DIALECT BOUNDARIES AND PHONOLOGICAL CHANGE IN UPSTATE NEW YORK

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ABSTRACT

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The eastern half of New York State is a dialectologically diverse region around which several dialect regions converge—the Inland North, New York City, Western New England, and Canada. These regions differ with respect to major parameters of North American English phonological variation; and therefore the interface between them is of interest because the location and structure of their boundaries can illuminate constraints on phonological changes and their geographic diffusion. In this dissertation, interviews with 119 speakers in New York State are conducted and phonetically analyzed in order to determine the dialect geography of this region in detail.

The sampled area is divisible into several dialect regions. The Inland North fringe contains communities that were settled principally from southwestern New England; here the Northern Cities Shift (NCS) is present, but not as consistently as in the Inland North proper. In the core of the Hudson Valley, there is clear influence from New York City phonology. The Hudson Valley fringe, between the Hudson Valley core and the Inland North, exhibits some NCS features, but no raising of /æ/ higher than /e/; this is attributed to

the effect of the nasal /æ/ system in blocking diffusion of full /æ/-raising. The North Country, in the northeastern corner of the state, is the only sampled region where the low back merger is well advanced, but the merger is in progress over the long term in the other regions except for the Hudson Valley core; this illustrates that the NCS does not effectively prevent merger.

General theoretical inferences include the following: (potentially allophonic) segments, not phonemes, are the basic unit of chain shifting, and one allophone can prevent another from being moved into its phonetic space; the effect of diffusion of a phonemic merger from one region to another may merely be a slow trend in the recipient region toward merger; and isoglosses for lexically-specific features may correspond better to popular regional boundaries than do phonological isoglosses. Finally, a definition of dialect boundaries as obstacles to diffusion is introduced.

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Chapter 1

Introduction

1.1. Nature of dialect boundaries

A **dialect region** can be roughly defined, in general, as any more or less geographically compact set of communities that share some linguistic feature or set of features that is not generally shared by communities beyond the limits of the region; a **dialect boundary** would then merely be the geographical boundary between two or more such regions. The most comprehensive study undertaken to date of the dialect regions of the United States and Canada is the *Atlas of North American English* (henceforth *ANAE*: Labov, Ash, & Boberg 2006). It analyzes data from speakers in the principal cities in every English-speaking region of North America to divide the continent up into some dozen or so major dialect regions based on the patterns of phonological and phonetic change that predominate in each area.[1]

Since these regions are defined in terms of the major cities they contain, the boundaries between them lie in most cases in less densely populated regions between the large cities. Therefore *ANAE* does not address the question of to what degree the smaller cities and towns outside the major urban areas share the linguistic features on whose basis the region as a whole is defined. Moreover, it provides little information as to where in the intercity territory the boundary lies.

[1] The data for *ANAE* was collected through a program of telephone interviews called the Telsur project. The corpus of phonetic measurements of the vowel systems of 446 speakers generated through this project and used in *ANAE* will be referred to in this dissertation as "the Telsur corpus".

Only in the fairly rare case that two cities that are very close to each other are classified by *ANAE* as belonging to different dialect regions (e.g., the adjacent cities of Detroit, Mich, and Windsor, Ont., in the extreme case) can the boundaries between the regions be located with much confidence. Cities belonging to two different dialect regions may be located hundreds of miles away from each other, while data on the territory between them may be entirely lacking; in that case the boundary between the two regions may lie anywhere in the intervening area. Therefore the dialectological status of communities close to the boundary remains in most cases unknown. There are at least four general possibilities for the status of such communities:

- A **sharp** boundary line. Communities on each side of the boundary line have all the linguistic features on whose basis the region is defined, to the same extent that communities distant from the border do. This is the situation which obtains at the border between the Inland North and Canadian regions at Detroit and Windsor (*ANAE*), and Johnson (2007) suggests that the same is or was the case at the border between the dialect regions of Eastern Massachusetts and Rhode Island.
- A **gradual** boundary; regional features fade out near the boundary. Communities close to the boundary exhibit the characteristic features of one region or the other to a weaker degree: either the sound changes are less advanced, or only a minority of speakers show their effects, or both; but each community can still be classified as belonging to one of the two regions.

- An **overlapping** boundary area. There is an area between the cities around which the two regions are defined in which the diagnostic linguistic features of both regions are found—either there are speakers who possess linguistic features characteristic of both regions, or some speakers show the linguistic pattern of one region and some show the other. Bigham (2006) suggests that the area in southern Illinois between the South and the so-called St. Louis Corridor (a corridor through central Illinois connecting Chicago and St. Louis, which exhibits dialect features associated with the North) may be such a region.
- A **null** boundary; regions do not meet. There is an area between the two dialect regions that does not participate in the characteristic sound changes of either region. This intermediate area may have a more conservative system that is in principle structurally open to the sound changes of one or both of the regions adjacent to it, or it may possess sound changes of its own that are distinct from those of the major dialect regions surrounding it (and thus constitute a third and perhaps previously undetected dialect region). In a case such as this, the existence of a boundary at all between the two original regions of interest was merely an illusion caused by the lack of data in the intervening area.

Obviously these configurations are not all necessarily mutually exclusive. For example, a single dialect boundary may be simultaneously sharp and gradual if, for example, there is a well-defined (sharp) line separating one set of

dialect features from another set, but the communities close to that sharp line on one or the other side (or both) possess relatively diluted manifestations of those features, while in communities farther from the boundary the distinctive regional features are present more strongly. In the case of a null boundary, where two dialect regions are separated by a third with distinctive features of its own, or a conservative region with no distinctive features, the two regions' boundaries with the third region may be either sharp or gradual. If a region is defined in terms of more than one distinctive linguistic feature, its boundaries may be sharp with respect to some features and gradual with respect to others. Other combinations are possible as well.

Identifying the status of communities in the intermediate zones between the major cities sampled by *ANAE*, and thus the nature of the boundaries between the regions defined by those cities, can shed light on the manner by which linguistic innovations originate and propagate across regions. For example, we may propose a model where dialect boundaries are based entirely on original settlement patterns, and a sound change begins simultaneously in precisely the region that was originally settled by a population whose linguistic system was favorable to that change; communities settled from other sources by populations less favorable to the change were simply not subject to it. In a situation like that, we should expect a sharp boundary—however close a community may be to the regional boundary should not prevent it from undergoing the characteristic changes of the region to the same extent that all other communities subject to the change do. If we expect dialect features to diffuse from location to location, however, so that a linguistic change originates

in an urban center, and then spreads to nearby cities and regions along lines of communication, in the pattern observed by Trudgill (1974), Callary (1975), and others, we should expect gradual boundaries: the boundary appears where it does merely because the innovation has only spread so far to date, and has only recently reached the outlying areas. Under this model, a null boundary may be merely a less advanced stage of a gradual boundary, in which the advancing wave of the diffusing sound change has not yet reached very far into the territory between cities. Overlapping dialect areas may exist if the characteristic sound changes of two regions are not linguistically incompatible with each other and therefore are able to spread into the same region without blocking each other's movement, or represent different salient social meanings to the population of the intermediate region, in such a way that some speakers choose to affiliate themselves with one adjacent dialect region and some with the other. Alternatively, overlapping dialect regions may merely be a result of population movement bringing speakers from both the dialect regions on either side into the intermediate territory. In each case, the particular status of the boundaries between dialect regions can offer some insight into how the difference between the regions arose and how the boundaries came to be where they are.

The existence, status, and distribution of dialect boundaries, especially sharp dialect boundaries, is also a valuable source of information on the mechanisms of and constraints upon linguistic change. The reason for this is fairly simple: ordinarily, communities located close to each other are linguistically fairly similar; any linguistic difference between such communities is therefore unexpected and in need of some explanation. There are three broad

categories of reasons why such communities may exhibit different linguistic features:

- A linguistic change may be in the process of expanding from the region in which it originated to new communities, and (at the time of data collection) has reached one of the two communities of interest but not the other. In this case, the location of the apparent dialect boundary is merely a consequence of the time at which data was collected—some years or decades later, the innovation will have spread to the second community as well and the linguistic difference between the two communities will be eliminated. So the difference that exists synchronically is basically accidental.
- There may be some social or cultural factor that prevents one community from participating in the linguistic changes of the other. A basic possibility is that there is simply a low degree of communication between the two communities (and the regions that contain them), despite their proximity; for example, this is the interpretation Labov (1974) gives to the North-Midland dialect boundary in northern Pennsylvania. More interesting is the possibility that speakers in one community may resist the linguistic changes of the other for ideological reasons—e.g., out of a desire to avoid being culturally identified with the other community or region. This scenario is suggested by Labov (to appear: ch. 10) for the North-Midland boundary west of Pennsylvania. In these cases, the location of the dialect boundary is determined by social factors.

- There may be some pre-existing fact about the linguistic system of one community with which the innovations of the neighboring community are incompatible: i.e., the boundary is determined by internal linguistic factors. This explanation may seem circular—it seems to be saying that the reason adjacent communities differ linguistically is because they *already* differed linguistically. However, the preexisting linguistic differences may be founded upon one of the other two reasons, incomplete diffusion or (past or present) social obstacles, and still create a linguistic incompatibility for some new feature. For example, if different (yet incompatible) innovations originate simultaneously in two adjacent communities, then by the time one is advanced enough in its home community to begin diffusing to the other community, the other community's incompatible change is advanced enough to block it. It may also be the case that the communities were not, so to speak, originally adjacent—i.e., the two communities were originally settled by founding populations with different dialects, and the pre-existing structural incompatibilities prevented the diffusion the features of one community into the other.

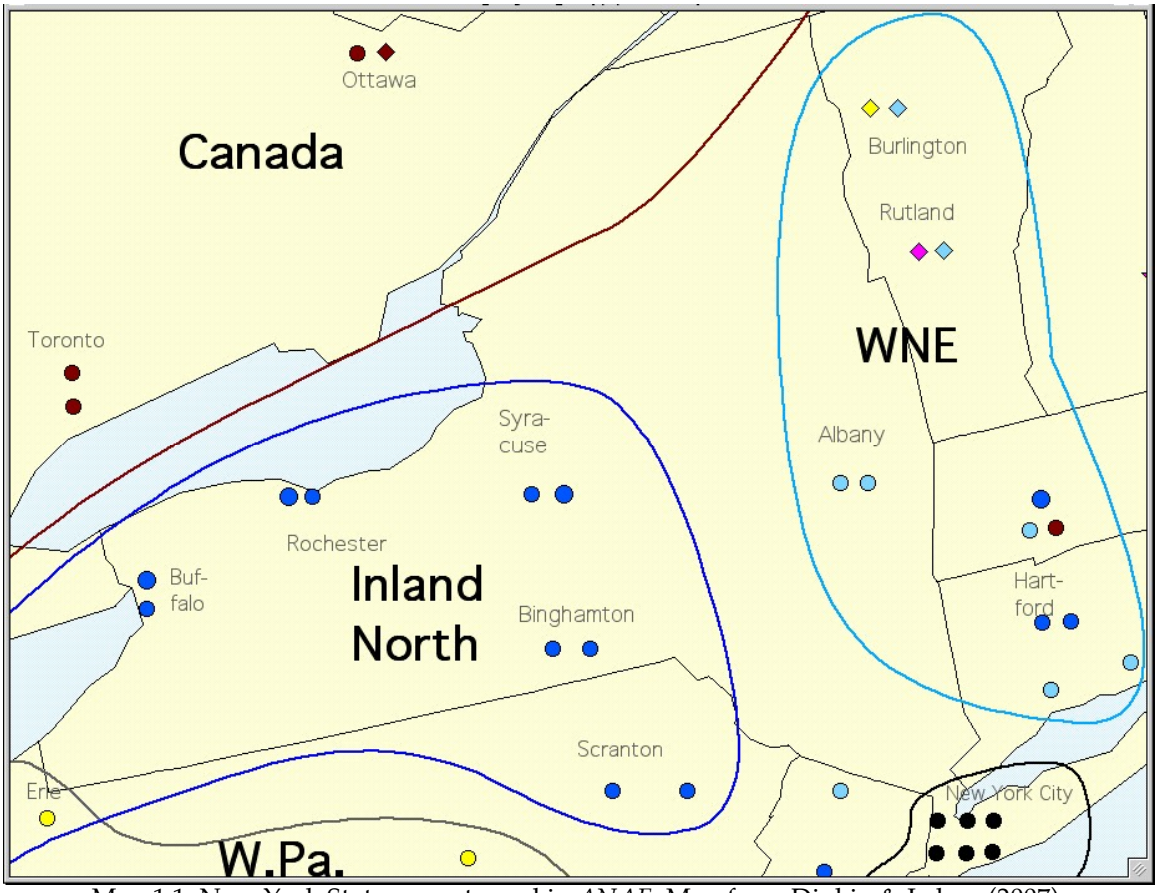
It is in the third case, a dialect boundary determined by linguistic constraints, that the nature of the dialect boundary can inform us about the structural systems underlying linguistic change. Since the linguistic constraint preventing the innovative feature on one side of the boundary from spreading to the other side of the boundary is feature-specific, we would expect other linguistic innovations to have succeeded in spreading across the boundary;

otherwise this scenario is indistinguishable from dialect boundaries of the socially-motivated or accidental types. In this case, it should be possible to compare the innovations that have succeeded in diffusing across the boundary with those that have been blocked in order to determine what the nature of the constraints blocking the latter are—what aspects of the existing dialect of one community are incompatible with the innovations from the other community. In this way, locating and studying dialect boundaries is useful not only for illuminating the geographic and historical factors that cause the boundaries to be located in particular places, but also the nature of the underlying structures that are involved in linguistic changes and dictate their direction.

1.2. New York State

The state of New York provides an ample laboratory for the study of dialect boundaries, in that at least five of the major dialect regions defined by *ANAE* intersect in or near New York State; these are displayed in Map 1.1. The western and central parts of the state are part of the Inland North dialect region, the home of the Northern Cities Shift. New York City, in the southeastern corner of the state, has a dialect region more or less to itself. The city of Albany is assigned by *ANAE* to the Western New England dialect region—specifically, Southwestern New England—although it is noted by Labov (2007) that Albany displays some features borrowed from New York City that other Western New England communities lack. Moreover, there are several other dialect regions adjacent to New York State whose boundaries with New York City, the Inland

North, and Western New England remain to be determined; these regions may in fact overlap New York State in smaller communities, although they do not include any of the cities in New York sampled by *ANAE*.



Map 1.1. New York State as portrayed in *ANAE*. Map from Dinkin & Labov (2007).

First, northeast of New York City is an area of northern New Jersey left uncategorized by *ANAE*, containing a few communities with marginal status that do not quite resemble New York City. Next, Northwestern New England is the other half of *ANAE*'s Western New England region, centered in Vermont; Boberg (2001) argues that it and Southwestern New England should be considered separate dialect regions. Northwestern New England lies east of northern New York's Adirondack State Park. The portion of the Inland North in Western New

York borders the Western Pennsylvania dialect region on its south side. And finally, the Canadian dialect region is adjacent to New York State both to the north and to the west—indeed, there are communities in northern New York that are closer to Canadian cities such as Ottawa and Montréal than they are to any American city sampled by *ANAE*. So a detailed dialectological study of New York State affords numerous opportunities for locating and examining the status of phonological change at a variety of types of dialect boundaries.

This dissertation will focus on dialect boundaries in the eastern part[2] of Upstate New York[3], in the large area between New York City, the Inland North, Canada, and Northwestern and Southwestern New England—a region at least 120 miles wide from east to west and 250 miles from north to south in which no data was collected by *ANAE*, and within which lie the interfaces between four or five distinct dialect regions. These dialect regions, although close together, are distinguished from one another by a variety of linguistic features. The Inland North and Canada are both marked by distinctive chain shifts operating in opposite directions to each other, with the Canadian Shift backing both /e/ and /o/[4] while the Northern Cities Shift in the Inland North fronts both (along with other changes). New York City has one of the most well-known and stigmatized American dialects, and possesses unusual features such as a phonemic split of /æ/, a highly raised and tensed /oh/, and variable non-rhoticity. Western New England is a relatively linguistically unmarked region, having few distinctive

[2] The dialect boundary at the western edge of New York State, between the Inland North and Western Pennsylvania in the vicinity of Erie, Penna., is also of interest; fortunately, that boundary is discussed in depth by Evanini (2009).
[3] I use the term "Upstate" in its relatively broad sense to encompass any portion of the state north or northwest of the general New York City metropolitan area.
[4] I use the notation of *ANAE* for vowel phonemes.

sound changes of its own; as mentioned above, however, it is divided into two parts, as described by Boberg (2001) and touched upon in *ANAE* as well. Northwestern New England is based in Vermont and distinguished by the completed low-back merger of /oh/ and /o/, which it shares with Canada. Southwestern New England is based in Western Massachusetts and Connecticut and is argued by Boberg to be phonologically the same as the Inland North but lacking the full raising of /æ/ above /e/ that initiates the Northern Cities Shift.

The aims of this dissertation are twofold. First, with the linguistic data I have collected from the large area unsampled by *ANAE*, I will be able to provide a more detailed dialectological picture of New York State. And second, by learning about the relationships and boundaries between those dialect regions, I will be able to draw some general inferences about the mechanisms and constraints on the diffusion of linguistic change, and phonological change in particular. My analysis in this dissertation will focus upon a small number of systematic phonological features which I will explore in depth: the Northern Cities Shift (henceforth NCS), the phonological treatment of /æ/, and the low back vowels /o/ and /oh/. In addition to these systematic features, I will also examine what I take to be an analogical change in the pronunciation of words like *elementary*, *documentary*, etc.

1.3. The features of interest

1.3.1. The Northern Cities Shift

The geographic distribution of the NCS will be the focus of Chapter 3 of this dissertation. The NCS was first described in detail in Upstate New York by Labov, Yaeger, & Steiner (1972) as a chain shift involving the movement of several members of the short and long-and-ingliding vowel subsystems (as categorized e.g. in *ANAE*), schematized in Figure 1.2. The fronting and raising of /æ/ is usually described as the first phase of the NCS, followed by the fronting of /o/ towards the low front space vacated by /æ/, although some researchers, such as McCarthy (2008), have argued that the fronting of /o/ preceded the raising of /æ/. These changes are followed by lowering of /oh/, backing and/or lowering of /e/, and backing of /ʌ/. The discussion of the NCS in this dissertation will employ the criteria defined by Labov (2007) for measuring the advancement of the NCS, and will therefore focus primarily on /æ/, /o/, and /e/.

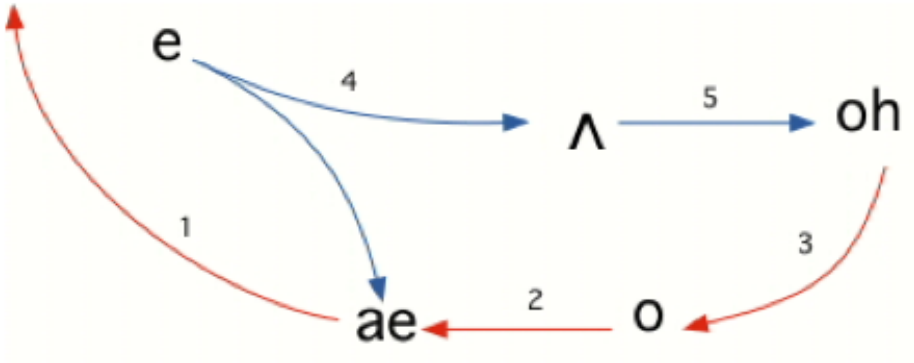


Figure 1.2. The Northern Cities Shift

ANAE confirms that the NCS is dominant in its sampled cities in western and central New York, as well as in northern Ohio, Michigan, northern Illinois, and eastern Wisconsin—two geographically distinct components that share the designation "Inland North" but are separated by the NCS-free city of Erie, Pennsylvania. Boberg (2001) argues that Southwestern New England also exhibits features of the NCS, albeit to a reduced degree compared to the Inland North proper. One of the Telsur corpus's four speakers in Northwestern New England shows an NCS-like vowel system as well. Therefore one of the chief aims of Chapter 3 will be to locate the boundary between the Inland North and Western New England, in order to determine the relationship between the two regions and the eastern extent of the full NCS.

