present maps of four such items and their relation to the dialect boundaries drawn in previous chapters.

21.1. Terms for 'carbonated beverage'

The ANAE interview schedule contained several lexical questions. The first is: *What's the general term you use for a carbonated beverage in your area?* Five terms with specific geographic patterns are displayed in Map 21.1: *soda*, *pop*, *coke*, *tonic*, and *soft drink*. When a subject gave more than one answer, the colored token on the map shows the more common response.

The dominant form used in the northeastern area is *soda*. The *soda* territory outlined in Map 21.1.is considerably larger than any previous view of the Northeast: it includes all of New York State except for the western end, the Mid-Atlantic states, and the Upper South, extending southward to include eastern North Carolina.

Soda is also heavily concentrated in an area centered on St. Louis, which is distinct from most Midland areas in its phonological patterns as well (Chapter 19). The St. Louis area extends northeastward to the lower part of the St. Louis corridor, and westward across Missouri to St. Joseph. Here however we do not see a St. Louis connection with the Inland North usage, which is dominated by *pop*, but rather with a Mid-Atlantic–Northeastern term.

A third *soda* area is located in the southwestern portion of the West, including communities in Arizona, Utah, Nevada, and California. The two large cities of California – San Francisco and Los Angeles – are not included, since they show a mixed pattern in which *soda* does not predominate.

Florida also shows a concentration of *soda* tokens, but since the communities are evenly divided between *soda* and *coke*, it is not identified as a *soda* area.

The South is the center of *coke* territory. The *coke* isogloss does not extend to the Virginia and eastern North Carolina, though there are four red symbols within that area; there is overlap with a slightly dominant use of *soda*. In Indiana, there is a striking northward extension of *coke* to include the Hoosier apex, with a strong presence of *coke* in Indianapolis.[1] The *coke* domain extends westward, beyond the border of the phonological South, to include New Mexico and Tucson, Arizona. A scattering of red symbols can be seen further westward, within the blue *soda* area in the West.

The most coherent geographical area is enclosed in the green isogloss, delimiting the speakers who use *pop* as their general term. It includes the North (except for the soda areas in New York State and southeastern Wisconsin), the Midland (including Pittsburgh), almost all of Canada (excepting Montreal and Winnipeg) and the Pacific Northwest.[2] In the Great Lakes region there is a notable scattering of the blue symbols that mark *soda*, but they are a majority only in the Milwaukee area.

The term *tonic* is well known to be characteristic of the Boston area, but in the Telsur data it does not predominate in any ENE city outside of Boston. It is also used by the two Telsur speakers in San Antonio.

Two minor terms in the South show a notable local concentration. Seven Telsur speakers responded *cold drink*. They are found in a narrowly delimited south central region: three in New Orleans, three in Dallas, and one in Houston. Although this term may seem to be a general description and not on the lexical level of *soda*, *pop* etc., its geographic concentration in the area of New Orleans suggests that it is a local equivalent.

The term *soft drink* might also seem to be a periphrasis that is generally available to all speakers, but it occurs with notable frequency in two Southern cities: New Orleans and Atlanta. The New Orleans Telsur data includes more speakers than those shown on Map 21.1. The totals are: *soft drink* 6, *soda* 3, *coke* 1, *cold drink* 3.

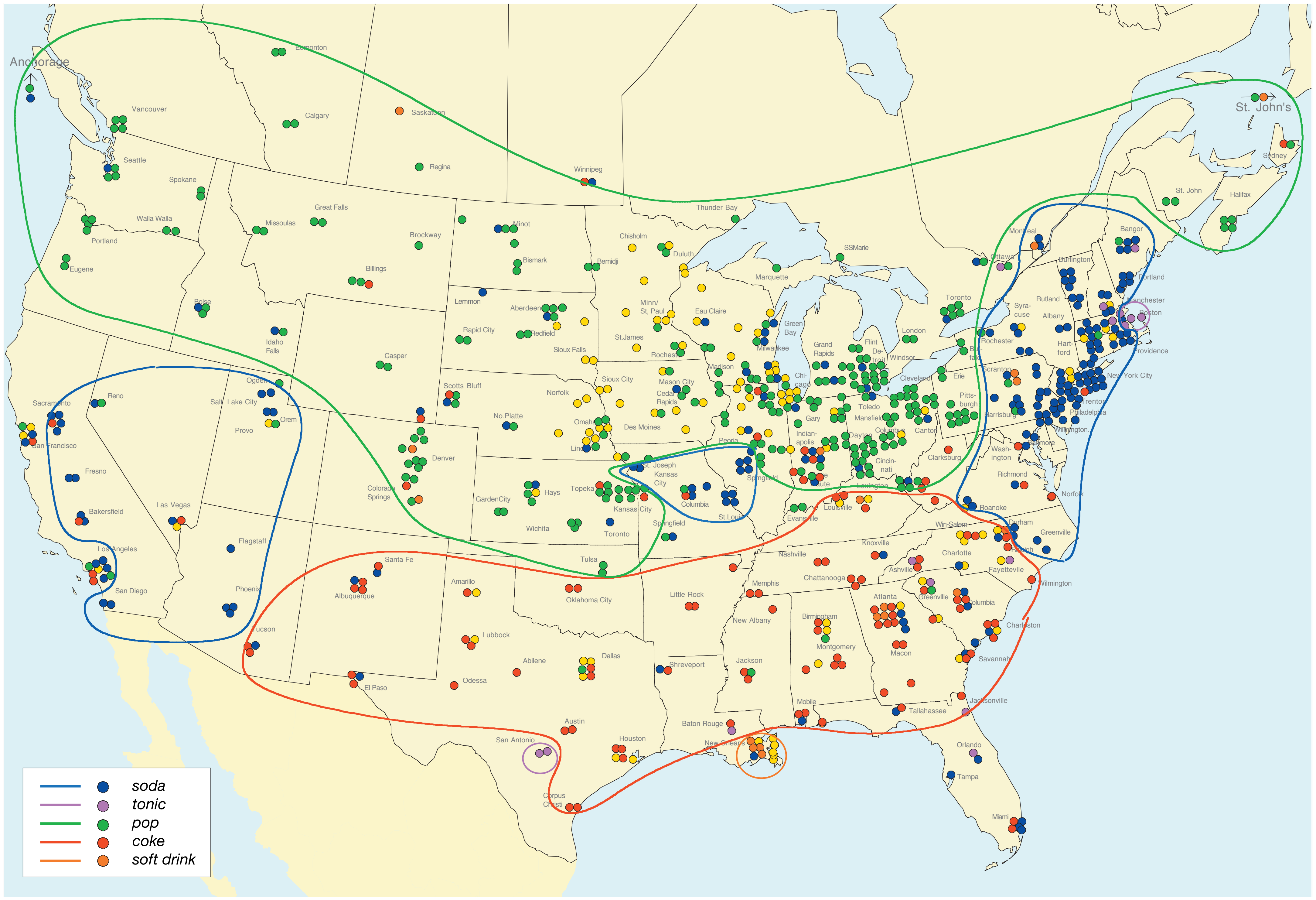
Terms for carbonated beverage show a marked tendency to differentiate African-American speakers from others. In New Orleans, the three users of *cold drink* are all African-American. In Atlanta, three of the four African-American speakers use *soda* in preference to *coke* or *soft drink*. In Columbia, two of three African-Americans show the same preference for *soda*.

The clear-cut regional preferences for 'carbonated beverage' are not unrelated to the ANAE boundaries of Map 11.15. The South is delineated by *coke* with an expansion in the east–west dimension, while the Ohio River boundary between Midland and South is preserved. St. Louis is recognized as a distinct region. The Northeast is a coherent unit, though embedded in a larger *soda* area. Canada is unified with a few exceptions. In other respects, however, the lexical boundaries run counter to the phonological boundaries. The North–South boundary between *soda* and *pop* is orthogonal to the isoglosses that separate North from Midland and Canada from the North, and the West is divided into northern and southern components in a fashion quite distinct from anything seen in previous chapters.

The parameters of the three major 'carbonated beverage' isoglosses are shown in Table 21.1. The dominant forms are *soda* and *pop*, which account for 83 percent of the data. The most widespread term, *soda*, shows a high degree of homogeneity for the three isoglosses of Map 21.1, a value of .81. Neither of the other two terms approaches this value, since *soda* is a competitor in their regions of geographic concentration. For the same reason, *pop* and *coke* show high consistency, since they are geographically limited in the way that *soda* is not. Leakage values show a parallel pattern: *pop* and *coke* are very low, while *soda* is remarkably high. These figures jointly indicate that *pop* and *coke*, though very widely used, are regional terms in the sense that *soda* is not.

1 For reasons noted in Chapter 9 (Figure 9.3), a larger number of Indianapolis subjects were interviewed than for most cities. The distribution of responses for 'carbonated beverage' were: *coke* 8, *soda* 5, *pop* 2. *soft drink* 1. Indiana cities south of Indianapolis show a mixed pattern, with about 50 percent representation of *coke*.

2 Two out of the three Telsur subjects in Montreal used *soda*. However, much larger amounts of data on Canadian English reported in Boberg (2004, 2005) indicate that it is *soft drink*, rather than *soda*, that provides the major exception to the general Canadian term *pop* in both Montreal and Winnipeg, as well as in Newfoundland (Boberg 2004, 2005).



Map 21.1. Geographic distribution of terms for 'carbonated beverage'

North America is sharply divided into regions by the general term for a carbonated beverage. *Soda* is used in the northeast, including the Mid-Atlantic States, and in a large southwestern area. *Coke* dominates the South, and extends much further westward than the phonological definition of the South. But *pop* is geographically the dominant term, extending over the Midland, the North, Canada, and the northwest. None of these boundaries match the phonological boundaries of North American dialects, though *coke* in the South comes closest.

Table 21.1. Isogloss parameters for four 'carbonated beverage' isoglossses

	Total marked	Total inside	Marked inside	Marked outside	Homo-geneity	Consis-tency	Leak-age
soda	282	192	156	126	0.81	0.55	0.26
pop	276	391	260	16	0.66	0.94	0.03
coke	106	176	86	20	0.49	0.81	0.03

DARE gives a regional entry for *coke* as the general term for a carbonated drink, and describes its distribution as "Chiefly Sth, Smidland, SW", which is not inconsistent with Map 21.1. DARE also supplies data on *pop*, with the map shown in Figure 21.1. Again, this is not inconsistent with Map 21.1, bearing in mind that any blank spaces in the DARE map would be filled with *soda* and *coke*. The *pop* area then would begin in western New York state, and extend westward to the north and north central states.

