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 back 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.

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]

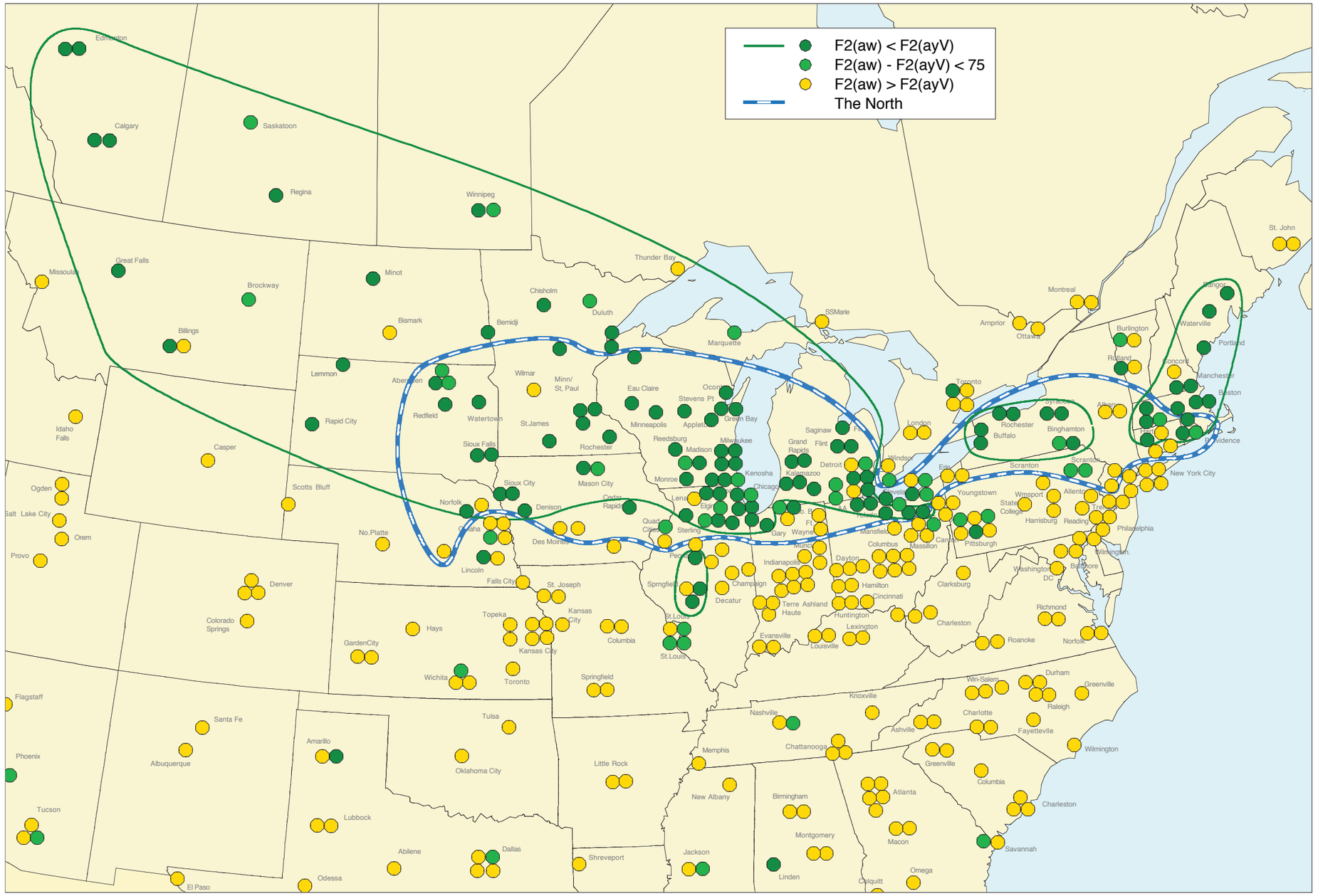
Map 14.2 shows only the speakers for whom /o/ and /oh/ are distinct: all those for whom *Don* and *dawn* were 'the same' in production or in perception are eliminated. The dark red symbols are those who pronounce *on* with /o/ to rhyme with *Don*. The magenta symbols indicate a low or mid back rounded /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

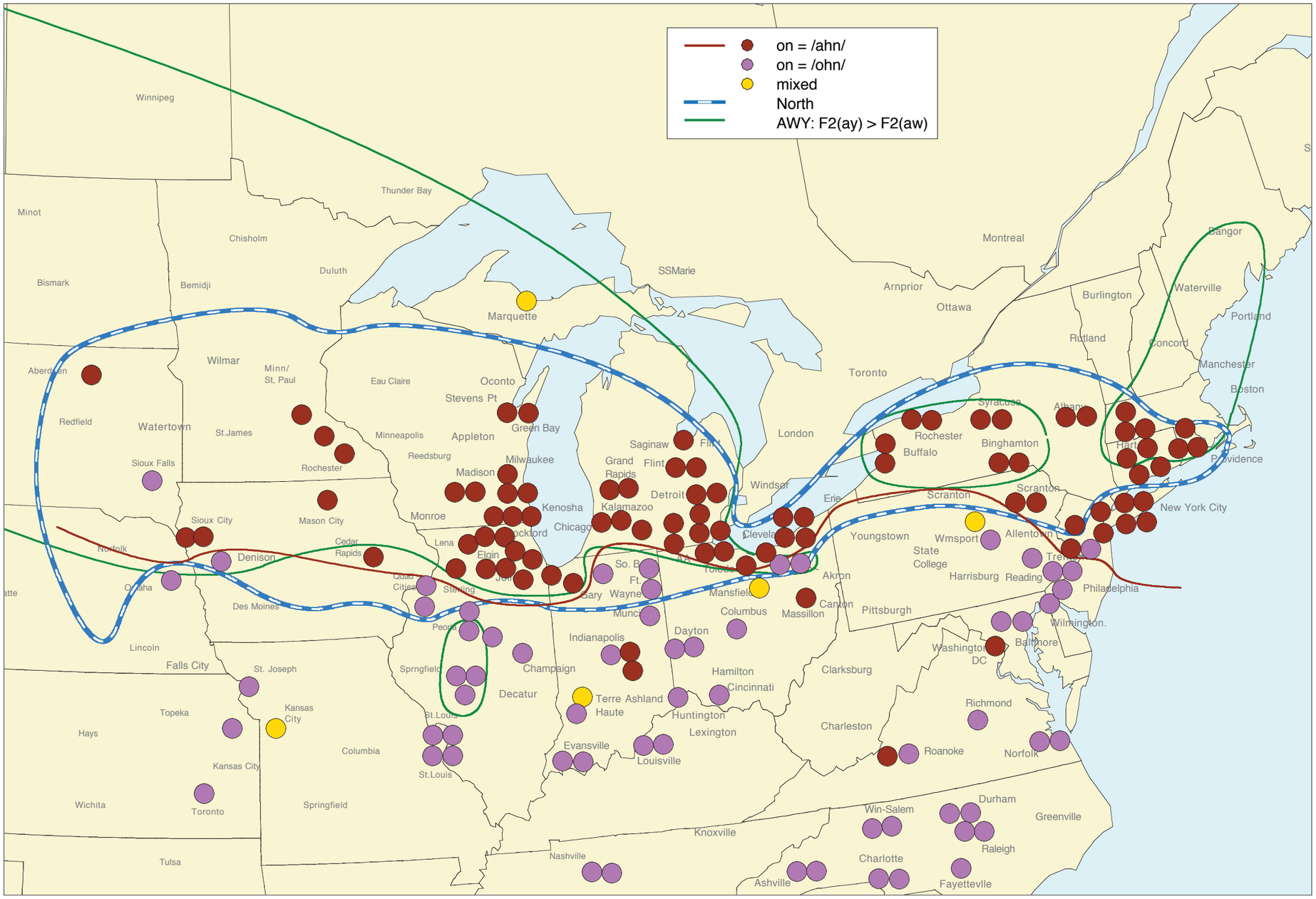
Map 11.2 gave an initial portrait of the Northern Cities Shift as the dynamic tendency defining the Inland North and the larger envelope of the Northern region. Figure 11.1, reproduced below as Figure 14.1, actually involves seven vowel

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 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 considered 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.

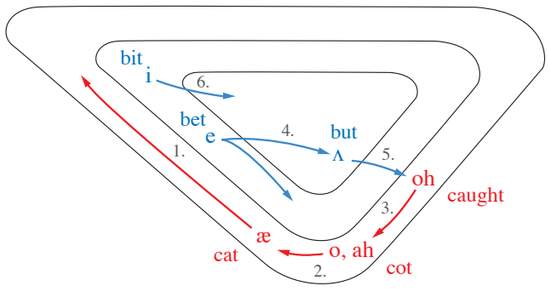


Figure 14.1. The Northern Cities Shift

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. Modern English /i, e, u/ are most likely pronounced in a way very similar to Old 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.