Labov (2007) and Preston (2008) argue that the NCS will show different synchronic and apparent-time profiles in communities in which it originated than in those to which the it spread through dialect diffusion. Labov suggests that in communities to which the NCS has diffused, there will not be a clear apparent-time trend toward more advanced NCS among younger speakers; meanwhile, Preston proposes that communities that have acquired the NCS through diffusion will have a more symmetric distribution of vowel phonemes in phonetic space than communities to which it has diffused. These arguments will be relevant in Chapters 3 and 4 when hypotheses about the origin and spread of the NCS in New York State are discussed.

1.3.2. Short-*a* and short-*o* systems

ANAE describes the status of the *caught-cot* merger and the status of /æ/ as the two factors upon which "the dynamics of a North American vowel system" depend. Both of /æ/ and the relationship between /o/ and /oh/ are intimately tied up with the NCS, inasmuch as raising of /æ/ and fronting of /o/ away from /oh/ are the two changes that have been claimed to be the earliest stage of the NCS. For these reasons, examining the status of /æ/ and of the *caught-cot* merger in eastern New York State is essential for determining the dialectological status of the communities in the intermediate zone between the five established dialect regions, and in determining the phonological structure of the NCS in particular.

The status of /æ/ will be the starting point for the discussion in Chapter 4. The regions surrounding the area of interest in eastern New York show great variety in /æ/ systems in the Telsur data. While the Inland North, of course, is dominated by the general raising of /æ/ that is part of the NCS, in Western New England the majority of Telsur speakers show the sharp nasal allophonic pattern, in which /æ/ is raised, fronted, and tensed before nasal consonants but not substantially raised in other environments. In the nearby Canadian cities in the Telsur sample—Montréal, Ottawa, and Arnprior—there is substantially less raising of /æ/ even before nasals, and for a couple of speakers it is /g/, not nasals, that triggers the greatest amount of raising in a preceding /æ/. New York City, of course, is dominated by a phonemic split in /æ/, with the raised and tensed phoneme /æh/ occurring usually before voiced stops, voiceless fricatives,

and non-velar nasals; and Labov (2007) notes that a monophonemic pattern with superficial similarities to the New York City biphonemic pattern is found in Albany.

Studying the phonology of /æ/ is of great importance for determining the origin of the NCS in particular. Labov, Yaeger, & Steiner (1972) introduce the suggestion that the raising of /æ/ in the NCS represents not a mere phonetic change in the surface manifestation of the /æ/ phoneme but a structural change on a deeper level, from a short vowel phoneme /æ/ to an underlyingly long /æh/. *ANAE* carries this idea forward, and hypothesizes that this structural phonological change in /æ/ was brought about as the result of dialect contact among speakers with a variety of different /æ/ systems in western and central New York in the early 19th century, when migration into the region boomed as a result of the construction of the Erie Canal. The plausibility of this hypothesis can be tested by looking in more detail at the phonology of /æ/ in New York State, especially in the area where the Inland North's general /æ/-raising comes into contact with the /æ/ systems of neighboring regions.

The low back or *caught-cot* merger was described at least as early as by Kurath (1939) in Eastern New England and Kurath & McDavid (1961) in Western Pennsylvania, and alluded to[5] by Avis (1956) in Ontario. According to *ANAE*, the earliest nationwide study of the *caught-cot* merger was a telephone survey conducted by William Labov in 1966, confirming the presence of the merger in

[5] Avis writes, in a description of the vowel phonology of his own Ontarian speech, "/ɑ/ *bot* (also *bought* in my speech), /ɒ/ *bog*, /ɔ/ *law* (these last three vowels are probably not phonemically distinctive in my dialect)". In other words, Avis alludes to the *caught-cot* merger as a probable feature of his own speech as a native of Ontario, but does not refer to it as a general feature of Ontario speech; his article is not concerned with the inventory of phonemic contrasts in Ontario in general, but rather with phonemic incidence in individual words.

Eastern New England and Western Pennsylvania as well as virtually all of the western United States. The earliest discussion of the merger in Northwestern New England appears to be that of Boberg (2001), although it was already quite advanced by that time; Boberg also notes the southward progress of the merger into western Massachusetts. Important and detailed studies of the spread of the merger to new communities include Herold (1990) and Johnson (2007); they both found merger taking place relatively suddenly (in apparent time) in communities undergoing intensive dialect contact.

The opposite of the *caught-cot* merger is the phonemic distinction between /o/ and /oh/, typically maintained in North America (by communities that maintain it) at least by means of having /o/ unrounded and /oh/ rounded. Labov (to appear: ch.7) observes that the unrounding of /o/ had been noted in New York State by 1832. *ANAE* describes certain regions as specifically "resistant" to the merger, in that the phonetic difference between /o/ and /oh/ (the "margin of security", in the sense of Martinet 1952) is greater than merely a difference in rounding: in the South, /oh/ has developed a back upglide; in the Inland North, /o/ is substantially fronted away from /oh/ as part of the NCS; and in a collection of Northeastern cities including New York City (and Albany, as noted by Labov 2007), /oh/ is raised and further backed. In other words, the region of eastern New York State selected for analysis in this dissertation is bordered by two regions where the merger is complete or nearly so (Canada and Northwestern New England), and at least two regions that are described as being actively resistant to the merger as a result of other sound changes (the Inland North, New York City, and Albany). This makes eastern New York State an ideal

location for studying the effect of dialect boundaries on the *caught-cot* merger and the ontological status of the "resistance" referred to in *ANAE*. This will be the focus of Chapter 5.

1.3.3. *Elementary*

An unexpected finding in the early stages of the research for this dissertation had to do with the pronunciation of words such as *elementary*, *sedimentary*, and *rudimentary*—i.e., words with the suffix *-ary* following *-ment*, which in standard American English carry primary stress on *-ment*. These were added to the initial word list at the suggestion of William Labov (p.c.). Words of this type were found very frequently in early data collection to be pronounced with secondary stress on the penultimate syllable, leading to a stress clash between the primary-stressed antepenultimate and the secondary-stressed penultimate, thus: *eleméntàry*. This feature is discussed in Chapter 6, in order to contrast the dialectological behavior of what appears to be a morpheme-specific analogical change with the behavior of the systematic structural features of the phonological system discussed in the earlier chapters. To the best of my knowledge, no prior research has been done on this feature, either inside or outside Upstate New York, although Evanini (2009) collected data on it in northwestern Pennsylvania and the adjacent portion of Western New York simultaneously with my research in the eastern half of New York. Since carrying out the research discussed in Chapter 6, there have been brought to my attention anecdotal reports of the *eleméntàry* pronunciation in such locations as Cincinnati

and New Orleans[6], perhaps indicating that a broader national study of this feature will be in order some time in the future.

1.4. Previous work other than Telsur

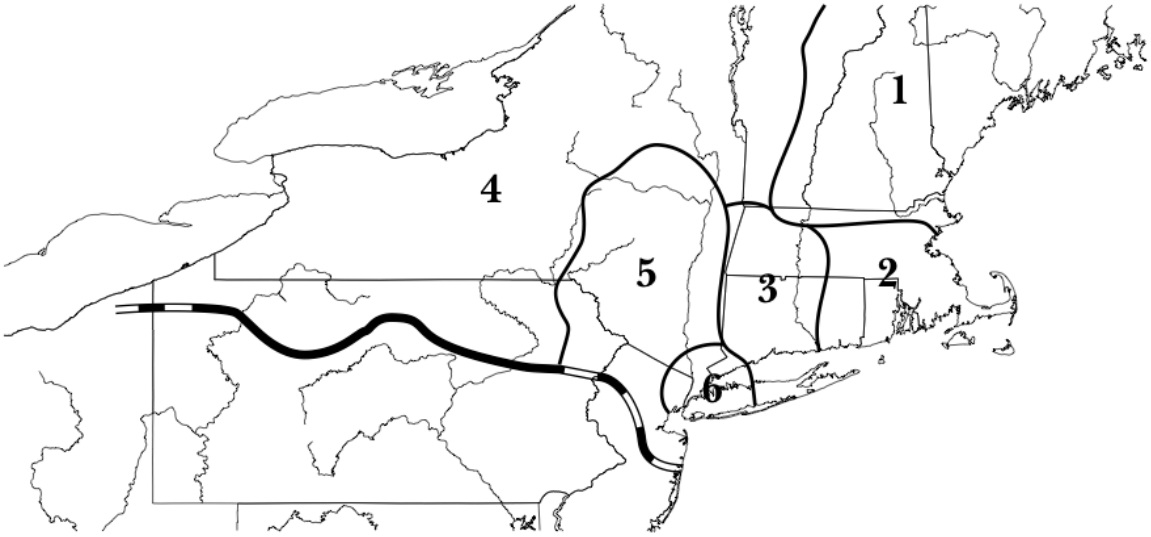
The Telsur project collected no data from the region of interest in this dissertation—the eastern half of Upstate New York—apart from two speakers in Albany. The Linguistic Atlas of New England (LANE) and Linguistic Atlas of the Middle and South Atlantic States (LAMSAS) projects (Kurath 1939, 1949; Kurath & McDavid 1961), on the other hand, did collect data from speakers in a large variety of communities throughout New York and adjacent states, interviewed in the 1930s and 1940s. On the basis of this data, Kurath (1949) drew a map of the dialect regions of the eastern United States, including New York State; Boberg (2001)'s reproduction of Kurath's northern dialect regions is shown as Map 1.3.

The LAMSAS regions differ substantially from the dialect regions defined by *ANAE* in New York State. Although New York City still has a dialect region more or less to itself, between New York City and Southwestern New England on the one hand and the Inland North on the other hand lies a large region encompassing most of the southeastern third of New York State that is identified as the "Hudson Valley"[7] region, which is completely absent from *ANAE*'s analysis. At the same time, Kurath groups what would become known as the

[6] For the time being I regard it as merely a coincidence that these are the same cities in which Labov (2007) finds the diffused version of the New York City /æ/ system beyond New York State and New Jersey.

[7] Despite the name, Kurath's Hudson Valley region is not restricted to the area around the Hudson River; it also includes most of the lower Mohawk and upper Delaware River areas, as well as the Catskill Mountains in between.

Inland North together with Northwestern New England as a single dialect region.



1. Northeastern New England
2. Southeastern New England
3. Southwestern New England
4. Upstate New York and western Vermont
5. The Hudson Valley
6. Metropolital New York

Map 1.3. Figure 2 from Boberg (2001), based upon Figure 3 from Kurath (1949). Kurath's lexical dialect regions of New York and New England.

Now, if the Hudson Valley does still exist as a distinct dialect region in the present day, it is not surprising that *ANAE* doesn't recognize it. The only data in the Telsur corpus from the area designated by Kurath as the Hudson Valley region comes from Albany and a few cities in northern New Jersey. Most of those New Jersey communities are somewhat hesitantly classified by *ANAE* as constituting a transitional region between New York and the Mid-Atlantic dialect area. Albany, however, is approximately 100 miles from Northern New Jersey, with no Telsur data collected from anywhere else in New York State that might be included as part of a Hudson Valley dialect region. So the Telsur corpus simply does not contain enough data to determine whether the "Hudson Valley"

dialect region still exists today, or if so whether its boundary with the Inland North is in the same place as it was when the LAMSAS data was collected. Map 1.3 suggests, then, that this dissertation may find a "null boundary" between the Inland North and Southwestern New England—i.e., the Inland North and Southwestern New England do not in fact border each other, but are separated by a third region, the Hudson Valley, that escaped the notice of *ANAE*.

The boundaries between the Hudson Valley and Inland North in Map 1.3, however, were drawn by Kurath (1949) based upon lexical features. The same map of regions and boundaries is reproduced by Kurath & McDavid (1961) in their discussion of phonological features in the LAMSAS data, but there seems to be relatively little justification for defining a Hudson Valley dialect region based upon phonological features alone. Eyeballing dialect maps based on phonetic transcriptions by fieldworkers is of course not an extremely reliable method of analysis (especially dialect maps that do not have boundaries drawn on them); however, from Kurath & McDavid's phonological maps it does not appear that there is any systematic feature capable of reliably distinguishing the Hudson Valley from Southwestern New England. Moreover, in their discussion of "cultivated speech" by region, they write, "The cultivated speech of Upstate New York and adjoining parts of Western New England is remarkably uniform in phonemic structure, in the phonic characteristics of the vowel phonemes, and even in the incidence of the phonemes." So it may be that the Hudson Valley never existed as a distinct *phonological* dialect region, and *ANAE*, whose regions are based on phonetic and phonological features, was correct in grouping Albany with Western New England. This dissertation, in using instrumental phonetic

measurements to examine speakers from communities in the vicinity of where Kurath draws the Hudson Valley–Inland North boundary, will be able to test for the authenticity of the "Hudson Valley" as a dialect region in phonetic and phonological terms.

The LAMSAS and LANE data were collected before some of the key phonological changes in these regions had been noticed, which means that they are of limited relevance for answering the principal questions in this dissertation. For example, while in the Telsur data the *caught-cot* merger is nearly complete in Northwestern New England (Boberg 2001), the LANE data does not find the merger in that region.[8] Similarly, although the raising of /æ/ is both widely regarded as the earliest stage in the NCS and arguably the most auditorily noticeable, no clear sign of it or any other NCS change is visible in the LAMSAS data. Kurath & McDavid (1961) do mark a few speakers in Upstate New York as having an allophone of /æ/ in *sack* and *ashes* with a raised offglide ([æ^{e}] or [æ^{i}]), which is at least conceivable as an ancestor of the NCS raised realization. However, the majority of LAMSAS speakers in what would today be recognized as the Inland North do not exhibit that allophone; moreover, it appears more frequently in New Hampshire, where the NCS does not exist today, than in Upstate New York. Likewise the LAMSAS data shows little apparent difference between central and western New York's /o/ and the /o/ of other regions where the *caught-cot* merger is not found, except for a possibly somewhat lower

[8] Moulton (1968)'s point that the LANE fieldworkers did not collect explicit minimal-pair data in any location on /o/ and /oh/ (or any other potential merger in progress) and were "hopelessly and humanly incompetent at transcribing phonetically the low and low back vowels" is well taken here, although Kurath (1939) does rate Bernard Bloch, the LANE fieldworker who collected data in Northwestern New England, as a relatively accurate transcriber.

frequency of the somewhat backer allophone [ɑ˃] relative to the fronter allophones.

There is some early evidence for movement toward the NCS in Upstate New York, however: Thomas (1935b)[9] writes:

> In upstate New York, [æ] is usually high and close to [ɛ]. It is often a bit higher still before [n] in such words as *candid*, *hand*, *land*, *man*, *manners*, and *mechanics*, in which it may also be lengthened and nasalized. A more striking variation results from a raising and tensing of the tongue position, usually without nasalizing, before voiced back consonants, in such words as *anchor*, *brag*, *crags*, *dragged*, and *draggled*. These two variants may best be recorded [æ˧] and [e˥], as in *man* [mæ˧n] and *brag* [bre˥g].

This constitutes a fairly clear indication that the NCS raising of /æ/ was already in progress in Upstate New York as of the 1930s, in contrast to Kurath & McDavid's portrayal[10]. It is also striking in that it indicates that in the early stages of the NCS, the tensing of /æ/ was more advanced before /g/ than before nasals, as is the case in some present-day Canadian speakers in the Telsur corpus, which according to *ANAE* is not generally true of the NCS as it exists today. Sadly, Thomas's report is not useful for the purposes of identifying dialect boundaries, because he does not identify whether the raising of /æ/ is more predominant in some regions of Upstate New York than in others. The large majority of his informants, however, were from central and western New York (Thomas 1935a), which is the part of New York State where the NCS is known to exist today.

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[9] Note that Thomas's data collection and publication *preceded* the LAMSAS project, although the LAMSAS publications apparently report no allophones of /æ/ higher than [æ].

[10] Labov ([1966] 2006: p.26) points out a similar understatement of raising in the LAMSAS treatment of the New York City /æh/ phoneme; Kurath & McDavid transcribe the vowel in words like *ask* and *dance* in New York City as a slightly raised [æ], whereas other sources describe it as being raised as high as that of *care*.

The only relatively recent dialectological study of which I am aware in the area of interest in this dissertation is that of Novak (2004) in Ballston Spa, a village in Saratoga County[11], some 30 miles north of Albany. Novak reports the NCS to be present in Ballston Spa, but decreasing in apparent time. This is substantially further east than the eastern boundary of the NCS in *ANAE*. However, Novak's phonetic measurements are not normalized in any way, which makes it hard to make comparisons either between the speakers in Novak's sample or between Novak's sample and *ANAE*. So it is difficult to say how advanced the NCS in Ballston Spa is in comparison to the Inland North *ANAE* communities.

A small amount of work I'm already aware of has addressed the relationships *between* the dialect regions surrounding the eastern half of New York State, which is the main focus of this dissertation. Boberg (2001), as noted above, argues that Southwestern New England and the Inland North are essentially the same region, with the phonological system of Southwestern New England being, he argues, merely a less advanced form of the NCS. Kurath (1949), on the other hand, has the Hudson Valley intervening between the Inland North and Southwestern New England, but regards *Northwestern* New England as part of the same dialect region as the Inland North. Boberg's categorization is based on phonology and Kurath's on lexical items—and Boberg argues that Kurath's data does not strongly justify drawing a boundary between Northwestern and Southwestern New England at all, while the present-day distribution of the *caught-cot* merger may. However, it is in Northwestern New

[11] Map 1.4 below shows the counties of New York State.

England—specifically Rutland, Vt.—that the most striking example of an NCS speaker in the Western New England Telsur data appears, slightly supporting Kurath's implication of a closer relationship between Northwestern New England and the Inland North.

Although Albany is classified as part of Southwestern New England in *ANAE*, presumably due to lack of data from any other nearby communities to compare it with, Labov (2007) assigns Albany a more special status. Albany is seemingly subject to a heavy degree of dialect diffusion from New York City—as mentioned above, in the Telsur data Albany exhibits both a simplified though recognizable variant of the New York City /æ/ pattern and the raised /oh/ that is characteristic of New York and other coastal Northeastern cities. This distinguishes Albany from the other communities assigned to Southwestern New England in *ANAE*, some of which have raising of /oh/ but none of which show the distinctive New York City tensing of /æ/ before voiced stops and voiceless fricatives.

The dialectological relationship between the Inland North and Canada has been studied more or less extensively, although not to my knowledge in the specific area that will be relevant in this dissertation (i.e., the border between far northern New York and eastern Ontario or western Quebec). Boberg (2000) finds the phonological boundary to be extremely sharp between the Inland North city of Detroit, Mich., and the Canadian city of Windsor in southwestern Ontario, notwithstanding that the two cities are directly adjacent to each other on opposite sides of the border and are intensely connected by communication and commerce. Slightly closer to the current region of interest, Chambers (1994) finds

some very sharp lexical boundaries between western New York and the "Golden Horseshoe" region of Ontario that borders New York across the Niagara River. On the other hand, both Chambers (1998) and Boberg (2000) find evidence that some lexical features have begun to diffuse across the boundary from the Inland North to Canada—so the international border may constitute a fairly sharp linguistic boundary, but not an impenetrable one.