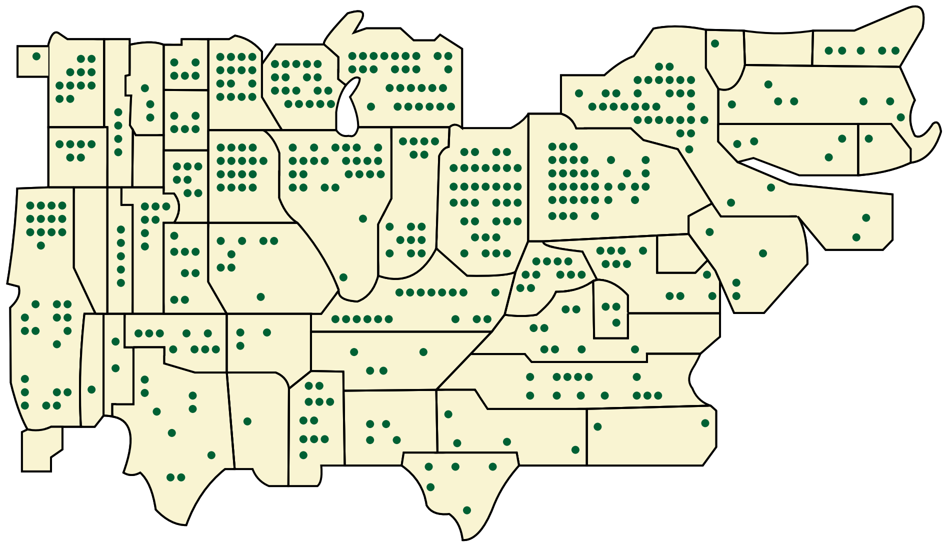


Figure 21.1. Distribution of *pop* for 'carbonated beverage' in DARE

A large amount of data on these lexical distributions has been collected recently by Internet surveys. Figure 21.2 is a display of the current results of A. McConchie (2002) for the three major terms. The color coding is the same as that in Map 21.1, with blue, red, and green indicating *soda*, *coke*, and *pop*. The *soda* distribution of Map 21.1 is reproduced in Figure 21.2 as three areas: the enlarged Northeastern area, the St. Louis area, and the southwestern *soda* areas . The concentration of blue *soda* tokens in the area of eastern Wisconsin is stronger than in Map 21.1 and indicates an independent region of Northeastern *soda* influence there. Florida shows the same even division between Northern *soda* and Southern *coke*. An equal division of *soda* and *coke* in the upper South with *coke* appears as well.

Figure 21.2 also delineates the South in a manner parallel to Map 21.1. The Southern *coke* area is even more limited in Virginia and North Carolina, extends northward to Indianapolis in Indiana, and westward to New Mexico and eastern Arizona.

The large and highly homogeneous *pop* area is also identical with that shown in Map 21.1, with New York State split into an eastern *soda* area and a western *pop* area. The area of *pop* predominance extends to the Pacific coast, with the exception of Wisconsin and St. Louis.

The regional character of *pop* and *coke* appears in Figure 21.2 as the absence of green symbols in the Southern red area and in the predominantly blue areas. The more general recognition of *soda* can be seen in the scattering of brown or yellow symbols throughout the predominantly red and green regions, as well as in its predominance in widely separated areas on both coasts.

Internet surveys such as McConchie (2002), Vaux et al. (2004), and Campbell and Plumb (2002) are effective in accumulating large amounts of data without controlling for the geographic origin of the respondents.[3] Figure 21.2 is a display of 149,000 responses. The maps provided by these internet surveys do not permit one to draw isoglosses with any degree of certainty, but there is a good coincidence of the areal configuration of these surveys with the 762 points of ANAE.

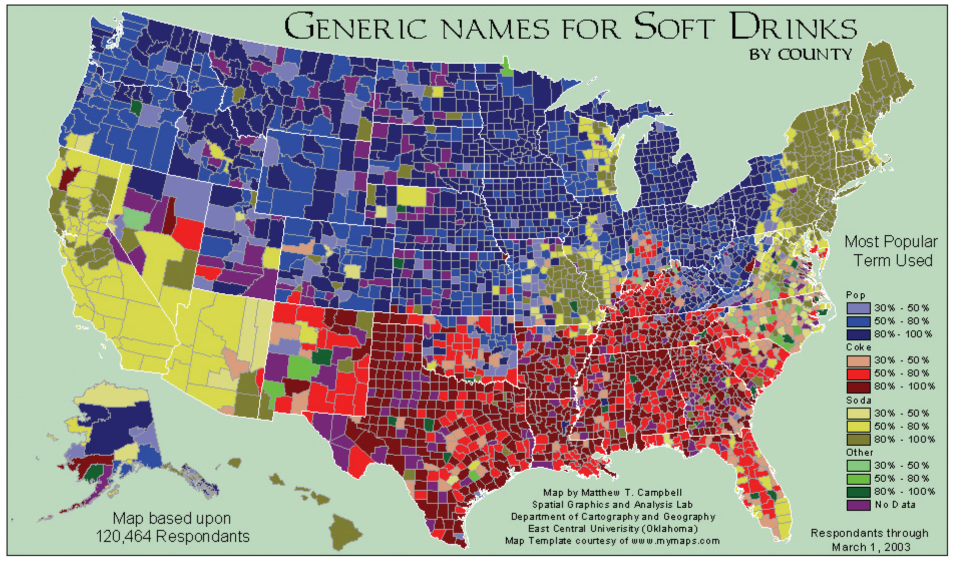


Figure 21.2. Distribution of *soda*, *pop* and *coke* in an internet survey (McConchie 2002)

21.2. /u/ and /uw/ in *roof*

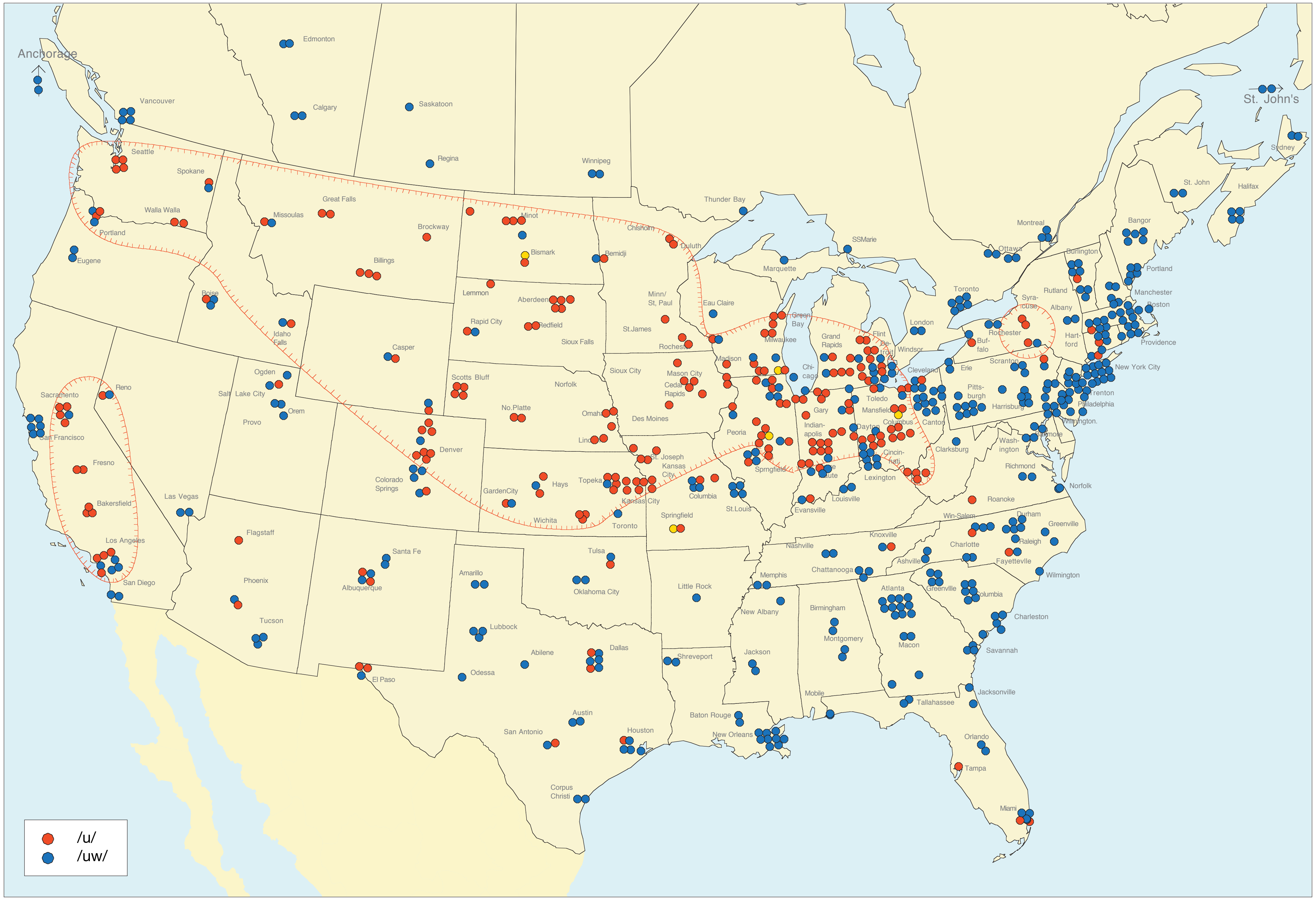
21.2

Map 21.2 shows the incidence of /u/ and /uw/ in the word *roof*. It is a large and coherent area, encompassing most of the western portion of the Inland North and adjoining sections of the Midland. In New York State, only one small area around Syracuse is included in the /u/ territory.

The southern edge of the /u/ area follows an irregular pattern, including a part of West Virginia, but excluding Cincinnati. The lower third of the Midland area agrees with Southern /uw/ in *roof*. The /u/ area extends westward to the Pacific Northwest. Canada is strictly excluded, with no trace of /u/ in this word. In addition to the coherent area marked out by the main isogloss, a separate area of /u/ pronunciation is found in central California.

Table 21.2 displays the isogloss parameters for the /u/ ~ /uw/ line in *roof*.

3 The McConchie survey asks for "home town" with city, state, and zipcode without specifying further the years spent in that area, an approach which may be more suitable for lexical items than for phonological issues (Payne 1976).



Map 21.2. The distribution of /u/ and /uw/ in *roof*

From the many regional differences in lexical incidence, ANAE selected only a few for comparison with phonological isoglosses. This map shows the shortening of /uw/ to /u/ in the word *roof*. There is a clear geographic pattern, which reflects only in part the isoglosses drawn in Chapters 11–20. Shortened *roof* is found in the western sections of the North and the Midland, extending further westward to the Pacific Northwest, with smaller concentrations in California (excluding San Francisco) and central New York State. It is notably absent in Canada, the Mid-Atlantic States, and most of the South.