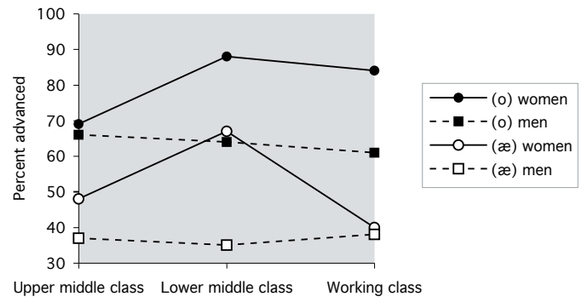


Figure 14.2. Stages 1 and 2 of the Northern Cities Shift by age and social class in Detroit (Fasold 1969)

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 group, before nasals, voiced stops, and voiceless fricatives, is 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 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 the latest change, but there are still unresolved questions of ordering involved. It is clear that the raising of /æ/ and the fronting

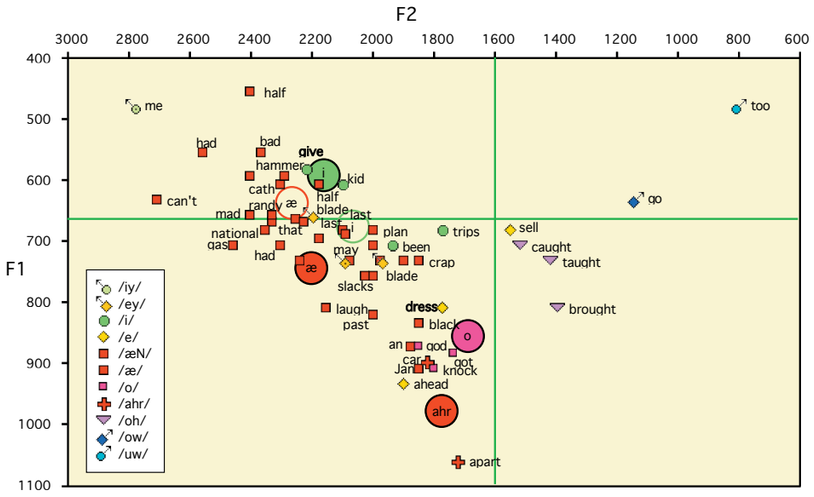


Figure 14.3. Vowel system of Carol M., 16 [1968], Evergreen Park

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 an 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 greater 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/

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 diameter 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).

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 .79 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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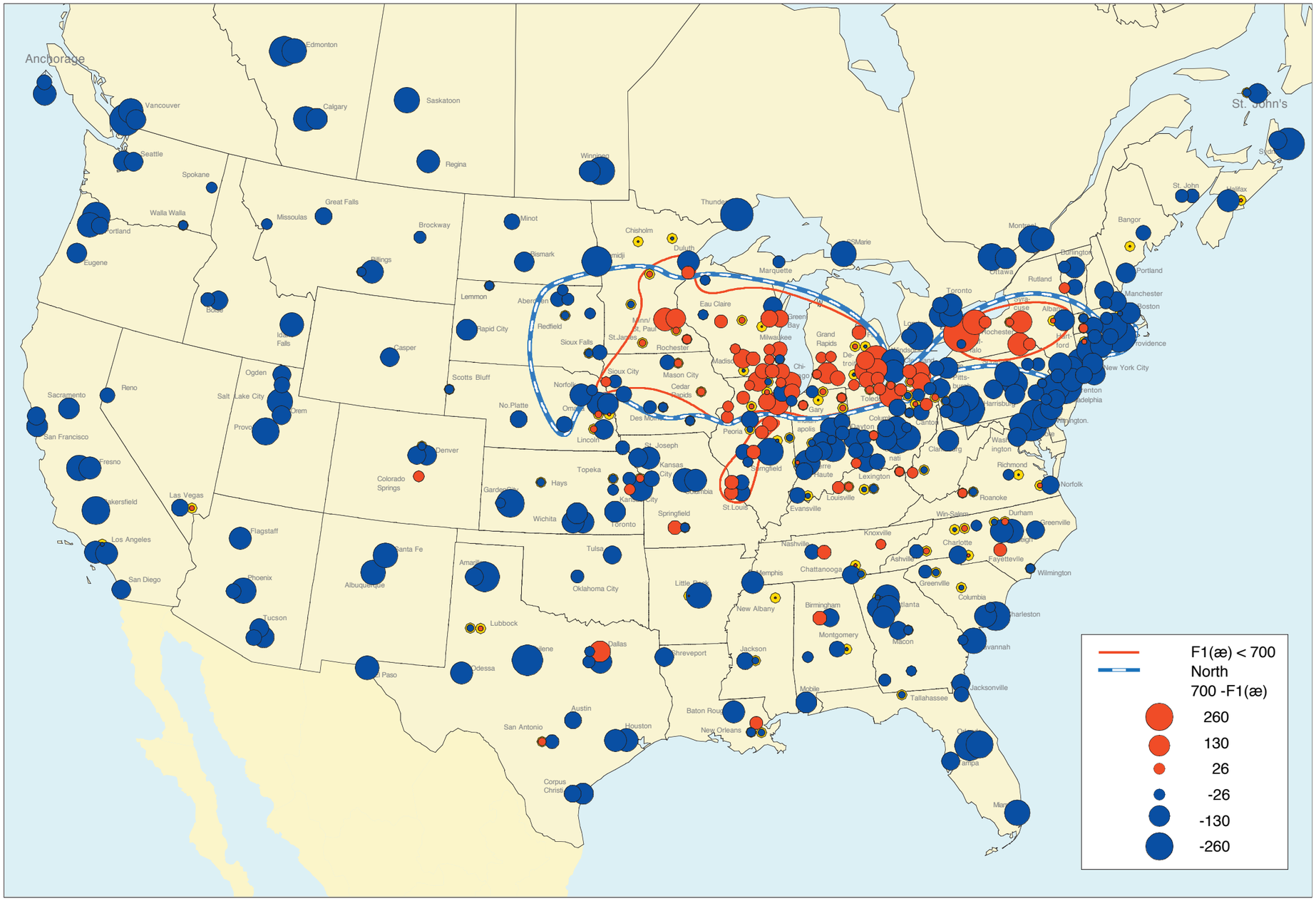
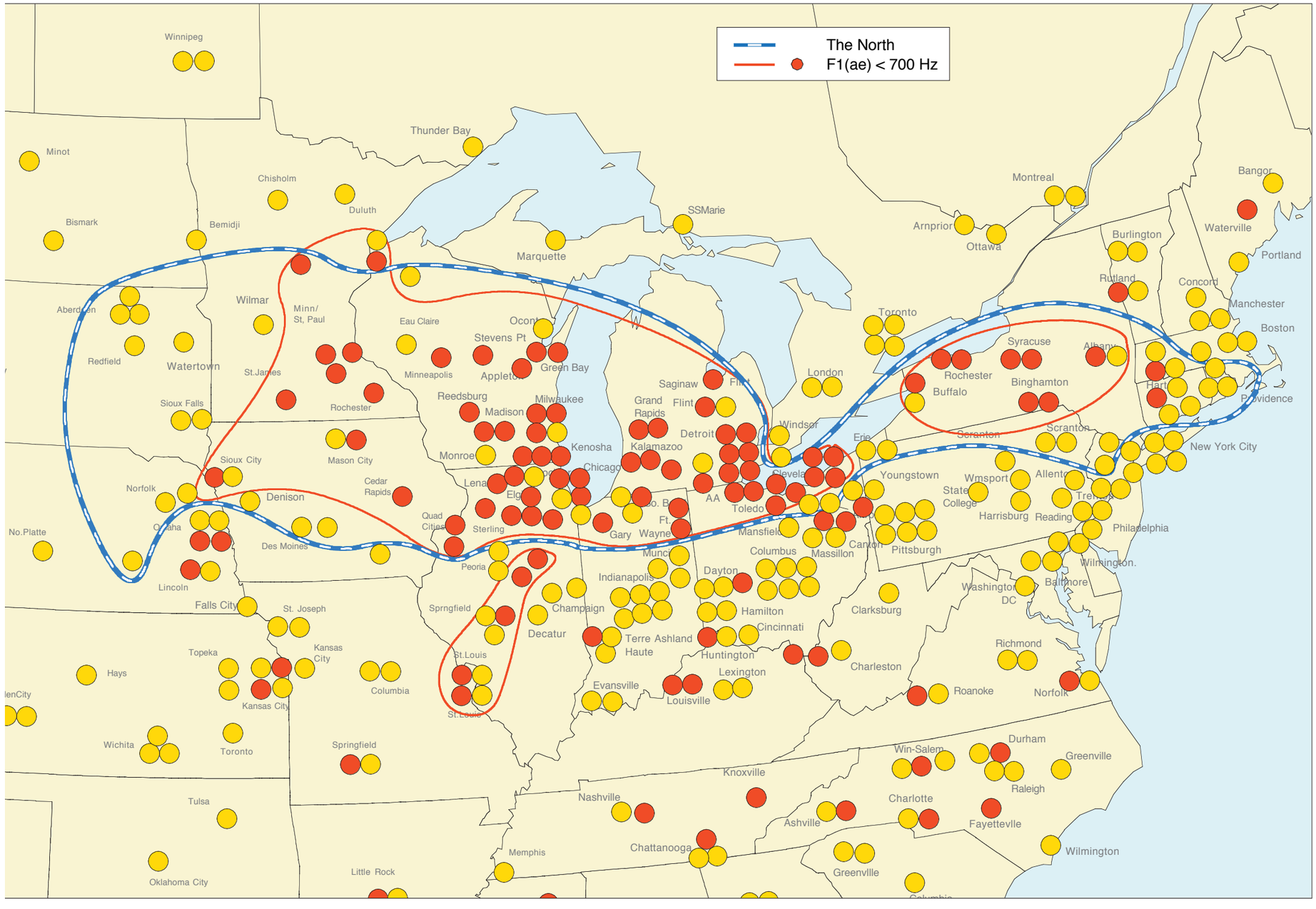
7 It is important to note that the raising of /æ/ is quite general across North America, but for many dialects it is concentrated in vowels before nasal consonants. The mean of /æ/ that is traced in Maps 10.5 and 10.6 does not include any vowels before nasals, so the contrast between the Inland North 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.