1.5. General issues

The dialect features I have chosen to focus on in this dissertation include a variety of different types of phonological change: the NCS is a chain shift; the New York City /æ/ system is a phonemic split; the "nasal" /æ/ system is an allophonic alternation; the *caught-cot* merger is, of course, a merger; and the stress shift on words of the *elementary* type is a change in the phonological content of a particular morpheme or set of lexical items. Thus comparing the geographical distributions of each of these features can give us some insight into to what extent different types of phonological change are subject to different geographical constraints.

One of the chief dialectological concepts I will focus on (though by no means the only one) is that of **diffusion** as defined in detail by Labov (2007): the propagation of linguistic change from one community to another through contact between adults, in contrast to the incrementation of change within a community through transmission of the change to children, or the intermediate situation of change propagated by contact between children whose parents have different

native dialects as discussed by Johnson (2007). Since diffusion takes place among adults, whose grammars are less malleable than children's, Labov argues that there are limits to how faithfully a complex linguistic change can be reproduced in a community to which it diffuses. The nature of these limits and how they affect the features of interest will be explored over the course of this dissertation. Chapter 7 will draw upon the discussion of the earlier chapters to compared the effects of diffusion on the different features under examination, in an attempt to produce a unified account of the theory of diffusion as it affects phonological changes of different types. Patterns of diffusion will also be used to motivate a more formal definition of the concept of dialect boundaries, to replace the loose definition that introduced this chapter.

My approach to phonological change is shaped by the model discussed by Bermúdez-Otero (2007). This model, which is explained in detail in Chapter 4, assumes a modular feed-forward architecture for phonology—in other words, the underlying phonological features and attributes that exist in underlying representations of lexical items have discrete values and are lacking in fine-grained phonetic detail; and there are multiple "stages" in the synchronic derivation of phonetic implementation from underlying representations, such that the rules applying at each stage have access only to the output of the preceding stage. Bermúdez-Otero's model describes a "life cycle" through which phonological rules can progress, developing from phonetic implementation rules to allophonic alternations to phonemic splits. Since all of these life-cycle phases are present in the various patterns of /æ/ in New York State, it will be possible to use this dissertation's data to test the usefulness of the life-cycle model for

changes in progress. The relevance of this model for explaining chain shifts and mergers and for explaining patterns of diffusion will be explored as well.

Map 1.4. The counties of New York State. Map produced by the U.S. Census Bureau.

The stage is now set to begin the exploration of the dialectological status of Upstate New York. Map 1.4 shows the counties of New York State, which will be referred to occasionally throughout this dissertation. Chapter 2 will detail my methodologies of data collection and phonetic analysis.

Chapter 2

Methodology

2.1. Overview of methodological goals

The goals of the selection of communities to be sampled in this dissertation were twofold: first, to cover a wide area of eastern New York State; and second, to obtain data from communities very close to the boundaries between dialect regions. Covering a wide area makes it possible to broadly divide up eastern New York into dialect regions, in much the way *ANAE* divides North America as a whole into dialect regions, and to get a general sense of the factors influencing the dialect geography of Upstate New York. Identifying and sampling communities on opposite sides of dialect boundaries will allow inferences to be drawn about the nature of the boundaries and thus the overall relationships between the dialects and regions as a whole.

It would be beyond the scope of this project to carry out an in-depth sociolinguistic study of every targeted community. On the other hand, *ANAE*'s approach of sampling only two speakers from most communities, while sufficient for the goal of drawing a relatively broad dialect map, would be unsuitable for the current project. A more detailed picture of the dialectological status of each community is necessary in order to compare communities in different parts of the same dialect region (say, those nearer to and farther from the dialect boundary) than would be necessary to merely define the overall

linguistic features of the region as a whole. This means a somewhat larger sample is necessary in each community.

The telephone-interview method used in *ANAE* is very efficient for sampling a large set of communities, avoiding the inconvenience and time-consuming travel that is necessary for carrying out field research in each targeted community—especially when it is not yet clear what communities will be of particular interest. However, when a relatively large number of speakers are to be interviewed in a single community, in-person fieldwork becomes more efficient: the Short Sociolinguistic Encounter methodology (Ash 2002), as described below, takes less time to carry out than a telephone interview and is sufficient for collecting the same number of vowel tokens; and it is usually easier to find willing participants for interviews by approaching them in person than by cold-calling telephone numbers. To allow the efficiencies of field research to cancel out the inefficiencies of telephone interviews and vice versa, the following hybrid methodology was developed[1]:

- conducting in-person interviews first in selected medium-sized cities in order to narrow the gaps left by *ANAE*'s sample of large cities;
- then conducting telephone interviews to attempt to zero in on the exact locations of dialect boundaries;
- and then conducting additional in-person interviews in certain communities which the results of the telephone interviews suggested might be closest to dialect boundaries or otherwise of interest.

[1] The specifics of the methods of data collection, the in-person and telephone interviews, are detailed in later sections of this chapter.

This methodology allowed both goals—sampling both a geographically broad set of communities, and communities near dialect boundaries in particular—to be efficiently satisfied, while collecting seven or more interviews in each of twelve key communities.

2.2. Selection of specific communities

Overall, the communities selected for study were chosen with the aim of estimating the locations of dialect boundaries as closely as possible using the best information that was available at each phase of research. Although in succeeding chapters of this dissertation data from all communities sampled will be presented together, as if all communities had been sampled and analyzed simultaneously, in actuality the research proceeded in stages, with the data from the speakers interviewed at each stage having being fully or partially analyzed before the selection of communities for the next stage began. Thus the selection of communities sampled later depended in some respects on the dialectological status of the communities sampled earlier. This means that the process of the selection of communities discussed in this section will necessarily make reference in some places to the dialectological findings discussed in later chapters of this dissertation.

The research project that led to this dissertation began as a pilot study of the eastward extent of the NCS and the location of the boundary between *ANAE*'s Inland North and Western New England regions. The westernmost city assigned to the Western New England region is Albany, and the easternmost

cities assigned to the Inland North are Syracuse and Binghamton.[2] The first city selected for in-person interviews in this project, therefore, was Utica: the most populous city between the Albany metropolitan area[3] and those two Inland North cities. Albany, Utica, and Syracuse all lie along Interstate 90, the east-west leg of the New York State Thruway; Utica is approximately 100 miles west of Albany and 50 miles east of Syracuse. Interviews were conducted in Utica in the summer of 2006.

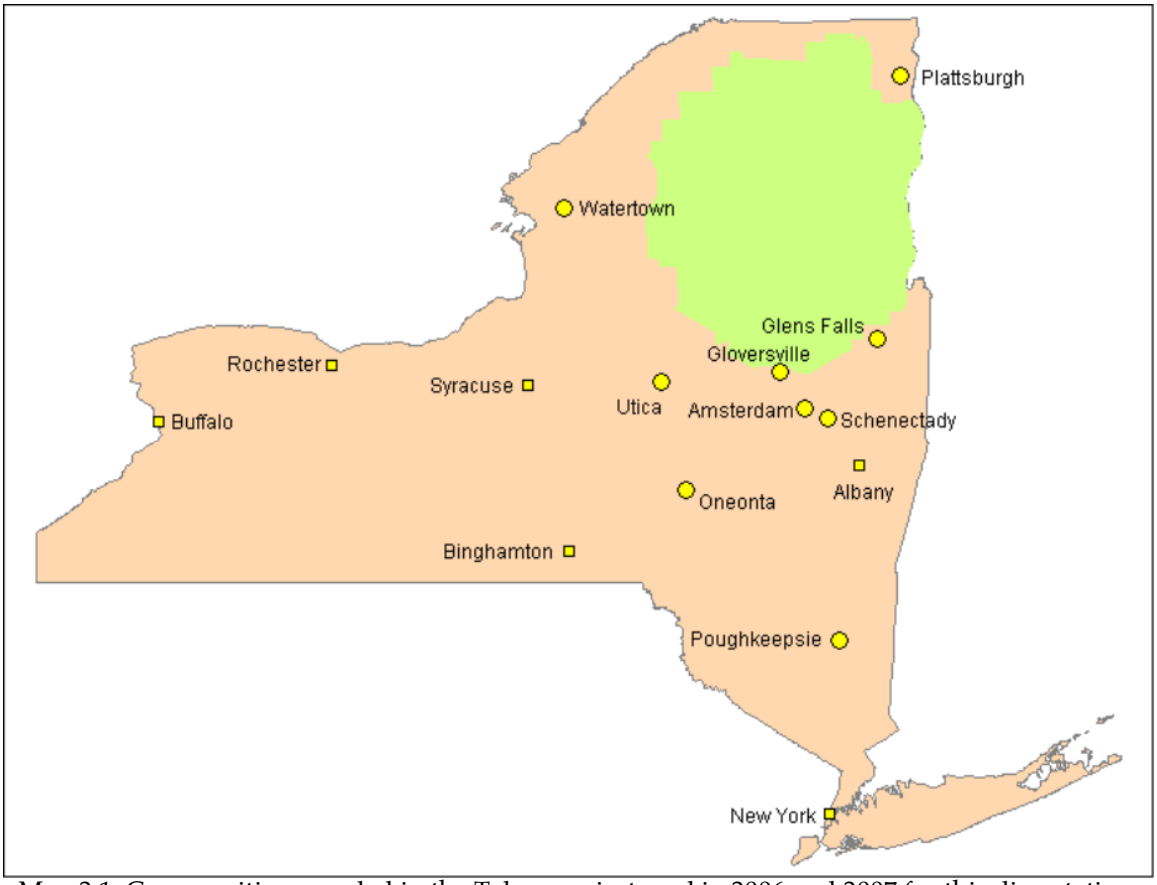
Utica was found to be part of the Inland North, and so the next phase of the pilot study narrowed in on the gap between Utica and Albany. Telephone interviews were conducted later in the summer of 2006 in the three largest cities between Albany and Utica: Schenectady, Amsterdam, and Gloversville. Schenectady and Amsterdam are both located along the New York State Thruway, Schenectady approximately 15 miles west of Albany and Amsterdam about 20 miles west of Schenectady. Gloversville is not directly on the Thruway but rather some eight miles north of it; it is about 15 road miles northwest of Amsterdam and 60 miles east of Utica. The telephone interviews suggested that Amsterdam and Gloversville were on opposite sides of a dialect boundary, and so in-person interviews were carried out in these two cities in the summer of 2007.

The next set of cities sampled was selected mostly according to the same rationale by which Utica was selected: medium-sized cities approximately midway between two cities assigned by *ANAE* to different dialect regions. These

[2] For the locations of these cities, see Map 1 below.

[3] The most populous city west of Albany proper and east of Syracuse and Binghamton is Schenectady, which was slightly larger than Utica as of the 2000 United States Census. Schenectady, however, is within the Albany metropolitan area, and Utica was selected as being more likely to be an informative data point.

included Oneonta, between Binghamton and Albany; Watertown, between Syracuse and Ottawa, Ontario; Poughkeepsie, between Albany and New York City; and Glens Falls, between Albany and Rutland, Vermont. Plattsburgh, which is separated from most of the rest of New York State by the vast Adirondack State Park, and is closer to Burlington, Vermont, and Montreal, Quebec, than to any other cities in New York, was added to increase the geographic spread of the sampled cities. In-person interviews were conducted in these five cities in the summer of 2007. Map 2.1 shows the locations of all the communities sampled up to this point in the project.



Map 2.1. Communities sampled in the Telsur project, and in 2006 and 2007 for this dissertation. The large light green area on this and other maps represents Adirondack State Park.

In the late winter and spring of 2008, telephone interviews were conducted in several cities and villages[4] along a rough line that the work up to that point suggested might approximate the southeastern border of the Inland North, many bridging gaps between cities sampled in earlier phases of research:

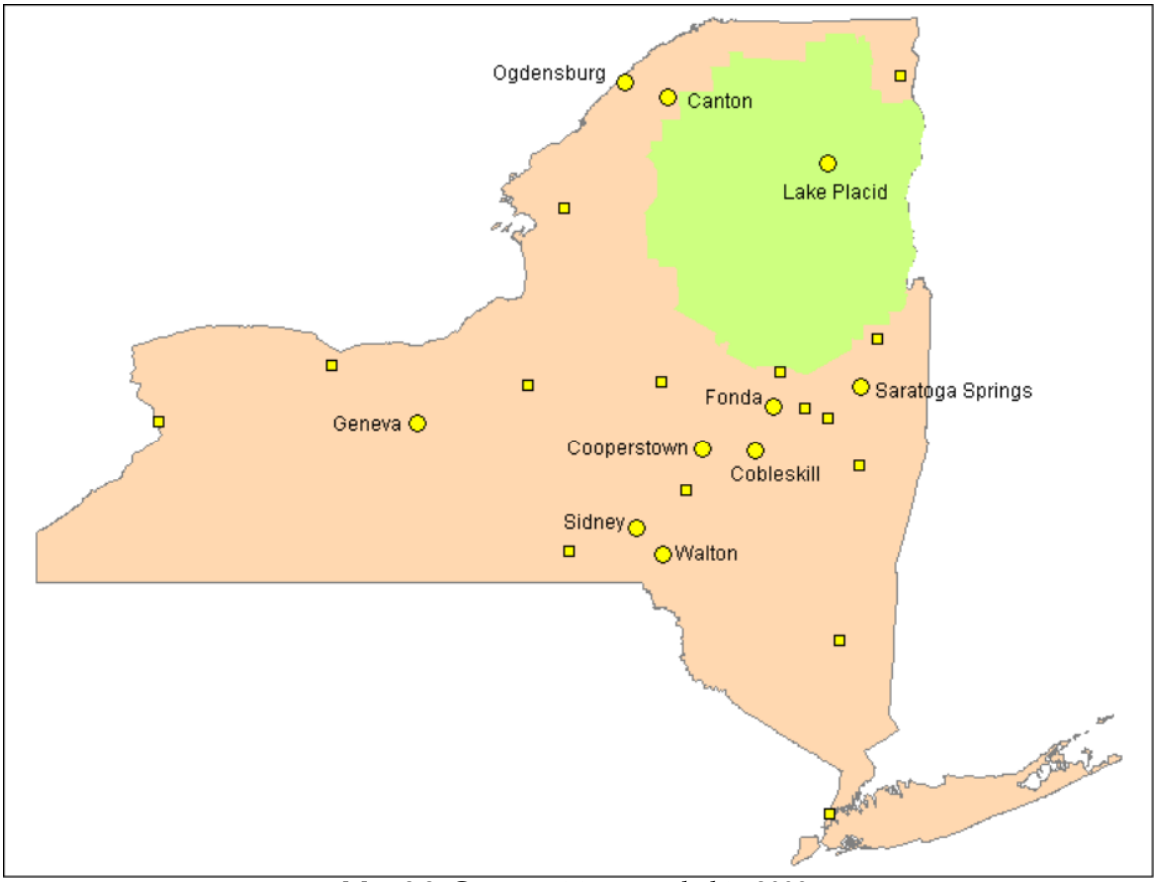
- Cobleskill, between Oneonta and Schenectady
- Cooperstown, roughly between Oneonta and Utica
- Fonda, on the Thruway, south of Gloversville and west of Amsterdam
- Saratoga Springs, between Albany and Glens Falls
- Sidney, between Oneonta and Binghamton
- Walton, south of Oneonta

Also sampled in this phase were communities in northern New York, bridging the gap between Watertown and Plattsburgh: Ogdensburg, Canton, and Lake Placid. (Lake Placid is the only community sampled in this study that lies within Adirondack Park.) Telephone interviews were also conducted in Geneva, a city midway between Syracuse and Rochester, in order to provide at least some data from a medium-sized city well within the boundaries of the Inland North region, for the sake of comparability with cities (like Gloversville) of similar size but near the edge of the Inland North. Communities sampled during this phase are shown on Map 2.2.

In the summer of 2008, in-person interviews were conducted in four of the communities sampled by telephone in the preceding phase: Ogdensburg and

[4] "Cities" and "villages" are two distinct types of general-purpose municipal governments under New York law. The chief difference is that villages remain subject to the jurisdiction of the surrounding town and cities do not. Cities are also usually, though not necessarily, larger in population than villages. The town is the third type of sub-county local government; towns are weak governmental entities into which all of the county land outside cities is subdivided.

Canton, selected because (like Gloversville and Amsterdam), they appeared to be on opposite sides of a dialect boundary despite being less than 20 miles apart; Sidney, selected because it appeared to be on the opposite side of a dialect boundary from Oneonta, only 25 miles away; and Cooperstown, because it appeared to be dialectologically dissimilar to all of the other nearby communities sampled. Some additional interviews were also conducted in Oneonta at this time, although these are for the most part not analyzed in the dissertation. Finally, in the autumn of 2008, additional telephone interviews were conducted in Cooperstown in order to increase the size of the sample.



Map 2.2. Communities sampled in 2008.

2.3. Interview methodology

2.3.1. In-person interviews

The in-person interviews were carried out mostly following the Short Sociolinguistic Encounter (SSE) protocol described by Ash (2002). These are semi-anonymous interviews of usually 10–25 minutes in length for which the researcher recruits subjects by approaching them in publicly-accessible places such as parks, swimming pools, street corners, cafés, and shops. Little demographic information is requested, and no personally identifying information such as names or telephone numbers, although on rare occasions subjects volunteered their contact information at the conclusion of the interview.

Subjects were recruited purely by availability, and little to no attempt was made to balance the sample by gender, age, or socioeconomic class. In this respect my in-person interview methodology echoed that of *ANAE*'s Telsur project, from which a detailed dialectological portrait of North America was achieved with no demographic control of the sample. Moreover, as discussed above, the chief advantage of conducting in-person interviews over telephone interviews is to efficiently maximize the size of the sample in any given community. Excluding potential interview subjects on the grounds that they were too demographically similar to individuals I had already interviewed, with no guarantee that I would be able to locate willing subjects with greater demographic diversity, could in many cases easily have significantly reduced my total number of interviews. In most communities, I was able to conduct approximately 10 interviews over the course of a 24-hour visit; as will be

discussed below, however, in many cases some of those interviews were excluded from analysis, and in the greatest number of cities visited I ended up with seven usable in-person interviews.

Not all interviewed subjects were directly approached by me in the standard SSE protocol: Some were referred to me or introduced to me by other subjects after I had interviewed them, or by potential subjects I had approached who were unwilling or ineligible to be interviewed themselves, as people they knew and thought might be interested in participating in my research. Also, in a small number of cases, I made appointments several days in advance with subjects who had been referred to me by an existing contact in the community; these include two speakers in Poughkeepsie (Fred M. and Natalie I.[5]) referred to me by an acquaintance, three speakers in Sidney (Lisa S., George S., and Keith M.) referred to me by a previous interview subject, and all of the additional speakers interviewed in Oneonta in 2008. The same interview methodology was employed with all speakers, regardless of whether I approached them directly or had them referred to me by other contacts.

Potential subjects were asked if they would be willing to help me out with a research project on communication patterns in New York State; if they answered that they were, they were asked if they had grown up in the community in which they were being interviewed. If a subject answered in the affirmative, and gave permission for me to record their voice, the interview began with a request for the demographic information that was being recorded:

[5] All names used for individual speakers in this dissertation are pseudonyms.

age[6], occupation, education, residential history, and languages spoken. Subjects were then asked about their travel patterns between their home community and each of several other nearby cities or regions—"How often do you or people in your family go to" e.g., Utica, Albany, New York City, western New York, New England, Canada, the Adirondacks, "and for what reasons?"—as well as their vacation habits. These questions were followed by free conversation on general topics about life in the community: the local economy, their own recreational and commercial habits, whether the community had changed since they were younger. Many speakers were asked about their opinions of the community: older speakers, for example, were often asked if they thought the community was a good place to raise children; younger speakers if they planned to move away from the community once they finished their education or found a better job. Spontaneous conversation with most subjects lasted between five and ten minutes, which (as will be seen below) was in all or almost all cases a sufficient volume of speech to produce a detailed portrait of each subject's vowel system.