Table 21.2. Isogloss parameters for the /u/ in *roof* boundary

	Total marked	Total inside	Marked inside	Marked outside	Homo-geneity	Consis-tency	Leak-age
/u/ in *roof*	282	192	156	126	0.81	0.55	0.26

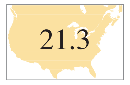
21.3. The geographical distribution of positive *anymore*

A number of studies have found considerable geographic variation in Americans' use of sentences with *anymore* in a positive context (Labov 1972; Hindle and Sag 1973; Hindle 1974; Murray 1993). The Telsur interview elicited responses to a range of grammatical forms, asking the subjects to respond on a three-point scale, with the instruction:

> For each sentence I read you, I'd like you to tell me whether you think it sounds like something you could say yourself, or something you've heard around your area but you wouldn't say, or something you've never heard before.

The subjects' use of the *positive anymore* construction was assessed by responses to the following three sentences:

(a) What if you were looking at the price of a new car and someone said, "Boy, cars are sure expensive anymore!"?
(b) What if someone said, "It's real hard to find a good job anymore"?
(c) What if someone said, "I used to watch football, but anymore I watch baseball"?



The scoring in Map 21.3 is based on the dominant pattern of response to these three sentences. A coherent region similar to the isogloss of Map 21.2 appears in which the majority of subjects respond that they would use this form themselves. The area outlined in red covers the Midland, including Pittsburgh and Philadelphia, and a good portion of the South Midland as defined in Kurath (1949). However, the line falls well to the south of the North/Midland lexical isogloss shown on Map 21.3. Chapter 14 showed that this isogloss delimits the phonological features that differentiate the North and the Midland. Both Indianapolis and Columbus show divided use. A slight majority of speakers in Indianapolis report the use of positive *anymore* themselves (8 out of 14), while only a minority of Columbus subjects do so (7 out of 17).

Two small areas of positive *anymore* use appear on Map 21.3 outside of the Midland area: one in north-central Pennsylvania and south-central New York, centered around Binghamton, and one in Southern Georgia and northern Florida.

Considerable caution must be exercised in interpreting these data. Positive *anymore* shows a disparity between intuitions and actual use. Long-term studies of positive *anymore* in Philadelphia show that the great majority of speakers will use *anymore* in constructions like (a)–(c) above, when enough spontaneous speech is recorded, but only about half will recognize this construction in response to direct questions (Labov 1972). Since it is not stigmatized overtly, and it is widely used by all social classes in speech, it is not yet clear why these intuitive responses differ so widely from practice.[4]

Murray 1993 reports a large-scale mail survey of the use of positive *anymore* throughout the Midwest, which indicates its widespread use in Midland areas, especially those settled by the Scots-Irish.[5] DARE has an extensive entry on positive *anymore*, along with the map of Figure 21.3. The density of responses is much lower than that of Figure 21.1. The highest concentration appears in Kentucky, Indiana, and Oklahoma, which is not inconsistent with Map 21.3.

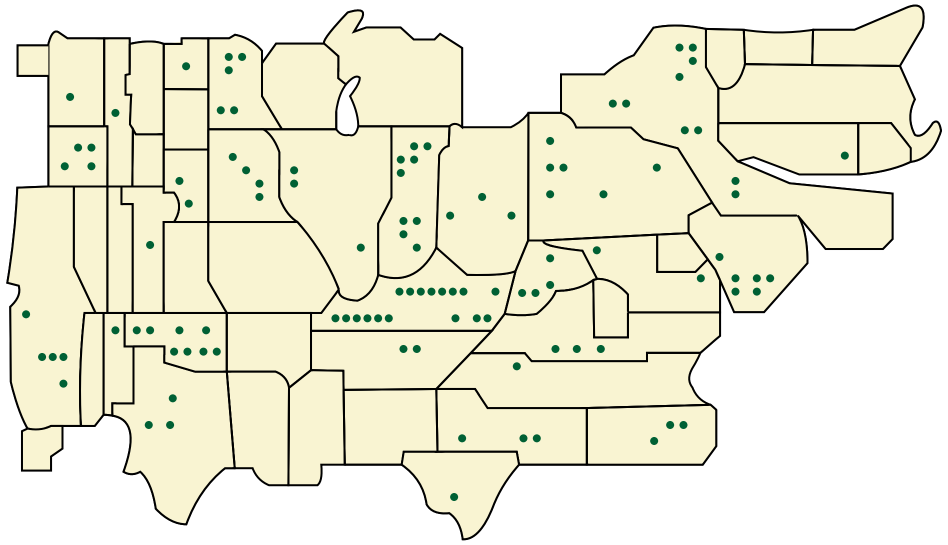
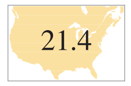


Figure 21.3. DARE informants who use positive *anymore* sentences

21.4. *needs* with past participle *needs*+PPtc



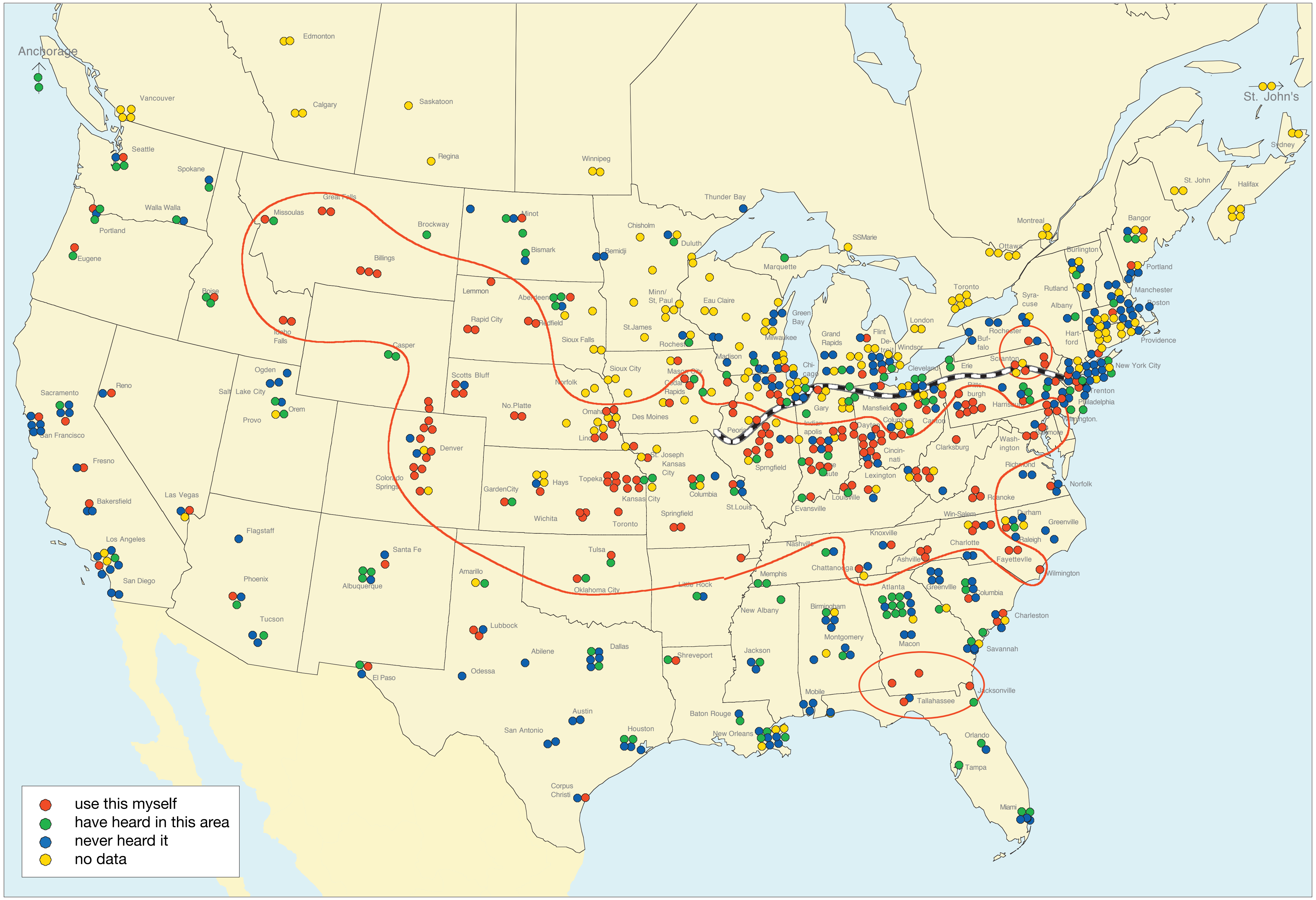
A second Midland grammatical construction surveyed by ANAE is the use of the past participle as a complement of the verb *needs* (*needs washed*) where other dialects use the present participle (*needs washing*) or an infinitive passive with the past participle (*needs to be washed*). Map 21.4 displays data on responses to questions on the following sentences:

(d) What if there were crumbs on the kitchen floor and someone said, "the floor needs swept"?
(e) What if a mother said to her child, "your hair needs cut"?

This construction has long been identified with the Pittsburgh area, but studies such as Frazer, Murray, and Simon (1996) showed that it had a broader Midland base. Map 21.4 reproduces the solid-red isogloss from Map 21.3, and superimposes an oriented red isogloss indicating the outer limits of the response to sentences (d)–(e) "I would use this myself", indicated here by red symbols. The *needs*+PPtc isogloss coincides generally with the positive *anymore* isogloss, but