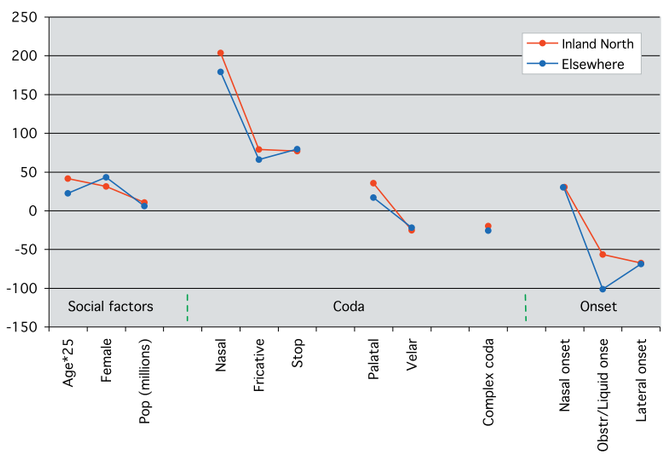


Map 14.4. The raising of /æ/

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/

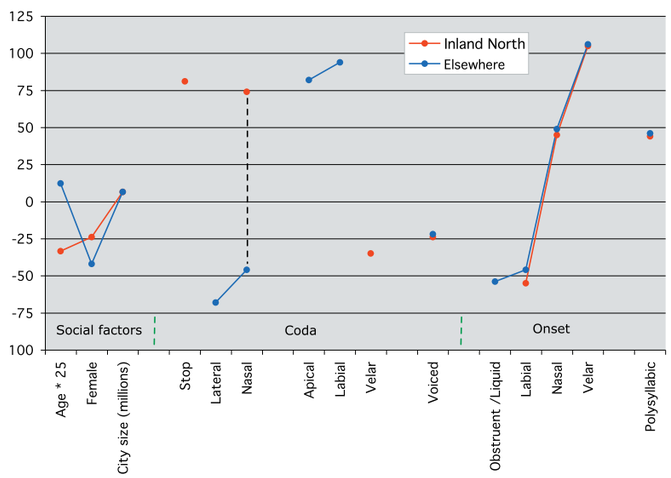
Map 14.5 shows the second stage of the NCS, the fronting of /o/ in *cot*, *rock*, *college*, etc. The brown symbols show all speakers for whom the mean F2 of /o/ is greater than 1450 Hz. Since in the normalized system of Telsur, 1550 Hz is the approximate center of the acoustically defined space utilized, a speaker with a mean value greater than 1450 is likely to have some tokens of /o/ that are front of center.

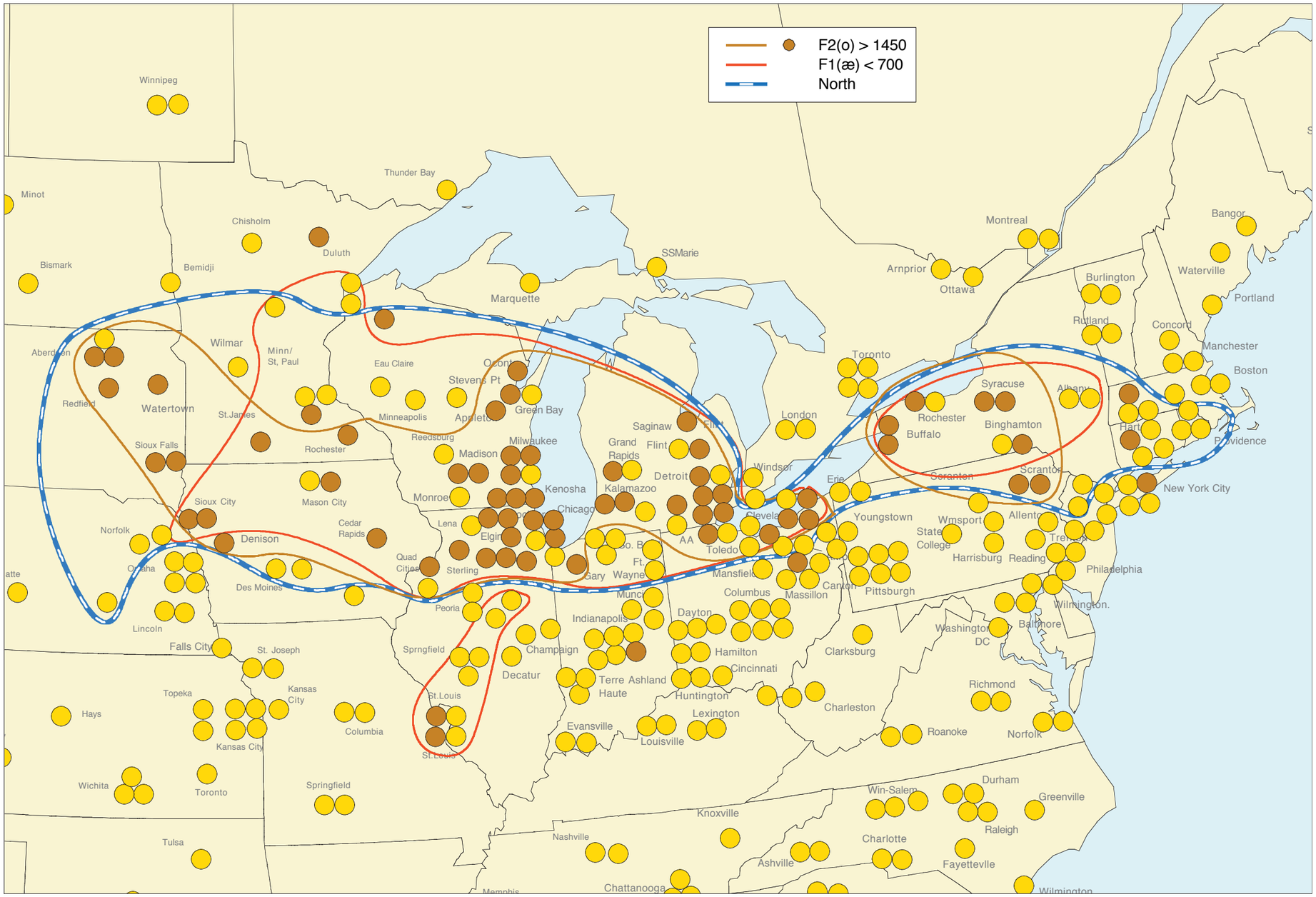
The area of fronting of /o/ is shown by the brown isogloss (the O2 line). The eastern section more or less coincides with the eastern section of AE1, and the agreement on the North/Midland line is quite high, with the exception of five speakers in Northern Indiana. The O2 line coincides with the main 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/

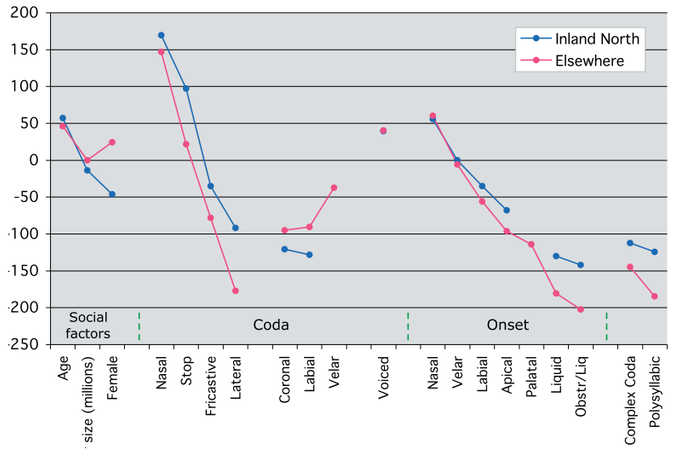
As shown in Figure 14.1, the phoneme /e/ moves in two different directions in the course of the Northern Cities Shift: lowering, as registered by an increase in F1, and backing, registered by lowering of F2. The Natural Break Maps 10.3 and 10.4 show that the geographic distribution of the lowering and 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 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.