The principal phonetic feature being studied, the advancement of the NCS, has been found (Ash 1999) not to be substantially influenced by the speaker's relative degree of carefulness or casualness of speech. For this reason, obtaining a large range of style-shifting between careful and casual styles was

[6] Some speakers stated their age, and some their year of birth. For comparability between speakers, all age data has been converted into year of birth; this will have resulted in errors for speakers who reported age and were born in the second half of the year or so. Since this will not have created any errors of greater magnitude than one year, and because with samples of the size used in this dissertation differences between people born in consecutive years would be unlikely to be noticeable anyhow, this fact is regarded as unimportant in general and will be noted when it may be relevant. Two speakers—Dennis C. from Watertown and Vic R. from Poughkeepsie—declined to state their exact years of birth; in apparent-time analyses I use my estimates of 1952 and 1932 for them, respectively.

not a priority in conducting these interviews; and style will in most cases not be analyzed in this dissertation.

Near the end of each interview, I told interviewees that the focus of my research was specifically linguistic differences between different parts of New York, and asked them whether they themselves were aware of differences in accent between their own community and other nearby communities or regions. Interviews concluded with a set of formal data-elicitation methods meant to focus on variables of interest. These always included a set of "semantic differential" questions, a written word list, and elicitation of explicit judgments of "same" or "different" on minimal or near-minimal written pairs of words. In each community, the minimal pairs investigated included two related to the *caught-cot* merger (*cot* vs. *caught* and *dawn* vs. *dawn*), two related to a potential phonemic split of /ay/ (*spider* vs. *lighter* and *fire* vs. *higher*), and two related to mergers which were expected to be complete throughout most of the region but might show variation near the extreme edges (*bother* vs. *father* and *merry* vs. *Mary*).

The "semantic differential" method consists of asking subjects to explore the difference in meaning between pairs of words, such as "What would you say is the difference between a bed and a cot?" The aim of this method is to elicit pronunciations of the targeted words without alerting the subject to the fact that pronunciation (rather than meaning) is the feature of interest to the researcher, and the method was found by Labov (1989) in a study of the /æ/ system of Philadelphia to yield results very similar to those from spontaneous speech.

Other formal methods were employed only in certain phases of the research, and will be discussed as they become relevant in later chapters.

In all communities except Utica, in-person interviews were recorded directly in .wav format using an M-Audio Microtrack II with a lavaliere microphone. In Utica, interviews were recorded on a Sony minidisc recorder.

2.3.2. Telephone interviews

Telephone interviews were conducted mostly according to the methodology of the Telsur project as described in *ANAE*. Once a community was selected, I consulted the data from the 2000 United States Census[7] to determine the most-represented ancestry groups in the community. For instance, in Watertown, the most frequently reported ancestry in the 2000 Census was Irish (18% of Census respondents), followed by German (13%) and Italian (12%). I then selected two letters randomly, and used WhitePages.com to generate a telephone directory of households in the chosen community whose names began with the selected letters. Starting from the beginning of that directory, I would then call the first telephone number on the list that was associated with a name that appeared characteristic of one of the top few ancestry groups in that community. If I failed to record an interview with a subject at that number, I would move on to the next name fitting the same ancestry qualification. If in this way I exhausted the directory generated by my randomly-chosen pair of letters without recording an interview, I selected a new pair of letters and began again.

[7] Available at *http://factfinder.census.gov*.

After conducting an interview, I selected a new pair of letters immediately to begin a new directory to recruit my next interview subject, rather than completing the directory in which the previous subject was found.[8] My target was to complete two usable telephone interviews in each community.

When a person answered the phone at any of these numbers, I introduced myself by reading the following script, based on the script used for the interviews reported in *ANAE*:

> Hi there; my name is Aaron Dinkin and I'm a researcher at the University of Pennsylvania, in Philadelphia. We're doing some research here on communication between different parts of New York, and so we're looking for people who grew up in certain places to help us out by telling us a little bit about how people say things in each area. Did you grow up in _____? *If yes*: Do you think you could you take a few minutes now to answer some questions about it?

If a speaker answered affirmatively that they had grown up in the community of interest, and was willing to participate in the research, then after getting permission to make a recording of the conversation I began the interview.

The subjects of the last two telephone interviews in Cooperstown (Nellie M. and Sally B.), conducted in the late summer of 2008, were recruited not by cold-calling numbers listed with randomly-chosen initial letters, as above, but through referrals by a previous interview subject acquainted with them. These interviews were conducted at appointed times planned several days in advance. The same interview methodology was employed in the interviews with these subjects as with the cold-called speakers.

[8] According to this methodology, people for whom the third letters of their surnames are near the beginning of the alphabet may be overrepresented in my telephone-interview sample. I am, however, unable to convince myself that this is important.

Telephone interviews began, following the Telsur model, with general questions about the subject's travel experience and familiarity with regional dialect diversity, and moved on to free spontaneous conversation about the same topics addressed in the in-person interviews: everyday life in the community, the local economy, and so on. After five to ten minutes of free spontaneous speech, I moved on to formal elicitation methods. These formal methods, like those used in the in-person interviews, included a set of semantic-differential questions. Since written word lists and minimal-pair lists are impossible over the telephone[9], they were replaced with requests for general classes of words (such as "Name all the articles of clothing you can think of") and elicitations of specific words and pairs of words through targeted questions. A typical minimal-pair elicitation would proceed as follows:

> What kind of animal runs in the Kentucky Derby? (*horse*)
> What do you call it when your throat feels scratchy and sore and you can't speak very well? (*hoarse*)
> Do you think those two words sound the same or different?
> Would you say them both again, and tell me which is which?

At the end of the telephone interviews, subjects were asked for the same demographic information requested in the Telsur project—age, occupation, parents' occupations, education, and ethnicity. Subjects were also asked whether they would be willing to be contacted again in case I needed more information about their community. Almost all subjects were willing to be contacted again; it was through my telephone interview subjects in Sidney and in Cooperstown that I arranged my pre-appointed interviews with speakers in those villages.

[9] In some of the telephone interviews conducted in 2006, I followed the *ANAE* methodology of mailing (or e-mailing) subjects a word list to read and then calling them back at a later date to record them reading it. This method was abandoned in later interviews in the interest of saving time.

Telephone interviews typically lasted between 20 and 35 minutes. The laboriousness of the word-elicitation questions contributed heavily to their length, typically about ten minutes longer than an in-person interview.

2.3.3. Selection of speakers for analysis

With the exception of two communities to be mentioned below, phonetic analysis was carried out on all white speakers who said that they had lived in the community in which they were interviewed from before starting school through adolescence (although many of them had moved away for shorter or longer periods of time after high school). In the case of villages, subjects who said that they had lived outside the village limits in their youth but attended school in the village were also included.

The only two non-white speakers interviewed in the course of this project were two African-American women from Poughkeepsie; they are excluded from analysis because of the lack of a baseline of comparison. Poughkeepsie is atypical in this set of communities in that its population, as of the 2000 Census, is 36% African-American and only 53% white. Of the other communities in which in-person interviews were conducted, none is less than 79% white or more than 13% African-American.

In two communities, there were one or more speakers whose interviews were not phonetically analyzed, in the interest of saving time and on the grounds that they were deemed not to substantially deepen the sample beyond the previously analyzed speakers from their communities. The five additional

interviews carried out in Oneonta in the summer of 2008 were not analyzed, because the nine Oneonta speakers already interviewed and analyzed in 2007 satisfied my target sample size. Similarly, after the first two telephone-interview subjects conducted in Schenectady turned out to both be over 67 years old, a third interview was conducted in the hope of broadening the age range of the sample. The third interview subject, as it happened, was also over 67 years old, and her interview was not analyzed. Since the bulk of the data presented in this dissertation is derived from the acoustic analysis of interview speech, these six speakers—one from Schenectady and five from Oneonta—will be for the most part ignored. In a few specified places, however, data will be presented from some of the formal elicitation tasks carried out with these speakers.

A few speakers who were not natives of the communities in which they were interviewed have been analyzed as well—typically individuals who said at first that they were natives of the communities being studied, but then clarified after the interview had already begun that they had actually grown up in another nearby community. These include one speaker from Yorkville, adjacent to Utica, and one from Morrisonville, near Plattsburgh. The largest set of such speakers were interviewed in Glens Falls and include two from Queensbury, the town immediately north of Glens Falls, and three from South Glens Falls, the village immediately (appropriately) to the south. Since several of the cities and villages sampled in this study are adjacent to or part of towns of the same name[10], it is also possible that some of the subjects who described themselves as natives of (for example) Oneonta are actually natives of the town rather than the city of

[10] This is true of Amsterdam, Canton, Cobleskill, Oneonta, Plattsburgh, Poughkeepsie, Sidney, Walton, and Watertown.

Oneonta; whether this is the case is not necessarily determinable from the data. Table 2.3 shows the number of subjects analyzed from each community in this dissertation; the total number of analyzed speakers is 119. A complete list of the 119 speakers can be found in the Appendix.

Table 2.3. The communities sampled, with the numbers of speakers analyzed from each.

community	2000 pop.	type	county	in-person	phone	total
Amsterdam	18,355	city	Montgomery	5	2	7
Canton	5,822	village	St. Lawrence	7	2	9
Cobleskill	4,533	village	Schoharie		2	2
Cooperstown	2,032	village	Otsego	5	4	9
Fonda	810	village	Montgomery		2	2
Geneva	13,617	city	Ontario		2	2
Glens Falls	14,354	city	Warren	7		7
Gloversville	15,413	city	Fulton	7	2	9
Lake Placid	2,638	village	Essex		2	2
Morrisonville	1,702	hamlet[11]	Clinton	1		1
Ogdensburg	12,364	city	St. Lawrence	7	2	9
Oneonta	13,292	city	Otsego	9		9
Plattsburgh	18,816	city	Clinton	7		7
Poughkeepsie	29.871	city	Dutchess	7		7
Queensbury	25,441	town	Warren	2		2
Saratoga Springs	26,186	city	Saratoga		2	2
Schenectady	61,821	city	Schenectady		2	2
Sidney	4,068	village	Delaware	6	2	8
South Glens Falls	3,368	village	Saratoga	3		3
Utica	60,651	city	Oneida	7		7
Walton	3,070	village	Delaware		2	2
Watertown	26,705	city	Jefferson	10		10
Yorkville	2,675	village	Oneida	1		1
total				91	28	119

[11] A "hamlet", in New York, is a relatively densely populated place within a town that does not have an incorporated village government of its own.

2.3.4. Evaluation of sampling methods

The usefulness of the data derived from these 119 speakers will, of course, depend on their representativeness as a sample of the population of the different regions of upstate New York being studied. Even in this project's best-sampled communities, seven to ten speakers still does not constitute an in-depth sociolinguistic sample of a speech community. However, it is still possible to examine how reliable a picture of each community the sampling processes detailed above give us.

The issue of sample reliability can be evaluated on the small scale by consideration of the communities in which both telephone and in-person interviews were conducted—Amsterdam, Canton, Cooperstown, Gloversville, Ogdensburg, and Sidney. In each of these communities, the preliminary findings from two telephone interviews were sufficiently striking to prompt further research to attempt to confirm or disconfirm these first impressions. In four of those six communities, the first impressions from the telephone interviews were confirmed by the follow-up in-person research. As later chapters will demonstrate, Gloversville was found to demonstrate a moderate degree of NCS; in Ogdensburg the NCS is in progress; in Amsterdam, there is no clear sign of the NCS; and in Canton the NCS is absent and the *caught-cot* merger well underway; and in all of these communities, the two telephone-interview subjects give the same general impression of the status of the community as the larger sample does.

In Cooperstown and Sidney, however, the initial telephone interviews gave only a small and possibly misleading portion of the picture, which was substantially deepened by in-person research. The telephone interviews suggested that Sidney was a highly advanced NCS community; however, none of the in-person interview subjects displayed NCS as advanced as the two telephone subjects, and many of them showed very weak or even absent NCS. Conversely, the initial telephone interviews in Cooperstown suggested a village that lacked the NCS entirely and was overall dissimilar to all the other communities sampled in southeastern and central New York; but in-person interviews found NCS features in some speakers, and in others a general phonological profile that was overall in keeping with the region.

The difference between Sidney and Cooperstown on the one hand and Amsterdam, Canton, Gloversville, and Ogdensburg on the other hand lies in the accidental degree of difference or similarity between the two telephone-interview subjects. In Sidney and Cooperstown, the two initial telephone-interview subjects happened to be demographically very similar: in Sidney, both were middle-class women in their 50s who had completed some college; in Cooperstown, both were college-educated women in their 20s who were planning to start graduate school in the next few years. So coincidentally interviewing two speakers with similar demographic profiles in one community gave a misleading picture of a community in which there is substantial variation between demographic groups—in these two villages in particular, between age groups. In each of Amsterdam, Canton, Gloversville, and Ogdensburg, however, the two telephone-interview subjects differed in age by at least 20 years, and in some

cases differed in socioeconomic class as well. (By coincidence, in all four communities the two telephone-interview subjects are the same gender.) So we can have more confidence in the telephone interviews to present a reliable sketch of a community's dialectological situation, especially in cases of potential change in progress, if the two speakers interviewed differ substantially in age and other demographic features.

There are seven communities in which only telephone interviews were conducted: Cobleskill, Fonda, Geneva, Lake Placid, Saratoga Springs, Schenectady, and Walton. In all of these but Lake Placid and Schenectady, the two speakers analyzed differ by more than 25 years in age, as well as in gender, education, occupational class, or some combination of those factors. In Schenectady, the two speakers (one female and one male) were born in 1929 and 1938, and are both retired from white-collar jobs. In Lake Placid, the two speakers (likewise one male and one female) are both college students born in the 1980s. So the results presented in this dissertation for Lake Placid and Schenectady should probably be taken with a relatively large grain of salt, at least insofar as they might be taken as a sketch of the communities' dialectological status. The data from Cobleskill, Fonda, Geneva, Saratoga Springs, and Walton, on the other hand, might be a bit more reliable as a first impression of the dialectological situation in those communities, inasmuch as they each have two data points from somewhat different demographics.

Similarly, the two speakers interviewed from Queensbury are both apparently lower-middle-class males born in 1989 and 1990, and so do not constitute a sample from which generalizations about the town of Queensbury

can be made. The three speakers from South Glens Falls range in year of birth from 1940 to 1983, and therefore are a somewhat more reliable rough sample of the village.

Table 2.4. Communities with seven or more speakers interviewed, by age and gender

		year of birth					mean y.o.b.
		before 1943	1943–1957	1958–1972	1973–1986	after 1986	
Amsterdam	female		1		3		1970
	male		2			1	
Canton	female	1		2		2	1973
	male		1		1	2	
Cooperstown	female		3	1	1	3	1967
	male	1					
Glens Falls	female				1	1	1975
	male	1		1	2	1	
Gloversville	female		2			1	1961
	male	2	1	1		2	
Ogdensburg	female	1		1	3	2	1972
	male			1	1		
Oneonta	female		1	1	1	2	1974
	male		1	1	1	1	
Plattsburgh	female			1	1		1972
	male	1	1		1	2	
Poughkeepsie	female		1		1	1	1966
	male	1	1	2			
Sidney	female		2	1		2	1964
	male		1	1	1		
Utica	female	1			1	2	1979
	male				2	1	
Watertown	female			1	3	1	1972
	male		1	4			
total		9	18	20	24	27	1970

From each of the twelve communities in which in-person interviews were conducted, there are between seven and ten interviews analyzed. This allows us to get a clear enough snapshot of these communities for the purposes of

assigning them to dialect regions, but is not enough to get a detailed sociolinguistic picture of variation within each of these communities. The amount of sociolinguistic detail that can be extracted from each depends on the amount of demographic diversity within each community's sample. Table 2.4 displays the ages and genders of the speakers interviewed in these twelve communities.

It is clear from Table 2.4 that the Short Sociolinguistic Encounter method, at least as practiced by me, skews the sample toward younger subjects. That means that when an overall mean value of any particular linguistic feature is computed for these communities, the value will tend to skew towards the value favored by younger speakers in cases of change in progress. The four communities with the highest mean ages—Gloversville, Sidney, Poughkeepsie, and Cooperstown, with mean dates of birth in the 1960s—have the most even distribution of speakers across age groups, and thus in those the data mean will be less skewed away from the community mean.

Most of the communities sampled show a wide enough distribution of ages that, if language change is fairly active in any one community, it should be visible in apparent time. Utica is the main exception to this: the sample from Utica included six speakers born between 1979 and 1989 and one older outlier born in 1942, which is not sufficient to convincingly establish a long-term trend. In Watertown, all of the male subjects are older than all but one of the female subjects, which means that there is the potential for confusion between change in apparent time and stable gender-based variation. In Cooperstown, the only male

subject is also the oldest by a margin of 31 years; he may or may not be strictly comparable to the six female speakers younger than him as well.

There are few enough speakers sampled in any one community that it is unlikely that any gender-based variation within a single community can be isolated. However, males and females are both well-represented in the overall sample, and so once communities are grouped into regions it will become possible to meaningfully compare male and female speakers within each region. The SSE method does not skew the gender makeup of the sample; of the 91 speakers interviewed in person, 47 are male and 44 are female. The telephone interview is skewed toward female speakers; the 28 telephone-interview subjects include 20 females and only eight males. However, the in-person interviews outnumber the telephone interviews by enough that the overall gender breakdown of the full sample, 64 females and 55 males, is still reasonably balanced. Oddly, among the oldest speakers the sample is skewed heavily toward males: among speakers born before 1943 there are eleven males (eight interviewed in person, three by telephone) and only four females (two in person, two telephone).

My attempt at supplementing SSEs with more in-depth, scheduled interviews in targeted communities must be regarded as a failure. My plan had been that, once I had identified communities of interest from my 2008 telephone interviews to target for in-person interviews, I would re-connect with those of my telephone-interview subjects who had expressed willingness to help with my further research, and ask for their assistance in contacting more speakers in their communities to schedule in-person interviews with. The communities I selected

for this approach were Sidney, Ogdensburg, and Canton.[12] In Sidney the approach met with moderate success: my telephone-interview subjects in Sidney were able to put me in contact with three more natives of Sidney with whom I scheduled and conducted in-person interviews (as well as one speaker from the adjacent town of Masonville, unanalyzed in this dissertation). These three speakers, however, were not sufficient to bring my Sidney sample size to seven, and so it was necessary for me to conduct SSEs in Sidney in addition to the scheduled interviews. In Ogdensburg and Canton, it was a complete failure—I was not even able to reestablish contact with my telephone-interview subjects from those communities. In one case, when I dialed the number at which I had conducted one of my interviews in Ogdensburg and asked for my contact by the name she had given, the person who answered the telephone then didn't even recognize the name. For this reason all of my in-person interviews in Ogdensburg and Canton are SSEs, although I incorporated into them a few formal methods that I had intended to employ in longer scheduled interviews.