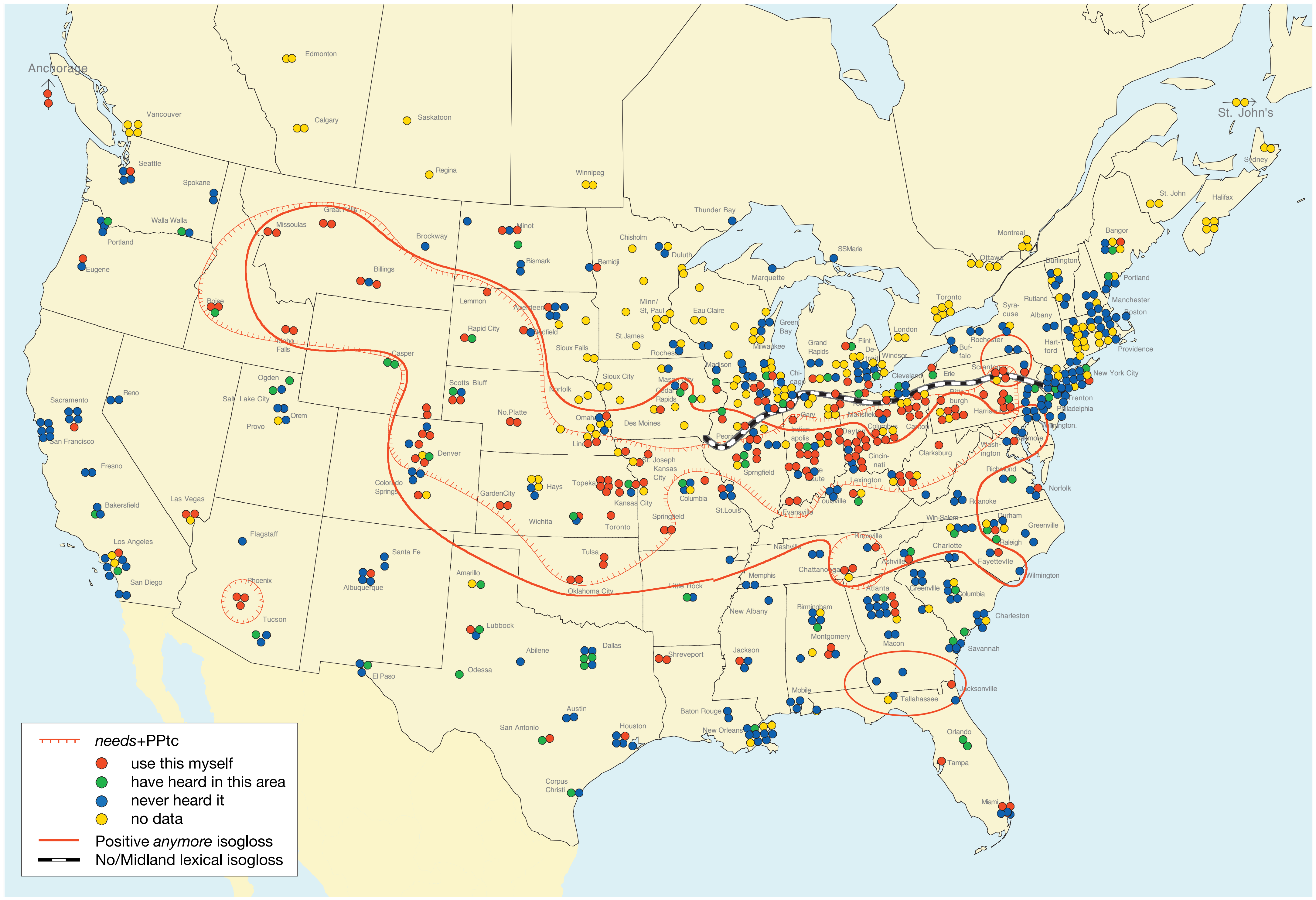
4 Wide differences in response to positive *anymore* sentences may be due in part to the cline of syntactic acceptability reported in Labov (1972) and Hindle and Sag (1973), but also due to pragmatic factors. In the eastern part of its range, positive *anymore* appears to be associated with the speech act of *complaint*. The cognitive dimension of "likelihood of occurrence" is then supplemented by the dimension of "speaker's desire for the event to occur". The LAMSAS schedule did not include positive *anymore*, but Guy Lowman did note sentences with positive *anymore* in his notebooks, and since the same sentence often occurs, it seems that he did ask for its acceptability. The density of such notations increased sharply when halfway in his westward trajectory across Pennsylvania, Lowman switched from a neutral sentence to the complaint *Farmers are pretty scarce around here anymore*. This high rate of notation continued throughout his interviews in the Appalachian states (R. McDavid, personal communication).

5 The maps in Murray (1993) are difficult to interpret, so that it is not possible to compare them with other results shown here.



Map 21.3. Geographic distribution of positive *anymore*

This map charts the use of *anymore* in positive sentences like *It's real hard to find a good job anymore*. This is a well-known pattern of Scots-Irish origin found currently in Northern Ireland. In the U.S., it is reported throughout the Midland area as originally defined by Kurath, uniting the Upland South with the Midland as defined by ANAE. A concentration of positive *anymore* users is also seen in central New York State and southern Georgia.



Map 21.4. Geographic distribution of the *needs*+PPtc construction

The syntactic construction *The car needs washed* represents the use of the past participle where other dialects use the present participle with *-ing*. Its distribution matches closely the Midland pattern of positive *anymore*, superimposed here from Map 21.3, but is somewhat narrower, excluding most points south of the Ohio River and the outlying concentrations in Georgia. It corresponds more closely to the ANAE phonological definition of the Midland than positive *anymore*. One outlying city is notable – Phoenix, Arizona. The extension of the Midland to areas of the central Northwest is almost identical with that of Map 21.3.

is more tightly confined to the Midland region as defined in Chapter 11. It does not extend as far southward, but stops at the Midland/South line marked by the Ohio River, and extends further northward to include the Midland cities of Ohio – Columbus, Akron, and Canton. The lexical North/Midland isogloss derived from Carver (1987) is added here again to show the degree of approximation of the *needs*+PPtc line to the North/Midland boundary. The oriented red line includes Harrisburg as well as Scranton, but does not reach eastward into southeastern Pennsylvania and Philadelphia. The westward extension to the Midwest and the North Central states matches the positive *anymore* line quite closely, varying with only a few border cities. In general, the *needs*+PPtc area is a subset of the positive *anymore* area.

The African-American subjects in Atlanta testify uniformly to the use of this construction, while others in that city do not. This is a further indication of the extent of racial differences in the Southern cities.

The geographic information given in Frazer, Murray, and Simon (1996) is consistent with Map 21.4. Their Figure 1 indicates a general Midland distribution, and their Figure 2 shows that the northern limit of *needs*+PPtc in Illinois falls close to the North/Midland line.

Responses to questions about *needs*+PPtc are subject to the same uncertainties as positive *anymore*, in that conscious recognition falls short of spontaneous speech. The isogloss parameters for these boundaries are similar, as shown in Table 21.3. *needs*+PPtc has somewhat lower homogeneity, and higher consistency. The geographic limits of *needs*+PPtc are more discrete, as confirmed by the low leakage value.

Table 21.3. Isogloss parameters for two Midland grammatical features

	Total marked	Total inside	Marked inside	Marked outside	Homo-geneity	Consis-tency	Leak-age
positive *anymore*	214	227	151	63	0.67	0.71	0.11
needs+PPtc	106	176	86	20	0.49	0.81	0.03

22. African-Americans

The Atlas of North American English includes a considerable amount of social information, but it is not a sociolinguistic investigation. It is a study of the regional distribution of phonological patterns, with a strong focus on change in progress. Chapter 4 described the Telsur sampling procedure of selecting surnames identified with the dominant ethnic groups in each speech community. The purpose was to avoid the selection of particular ethnic groups which for one reason or another had remained linguistically separate from the main community. Table 4.2 showed that the largest single ethnic identification of Telsur speakers was German (216), followed by English, Scots-Irish, Irish, Italian, Scandinavian, French, and Polish. None of the many multivariate analyses reported in the previous chapters found a significant effect of ethnicity, a finding consonant with other studies which show that ethnicity and language background are the weakest of all the social correlates of language in the urban speech community (Labov 2001). There is generally no significant difference between the second and third generations of each ethnic group in the mainstream population (Allen 1973; Labov 1976).

This finding does not apply to language and ethnic groups that are generally classified as "minorities." The U.S. census 2000 figures show 12.3% African-American and 12.5% Latino.[1] Studies of the English of the Latino minority have found distinguishing features in the English of the second and later generations (Wolfram 1974; Santa Ana 1991; Wald 1981). Many of these are common to the English of those whose families spoke the Spanish dialects of the Caribbean, Mexico, Central and South America.[2] Several studies have found sharp divisions within the Latino community in orientation towards the surrounding local white dialect, African-American English, and traditional Spanish-speaking culture (Poplack 1978; Fought 1999, 2003). The Telsur sample was not designed to provide the fine-grained social data that could distinguish and report on these subgroups. The seven Telsur speakers who gave their ethnic identification as "Hispanic" were not part of a systematic effort to study the Latino speech community; on the contrary, they generally represent individuals who are integrated into the mainstream speech community.

The African-American speech community is structured quite differently. There is a well-studied continuum that extends from a standard African-American English, distinguished from middle-class Euro-American English by only a few phonetic features, to African-American Vernacular English [AAVE], which shows sharp phonetic and grammatical divergence from European-American varieties. Many convergent studies show that AAVE is a relatively uniform dialect, spoken across the United States with relatively little regional differentiation by the great majority of African Americans living in districts with large African-American populations (NYC: Labov et al. 1968; Detroit: Wolfram 1969; Washington: Fasold 1972; Los Angeles: Baugh 1983; Philadelphia: Labov and Harris 1986; Texas: Bailey 1993, Cukor-Avila 1995; North Carolina: Wolfram 1992). Geographic differences that have been reported so far for AAVE are limited to such phonetic effects of the surrounding dialect as the rate of *r*-vocalization (NYC: Labov 1966; Philadelphia: Myhill 1988). Numerous studies report that African-Americans do not participate in the regional vowel shifts that have been the main focus of this Atlas (Thomas 1989, 2000; Graff, Labov, and Harris 1986).[3] The Telsur studies of the major cities of the Northeast, the North, the Midland, and the West were not designed to obtain a representative sample of the African-Americans in those cities. Of the 44 interviews with African-Americans in Table 4.2, 18 were with individuals outside the South who showed no marked features of AAVE.[4]

The situation in the South is quite different. At least for the older, rural speakers who form the backbone of the LAMSAS data, it might be said of phonology as it was said of lexicon, that "by and large the Southern Negro speaks the language of the white man of his locality or area and of his level of education" (Kurath 1949: 6). Thomas 1989, Bailey 1987, and Wolfram, Thomas, and Green 2000 show that this is only a rough approximation. It is clear that an accounting of the regional dialect of the South cannot ignore the speech of African-Americans. We need to know the extent to which African-Americans match, surpass or lag behind Whites in the active sound changes that define this region, and how they might have contributed to its formation. Using the techniques described in Section 4.6, we located the areas of the largest Southern cities in which a high percentage of the population was African-American, and obtained 23 interviews with African-American subjects in those areas.

Map 22.1 shows the locations of the 44 Telsur subjects who identified themselves as African-American. 22.1

22.1. Ongoing mergers in the African-American community

A number of differences between African-Americans and Whites have emerged so far. Chapter 7 showed that African-Americans have a much lower probability of using constricted [r] than Whites, and have maintained *r*-less pronunciation in areas of the South where Whites have become completely *r*-full. Chapter 9 found that African-Americans have led in the merger of /i/ and /e/ before nasals. In Chapter 20, it was found that African-Americans tended to use different terms for 'carbonated beverage' than Whites, and were more likely to accept the construction *needs washed*.