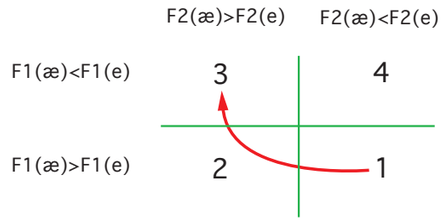


Figure 14.8. Relative positions of F1 and F2 of /e/ and /æ/

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/.

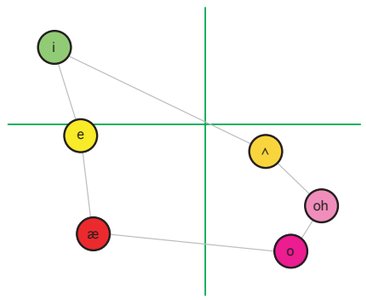


Figure 14.9. Quadrant 1 NCS Vowels for Beatrice S., 62, Williamsport, PA

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.

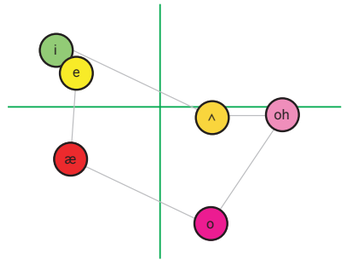


Figure 14.10. Quadrant 2 NCS Vowels for TS 55, James W., 78, Chicago, Illinois

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.

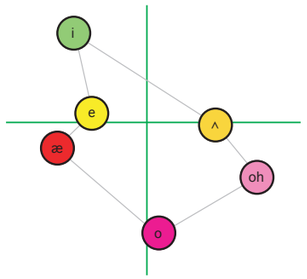


Figure 14.11. Quadrant 2 NCS vowels for TS115 Steve A., 43, Ann Arbor, MI

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.

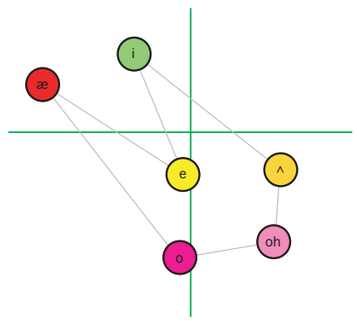


Figure 14.12. Quadrant 3 NCS vowels for TS 359, Sharon K., 35, Rochester, NY

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.

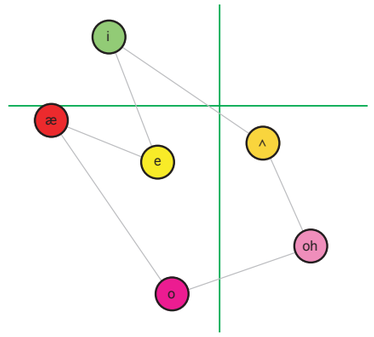


Figure 14.13. Quadrant 3 NCS vowels for TS 3, Martha F., Kenosha, WI

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 statistical parameters of the quadrant 3 isogloss – the EQ line – are almost exactly those of the ae1 isogloss (Appendix 14). Homogeneity is .71 and consistency .80.

A second structural measure is the ED measure. 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 the 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 EAQ 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.

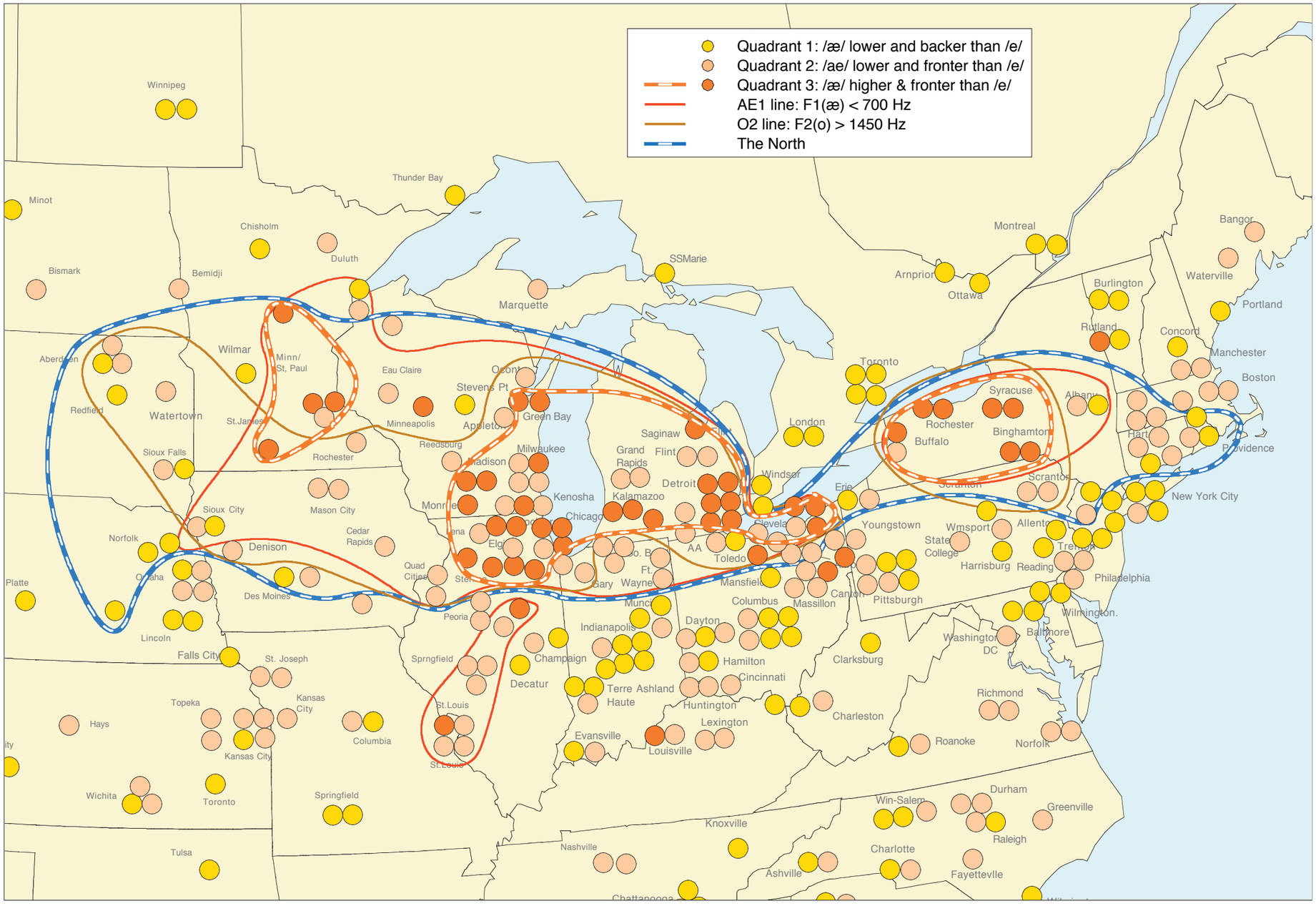
The homogeneity of the ED measure is considerably greater than the EQ and AE1 measures (.84). Consistency, however is lower (.68), This reflects the scattering of blue circles in the area of the Northern region west of the Inland North proper.

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 bolue 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, with backing in the North much the larger effect. 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.