2.4. Phonetic measurements

The full vowel system of each selected speaker was measured, using the general methodology described in *ANAE* in order to ensure comparability with data from *ANAE*. For each speaker, first and second formant (F1 and F2) values were extracted for about 400–600 vowel tokens wherever possible. For 22 more

[12] In Oneonta this approach—through recontacting SSE subjects whose contact information I possessed—was somewhat more successful; but it was also much less essential inasmuch as nine speakers from Oneonta had already been interviewed.

reticent speakers with relatively short interviews, the number of measurable vowel tokens was less than 400; for a single speaker (Jake V. from Gloversville) only 190 vowel tokens were measurable. However, with the possible exception of Jake V., even the speakers with the fewest measurable tokens are sampled at least as thoroughly as most speakers in *ANAE*, in which the mean number of tokens measured per speaker was 305. 10 speakers have more than 600 vowel tokens measured; the mean number of vowel tokens measured per speaker is 483, yielding a total corpus of 57,464 vowel measurements across the 119 analyzed interviews. This is approximately 40% of the size of the corpus of vowel measurements used in *ANAE*.

Only vowels with at least secondary stress were measured; reduced vowels and unstressed syllables were ignored. Vowels preceded immediately by the glides /w/ or /y/ were also not measured. In nearly all cases, measurement of vowels began at the beginning of the recorded interview and proceeded forward one token at a time from there until the end of the interview or until the target number of measurements (500) was being approached; when the number of measurements was approaching 500, I would skip to the formal methods near the end of the interview. All tokens elicited through semantic differentials, the telephone-interview word-elicitation questions, word lists, or minimal-pair lists were always measured (except when excluded for the reasons listed at the beginning of this paragraph). When multiple tokens (usually three or more) of the same word had been measured in the same interview, additional tokens of that word would often be skipped in order to avoid oversampling a particular phonetic environment for that vowel phoneme; however, I did not do this

systematically, and there are several interviews in which the same word is measured five or six times. In the rare case that it was impossible for me to determine what phoneme a particular vowel token represented, of course I did not measure it. In the case of place names with which I was unfamiliar, if I found it difficult to identify a particular vowel token I referred to De Camp (1944)'s list of phonetically transcribed Upstate New York place names for a suggestion.

Measurements of F1 and F2 were extracted using Praat 4. Each vowel token was measured at a single point selected by hand as being characteristic of the central tendency of the vowel nucleus, following the method described in *ANAE*. (Offglides of diphthongs were in general not measured.) For monophthongal vowels and upgliding diphthongs such as /ay/, /ey/, /aw/, /ow/, the measurement was taken at or near the point of maximum F1 within the nucleus, indicating the phonetically lowest point in the articulation of the vowel. For front vowels preceding /l/, particularly tense front vowels preceding /l/, the measurement was taken at the point of maximum F2, indicating the frontest point in the articulation of the vowel before beginning the glide back towards /l/. Likewise, the formants were measured at the F2 maximum (or, respectively, minimum) point for ingliding front (respectively, back) vowels, indicating the frontest or backest point in the production of the vowel before the glide into the center. Vowels either before or after /r/ were measured during the period of maximum F3; while syllabic /r/ itself (as in *bird*) was measured at the point of minimum F3. In cases of ambiguity—for example, when there was more than one local F1 maximum in the formant track—preference was given to points closer to the point of greatest sound amplitude.

In all cases, points that were selected for measurement were checked by ear before the formant measurements were recorded to ensure that the selected point was actually within the vowel nucleus. If, for example, the off-glide was clearly audible when listening to an excerpt that *ended* with the selected point, that point would be deemed not clearly within the nucleus and an earlier point would be selected if possible. The general guideline I followed here in determining whether the selected point was within the nucleus was that the vowel nucleus itself should be audible when either the segment ending with the selected point or the segment beginning with it was played, but the off-glide and syllable coda should *not* be audible when listening only to the segment ending with the selected point, and the syllable onset should not be audible when listening only to the segment beginning with the selected point. In rare cases the vowel nucleus was short enough that it was impossible to find a point which satisfied these (seemingly fairly lax) constraints; in those cases I merely attempted to find whatever point within the visible formant structure was at an F1 maximum (or F2 or F3 maximum or minimum, depending on the circumstance, as outlined above).

The vowel phoneme /æ/ required special care in choosing a point to measure. One of the key questions to be addressed in this dissertation, of course, is which speakers in the sample display the NCS and which do not; and one of the key features of the NCS is that, under the NCS, particularly in its advanced forms, /æ/ develops a clear and distinct inglide, in contrast to the presumably monophthongal /æ/ of other dialects. The characteristic of /æ/ that will be used in this dissertation in determining whether any given speaker is subject to the

NCS will be the height of /æ/ in F1, rather than the presence or absence of an off-glide specifically; this is to maintain comparability with *ANAE*, in which /æ/ height is used. However, whether or not any particular token of /æ/ is ingliding is essential in determining how to *measure* its F1, simply because the method outlined above for choosing a point for measurement differs according to whether the vowel is monophthongal or ingliding. In order to avoid prejudging a speaker or community's status with respect to the NCS, it was necessary to judge on a case-by-case basis whether each token of /æ/ was to be regarded as ingliding or not—or at least, each token whose F1 maximum and F2 maximum occurred at different points in time. A token was judged as possessing or not possessing an inglide both by inspection of the formant trajectories and by ear. A token that exhibited a very sharp F2 decline, or whose F1 maximum was during the period of F2 minimum, was judged as ingliding. In the more challenging cases, where F2 showed a moderate decline and the F1 maximum was merely somewhat later than the F2 maximum, ingliding status was judged by ear: if the portion of the vowel after the F1 maximum had a perceptibly different vowel quality than the portion before the F1 maximum, it was judged to be an inglide and the formants were measured at the F2 maximum. For several tokens of /æ/ that displayed the form of ingliding identified as "northern breaking" by *ANAE*—a nucleus and inglide target with formant steady states of comparable length, each with its own amplitude peak—the token was often noted as a case of breaking and the formants of the second component were measured as well.

Note that, although the status of tokens of /æ/ as ingliding or not was not used directly to influence a speaker or community's classification as a participant

or non-participant in the NCS, the judgments described in the foregoing paragraph still influenced speakers' classification. Speakers' NCS status, as discussed in later chapters, will be established with reference to mean height of /æ/; and the F1 height measured for any given token of /æ/ was influenced by whether that token was judged to be ingliding or not: non-ingliding tokens were measured at the F1 maximum, while ingliding tokens were measured at some point with lower F1. Therefore, speakers for whom a larger fraction of tokens of /æ/ were judged as ingliding will show up in the analyses as having mean /æ/ higher in the vowel space than they would if those same tokens had been measured as if they were not ingliding. Since the mean height of /æ/ is a component in establishing speakers NCS status, therefore the distinction in measurement technique between monophthongal and ingliding tokens of /æ/ means that speakers for whom a large number of tokens were judged as ingliding are more likely to be considered participants in the NCS. This is consistent with the intuition that the NCS is distinguished in part by the high frequency of ingliding /æ/, even though the inglide itself is not used directly in categorizing speakers with respect to the NCS.

For each speaker, the mean F1 and F2 for each vowel phoneme were computed in Plotnik 8. Prior to computing the means, apparent outliers were double-checked by hand. For each vowel phoneme in a given speaker's vowel system, I viewed the F1/F2 plot of all measured tokens of that vowel; if any token appeared impressionistically to be well outside the distribution of other tokens of the same phoneme, I returned to Praat to check for possible errors in the measurement (or recording of the measurement) of that token's formants. If I

found that the original recorded formant values were correct, I let them stand; if I found substantially different formant values upon re-measuring the token, I would replace the measurements before computing the means.

In computing means, Plotnik deliberately ignores vowel tokens in certain phonetic environments as being non-representative of the default phonetic target for a particular phoneme—in particular, tokens before sonorants or after obstruent+liquid clusters are disregarded in calculating means. For some phonemes, Plotnik operating under its default settings computes the means separately for two classes of phonetic environments. Thus, for example, the mean F1 and F2 of /ey/ before a consonant on the one hand and before a word boundary or vowel on the other hand are computed as if they were two distinct phonemes. Plotnik makes occasional errors in determining the phonetic environments of vowel tokens, and therefore (for example) a few tokens before sonorants may have inadvertently not been discarded in computing means, or a few tokens of /ey/ before vowels may have been incorporated into their speakers' means for preconsonantal /ey/ rather than prevocalic /ey/. I have for the most part accepted the phonetic environment– dependent means as computed by Plotnik, without looking for errors; although when I have noticed individual errors in Plotnik's phonetic-environment determinations I have corrected them.

For inter-speaker comparability, all speakers' vowel measurements were log-mean normalized in Plotnik, using the same group norm used in *ANAE*. Numerical formant values, means, differences, and so on mentioned within this dissertation will all be normalized numbers, unless noted otherwise.

When a vowel's mean F1 or F2 for an entire community is presented, all speakers are weighted equally. For example, the mean F1 of /e/ in Gloversville is 691 Hz. This is the mean of the nine (normalized) F1 means of /e/ of Gloversville speakers as calculated in Plotnik, not the mean of all of the individual measured tokens of /e/ among those nine speakers.

All interview recordings and F1/F2 measurements used in this dissertation will be archived at the Linguistics Lab of the University of Pennsylvania.

Chapter 3

The Northern Cities Shift and Settlement History

3.1. The nature of the Inland North's eastern boundary

Identifying the eastern extent of the Northern Cities Shift is a topic of major interest because of conflicting characterizations in the literature of the relationship between the Inland North and Western New England dialect regions. Although all sources agree that Western New England is an essential part of the Inland North's history, predictions differ on whether a boundary exists between them in the present day and, if so, what the nature of that boundary will be.

Kurath (1949) defines a "Hudson Valley" dialect region located between the Inland North and Southwestern New England. However, examining the maps of Kurath & McDavid (1961) fails to reveal any phonological difference between the Hudson Valley and Southwestern New England. Albany, the only city in the Telsur corpus that might be within Kurath's Hudson Valley region, is grouped with Southwestern New England by *ANAE*, which weakly implies that the Hudson Valley is to be considered part of Southwestern New England for present-day dialectological purposes. If a boundary between the Inland North and Western New England exists, it may pass through Kurath's Hudson Valley, or coincide with one of the Hudson Valley's boundaries.

Boberg (2001) concludes that Southwestern New England is a "subtype of the Inland North", differing from the Inland North proper not in phonological

structure but rather only in phonetic detail—specifically, "the relative advancement of the Northern Cities Shift". In other words, in Boberg's analysis, Southwestern New England is essentially an eastern extension of the Inland North region, which is just as open to the NCS as communities in the Inland North proper are; it just happens not to have undergone the shift *yet*. If this is the case, we would not expect to see a sharp discontinuity between the Inland North and Southwestern New England. Rather, if the only difference between them is that the NCS is more advanced in the Inland North proper and less advanced in Southwestern New England, we might expect to find NCS features with an intermediate degree of advancement in the intermediate area between Syracuse and Binghamton on the one hand and Connecticut and Albany on the other.

Boberg is one of *ANAE*'s authors, and the text of *ANAE* echoes the point of his (2001) paper in saying that "the basic configuration underlying the NCS can be found among Western New England speakers." It goes on, however, to present a different interpretation of the phonological status of the Inland North, arguing that the cause of the NCS depended upon the unique settlement history of western and central New York. The argument hinges on the fact that the largest NCS cities in Upstate New York—Buffalo, Rochester, and Syracuse—all lie along the Erie Canal, whose construction spurred the population growth of the region:

> 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 addition, the great expansion of New York City after the [Erie] Canal was completed ensured a flow of workers, passengers, and entrepreneurs from outside of New England, up the Hudson River and westward to Buffalo. […] 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 New York State was none of these, but the general raised short-*a* pattern of the NCS. (*ANAE*: 214)

In other words, as Upstate New York's settlement was driven by the construction of the Erie Canal in the 1820s, the combination of multiple incompatible phonological treatments of /æ/ from different regional origins gave rise to the NCS's distinctive raising of /æ/. This account makes different predictions about the relationship between the Inland North and Western New England than Boberg (2001) does. Under the *ANAE* interpretation, the NCS is phonologically distinct on a qualitative level from the vowel systems of the dialect regions that contributed to the region's settlement, and it could not have arisen in one of these regions alone. If this is the case, we would expect to see a sharp boundary between the Inland North and the surrounding regions, whether Western New England or Hudson Valley: communities that share the distinctive Inland North settlement history, driven by the Erie Canal, will share the Inland North phonology and undergo the NCS; communities with a different early settlement history won't be subject to the NCS; and in principle such communities could be arbitrarily close to each other.

Thus by identifying and examining the linguistic status of communities near the edge of the Inland North—if such an edge exists—we can attempt to determine the nature of the boundary and the phonological relationship between the NCS and Southwestern New England, and elucidate the status of the Hudson Valley as a dialect region. A gradual transition eastward from the Inland North would suggest that, as Boberg (2001) argues, Southwestern New England's vowels are phonologically no different from the NCS, and that the Hudson Valley should not be distinguished as a separate dialect region; a sharp boundary

would suggest that the presence of the NCS constitutes a substantive phonological difference between the Inland North and whatever region is adjacent. Thus, examining the status of the NCS in the sampled communities will allow us to draw a general map of the major present-day dialect boundary of Upstate New York, determine what constraints control the distribution of the NCS, and get a hint of the underlying phonological issues involved. Chapter 4 will go further into the phonological status of /æ/ in particular.

3.2. Results: categorical NCS criteria

3.2.1 Overall findings

Great variation was found across the full sample of 119 speakers with respect to the presence or absence of the NCS. The most advanced NCS was found in the vowel system of Janet B., a 64-year-old bookstore clerk from Utica, depicted in Figure 3.1. Janet's /æ/ is extremely high and front, with only three tokens lower than the midline of her vowel space; her mean /e/ is so back, and her mean /o/ so front, that both line up along the center line; and her /ʌ/ is far to the back of the vowel space. By contrast, Emily R, a 21-year-old college student from Cooperstown, shows no NCS at all: /æ/ remains in low front position, not even on average as far front as /e/; /o/ is some distance back of center; and /e/ and /ʌ/ are about the same distance front and back of center respectively. Her vowel system is shown in Figure 3.2.

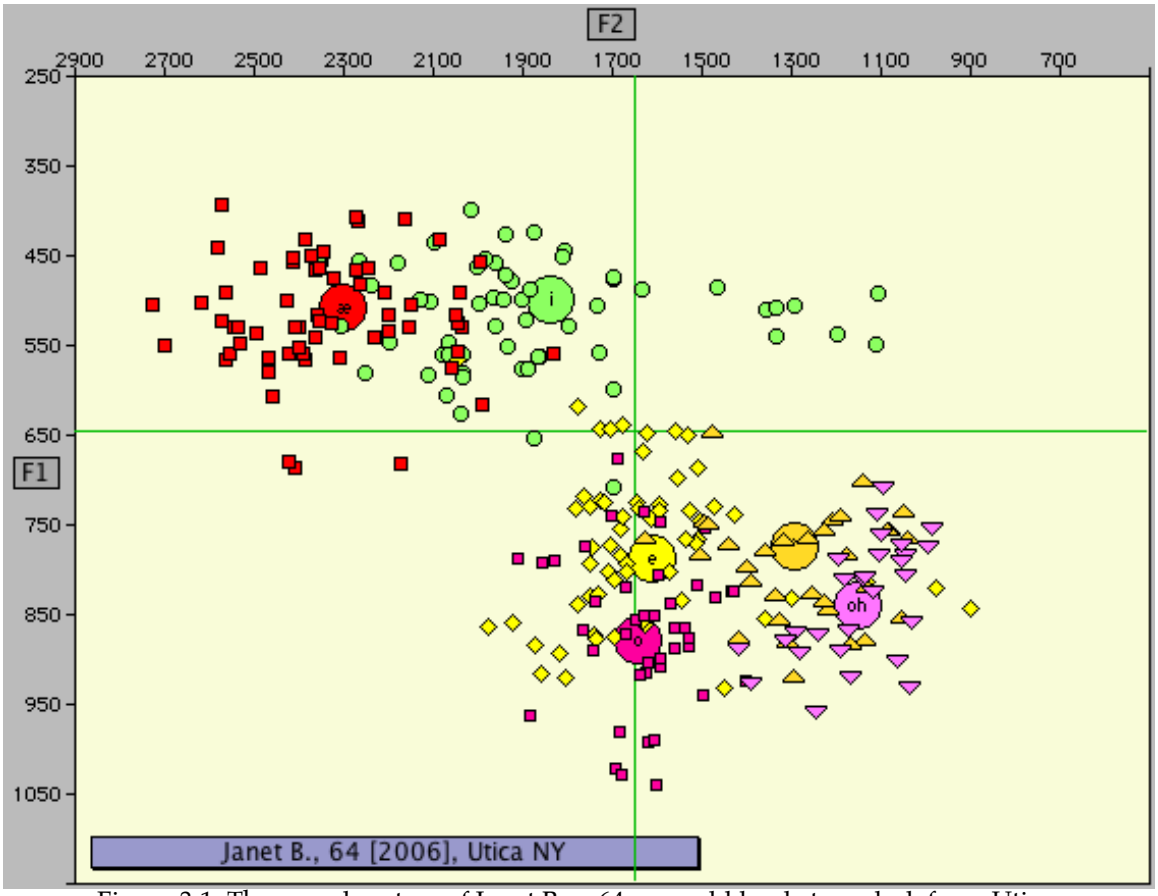


Figure 3.1. The vowel system of Janet B., a 64-year-old bookstore clerk from Utica.
red = /æ/; orange = /ʌ/; yellow = /e/; green = /i/; light purple = /oh/; magenta = /o/

Labov (2007) uses a set of five criteria based on the mean normalized formant values of the NCS vowel phonemes to quantify speakers' degree of participation in the NCS. These criteria are as follows:

- **UD criterion**: /o/ is fronter than /ʌ/.
- **ED criterion**: /e/ is less than 375 Hz fronter than /o/.

  (i.e., F2(/e/) – F2(/o/) < 375 Hz)
- **EQ criterion**: /æ/ is higher and fronter than /e/.
- **AE1 criterion**: /æ/ is higher than 700 Hz (i.e., F1(/æ/) < 700 Hz).
- **O2 criterion**: /o/ is fronter than 1500 Hz (i.e., F2(/o/) > 1500 Hz).

Janet B. easily satisfies all five criteria. Her /o/ is fronter than /ʌ/; /e/ is not only less than 375 Hz fronter than /o/, it is in fact backer than /o/; /æ/ is much higher and fronter than /e/; F1 of /æ/ is 510 Hz, much less than 700; and F2 of /o/ is 1638 Hz, more than 1500. On the other hand, Emily R. satisfies none of the five, with /o/ backer than /ʌ/, /e/ fronter than /o/ by 375 Hz, /æ/ lower and backer than /e/, F1 of /æ/ 829 Hz, and F2 of /o/ 1262 Hz.