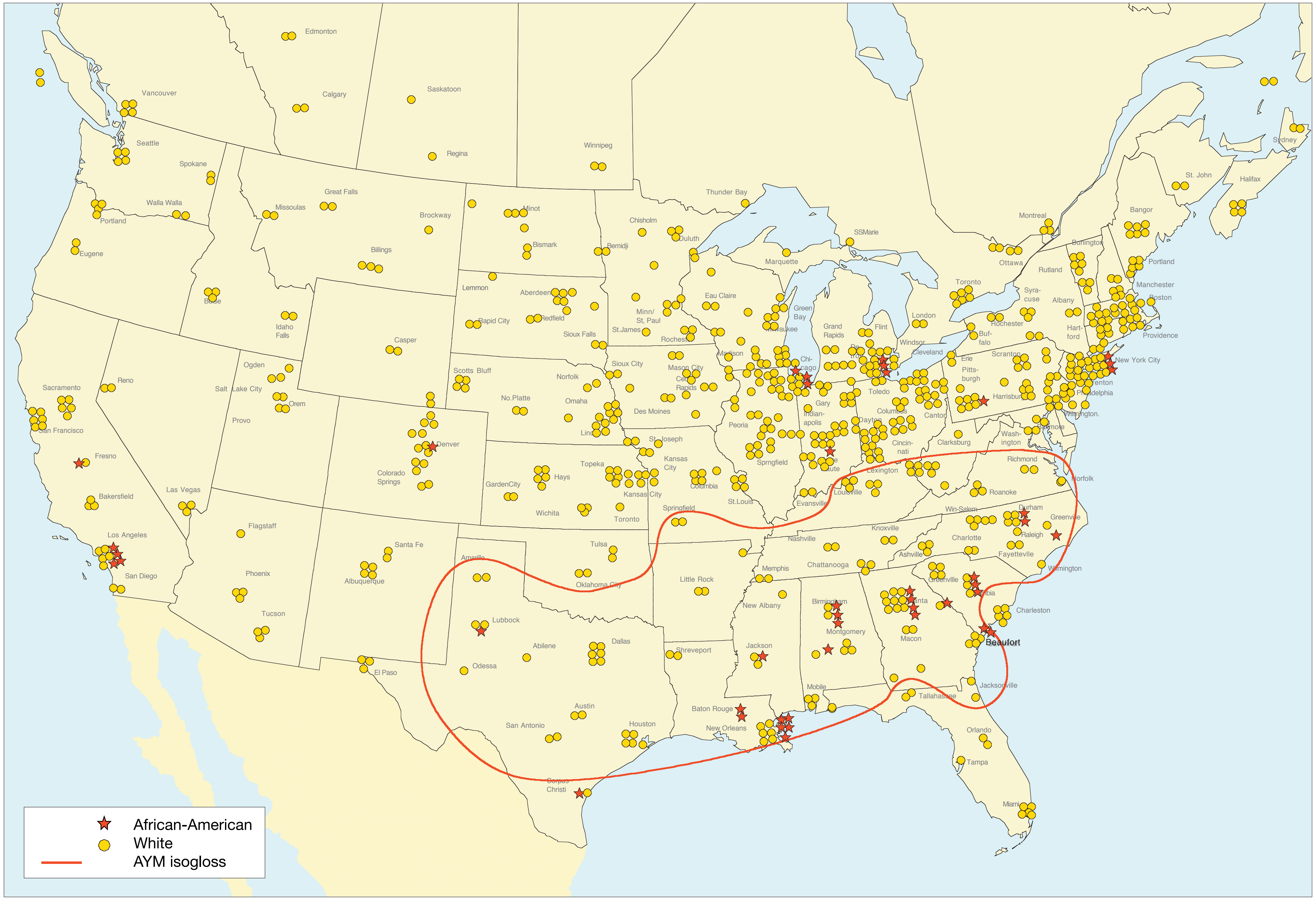
Table 22.1 compares Whites (W) to African-Americans (AA) for seven phonological features studied in Chapters 7–9, based on minimal pairs and the frequency of *r*-vocalization. The table shows for each city and ethnic group the numbers of subjects who satisfied the criterion for that variable out of the total number of subjects. Seven cities within the regional dialect of the South are listed in the upper part of the table, and four cities outside of the South in the lower part.

1 The discussion in this chapter will exclude Canada, where the majority of the population of African ancestry immigrated relatively recently from Caribbean countries and shows comparatively little divergence from European Canadian speech in the Canadian-born generation.

2 Simplification of coda clusters /rt, rd/; alternation of palatal affricates and fricatives; weakening of prosodic constraints on coronal stop deletion.

3 Thomas (1989) reports some fronting of /ow/ among African-American high school students in Columbus, Ohio.

4 Despite the general finding that most African-Americans do not participate in local sound changes in Northern cities, there are always individudals who are integrated into the surrounding community.



Map 22.1. Distribution of African-American subjects

The Atlas of North American English included 44 interviews with subjects who identified themselves as African-American. The 26 subjects within the AYM isogloss that defines the South were selected as a basis of comparison of African-American and White phonology in six major cities of the Southeast: New Orleans, Birmingham, Atlanta, Augusta, Columbia, and Durham. The 18 subjects outside of the South give some information on black/white differences in phonological contrasts, such as the merger of /in/ and /en/ in *pin* and *pen*.

The overall probability for all subjects of the difference between W and AA being significant is given in the last line.

A number of the maps in this Atlas have showed a difference between Whites and African-Americans in the South, but the differences shown here are more extensive and systematic. For all of the variables studied here, there is a significant difference between the two groups, though some are much stronger than others. The smallest effect is found with the (hw ~ w) variable, the maintenance of any difference between the initials of *whale* and *wail*, and the greatest difference in the (il ~ iyl) variable, the merger of *fill* and *feel*.

On the whole, AA speakers are more conservative than Whites. They show more resistance to the incursion of consonantal /r/ in the South, in every city in the formerly *r*-less areas (excluding Lubbock). In the non-Southern areas, only New York City provides relevant data: here all three AA speakers show some *r*-vocalization. Since all African-American dialects of English and English-based Creoles show a high degree of *r*-lessness, this is to be expected. In every city where *r*-lessness is a traditional feature of both Black and White speech, African-Americans show a higher degree of *r*-vocalization (Labov 1966; Labov, Cohen, and Robbins 1968; Myhill 1988). The behavior of the AA group with the nearly completed mergers studied in Chapter 8 gives more evidence of this conservative tendency. The rapidly disappearing distinction of ɔhr ~ ohr in *horse–hoarse*, *morning–mourning*, is preserved more by AA speakers in each of the eleven cities of Table 22.1. As noted above, there is a significant tendency of AA speakers to preserve the distinction of *whale* and *wail* more than whites.

It has been noted that African-Americans have a greater tendency to resist the low back merger of /o/ and /oh/ than Whites (Veatch 1992). Only Los Angeles is relevant to this issue in Table 22.1, where all five Whites show a complete merger, but none of the four African-Americans.

While AA speakers are conservative in regard to the almost completed changes of Chapter 8, they are in the forefront of three ongoing mergers described in Chapter 9. The merger of /in/ with /en/ is a general characteristic of the African-American speech community, extending beyond AAVE to all social levels. In the South, 75 percent of the AA speakers had a clear merger in both production and perception, as opposed to 42 percent of the whites. In the North, only AA speakers have the merger.

Chapter 8 showed that the merger of high vowels before /l/ was advancing in different geographic areas of the U.S. with the *feel–fill* merger concentrated in the South, and the *fool–full* merger most advanced in western Pennsylvania. Table 22.1 registers all those responses that show any tendency towards merger: that is, subjects who do not make a clear difference in both production and perception. The figures show that AA speakers are considerably ahead of Whites in the il ~ iyl merger, with 82 percent of AA speakers showing some indication of merger vs. 28 percent of Whites in the seven cities of the South. The opposition is even stronger in the four cities of the North, with 1/25 not clearly distinct for Whites, and 11/12 for African-Americans. The situation is similar but less marked for the opposition of /ul/ and /uwl/.

The only ongoing merger that is not advanced among African-Americans is the low back merger of /o/ and /oh/. Here the AA speakers show minimal tendency, as noted above.

22.2. Acoustic analysis of African-American speech

The analysis of the South in Chapter 18 was focused primarily upon two active chain shifts: the Southern Shift and the Back Upglide chain shift. The South shares with the Midland a strong fronting of /ow/ as well as the general fronting of /uw/, and shows in addition fronting of /uw/ before /l/. The acoustic analysis of four African-American speakers will illustrate how AA speakers differ from Whites in regard to these dynamic processes.

Figure 22.1 shows the mean values of the vowel system of two Telsur subjects from Columbia, South Carolina. On the left is Kathy F., 46, of Irish background, a housewife who does bookkeeping at home. On the right is Daniel W., also 46 years old, an African-American. He is a computer consultant, with two years of college education. It is evident that his vowel system is more conservative than that of Kathy F. in many ways.

Table 22.1. Comparison of Whites and African-Americans for minimal pairs and *r*-vocalization in six cities of the South and four outside of the South. 00 = 'same' in production and perception; 22 = 'different' in production and perception

	(r) < 100%		o ~ oh =00		in ~ en = 00		ɔhr ~ ohr<> 00		il ~ iyl <> 22		ul ~ uwl <> 22		hw ~ w <> 00	
	W	AA	W	AA	W	AA	W	AA	W	AA	W	AA	W	AA
South														
Durham NC	1/5	2/2	0/5	0/2	4/5	2/2	1/5	1/2	3/5	1/2	1/5	1/2	2/4	2/2
Columbia SC	1/3	3/3	0/3	0/3	2/3	3/3	0/3	2/3	1/3	2/3	2/3	1/3	0/3	1/3
Augusta GA	0/1	0/1	0/1	0/1	0/1	0/1	0/1	1/1	0/1	1/1	0/1	1/1	1/1	1/1
Atlanta GA	2/9	4/4	0/9	0/4	5/9	2/4	1/9	1/4	0/9	4/4	3/9	3/4	5/9	2/4
Jackson MI	0/2	1/1	0/2	0/1	0/2	1/1	1/2	1/1	1/2	1/1	0/2	0/1	1/2	1/1
New Orleans LA	4/6	5/5	0/6	0/5	0/6	4/5	5/6	5/5	1/6	4/5	1/6	3/5	3/6	2/5
Lubbock TX	0/2	0/1	0/2	0/1	2/2	1/1	0/2	0/1	2/2	0/1	2/2	0/1	1/2	1/1
Total	8/28	15/17	0/28	0/17	11/26	12/16	8/28	11/17	8/28	14/17	9/28	9/17	13/28	12/17
Non-South														
Los Angeles CA	1/5	1/4	5/5	0/4	0/5	2/4	1/5	2/4	0/5	4/4	2/5	2/4	0/5	2/4
Chicago IL	0/4	1/2	0/4	0/2	04	0/2	2/4	1/2	0/4	1/2	2/5	2/2	4/4	1/2
Detroit MI	0/7	2/3	0/7	0/3	0/7	2/3	0/7	1/3	0/7	3/3	2/7	3/3	1/7	1/3
NYC	7/9	3/3	0/9	0/3	0/9	2/3	2/9	2/3	1/9	3/3	1/9	3/3	1/9	1/3
Total	8/25	8/12	5/25	0/12	0/25	6/12	5/25	6/12	1/25	11/12	7/25	10/12	6/25	5/12
Over-all Total	16/53	23/29	5/53	0/29	13/53	18/29	13/53	17/29	9/53	25/29	16/53	19/29	19/53	17/29
p AA≠W (chi-sq)	< .0001		<.005		<.0001		<.0001		<.00001		<.001		<.05	

The Southern Shift is well developed in Figure 22.1a, but not in Figure 22.1b. Both speakers show deletion of the glide of /ay/, the first stage of the Shift, with slightly less than half the tokens as monophthongs (highlighted). In both cases, vowels before voiced obstruents are included in the monophthongal group. But while Kathy F. clearly shows Stage 2 of the shift, with /ey/ and /e/ reversed, the two nuclei are at the same level for Daniel W.