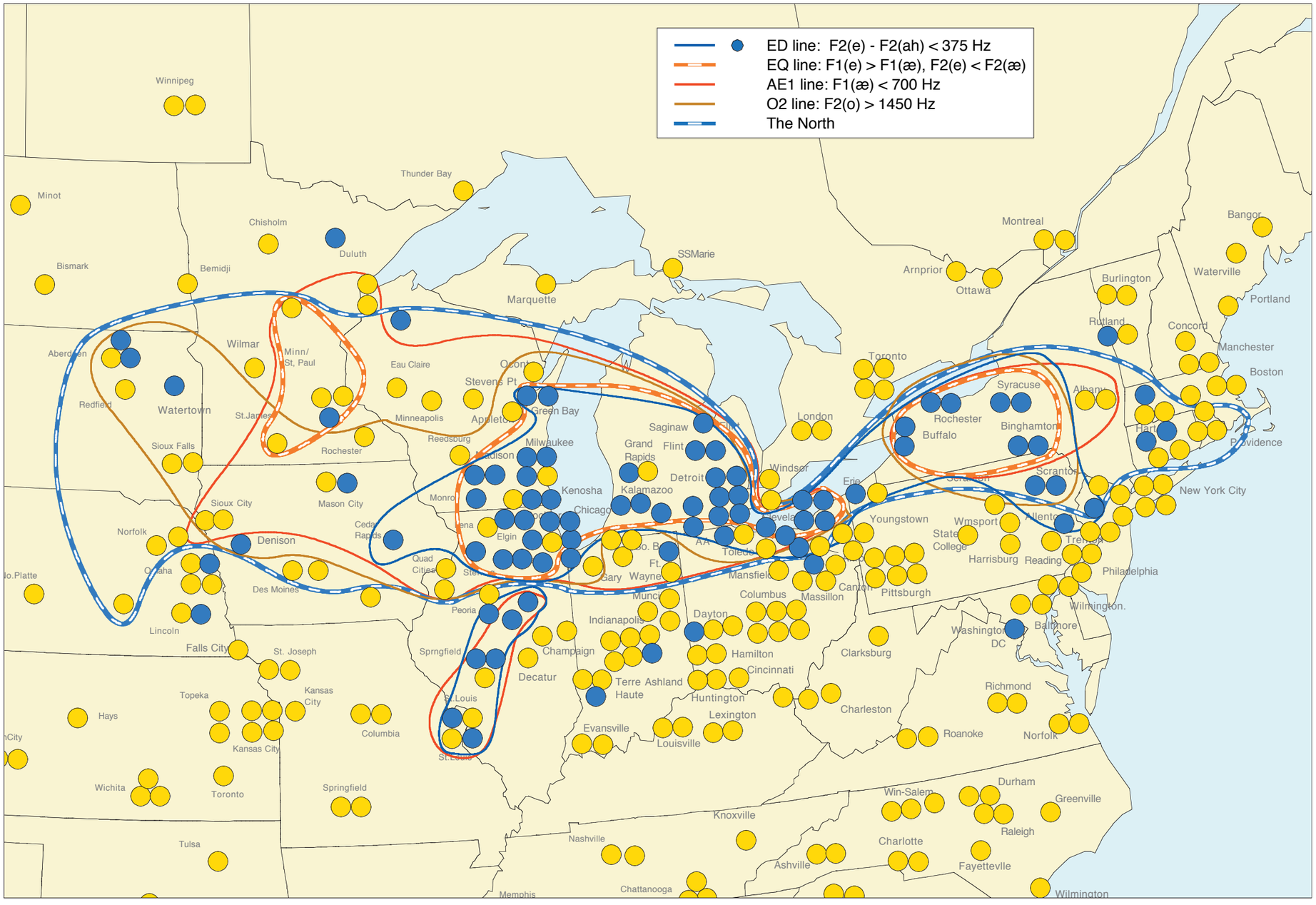
Table 14.5 and *Figure 14.14*. Regression coefficients for the second formant of /ʌ/ for the North [N = 1794] and elsewhere [N = 5122]. Only factors significant at $p < .01$ or better are shown.

	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



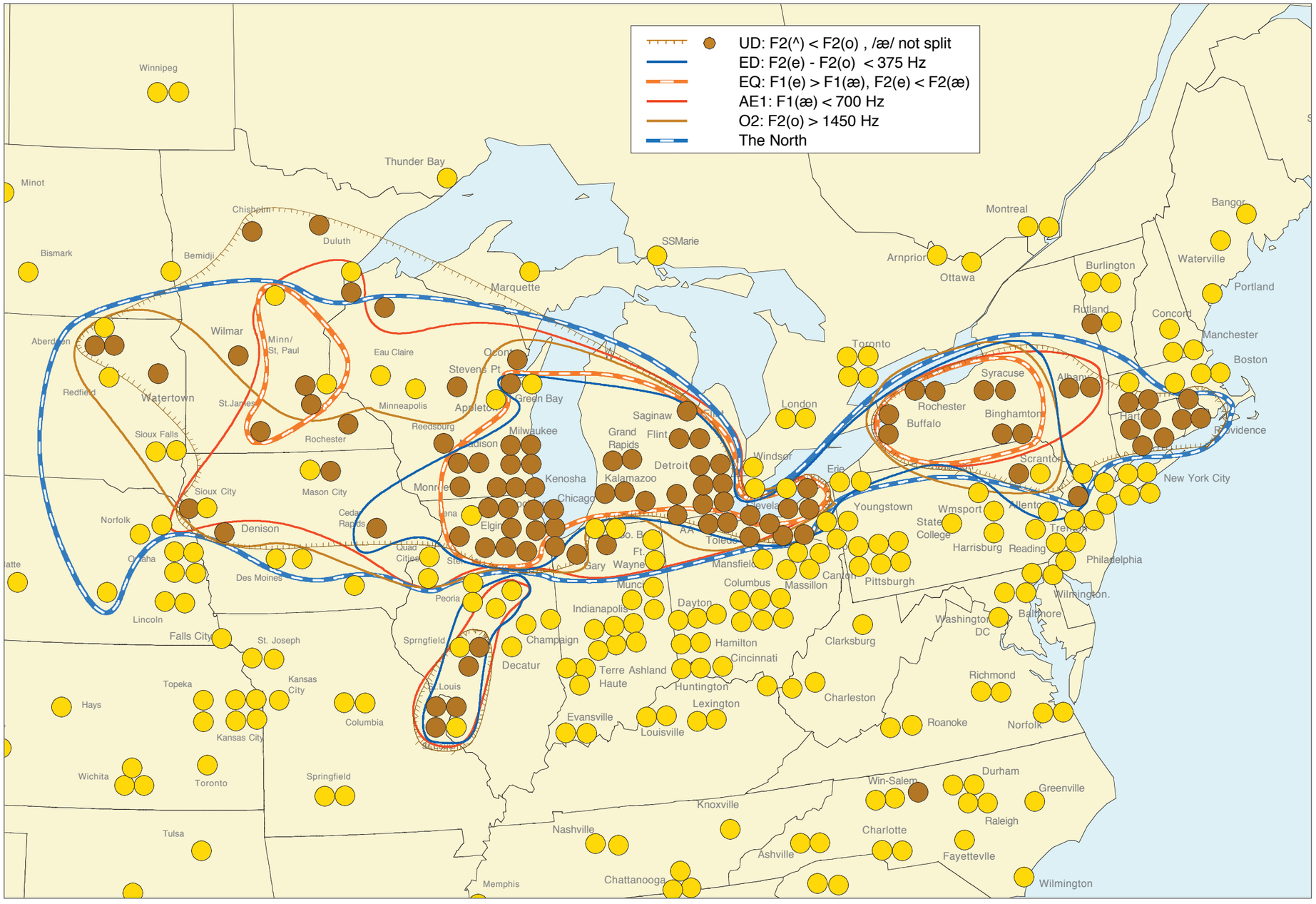
Map 14.6. The EQ measure in the Inland North

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.



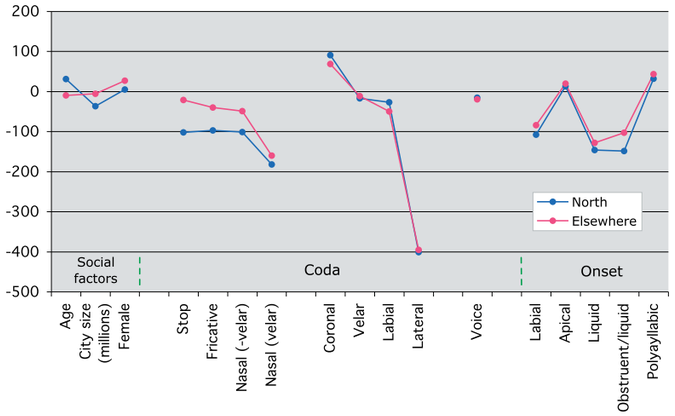
Map 14.7. The ED measure of the Northern Cities Shift

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 there are only four points in the Midland who sastisfy the ED criterion.



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.



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 includes 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.

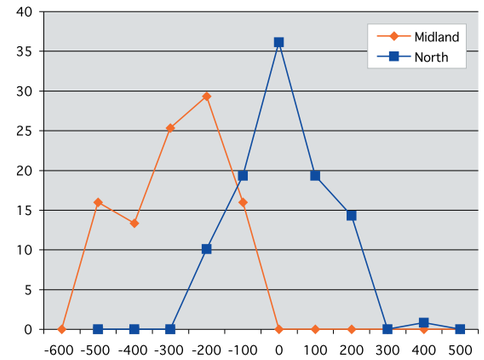


Figure 14.15. Distribution of F2(o) – F2(ʌ) for all North [N=119] and Midland [N=79] speakers