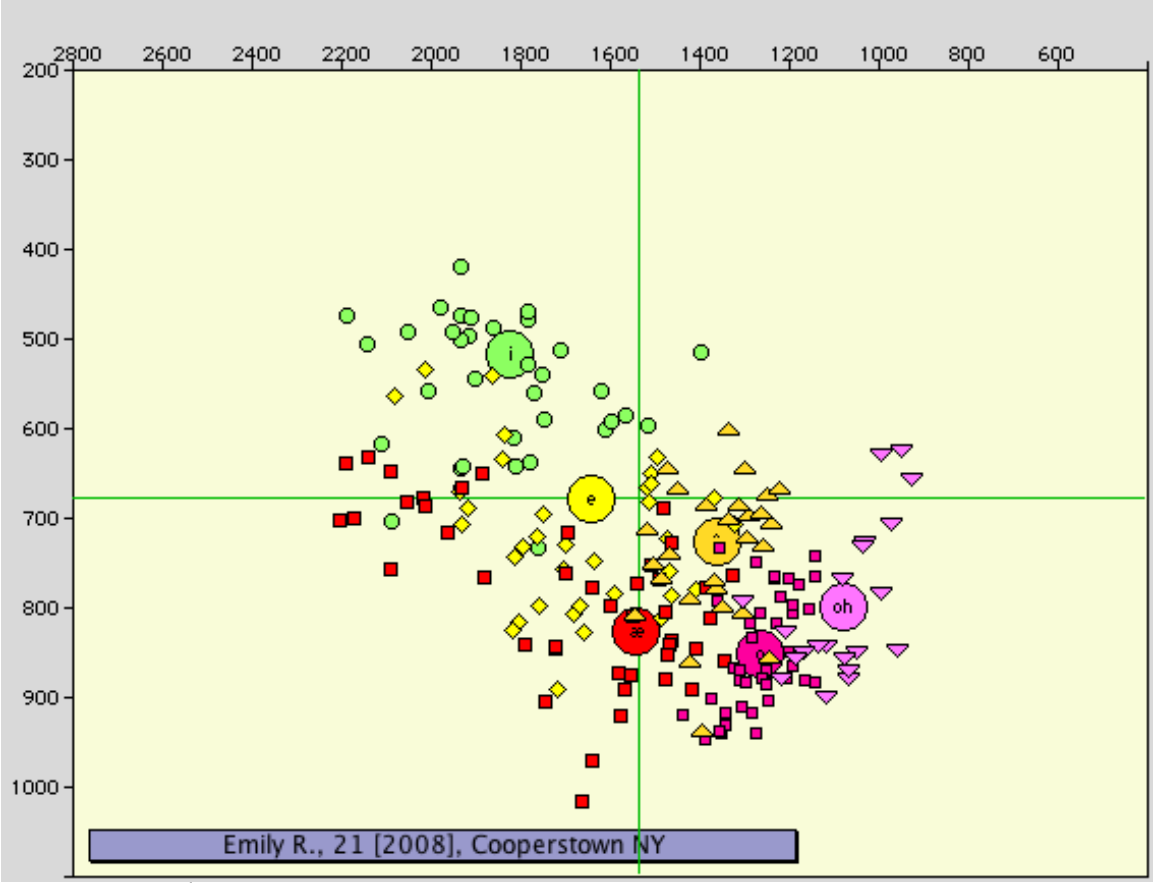


Figure 3.2. The vowel system of Emily R., a 21-year-old college student from Cooperstown. red = /æ/; orange = /ʌ/; yellow = /e/; green = /i/; purple = /oh/; magenta = /o/

Table 3.3 lists how many of the 119 speakers in the data set satisfy each of the five criteria, compared to the 446 speakers in the Telsur corpus. Although the EQ, AE1, and O2 criteria are satisfied by relatively small subsets of the current sample, large majorities satisfy both the ED and UD criteria. Thus, with respect

to ED and UD, the New York State speakers in this study overall basically resemble the Inland North speakers from the Telsur corpus. But with respect to the other three criteria, the speakers in this study are overall more like the non–Inland North Telsur speakers.

Table 3.3. The number of speakers satisfying the five NCS criteria in the current sample (n = 119), compared with *ANAE*'s Inland North region (n = 61) and the rest of the Telsur corpus (n = 385).

criterion	% NYS speakers	% *ANAE* IN speakers	% other Telsur
UD	84%	93%	15%
ED	85%	84%	13%
EQ	18%	66%	3%
AE1	26%	84%	17%
O2	18%	46%	5%

It is not expected, of course, that the speakers in this dissertation's data set will overall resemble the Inland North in all respects; the sampled communities were chosen with the aim of being located on both sides of the eastern border of the Inland North. But it is noteworthy that, instead of being intermediate between Inland North and non–Inland North distributions of all five criteria, they match the Inland North quite closely in two of the five. This means, in all likelihood, that even the communities which are found to be outside the Inland North will show Inland North–like ED and UD features. The Telsur corpus contains thirteen Western New England speakers; of those, nine satisfy the UD criterion, but only five the ED criterion. So it is not surprising that a set of speakers straddling the Inland North–Western New England border satisfies UD to a very high degree; but the high rate of ED in the New York State corpus is characteristic of the Inland North but not Western New England.

In addition to how many speakers in the sample satisfy each of the five NCS criteria, we can ask how many speakers satisfy *any number* of criteria—that

is, how many speakers satisfy all five criteria, how many satisfy four, and so on. The number of criteria satisfied by any given speaker will be referred to as that speaker's *score* (or *NCS score*). These figures are displayed in Table 3.4. Whereas a large majority of Telsur speakers outside the Inland North meet none of the five criteria, and a plurality of Telsur Inland North speakers meet all five, in the New York corpus fairly few speakers meet either zero or five; a plurality of them meet exactly two. These results are unsurprising: Table 3.3 shows that two of the five criteria are met by large majorities of the New York corpus, while the other three are satisfied by relatively small minorities; thus it is expected that the most frequent score in the New York corpus would be two. However, Table 3.4 shows more clearly than Table 3.3 how the New York corpus sits in between the Inland North and non–Inland North Telsur subsets with respect to the five criteria.

Table 3.4. The NCS scores of speakers in this study's New York State data set, compared with *ANAE*'s Inland North region and the rest of the Telsur corpus.

# criteria	% NYS speakers	% *ANAE* IN speakers	% other Telsur
5	3%	36%	1%
4	18%	26%	1%
3	14%	16%	3%
2	42%	16%	9%
1	13%	5%	21%
0	8%	0%	66%

3.2.2. Classifying communities

In order to determine the location and nature of the Inland North–Western New England boundary, it is necessary to look at the sampled communities one at a time rather than in the aggregate, so that they can each individually be assigned to the Inland North, to Western New England, or to some other category. The bulk of this chapter will focus on the twelve

communities in which seven or more interviews were conducted, on the grounds that there is enough data from those communities to determine the status of the NCS in each of them relatively unambiguously; these communities are Amsterdam, Canton, Cooperstown, Glens Falls, Gloversville, Ogdensburg, Oneonta, Plattsburgh, Poughkeepsie, Sidney, Utica, and Watertown. The communities with samples of between one and three speakers will be reintroduced at the end of the chapter.

Utica is the easiest city to categorize in this data set. As seen in Figure 3.5, none of the seven speakers in Utica have scores less than three, and a plurality scores four. This places Utica solidly within the Inland North, in which the NCS dominates. This expands the known extent of the core Inland North region eastward by some fifty miles.

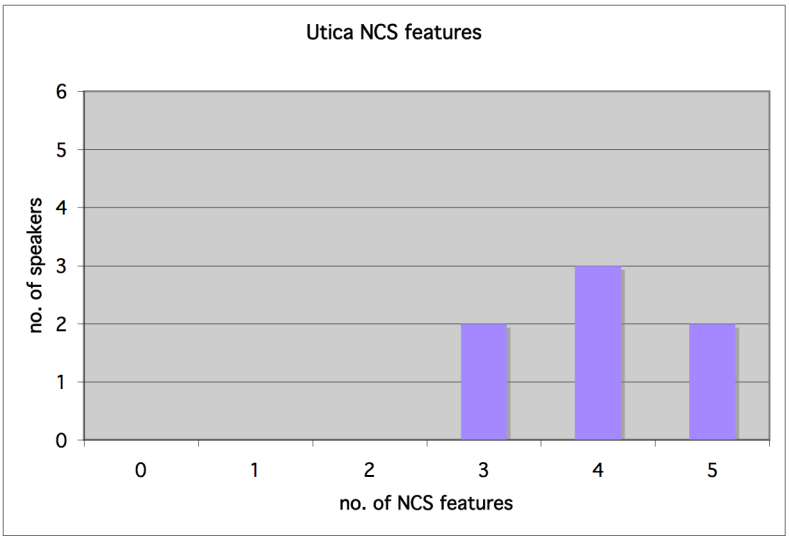


Figure 3.5. NCS scores of speakers in Utica.

As shown in Figure 3.6, five of the twelve communities can be placed with confidence outside the Inland North region: Amsterdam, Oneonta, Poughkeepsie, Plattsburgh, and Canton. Among thirty-nine speakers in these

five communities, only two have a score higher than two; and three of the five communities range down to zero in at least one speaker. But although these five communities are clearly outside the range which would allow them to be categorized as part of the Inland North, neither are they very typical of communities in the Telsur corpus outside the Inland North. Outside the Inland North in the Telsur corpus, fully 87% of speakers have scores lower than two; in Amsterdam, Oneonta, and Poughkeepsie, more than half the speakers in this data set score two or three. Only in Canton do a plurality of speakers meet none of the NCS criteria, and even that plurality is less than a majority.

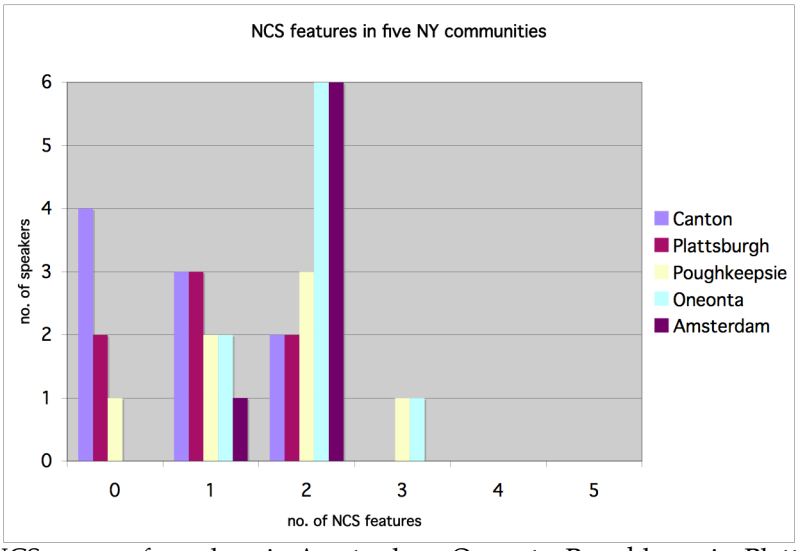


Figure 3.6. NCS scores of speakers in Amsterdam, Oneonta, Poughkeepsie, Plattsburgh, and Canton.

In fact, what these five communities resemble overall is *ANAE*'s Western New England region, whose scores are shown in Figure 3.7: the Western New England data is dominated by speakers meeting one or two criteria, with comparatively few exceptions below one or above two. Amsterdam, Oneonta, Poughkeepsie, and Plattsburgh each individually fit more or less within this

profile, and Canton is not far from it. So we can tentatively group these five communities with Western New England, as *ANAE* does Albany.

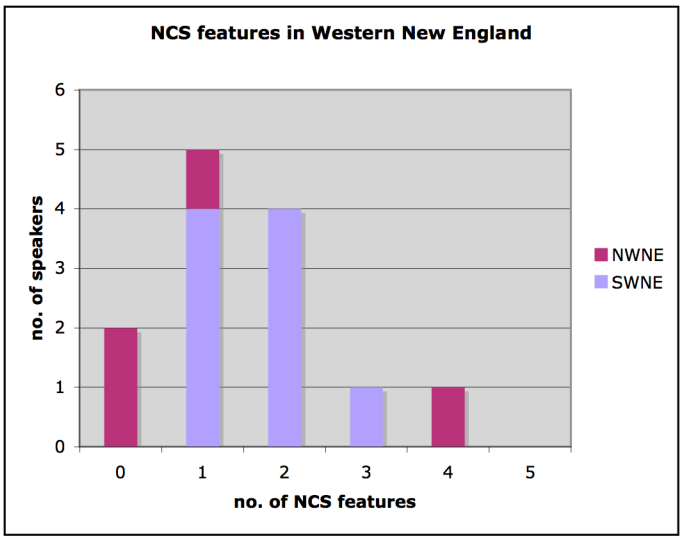


Figure 3.7. NCS scores of Telsur speakers in Western New England.

There is a relatively sharp distinction in Figure 3.6 between Canton and Plattsburgh on the one hand and Amsterdam and Oneonta on the other. In both Amsterdam and Oneonta, there is a large majority of six speakers with a score of two, only one or two speakers scoring one, and no zeroes; by contrast, Canton and Plattsburgh have only two speakers each scoring two, and a majority scoring less than two. Poughkeepsie has a less sharp peak at two than Amsterdam and Oneonta do, but it can be grouped with them in that the majority of Poughkeepsie speakers score two or higher. Since Plattsburgh and Canton are also two of the three northernmost communities sampled in this study, there is a temptation to regard them as more closely affiliated with Northwestern New England, and Amsterdam, Oneonta, and Poughkeepsie as more closely affiliated with Southwestern New England.

This temptation is apparently justified. The key linguistic feature distinguishing Northwestern from Southwestern New England in *ANAE* is that the *caught-cot* merger is complete or nearly so in Northwestern New England and largely absent in the sampled cities in Southwestern New England. As will be discussed in Chapter 5, the *caught-cot* merger is not entirely complete in any of the communities sampled in this study; but in each of Plattsburgh and Canton, only one speaker has a secure distinction between the two phonemes, and these are the only two communities sampled in which more than two speakers are fully merged in perception.

Moreover, Figure 3.7 suggests that Northwestern New England speakers may overall exhibit fewer NCS features than Southwestern New England speakers, though the small number of speakers and the seeming outlier in the form of a speaker from Rutland, Vt., with a score of four may render such a judgment questionable. But if the four-point speaker in Rutland is an outlier, as seems at this point intuitively reasonable[1], and that in fact most Northwestern New England speakers score one or zero while Southwestern New England speakers mostly cluster around one and two, then this makes sense of the fact that speakers in Amsterdam, Oneonta, and Poughkeepsie satisfy NCS criteria more than do speakers in Plattsburgh and Canton[2] ($p < 0.0005$). In this case we

[1] One reason for considering this speaker an outlier is that she is the only speaker in the entire Telsur corpus who simultaneously displays the *caught-cot* merger and an NCS score or 4 or more. The presence of the merger is the reason *ANAE* does not consider her an Inland North speaker. This speaker's status will be touched upon further below.

[2] Of course, the two factors here distinguishing Northwestern from Southwestern New England—*caught-cot* merger and a lower rate of satisfying NCS criteria—are not independent. Several NCS criteria have to do with the frontness of /o/; a speaker who merged /o/ with /oh/ would be more likely to have /o/ backed than one who makes the distinction.

can tentatively assign the former three cities to Southwestern New England, at least by *ANAE*'s standards, and the latter two to Northwestern New England.

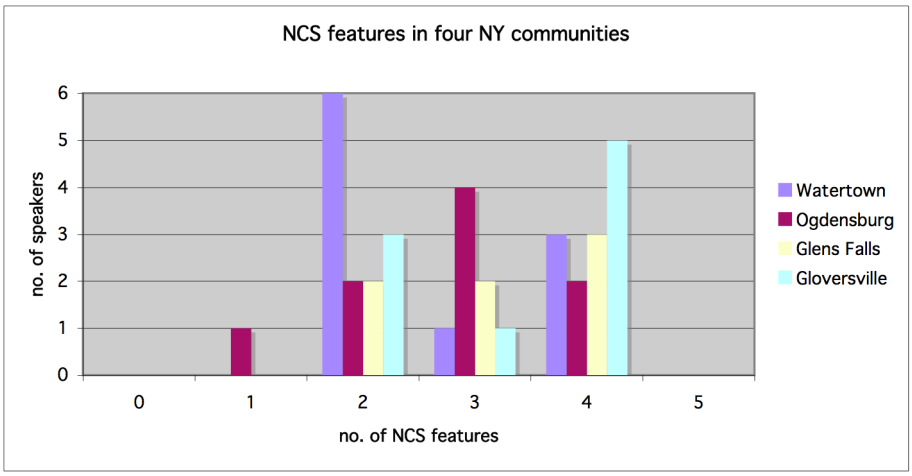


Figure 3.8. NCS scores of speakers in Gloversville, Glens Falls, Ogdensburg, and Watertown.

Figure 3.8 shows the scores of speakers in Gloversville, Glens Falls, Ogdensburg, and Watertown. There are no speakers in the data from any of these cities scoring zero or five. In each of the four cities, speakers' scores range between two and four, with the only exception being a single speaker in Ogdensburg with a score of one. This distribution matches neither the Inland North pattern (dominated by fives and fours with very few speakers below four) nor the Western New England pattern (mostly between zero and two with very few speakers above two); it seems to occupy a position intermediate between the two patterns. Although there appear to be differences between these four cities—Gloversville has a majority of speakers scoring four, and fewer scoring three or two, while Watertown shows a majority of twos and fewer threes and fours—these differences do not reach the level of statistical significance. These four cities do, however, differ at the $p < 0.05$ level both from Utica and from the five communities assigned above to the Western New England region. So it appears

as if Gloversville, Glens Falls, Ogdensburg, and Watertown constitute an additional coherent set of communities in which the NCS exists but is not dominant as it is in the Inland North proper; these cities may be tentatively described as part of the "fringe" of the Inland North. In each of these "fringe" cities, there are speakers in the data who demonstrate the NCS very clearly, but nobody seems to satisfy all five NCS criteria. At the same time, there are also a substantial number of speakers who clearly are not subject to the NCS; but even they still mostly satisfy the ED and UD criteria.

Of the ten communities discussed so far, eight have a difference of at most two points between their highest- and lowest-scoring speakers. The other two (Poughkeepsie and Ogdensburg) have all speakers but one within a range of two points, and a single high or low apparent outlier. Cooperstown and Sidney, the remaining two villages under examination, have scores that are a bit more spread out, as shown in Figure 3.9.

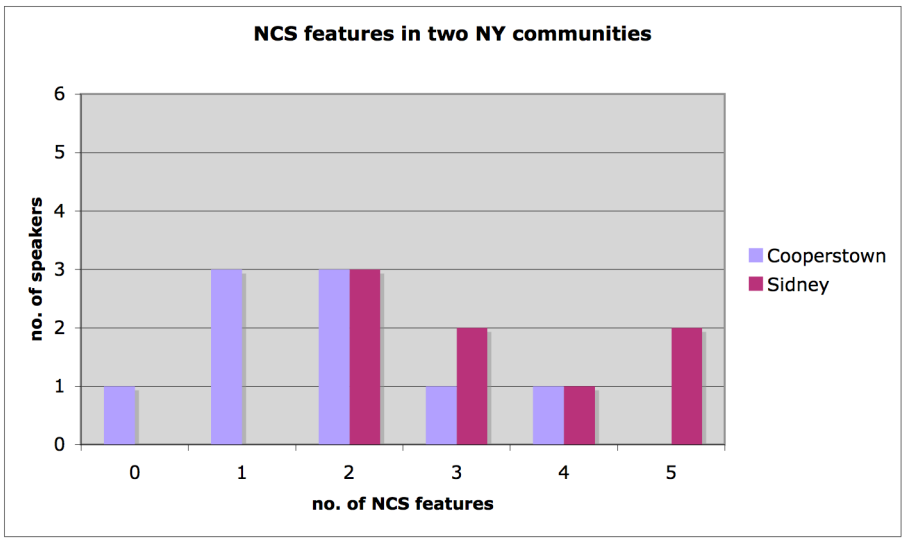


Figure 3.9: NCS scores of speakers in Cooperstown and Sidney.

Although Cooperstown is dominated by speakers scoring one and two, like some of the communities in Figure 3.6 above, it differs from those in that one speaker in Cooperstown has a score as high as four—higher than any speaker interviewed in the communities in Figure 3.6.[3] Indeed, scores in Cooperstown have a greater range than in any other community in the sample, from four all the way down to zero. Meanwhile, Sidney cannot be easily assigned to either the Inland North proper (like Utica) or the "fringe" as defined above: the Inland North proper is dominated by speakers scoring four or five, with relatively few twos and threes; and the fringe, as defined by Figure 3.8, includes no fives even in Gloversville, the fringe city with the highest average score. Sidney, whose sample in this study is roughly evenly spread out among all the scores between two and five, seems to display a profile unseen elsewhere in this sample.