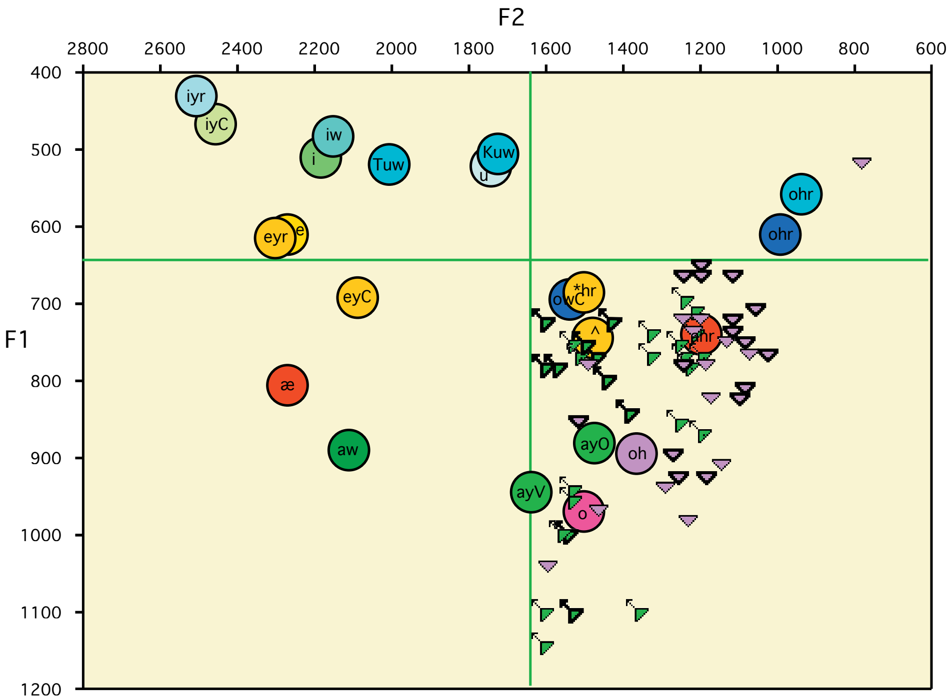


Figure 22.1a. Vowel system of Kathy F., 46, White, Columbia, SC. Highlighted /ay/ tokens = glide deletion. Highlighted /oh/ tokens = back upglide

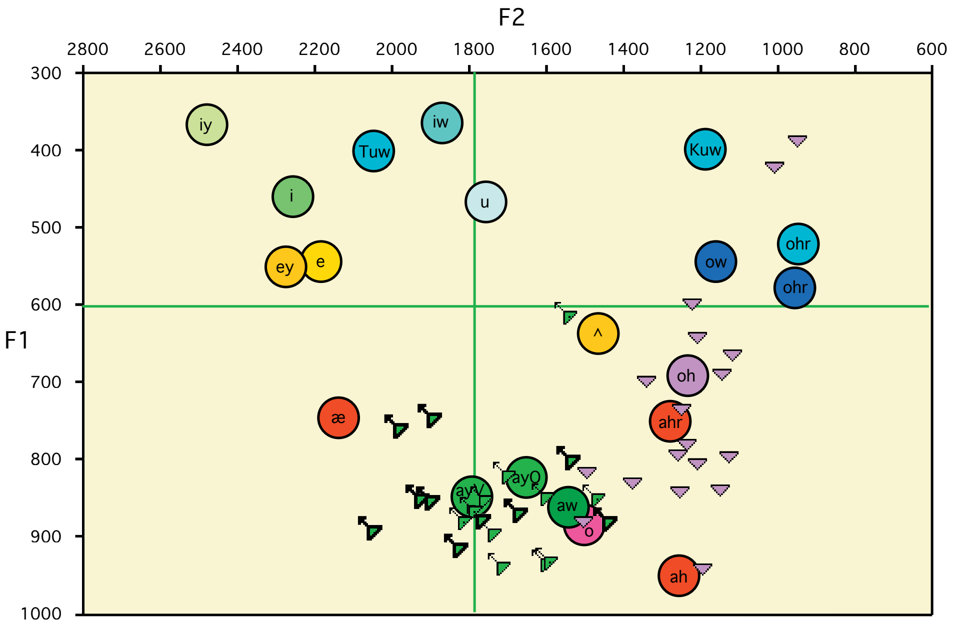


Figure 22.1b. Vowel system of Daniel W., 46, African-American, Columbia, SC. Highlighted /ay/ tokens = glide deletion

The fronting of the back upgliding vowels is much more advanced in Figure 22.1a. /uw/ after coronal (Tuw) and non-coronal stops (Kuw) is front of center, and /ow/ is close to center position. But in Figure 22.1b, /uw/ is fronted only after coronal consonants, while /Kuw/ is in far-back position along with /uwl/.

The most dramatic difference between the two speakers is in the Back Upglide shift. For Kathy F., /aw/ is well to the front, in a position that might well be labeled /æw/. The great majority of the /oh/ tokens show a back upglide (highlighted), and many are unrounded. Daniel W. has no back upglides with /oh/ and the mean of /aw/ is well back of center. The chain shift /oh/ → /aw/ → /æw/ is fully developed in Figure 22.1a but not at all in evidence in Figure 22.1b.

Figures 22.2a, b are a comparable pair of analyses of speakers from Durham, North Carolina. Elizabeth C. is a 40-year-old homemaker from a working class family; her ethnic background is a mixture of Scots-Irish and Cherokee. Linda B. is an African-American day-care teacher, 35 years old. The contrast between the two systems is similar with that seen in the Columbia speakers. Elizabeth C. has an even more complete Southern Shift than Kathy F. Almost all /ay/ tokens show glide deletion, and both Stage 2 and Stage 3 are evident in the reversals of /e/ and /ey/, /i/ and /iy/. Linda B., the African-American speaker, has fewer instances of glide deletion. She does show a Stage 2 reversal of /e/ and /ey/, but not of /i/ and /iy/. Just as in Figures 22.1a, b, there is much more fronting of the back upgliding vowels for the white speaker. Elizabeth C. shows /uw/ after non-coronals just back of center, while for Linda B., this category shows no fronting at all. A similar contrast is seen in the fronting of /ow/. The mean /ow/ of Elizabeth C. is almost central, while the mean for Linda B. is in mid back position.

The Back Upglide chain shift is fully exemplified in Figure 22.2a, with five of the tokens of /oh/ showing a back glide. There are no such back upglides in Figure 22.2b. However, /aw/ is fronter than /ay/, unlike the situation in Figure 22.1b. It can also be noted that /iw/ is fully front and separate for Elizabeth C., but not for Linda B.

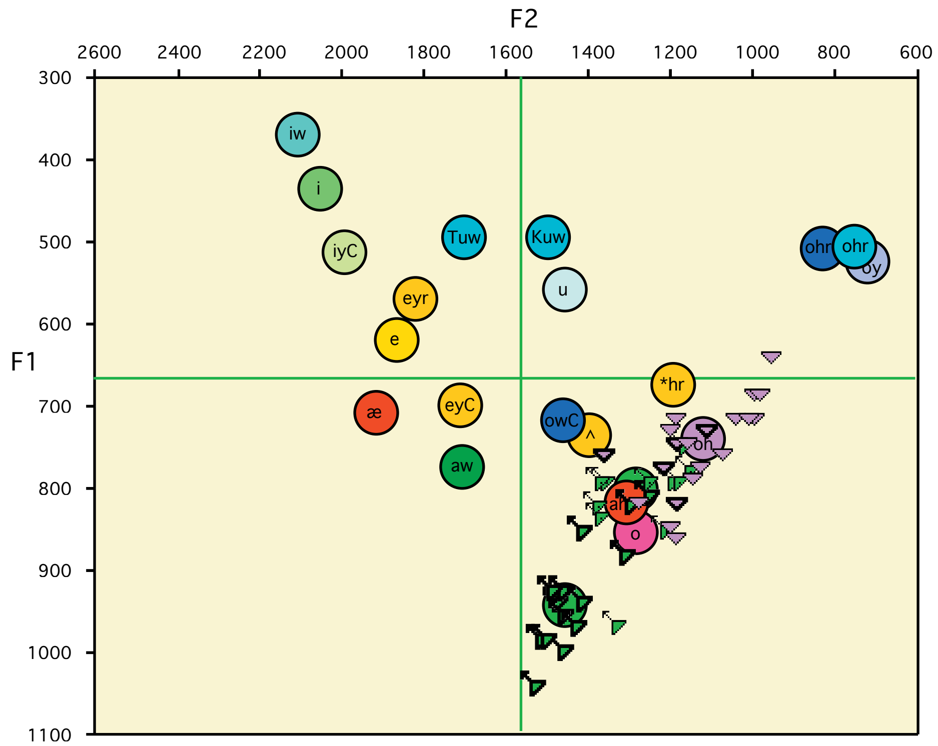


Figure 22.2a. Vowel system of Elizabeth C., 40, White, Durham, NC. Highlighted /ay/ tokens = glide deletion. Highlighted /oh/ tokens = back upglide