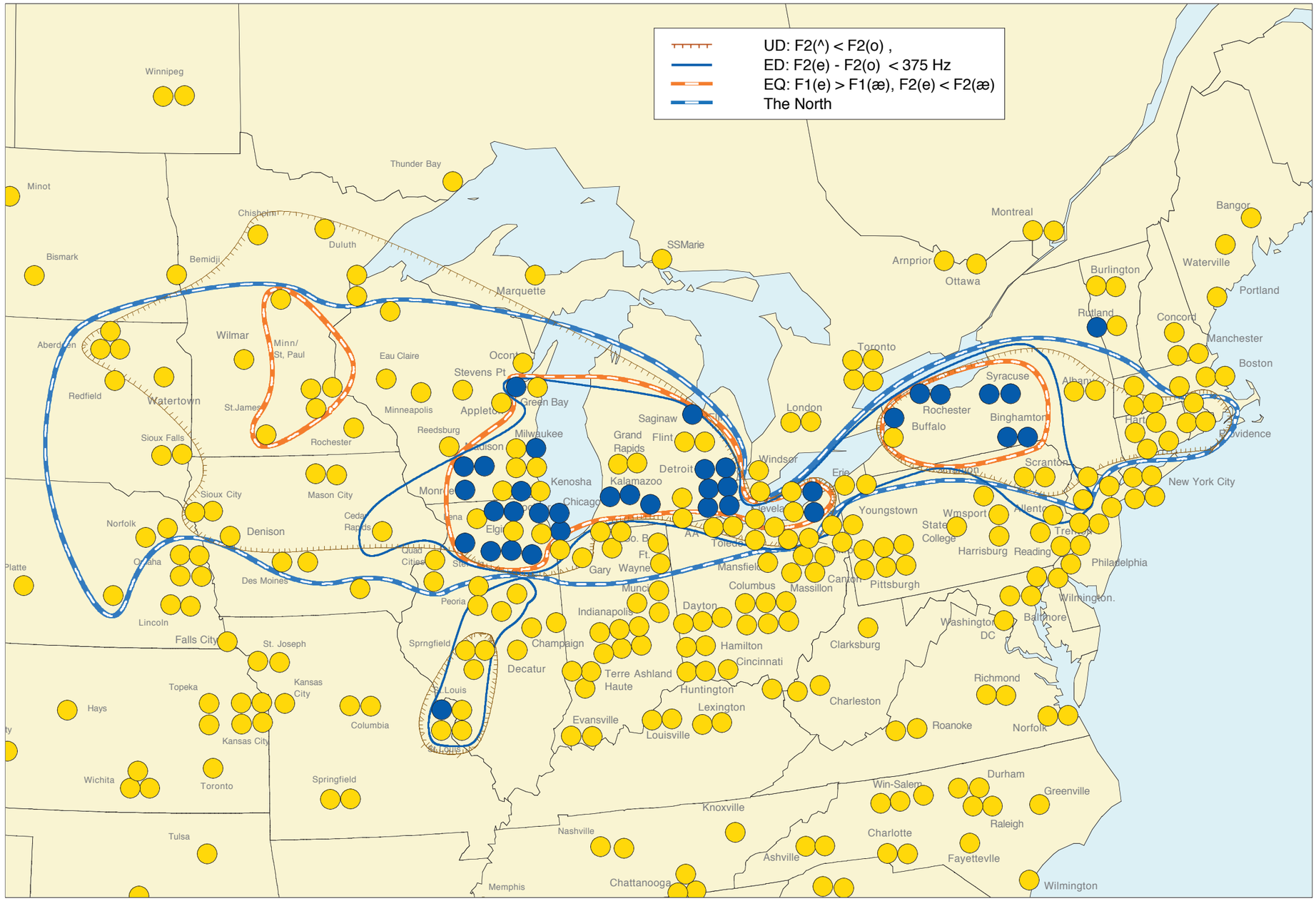
Map 14.9 shows the distribution of speakers who satisfy the three structural criteria of the NCS presented in Maps 14.6–14.8.[12] The blue circles represent speakers who are positive on the following measures:

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 14.9. 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 (1/8).

14.10

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

14.11

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*,

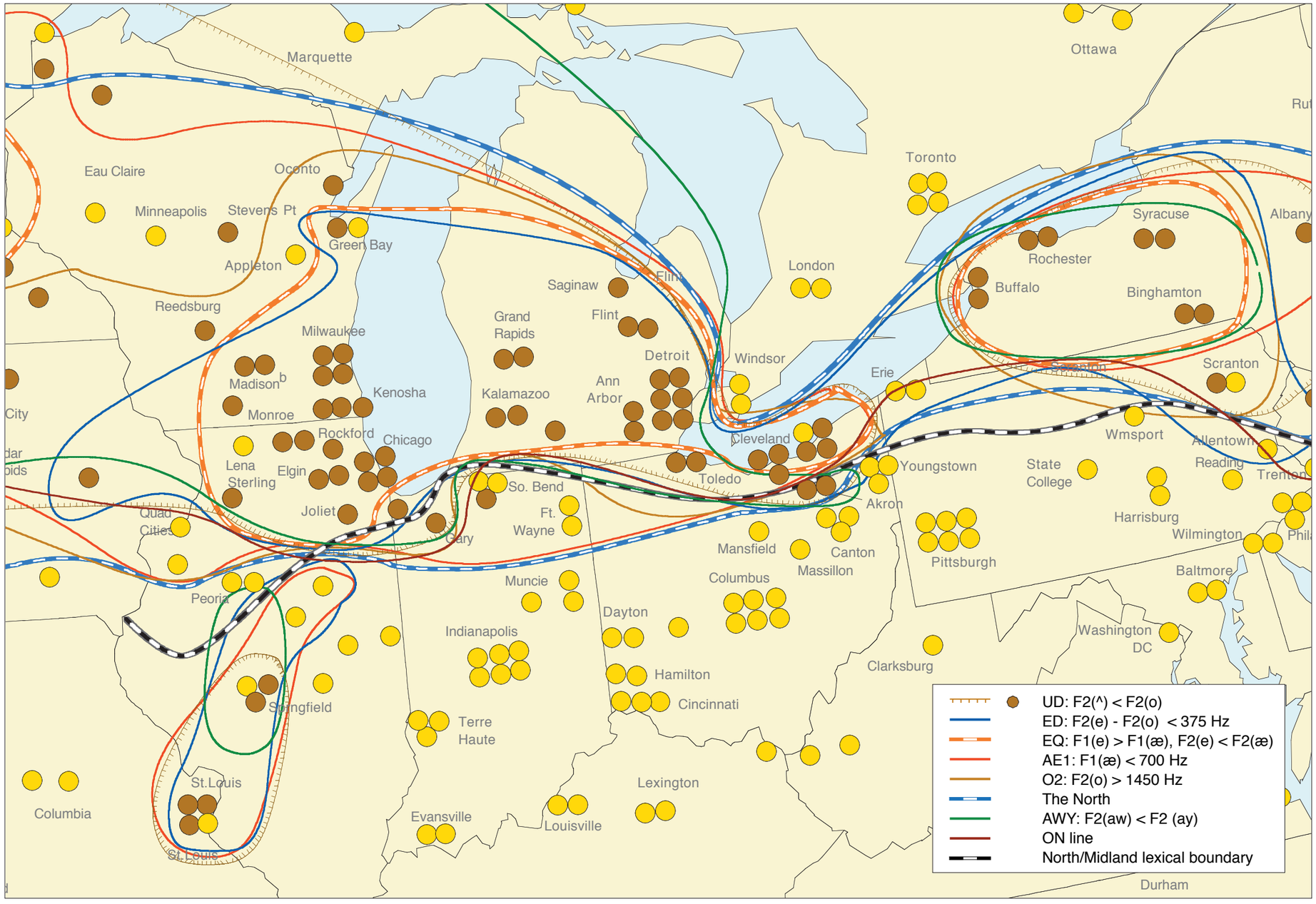
13 Two speakers outside of this core area satisfy the four criteria but do not fall within all four isoglosses (Rutland, Vt and Buffalo, NY). This is because the other speaker in that community was not as consistent for all criteria. See the section on W.N.E. at the end of this chapter for a discussion 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 EOD 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 work 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 on 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.

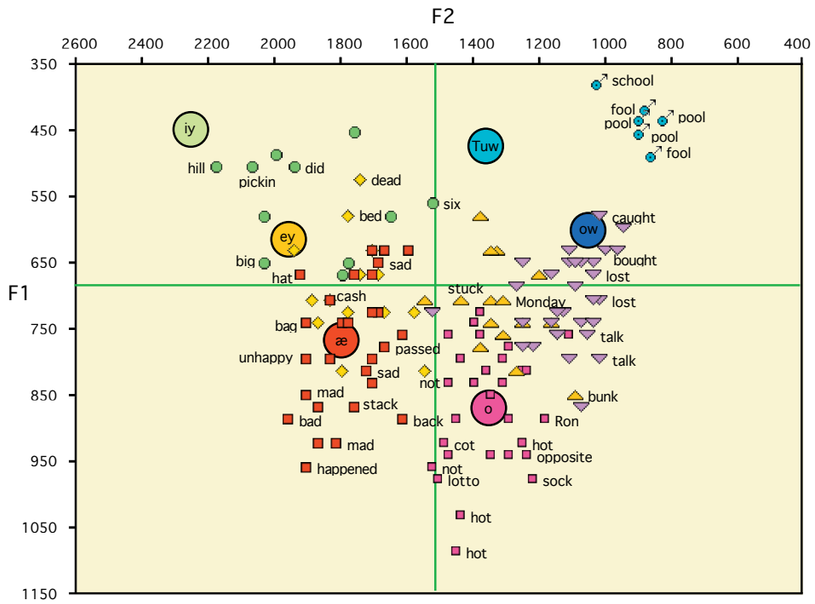


Figure 14.16. Vowel system of James W., 78 [1993], Chicago, Illinois, TS 55

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/.