One way to deal with the seemingly irregular behavior of Cooperstown and Sidney would be to declare that Cooperstown belongs to the Western New England dialect region like the cities in Figure 3.6 and merely has a high-scoring outlier, and that Sidney belongs to an intermediate class between the Inland North proper and the fringe, just as the fringe was defined as an intermediate class between the Inland North and Western New England. However, we can gain a clearer picture of Cooperstown and Sidney by looking at the speakers from those two villages in a bit more detail, from the perspective of change in apparent time. Figure 3.10 displays the relationship between NCS score and age.

[3] Anecdotally: Some middle-aged natives of Cooperstown spoken to in the course of this research who declined to participate in a recorded interview seemed impressionistically to exhibit relatively strong NCS features. Although these speakers are, obviously, not included in the data presented in this dissertation, they suggest that the speaker from Cooperstown scoring four in Figure 3.9 is not merely an outlier.

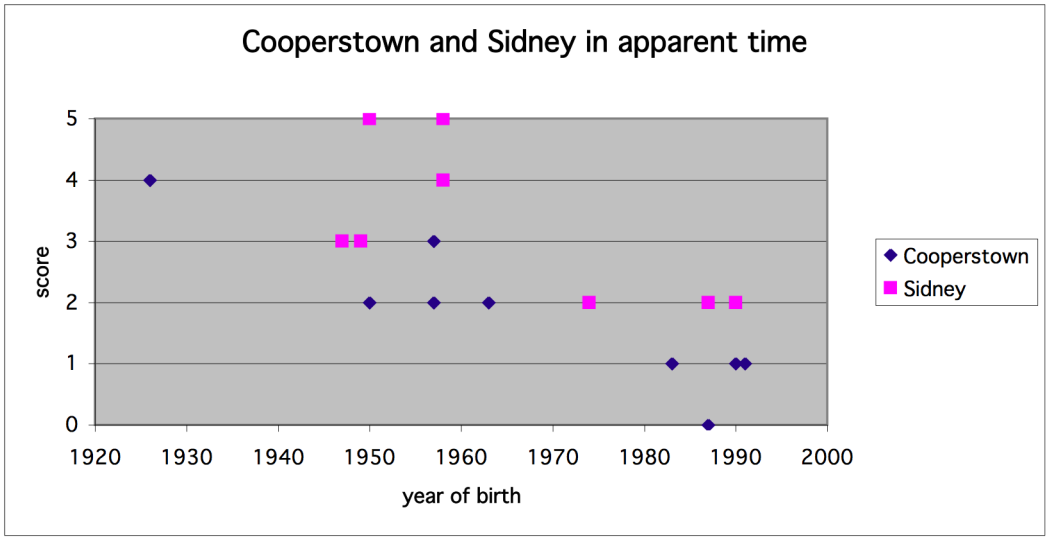


Figure 3.10: NCS scores in Cooperstown and Sidney versus age.

From the apparent-time point of view, the dialectological status of Cooperstown and Sidney becomes much clearer. In Sidney, the three speakers born later than 1970 all have a score of two, while the five older speakers score between three and five. In Cooperstown, the four speakers born after 1980 score one and two, the four between 1950 and 1965 score two and three (but see note 3 above), and the one born in 1926 scores four. In both villages the difference between the younger and the older or middle-aged speakers is significant to the $p < 0.02$ level or better; additionally, in Cooperstown, the Pearson correlation between year of birth and score is significant with $p < 0.0005$ and $r^2 \approx 0.83$. So now it becomes clear that Cooperstown and Sidney are both in the process of *retreat* from the NCS.

In Sidney, the older speakers fall more or less in the range of the Inland North, reaching scores as high as five but no lower than three; but the younger speakers all score two and would seemingly be at home in a community like Amsterdam or Oneonta, where large majorities of speakers score two. In

Cooperstown, the older speakers seem from this data to belong to an Inland North fringe community, like Watertown, with scores between two and four; the younger speakers all score below two, and in this respect are most similar to places like Canton and Plattsburgh, which were assigned above to the Northwestern New England region. The younger speakers in Cooperstown also agree with Canton and Plattsburgh in showing direct effects of the *caught-cot* merger; these three are the only communities in the sample in which more than one speaker judged all /o/~/oh/ minimal pairs as the same. Meanwhile, the merger is absent from the older speakers in Cooperstown; this will be discussed in more detail in Chapter 5.

3.2.3. Change in apparent time

Now that change in progress has been found in Cooperstown and Sidney, two villages with exceptionally spread-out score profiles, it is necessary to ask whether change in apparent time exists in the other ten communities in this study, and whether it should affect their categorization if change in progress is found. All communities sampled have a range between oldest and youngest speaker of at least 37 years (the smallest range is in Watertown), which is a wide enough span that generational differences might be visible even in these small samples. However, in Utica, if the oldest speaker is excluded, the remaining six speakers only have a range of 10 years in age[4]; so with the age distribution of

[4] Glens Falls is the next closest from this perspective: excluding the oldest speaker, the remaining six have an age range of 24 years.

speakers in the sample being so skewed, even if change in progress exists in Utica it may not be evident in the data.

Apart from Cooperstown and Sidney, there are four cities in the data in which the correlation between NCS score and year of birth is significant at the $p < 0.1$ level or better[5]: Ogdensburg, Oneonta, Poughkeepsie, and Plattsburgh. These three cities' apparent-time profiles are displayed in Figure 3.11.

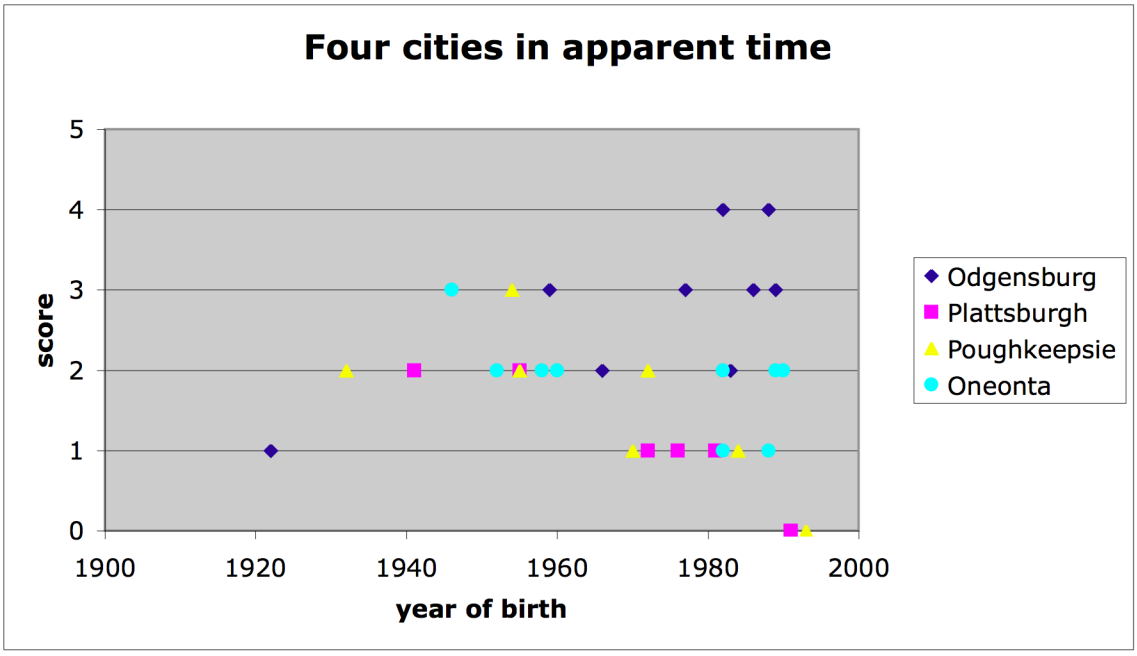


Figure 3.11. NCS scores in Ogdensburg, Oneonta, Plattsburgh, and Poughkeepsie versus age.

Ogdensburg displays a statistically significant trend *toward* the NCS; however, this apparent trend is almost entirely due to the one speaker born in 1922 with a score of one. If she is excluded, the correlation disappears: r^2 drops from 0.53 to 0.13, and p jumps from 0.025 to 0.37. So even if it is the case that the

[5] $p < 0.1$ is chosen as a threshold here to allow for the possibility that there might be a community in which there is clear change in apparent time that is not very well represented by the Pearson correlation statistic. For example, in Sidney the difference between older and younger speakers is categorical, and a t-test finds it significant to $p < 0.02$; but the Pearson correlation statistic applied to Sidney yields a probability of $p \approx 0.064$.

NCS came to Ogdensburg slightly later than to other fringe Inland North cities (e.g., the oldest speaker in the Gloversville sample was born in 1925 and scores four), there is no strong evidence here for change in progress more recently.

Table 3.12. Age correlation of F2 of /o/ and /o/~/oh/ Cartesian distance in Plattsburgh. /o/ F2: $r^2 \approx 0.81$, $p < 0.01$ /o/~/oh/: $r^2 \approx 0.74$, $p < 0.02$

year of birth	/o/ F2	/o/~/oh/	ED?	UD?
1941	1433	301	yes	yes
1955	1421	102	yes	yes
1972	1377	152	yes	
1976	1352	150		yes
1981	1322	57	yes	
1991	1208	24		
1991[6]	1288	25		

The trend away toward lower scores in Plattsburgh is extremely strong: of three age cohorts in the data, each has a uniform score within the cohort that is one point less than the next older cohort. Despite having only seven speakers, this correlation is significant to the $p < 0.002$ level, with $r^2 \approx 0.89$. This trend can be attributed to the progress of the *caught-cot* merger in Plattsburgh. Data for the backing of /o/ in Plattsburgh is shown in Table 3.12: as the distance between /o/ and /oh/ diminishes, /o/ moves back; and as /o/ moves back, fewer speakers will satisfy the ED and UD criteria. In this case, the apparent-time change in NCS score in Plattsburgh should not be interpreted as a change in the city's dialectological affiliation, as seems to be the case with Sidney and Cooperstown. Rather, the ED and UD criteria are shared broadly between Inland North and non–Inland North communities in New York State. Plattsburgh is a non–Inland North city with an unrelated sound change, the *caught-cot* merger, in

[6] Obviously the two Plattsburgh speakers born in 1991 are represented by a single pink square in Figure 11.

an advanced state of progress; the merger, while affecting the ED and UD criteria, does not really affect the city's relationship (or lack thereof) to the Inland North.

The correlation between year of birth and NCS score in Poughkeepsie does not quite reach the level of statistical significance, with $p \approx 0.057$, although r^2 is a fairly high 0.55. Unlike in Sidney, a *t*-test does not find the difference between the older and younger speakers' scores to be statistically significant either: the best result, comparing the three older with the four younger speakers, yields $p \approx 0.052$. Moreover, only one statistically significant age pattern emerges from the individual NCS criteria and vowels: the two Poughkeepsie speakers (out of seven) who do not satisfy the UD criterion are the youngest, born in 1984 and 1993; the other five speakers were born between 1932 and 1972. The age difference between speakers satisfying and not satisfying UD in Poughkeepsie is significant to $p < 0.02$. However, unlike in Plattsburgh, F2 of /o/ does not display a significant correlation with age; neither does /ʌ/. Therefore, there is no convincing reason to claim that Poughkeepsie in the process of changing its dialectological status.

Oneonta has slightly more reason for us to suspect a change in apparent time away from the NCS. Like in Poughkeepsie, older speakers' scores range between two and three, while younger speakers' scores are two and below; but the correlation between age and NCS score does not reach the level of statistical significance ($p \approx 0.078$), and *t*-tests do not find significant differences between older and younger speakers either (best result: $p \approx 0.11$). However, F2 of /o/ is significantly correlated with age and backing in apparent time. Moreover,

although there is not a statistically significant Pearson correlation between age and F1 of /æ/, a *t*-test finds that the three speakers with the highest /æ/ (i.e., the lowest F1) are on average *older* than the speakers with lower /æ/ at the $p \approx 0.01$ level. So there is some weak evidence for movement away from the NCS in apparent time in Oneonta, resembling the somewhat more convincing trend visible in the nearby village of Sidney; conceivably Oneonta is merely more advanced in such a trend away from the NCS than Sidney is. However, this evidence is not altogether convincing; the *lowest* /æ/ in Oneonta belongs to the second-oldest speaker in the sample, and the backing of /o/ may, like in Plattsburgh, have an independent cause. So for the time being I shall continue to regard Oneonta as a non–Inland North community, but keep in mind the possibility that it is merely in a late stage of abandonment of the NCS.

3.2.4. Summary of results from NCS scores

To sum up, then, according to the five NCS criteria used by Labov (2007), the twelve cities examined so far can be categorized as follows: Utica belongs to the Inland North, fully subject to the NCS. Amsterdam, Oneonta, Poughkeepsie, Plattsburgh, and Canton are not subject to the NCS, although the UD and ED criteria are frequently satisfied in them (unlike most non-NCS communities). These five resemble *ANAE*'s Western New England region to an extent—Amsterdam, Oneonta, and Poughkeepsie grouping with Southwestern New England, and Plattsburgh and Canton with Northwestern New England. Gloversville, Glens Falls, Ogdensburg, and Watertown belong to the "fringe" of

the Inland North: the NCS is present in these communities, but inconsistently so. Cooperstown and Sidney are undergoing change in progress away from the NCS: Sidney from a core Inland North community to one more like Amsterdam and Oneonta; and Cooperstown from an Inland North fringe community to one with less conformance to the NCS than any other in this study.

3.3. The EQ1 index

3.3.1 Definition and motivation

The five NCS criteria are a fairly blunt instrument for measuring the participation of a speaker or community in the NCS. This is because they are *categorical* criteria: for instance, the UD criterion is satisfied whenever mean /o/ is fronter than /ʌ/, regardless of how much fronter it is. In fact, *ANAE* and Labov (2007) do not even appear to take note of whether the F2 difference between /o/ and /ʌ/ is statistically significant when deciding whether a speaker meets one of the five criteria; and for that reason, neither does the analysis presented above.

To see why this is important, consider the vowel system of Dennis C., a man in his 50s from Watertown who works as a museum caretaker, presented in Figure 3.13. Dennis C. easily satisfies the ED, UD, and O2 criteria. However, his mean F1 for /e/ is 697 Hz, and his mean F1 for /æ/ is 701 Hz—meaning he misses satisfying the EQ and AE1 criteria by only 4 Hz and 1 Hz, respectively. It is evident that Dennis C.'s /æ/ is quite raised, and no one would mistake it for a low vowel. It is not raised as far as it could go—some NCS speakers have /æ/

raised as high as /i/ or higher, like Janet B. in Figure 1—but he certainly shows some degree of participation in the NCS raising of /æ/, and the EQ and AE1 criteria give him no credit for it.

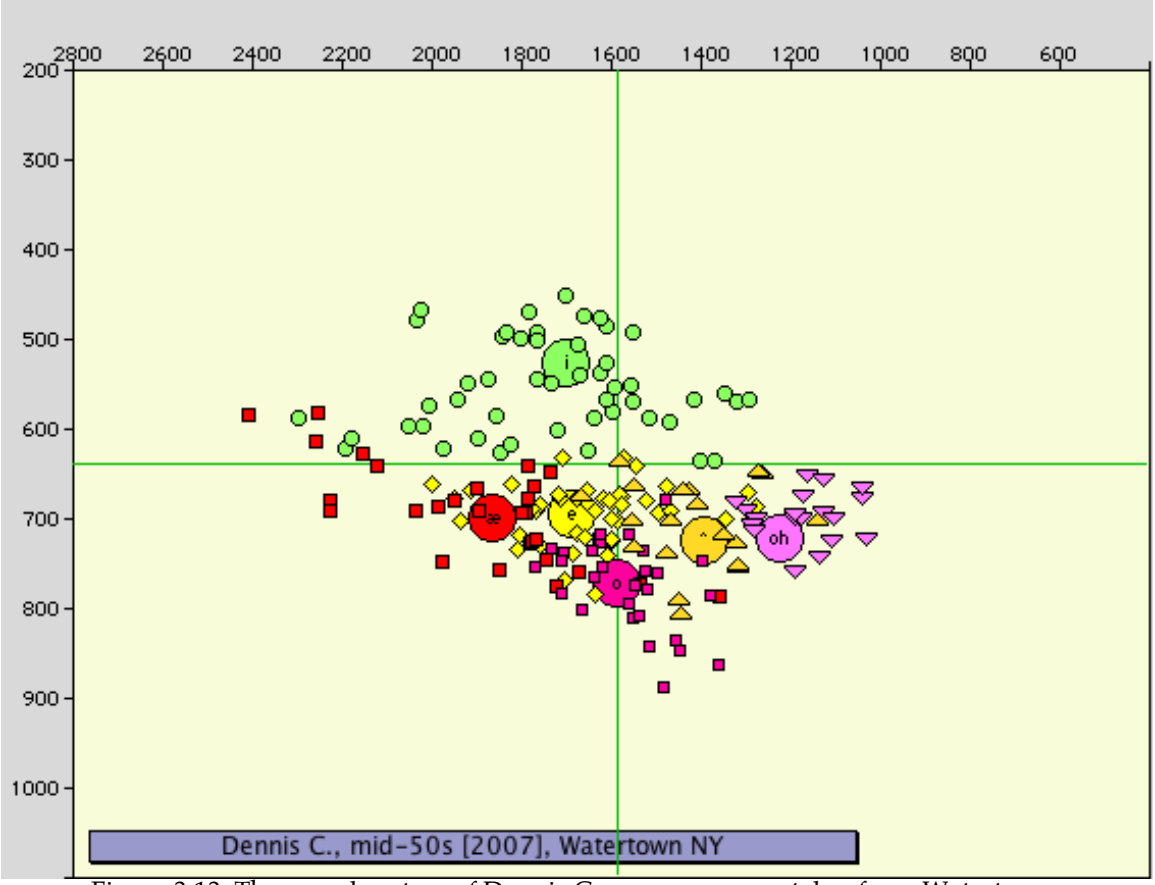


Figure 3.13. The vowel system of Dennis C., a museum caretaker from Watertown. red = /æ/; orange = /ʌ/; yellow = /e/; green = /i/; purple = /oh/; magenta = /o/

Moreover, compare Dennis C. to Steve B., a 25-year-old unemployed roofer from Glens Falls, whose vowels are shown in Figure 3.14. Steve B. satisfies both the AE1 and the EQ criteria, but by margins almost as small as Dennis C. fails to satisfy them: Steve's mean /æ/ is 6 Hz higher than /e/ and 14 Hz higher than 700 (i.e., it is 686 Hz). Impressionistically, Steve's vowels look quite similar to Dennis's. Statistically, neither Steve's nor Dennis's /æ/ is significantly different either from /e/ or from 700 Hz, or from each other; for each

comparison, a *t*-test finds $p > 0.1$ or worse. But because of the categorical nature of the AE1 and EQ criteria, this similarity between Steve and Dennis's /æ/ distributions is lost in the data considered above.