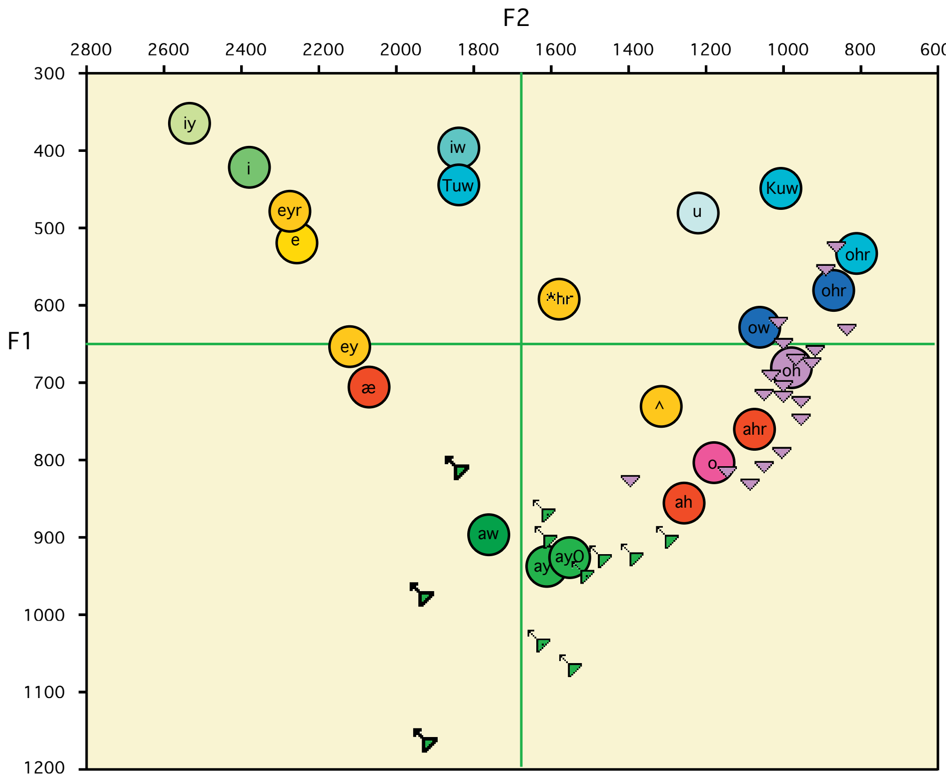


Figure 22.2b. Vowel system of Linda B., 35, African-American, Durham, NC. Highlighted /ay/ tokens = glide deletion

In respect to the dynamics driving the Southern vowel system, Durham is in advance of Columbia by all the measures we have taken. And in both cities, the White speaker is more advanced, the African-American speaker more conservative.

22.3. Comparison with rural and small town African-American speakers

Thomas (2000) carried out acoustic analysis of 28 African-Americans, largely from rural areas in North Carolina and Texas, with birth dates ranging from 1848 to 1989 and presents vowel charts of the mean nuclei and glide targets.[5] Table 22.2 is our summary of Thomas' data for the phonological developments that are the focus of this Atlas. The "East" section of Thomas's data includes one speaker from Virginia and Alabama along with the North Carolina data, and the "West" section includes two speakers from Memphis along with the Texas data. Since Thomas's data extends to speakers born in the nineteenth century, it provides insight into the history of the Southern Shift among African-American and White speakers.

The table indicates that the Southern Shift developed more slowly among African-Americans than among White speakers. For these AA speakers, there is no glide deletion before voiceless consonants, and there is no trace of Stage 2 for the older subjects. At the same time, it is clear that younger AA speakers do participate in the Shift. Since Thomas did not work with speakers from the Inland South, it is to be expected that Stage 3 would not appear. Many of his interviews are in the Texas South area, and the 60 percent glide deletion before voiceless consonants shows that African-Americans in that area share this development with Whites.

The Back Upglide chain shift is also less vigorous among AA speakers. The back upglide with /oh/ is found, but not the vigorous fronting of /aw/ to /æw/. In fact, the /aw/ column is the single most striking difference between the two groups. While Whites move to 100 percent strong fronting of /aw/, this is a minor tendency among African-Americans, and the majority keep /aw/ back of center. Graff, Labov and Harris 1986 showed that in Philadelphia, the opposition of front to back nucleus for /aw/ has become a categorical contrast of white and black phonology. In this experimental study, raising the second formant of the nucleus of /aw/ of an African-American speaker dramatically changed the perception of his ethnicity from black to white.

The fronting of the other back upgliding vowels is generally less marked among African-Americans, particularly in the case of /uw/. Vowels after coronals and non-coronals are not distinguished in the mean values given by Thomas. The average of /Kuw/ and /Tuw/ in Figures 22.1–21.2 will give a result back of center, even when /Tuw/ is well front of center, and this is probably the case with the Thomas subjects as well.

African-Americans and Whites show the same rapid decline in the contrast of /ɔhr/ and /ohr/. The three AA subjects in the West who retain this distinction show the same conservative tendency as in Table 22.1.

The Thomas data include remarks on the vocalization of /r/. Vocalization is consistently stronger among African-Americans than among Whites. In the Thomas data for Whites, no remarks are made on (r) among the younger speakers; it is assumed that they are 100 percent *r*-ful. However, all of the AA subjects are recorded by Thomas with variable /r/; none show the 100 percent /r/ characteristic of White speakers in Texas.

The merger of /ul/ and /uwl/ is noted in the speech of three younger African-Americans in Texas, consistent with the data earlier in this chapter. No reflection is found of the higher degree of merger of /il/ and /iyl/.

From these studies of older and younger speakers among rural African-Americans, it can be seen that the Southern Shift is advancing in the western region of the South, but not in the eastern region. Fronting of back upgliding vowels does not show the remarkable advance found among Whites. *r*-vocalization is declining, but not as rapidly as among Whites. This agrees with the view developed by ANAE data of African-American English as a phonologically conservative dialect in urbanized areas in the South.

5 Thomas' analyses of speakers with a Caribbean or Gullah background are not included in this summary, nor those from the Outer Banks of North Carolina, since these distinctly different vowel systems are not immediately relevant to the major trends reported here for the urbanized areas of the South. Reports of mainland communities in eastern North Carolina are included.

Table 22.2. Percent realization of phonological features of Southern English for Whites and African-Americans, derived from acoustic measurements provided in Thomas (2000). Under Southern Shift, Stage 1 is glide deletion of /ayV/ and /ay0/; Stage 2 is reversal of the relative positions of /ey/ and /e/; Stage 3 is reversal of the relative positions of /iy/ and /i/.

		Southern Shift				Back	Fronting of								
		Stage 1		Stage 2	Stage 3	Upglide									
	Born	ayV	ay0			oh → aw	ow	uw	aw	ɔhr ≠ohr	r=0	r=100	il=iyl	ul=uwl	N
White															
East	<1930	82	9	36	9	64	36	45	73	82	36	0	0	0	11
	1930–	82	27	64	9	82	91	82	100	18	9	55	0	0	11
West	<1930	67	17	33	0	58	83	8	75	50	0		0	0	12
	1930–	95	89	84	0	26	84	84	100	5	5		26	37	19
African-American															
East	<1930	40	0	0	0	50	10	0	10	70	60	0	0	0	10
	1930–	25	0	25	0	25	50	25	0	0	0	0	0	0	4
West	<1930	50	0	0	0	50	0	25	25	100	0	0	0	0	4
	1930–	70	0	60	0	50	40	0	30	30	10	0	0	30	10

23. The findings of the Atlas of North American English: An overview

How successful is the ANAE sampling method?

Chapter 1 reviewed the history of American dialectology, and considered the problem that only a small fraction of the phonology of North American English has been mapped systematically since the initial achievement of LANE in the 1930s. The solution proposed was a telephone survey of urbanized areas. ANAE was initiated with a pilot project in 1992. The main data collection began in 1994, and 80 percent of the 800 interviews were carried out in the following five years, The method therefore produced an overall view of the phonology of the continent in a short enough period of time so that all regions studied can be considered contemporaneous.

The success of the method of selecting subjects, described in Chapter 5, can be assessed informally by viewing the geographical regions first displayed without analysis in Chapter 10 and then analytically in Chapter 11. These maps show large areas of consistent response, often with sharp boundaries between them. A more precise assessment is achieved by the measures of homogeneity and consistency of the geographic boundaries constructed. The major isoglosses that define the Inland North, the South, and Canada, based on the sound changes in progress in those regions, show high values on these measures (Appendix 11.1). Among the most striking results are the boundaries that separate the fronting of /ʌ/ in the Midland from the backing of /ʌ/ in the North (Map 11.14) and the outer definition of the South by the glide deletion of /ay/ (Map 11.3). In general, the uniformity of structural patterns across large areas testifies to the success of the method.

Given the well-known mobility of the North American population, such uniformity of results testifies to the robustness of the linguistic measures used. The maps of this Atlas are focused not upon sociolinguistic variation within the community, but rather upon the different structural bases for that variation. In one sense, Telsur represents each community with only a few speakers. But most geographic areas are represented by a much larger group, of 30 to 80 speakers. Within that group, our regression analyses permit us to chart social variation by age, gender, and education. These results also testify to the speed with which new dialects are formed and the rapidity with which the children of mobile parents are absorbed into the local community (Payne 1996; Kerswill and Williams 1994).

There are also limitations to the findings of the Atlas which are inherent in the Telsur method. In examining the dialect regions defined by ANAE, it must be born in mind that the position of any given city near an isogloss is open to further study. Definitive membership in a given dialect region can be assigned for cities in central areas and for those border regions where many isoglosses separate cities on either side (e.g. Map 14.11). The exact definition of transition zones between most dialect areas, and the dialect membership of individual communities within those zones must be left for future studies with a more detailed focus on particular regions. The best that ANAE can do in this connection is to identify those regions that are promising sites for local research. Secondly, the ANAE regions are defined by the major urbanized areas, not the smaller towns between them. It cannot be assumed that these small towns and rural areas are always weaker versions of the phonological systems of the larger cities, as the cascade model would predict (Trudgill 1974; Callary 1975). More detailed studies of the Mid-Atlantic States indicate that the intervening areas between big cities are following an entirely different pattern (Ash 2002; Ch. 17).

The definition of dialects on the basis of sound changes in progress

American dialects were originally defined by locating the coincidence of regional vocabulary boundaries (Kurath 1949). In approaching the phonologies of North American dialects, ANAE looked for the most systematic definition: the manner in which sound changes entail, encourage or inhibit other sound changes. The analysis starts with the phonemic status of the low vowels /æ/ and /o/, and relates these to the major chain shifts in progress (Maps 11.1 and 11.2). Thus the low back merger of /o/ and /oh/ triggers the Canadian Shift (Map 15.4) and the Pittsburgh Shift (Figure 19.6). On the other hand, the Northern Cities Shift and the Southern Back Upglide Shift act to preclude the low back merger. These systematic relations reinforce the discreteness of dialect boundaries and lead to the steady development of neighboring regions in different, sometimes opposite directions.