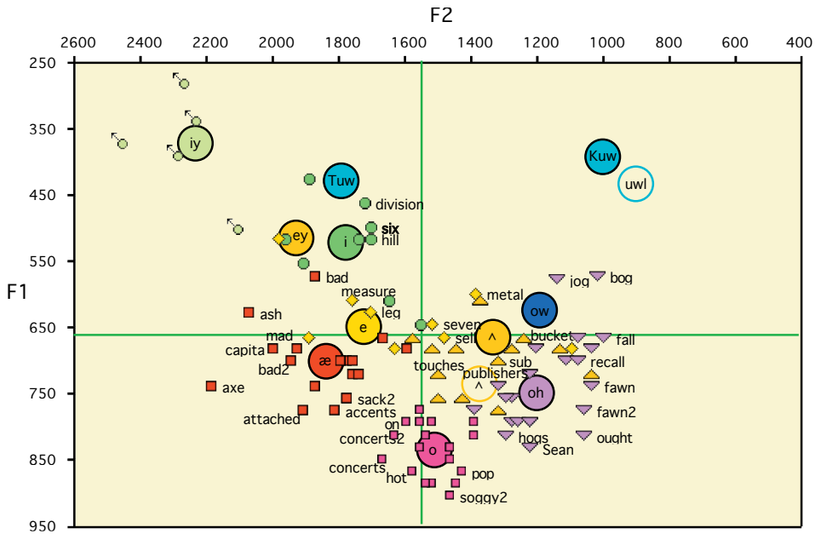


Figure 14.17. Vowel system of Steve A., 43 [1994], Ann Arbor, MI, TS 115

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)

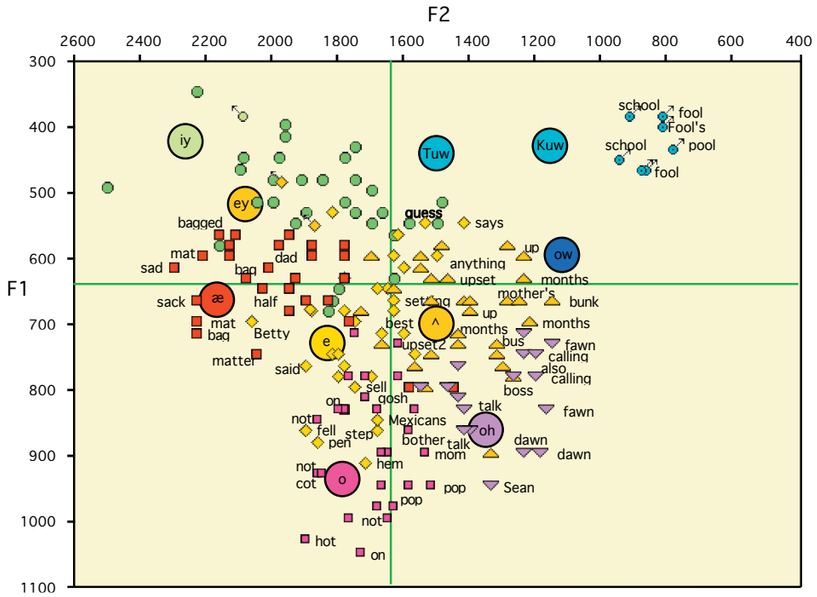


Figure 14.18. Vowel system of Martha F., 28 [1992], Kenosha, WI, TS 3

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*".

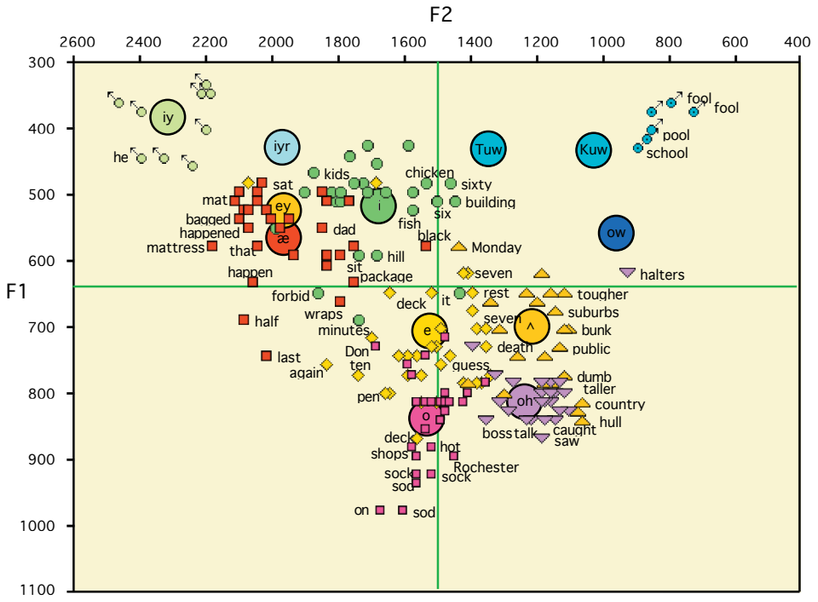


Figure 14.19. Vowel System of Sharon K., 35 [1995], Rochester, NY, TS 359

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.

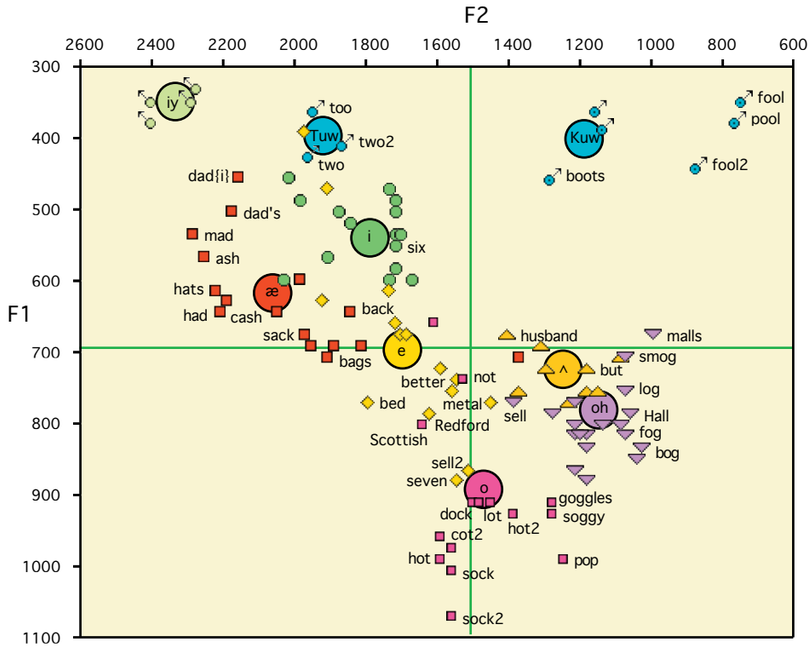


Figure 14.20. Vowel system of Libby R., 42 [1994], Detroit, Michigan, TS 125

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 confirms 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.

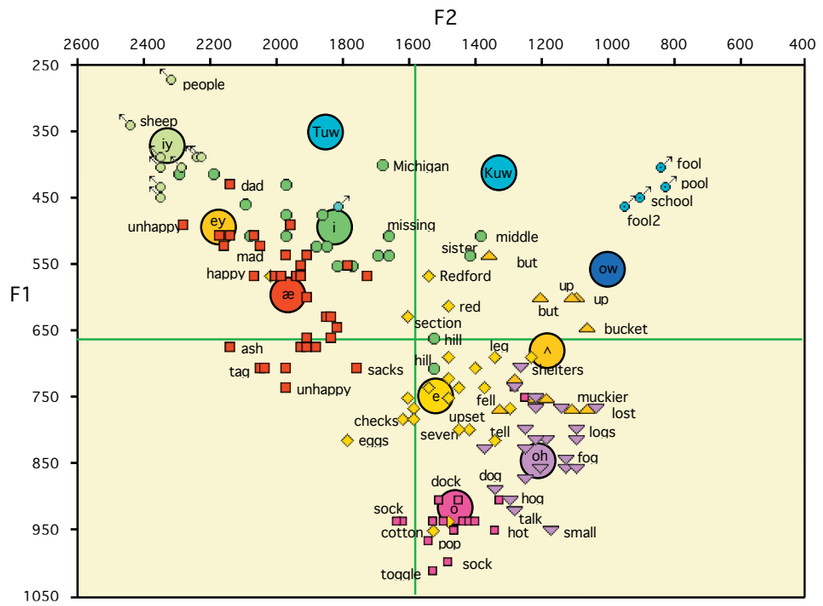


Figure 14.21. Vowel system of Joanna R., 14 [1994], Detroit, Michigan TS 124

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/, a negative correlation with education can be observed.

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.

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.

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 second two, reflecting the strong gender coefficient for /æ/ and /e/ in Table 14.6.

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. At the same time, the backing of /e/, a recent change, shows correlations with both gender and 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.

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 different region encompassing the four speakers from Vermont, three from western Massachusetts, and four in Connecticut. In this respect, the area is distinct 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/ 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.

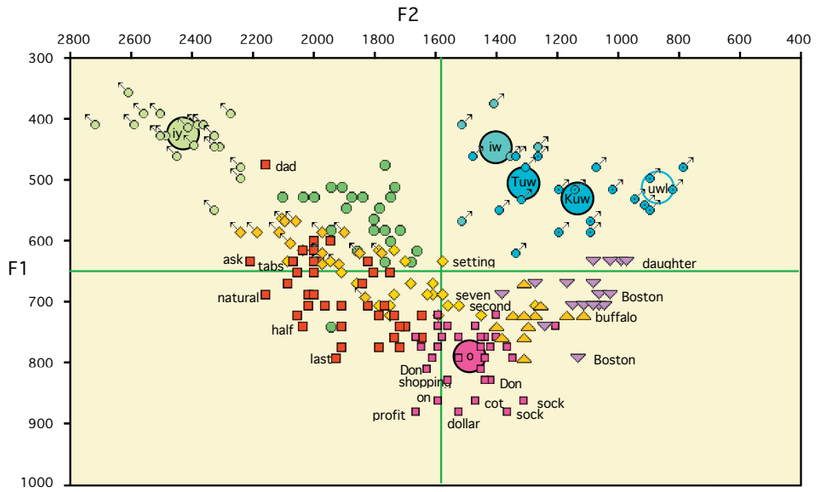
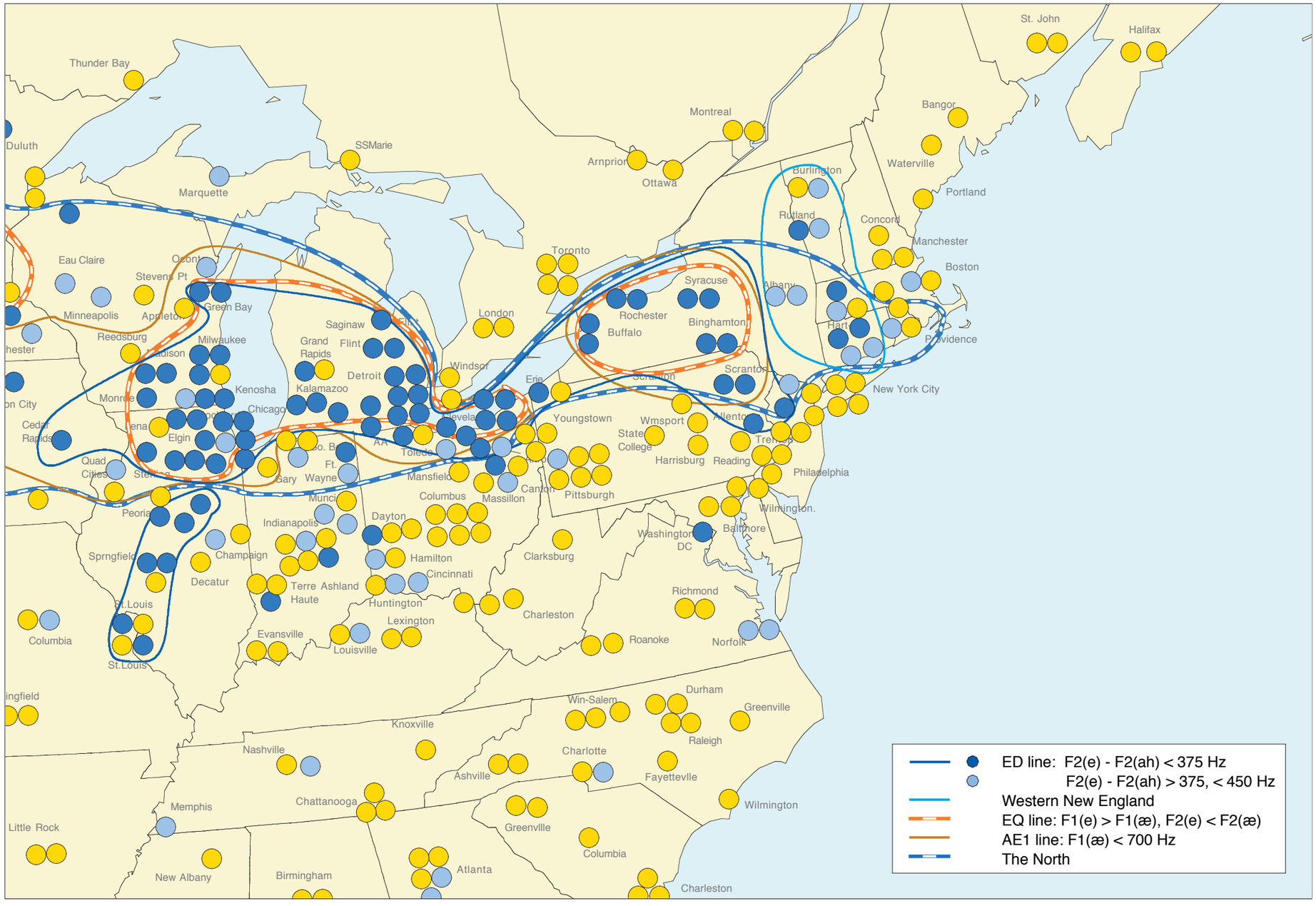


Figure 14.22. Vowel system of Jesse M., 57 [1996], New Britain CT, TS 465

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.

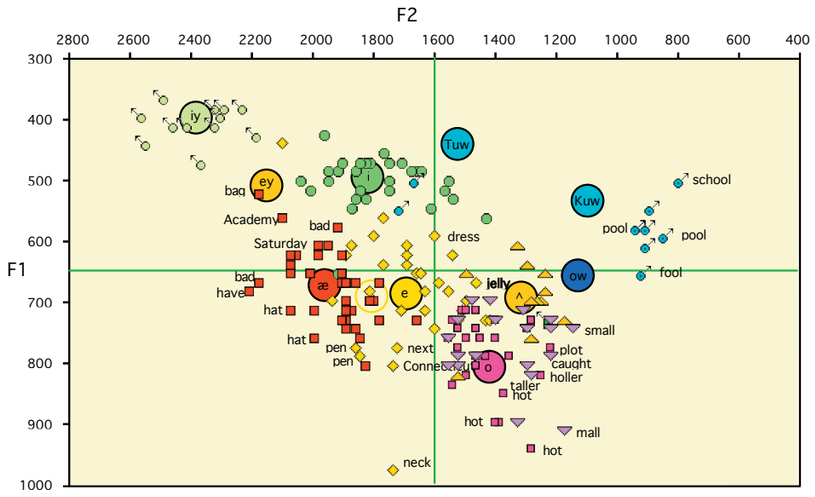


Figure 14.23. NCS in the vowel system of Phyllis P., 63 [1995], Rutland VT, TS 434

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 scope of this Atlas.

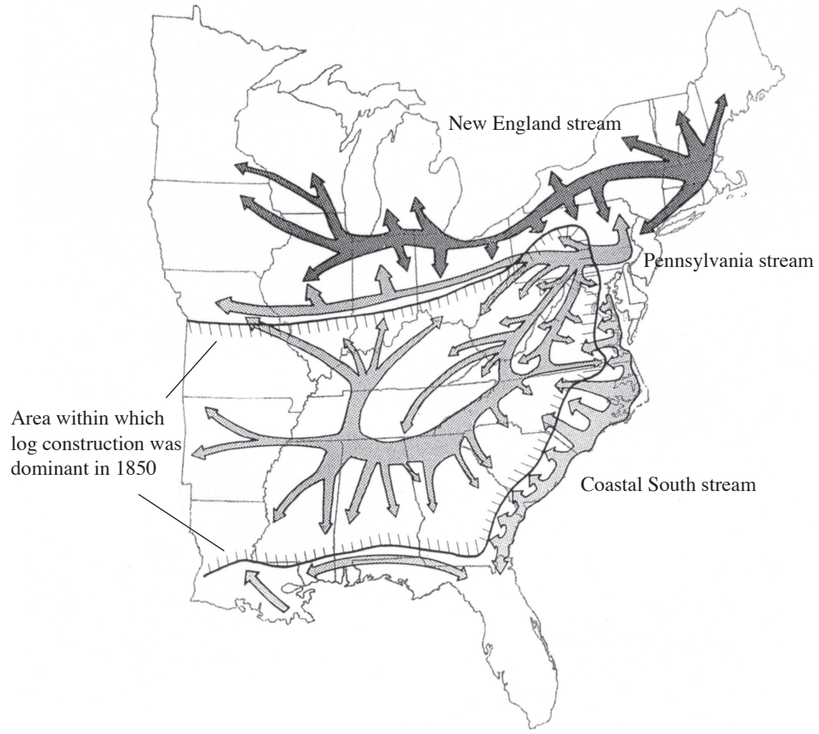


Figure 14.24. Settlement patterns based on house building practices (from Kniffen and Glassie 1966)

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.