The structural definition of dialects also has its limitations. The West (Chapter 20) is not a well-defined area compared to other regions; internally it shows much variation; its isogloss has low homogeneity (.56) and moderately low consistency (.62). There are also areas that fall between major dialect areas, with properties so mixed that they are best categorized as "transitional" (Map 11.13). Though the Inland North is well defined by the Northern Cities Shift (Map 14.6–14.9), there are many possible alternate definitions of the North. The relative fronting of /ay/ and /aw/ provides one definition, and resistance to the fronting of /ow/ another. The outer limit of the North was established by combining resistance to the low back merger, to the splitting of short-*a* and to the fronting of /ow/. This definition of the North is motivated primarily by its status as the region in which the NCS was generated. Other considerations would lead to a North that extended much further westward, including the North Central States for some features, or as far as the Pacific Northwest.

The major new findings of ANAE

The dialect regions established in Chapter 11 generally agree with those of lexical dialect geography, a fact that reflects the enduring influence of the original regional patterns of the the settlement of English-speaking of North America. One of the few points of divergence concerns the status of the South Midland region, which Kurath placed in the Midland. The ANAE data show that, at least in phonological terms, this region belongs with the South – one of the possibilities that Kurath himself considered. The major chain shifts that play central roles in ANAE classifications have been identified in the decades following Kurath's original analysis. The Back Chain Shift before /r/ has been recognized from the same period. The Northern Cities Shift and the Southern Shift were described as early as 1972 (LYS). The Canadian Shift was first identified by Clarke et al. in 1995. The elements of the Southern Back Upglide Shift have been known to students of Southern phonology for more than half a century, though their recognition as a chain shift is new in ANAE. The Pittsburgh Chain Shift is a new phenomenon, described in ANAE for the first time.

The first recognition of these chain shifts was the product of exploratory studies of a few cities, and there was no way to estimate how widespread and general these processes were. From a phonological point of view, North America was a generally dark landscape, relieved by a few brightly lit areas. With the completion of ANAE, the number of cities that we can compare has been multiplied by a factor of a hundred. Though many areas between these cities still remain dark, the overall effect is a general illumination of North American phonology. We now know that the NCS has swept over a vast region of 88,000 square miles, inhabited by a population of 34,000,000. We know that glide deletion before voiced obstruents is dominant over the entire South, and that the second stage of the Southern Shift covers almost all of that area, but that glide deletion before voiceless obstruents and the third stage of the Shift are concentrated in narrow areas at the core of the Southern States. We know that the U.S. is sharply divided into a Northern area with relatively back nuclei of /ow/ and /aw/, a Southeastern super-region with relatively front nuclei for these vowels, and the West with a mixed situation. We know that the Mid-Atlantic cities are remarkably similar, sharply differentiated from New York City with which they share a split short-*a* system. We have discovered that the Canadian Shift distinguishes Canada along most of its border with the United States, and particularly in Southern Ontario where the populations across the border are the largest.

One important result of ANAE is the confirmation of the earlier finding of sociolinguistic studies that change in progress is continuing, a result that has aroused a great deal of interest in the general public. Given the uniform exposure of speakers everywhere to the broadcast standard of the mass media, it is difficult for most people to believe that sound change is continuing at a rapid rate. On a larger scale ANAE finds that the diversity of regional dialects in North America is not diminishing, but is increasing over time. ANAE also finds that divergence is not omnipresent. While Chapters 14 and 15 show new and vigorous changes in the North and Canada, Chapter 18 shows that the Southern Shift is receding in apparent time. A number of local dialects, spoken in medium-sized cities, are giving way to regional patterns: Charleston, Savannah, New Orleans, Cincinnati, St. Louis (Chapters 18, 19). Increasing diversity in North America is a regional phenomenon, not a local one.

ANAE introduces a number of new discoveries of a continental scope. Though the continent is split in regard to the fronting of /ow/, it is unified in the fronting of /uw/ after coronals (Map 12.1). The study of the various patterns of short-*a* tensing, a major topic of sociolinguistic research in the Mid-Atlantic states, is here extended to the continent as a whole (Chapter 13). Though most of the patterns have been identified before – the nasal system, the general raising in the Inland North, the split short-*a* system of the Mid-Atlantic States, Southern breaking – the overall distribution is seen for the first time. Chapter 13 develops the entirely new phenomenon of "Northern breaking", in which the vowel develops two distinct steady states of equal duration. As we would expect, the phonetic conditions that favor and disfavor sound change are broadly similar across the continent. Even more remarkable then is the discovery of two different patterns of phonetic conditioning dividing the continent, in which the relative conditioning effects of following /d/ and /g/ are sharply reversed (Map 13.5).

Directions of change in progress

Since the ANAE strategy depended upon completing the investigation in the shortest possible span of time, it could not in principle generate data on change in real time. The irregular history of American dialectology has produced only a few opportunities for real-time comparison.[1] Apparent time distributions therefore provide the main data base for estimating how active the various chain shifts and mergers are, and in what direction they may be moving.[2] The various regression coefficients for age found throughout Chapters 7–20 depend upon the representation of age levels generated by the sampling method. Tables 4.1 and 4.2 and Figures 4.2 and 4.3 show that the sample includes speakers from adolescents to octogenarians in all major regions and for both genders. These tables reflect the Telsur emphasis on women from 20 to 40 years of age as the leaders of linguistic change, but they also show the comparability of age distributions across genders and regions.

Following the principle that mergers advance at the expense of distinctions, we find many mergers moving rapidly to completion (Chapter 8). It is not surprising to find in Table 9.3 that there is an overall advantage for younger speakers in the progress of the low back merger. The more detailed view of regions shows no such change in apparent time in those regions with a structural basis for resistance to the low back merger, but it does appear in those with a history of merger: the West and Eastern New England (in Canada, the merger is apparently complete). The newest trend can be observed in the South, where a strong age differential indicates an advance of the merger in apparent time. The Midland, where the low back merger is generally in a transitional state, also shows a steady advance towards merger among younger speakers.

The chain shifts studied in ANAE generally show a strong advance in apparent time. For the NCS, significant age coefficients are found for all five of the sound shifts involved (Chapter 14). For the Canadian shift, this holds for the lowering and backing of /e/ and the backing of /æ/ (Table 15.1). But as noted above, the Southern Shift is receding in the Telsur data, and also differs from the NCS and Canadian Shift in its relation to city size. While the Inland North and Canadian communities show an advancing urban pattern, the South shows a solidification and generalization of its basic pattern, along with a slow retreat led by the largest cities. (Table 18.3).

Though the Telsur sample focused on locality rather than social parameters, the natural variation in the larger regions is sufficient to yield some insights on how change proceeds. The strongest correlations were found with age, gender and city size. As previous studies have shown, women are in advance for those linguistic variables that show strong movement in apparent time. This was particularly evident in the widespread fronting of the back upgliding vowels, and for three of the four elements of the Northern Cities Shift. There was no significant gender factor in the Southern Shift, which is receding in apparent time, but the special status of women re-emerged in the more rapid reversal of fronting of /uw/ before /l/, where women led the retreat.

Unexpected findings and unsolved problems

The general view among American dialect geographers was that dialect boundaries based on lexical selection have been generated by more or less arbitrary

1 The most useful of these stems from the exploratory sociolinguistic interviews in Chicago in the late 1960s, which plainly indicate an earlier stage of the NCS where /e/ had undergone only lowering, not backing.

2 See Bailey et al. (1991) for a comparison of real and apparent time which indicates the reliability of apparent time as a measure of linguistic change in progress. Since most real time studies show some change in the adult population, it appears that most apparent time data understates the extent and rapidity of change (Boberg 2004; Sankoff 2005).

variables, and that the true picture would be a series of continua if all data were used in an unbiased manner (see Chapter 1). A different view emerges from the phonological materials used by ANAE to define North American dialects. When one isogloss is superimposed upon another to which it is structurally related, we generally obtain either a tight bundle or a concentrically nested series. The two major dialect divisions that emerge are the North/Midland boundary and the Midland/South boundary.[3] The North/Midland boundary is the most remarkable, since it falls very close to the North/Midland lexical boundary that reflects a settlement history dating back to the mid nineteenth century. We have good reason to believe that the Northern Cities Shift is a creation of the twentieth century. It is not immediately evident why the many sound changes of the NCS stop abruptly at the North/Midland boundary. There are structural considerations, in that vowels on either side of the boundary are moving in opposite directions under the control of unidirectional principles (Map 14.8). However, these do not fully explain why the North/Midland boundary remains so firmly in place, and further explorations into the communicative patterns and cultural geography of the area are called for.

The ordering of the five steps of the NCS has been accepted for some time. However, the various maps of Chapter 14 show that the eastern and western boundaries of these processes are not as sharply delimited as the north–south boundaries. In particular, the back variants of /ʌ/ extend further to the east and west than other elements of the shift. This may reflect an earlier initiation of this backing movement, which is now considered the most recent change. In a similar way, the east–west relations of the raising of /æ/ and the fronting of /o/ raise questions about their relative priorities in real time. This is not unrelated to another unsolved puzzle, the relations of /e/ and /ʌ/ in the NCS. The recordings made in Chicago in 1968 show no backing of /e/, but later recordings show a progressive backing in which the most retracted forms of /e/ overlap with /ʌ/. Push chains of this type are not easily accommodated to the mechanism of probability matching that is advanced to account for the more normal pull chains and hole-filling patterns (Labov 2001: 586–587).

The expectation of a progressive advancement of merger is fulfilled by the westward and southward expansion of the low back merger in western Pennsylvania. Reports of the steady expansion of the merger in Texas also conform to this pattern (Bailey et al. 1991). However, the eastern boundary of the low back merger in the West has not shifted further east as might have been expected, but is actually further west than the boundary shown in the 1966 survey of long distance telephone operators, particularly in eastern Nebraska, eastern South Dakota, and Minnesota (Map 9.4). On the other hand, the low back merger seems to be expanding in a different manner in the Midland, where the majority of the speakers show a close approximation of /o/ and /oh/ but not yet a merger.

Prominent among the unsolved problems created by ANAE results is the differentiation of conditioning factors in the raising of short-*a* (Map 14.5). In general, the phonetic conditioning of such continent-wide processes is uniform across the continent. The dialect geography of short-*a* systems, and in particular the reversal of the relative influence of voiced apicals and velars on the raising of /æ/, is therefore unexpected and demands a further accounting.

3 The Canada/US boundary is extremely sharp in some sections, as in the boundary shared with the Inland North, but less well defined in others, as in the West or the Atlantic region.

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