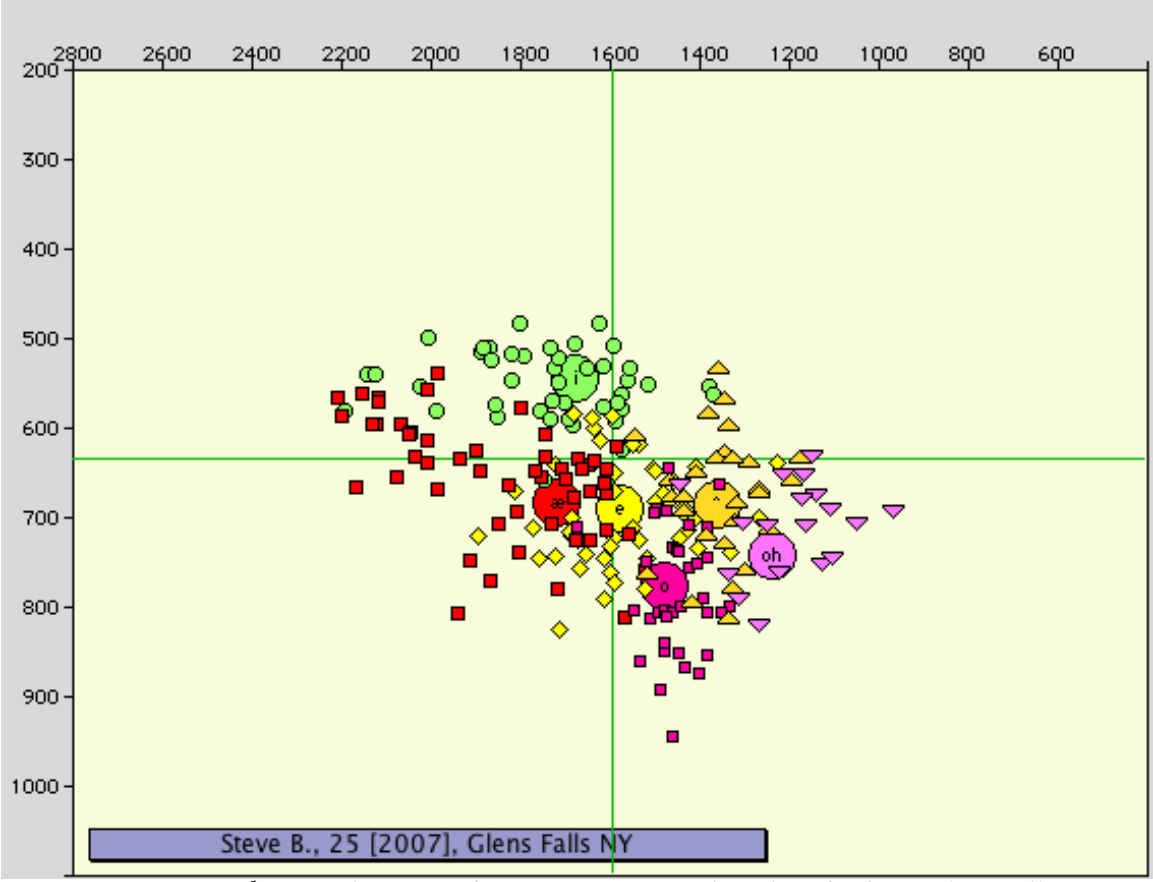


Figure 3.14. The vowel system of Steve B., an unemployed roofer from Glens Falls. red = /æ/; orange = /ʌ/; yellow = /e/; green = /i/; purple = /oh/; magenta = /o/

To get a more gradient view of communities' different degrees of participation in the NCS, we will use a quantitative version of the EQ criterion—the EQ1 index. This is simply the difference in F1 between mean /e/ and /æ/—positive if /æ/ is higher, and negative if /e/ is higher. For instance, Dennis C.'s EQ1 index is –4; Steve B.'s is +6; Janet B.'s is +280; and Emily R.'s is –150.

The EQ1 index was selected, rather than gradient versions of the other four NCS criteria (that is, the F2 distance between /e/ and /o/, the F1 value of

/æ/, and so on), for several reasons. First, the raising and tensing of /æ/ is often described (by *ANAE*, for example) as the *first* stage of the NCS. If this is the case, the presence of /æ/-tensing will be the most important diagnostic of the NCS: if a community participates in the NCS at all, it ought to show some degree of raising of /æ/. Moreover, if a speaker or community is still in an incipient stage of the NCS, they may show a small degree of raising of /æ/ that might escape coarse measures like the EQ and AE1 criteria but be visible quantitatively.

The distance in F1 between /æ/ and /e/ also shows greater variability from community to community than do the quantitative equivalents of the other four NCS criteria. According to an ANOVA analysis, the EQ1 index has an *F* ratio greater than 10—that is to say, the differences in EQ1 index from community to community are overall more than ten times as great as the variation found within the individual communities. The other four quantitative equivalents have *F* ratios between approximately 3 and 8, and therefore the EQ1 index does the best job of distinguishing between the communities sampled.[7] Since the aim of this chapter is to group the communities into dialectological categories, it will be most illuminating to focus on the index that makes the sharpest distinctions between communities.

3.3.2 Results of the EQ1 index

Figure 3.15 displays the EQ1 indices of all 98 speakers in the twelve communities being examined; Table 3.16 shows the mean EQ1 index for each

[7] All of these *F* ratios are statistically significant at the $p < 0.001$ level or better—that is to say, there are significant differences between communities in all five gradient NCS criteria.

community. It is fairly clear from Figure 3.15 that the twelve communities in the data are divided by the EQ1 index into two sets of six. In the six communities on the left side of Figure 3.15—Utica, Gloversville, Sidney, Watertown, Glens Falls, and Ogdensburg—all speakers in the data have EQ1 indices greater than –88. On the right, in Oneonta, Cooperstown, Amsterdam, Canton, Poughkeepsie, and Plattsburgh, all speakers in the data except one have EQ1 indices less than –37. The average of these two limits is –62.5, which can serve as a rough boundary between a "high" range of EQ1 indices, –62 and up, and a "low" range, –63 and below. In the six communities on the left side of Figure 3.15, only six speakers have low EQ1 indices; in the six communities on the right, only five speakers have high EQ1 indices. This means a total of only eleven of these 92 speakers fall on the "wrong" side of the –62.5 line between the high-EQ1 communities and the low-EQ1 communities. So the distinction between the high- and low-EQ1 communities is a fairly clear one.

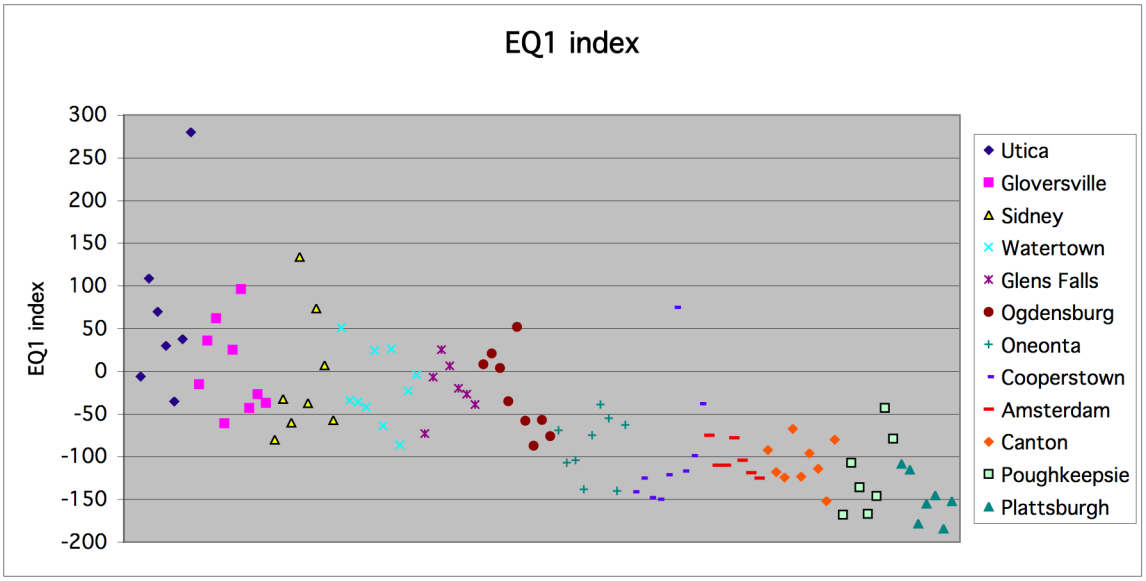


Figure 3.15. EQ1 indices for all speakers in communities with 7 or more speakers sampled. Communities are ordered from left to right by mean EQ1 index; within each community, speakers are ordered by age, with the youngest on the left.

Table 3.16. Mean EQ1 index for each community with seven or more speakers sampled.

community	mean EQ1	st. dev.	*n*
Utica	+69	104	7
Gloversville	+4	53	9
Sidney	–6	74	8
Watertown	–19	43	10
Glens Falls	–19	32	7
Ogdensburg	–25	48	9
Oneonta	–88	36	9
Cooperstown	–96	73	9
Amsterdam	–103	19	7
Canton	–107	26	9
Poughkeepsie	–121	47	7
Plattsburgh	–148	29	7
Telsur Inland North	+22	72	61
Telsur non–IN	–111	55	385

Moreover, the two sets of six communities are not only distinct from each other but relatively homogeneous within themselves. An ANOVA analysis reveals that the variation in EQ1 index among Utica, Gloversville, Sidney, Watertown, Glens Falls, and Ogdensburg is not quite sufficient to reach the level of significance ($p \approx 0.051$)[8]. Likewise, *t*-tests find no significant difference between any pair of these six high-EQ1 communities; the pair closest to being significantly different is Utica and Ogdensburg ($p \approx 0.056$). Similarly, ANOVA finds no significant difference ($p > 0.12$) among the six low-EQ1 communities—Oneonta, Cooperstown, Amsterdam, Canton, Poughkeepsie, and Plattsburgh—although *t*-

[8] Obviously *p* values just barely over 0.05 do not demonstrate that there is no real difference between communities. They do, however, indicate that if there is a real difference between communities, it is likely to be a relatively small difference compared to those that do achieve significance on data sets of similar size.

tests show that Plattsburgh has lower EQ1 indices than both Oneonta and Amsterdam at the $p < 0.01$ level.[9]

It is reassuring that the two sets of six communities into which the EQ1 index partitions the data are similar to the groups into which the communities were classified above according to the five categorical criteria. Oneonta, Amsterdam, Canton, Poughkeepsie, and Plattsburgh, which were grouped as resembling Western New England in the previous section, appear together on the right side of Figure 3.15; Gloversville, Watertown, Glens Falls, and Ogdensburg, classified as "fringe" Inland North, all appear on the left side of Figure 3.15. Utica, rather than having distinctly higher EQ1 indices than the fringe cities in general, occupies a similar range with only one high outlier, and is not significantly different at the $p < 0.05$ level from any of them.[10]

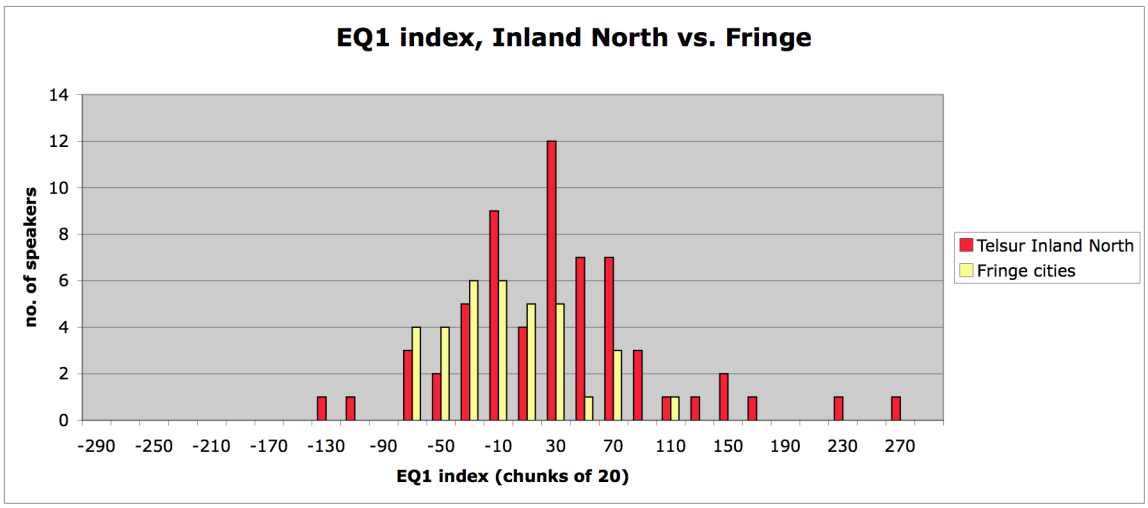


Figure 3.17. A histogram of the EQ1 indices of speakers in the Telsur Inland North cities and this study's "fringe" cities. Each column along the horizontal axis represents a range of 20 Hz in EQ1 index—so the tallest red column represents 12 Telsur Inland North speakers whose EQ1 indices are between +11 and +30.

[9] The standard used for significance here is $p < 0.01$ instead of $p < 0.05$ because fifteen *t*-tests must be carried out to search for significant differences among six communities; a large number of *t*-tests increases the probability of p being less than 0.05 accidentally.

[10] By contrast, the range of NCS scores for Utica is higher than even the highest-scoring fringe city—from three to five rather than from two to four—and is different at the $p < 0.02$ level from both Ogdensburg and Watertown.

The fringe cities' EQ1 indices justify identifying them as basically affiliated with the Inland North region, rather than merely being an intermediate category between the Inland North and Western New England that is not more closely associated with either one. Figure 3.17 shows that, although the mean EQ1 index of the fringe cities is slightly below that of the Telsur Inland North sample, they are well within the general EQ1 distribution of the Inland North overall; in fact, the mean EQ1 index of the fringe cities is –15, only half a standard deviation below the mean of the Telsur Inland North speakers. So the fringe cities can be identified as a set of communities which basically pattern as part of the Inland North, but are slightly less advanced in its key NCS features than the core Inland North region defined in *ANAE*.

Likewise, the five communities that were classified above as fitting more or less within *ANAE*'s Western New England region in their NCS scores resemble Western New England in EQ1 index as well. Figure 3.18 demonstrates how the EQ1 indices of Oneonta, Amsterdam, Canton, Poughkeepsie, and Plattsburgh (mean: –112) match the range of those of the thirteen Telsur speakers from Western New England (mean: –88); although Western New England appears to have a slightly higher mean, the difference is not significant. From comparing Figures 3.17 and 3.18, whose horizontal axes are drawn to the same scale, it is also clear that Western New England and these five cities in New York do *not* lie within the general range of the Inland North. Indeed, the distribution of EQ1 indices in Oneonta, Amsterdam, Canton, Poughkeepsie, and Plattsburgh is typical of non–Inland North communities—the mean EQ1 index of the 373

Telsur speakers outside the Inland North and Western New England is –111, almost exactly the same as these five New York communities.

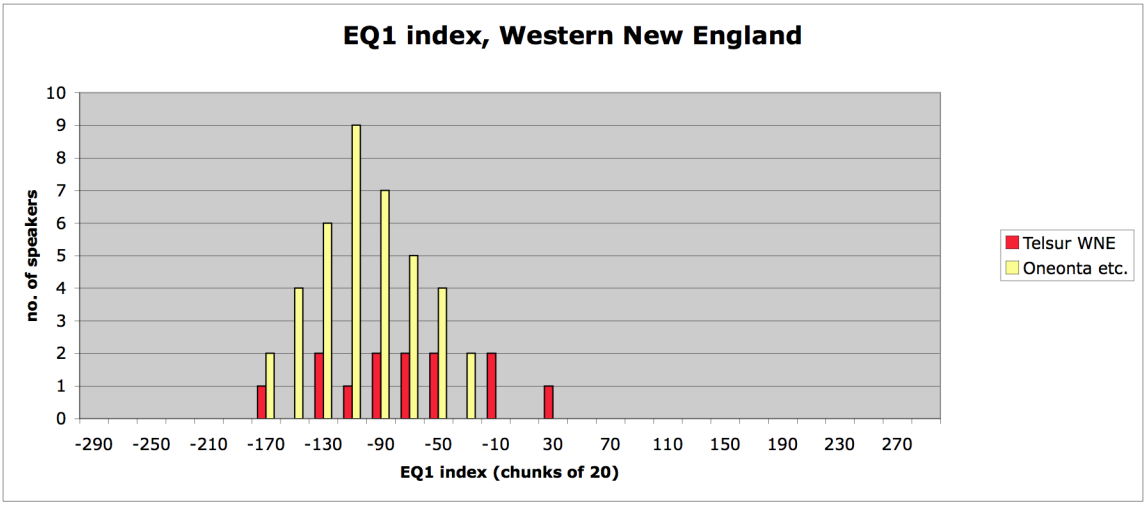


Figure 3.18. A histogram comparing the EQ1 indices of the Telsur speakers in Western New England with Oneonta, Amsterdam, Canton, Poughkeepsie, and Plattsburgh collectively.

3.3.3. Change in apparent time

Sidney and Cooperstown, the two villages identified above as undergoing change in apparent time away from the NCS based on their NCS scores, do not clearly exhibit the same behavior in the EQ1 index. Neither Sidney nor Cooperstown exhibits a statistically significant Pearson correlation of EQ1 index with year of birth or *t*-test contrast of EQ1 index between older and younger speakers. In particular, in Sidney, all of the three speakers with positive EQ1 indices were born before 1960; but the *t*-test comparing older and younger speakers' EQ1 indices yields $p \approx 0.084$. This does not necessarily indicate that retreat from the raising of /æ/ over /e/ is not part of Sidney's retreat from the NCS as a whole. Indeed, there *is* a statistically significant difference between the older and younger speakers' F1 of /æ/ ($p \approx 0.03$): the three younger speakers

average 785 Hz, and the five older speakers average 677 Hz. So the NCS raising of /æ/ does appear to be being reversed in Sidney. However, the sparseness of the data makes it difficult to get a clear picture of the status of the NCS in Sidney. The younger speakers in Sidney have EQ1 indices between –32 and –80 and all have NCS scores of 2, making them resemble the low end of the Inland North fringe speakers and the high end of the Western New England–like communities; the speakers are therefore not obviously classifiable between the two categories.

In Cooperstown, where the apparent-time change in progress of NCS scores is much clearer than in Sidney, that change in NCS scores still doesn't translate into a significant correlation between EQ1 index and age. Cooperstown does differ from the other low-EQ1 communities on the right side of Figure 3.15 in the presence of a high outlier: Cooperstown and Utica are the only communities in the data to feature a speaker with an EQ1 index more than two standard deviations away from the community mean; and Cooperstown is the only one of the low-EQ1 communities to have a speaker with a positive EQ1 index (at +75, the fifth-highest EQ1 index in the entire 119-speaker data set, outside the EQ1 range of non–Inland North communities and even on the high side for the Inland North). Moreover, not only is the highest EQ1 index on the right side of Figure 3.15 in Cooperstown, but the second-highest is as well, at –38. So Cooperstown does appear to have more participation in NCS /æ/ raising than the other low-EQ1 communities. Although there is no significant correlation between age and EQ1 index in Cooperstown ($r^2 \approx 0.33$; $p \approx 0.11$), there is a strong correlation between height of /æ/ and age ($r^2 \approx 0.73$; $p < 0.005$). So in Cooperstown, like in Sidney, there is change in progress away from the raising of

/æ/ which is not reflected to a statistically reliable degree in the EQ1 index—perhaps because of noise introduced by random variation in F1 of /e/ (which, however, is not itself visibly undergoing change in progress in either village.)

Cooperstown was described above as undergoing a change away from being an Inland North fringe community like Watertown, on the basis that its older speakers' scores ranged between two and four. This diagnosis is less clear from the perspective of the EQ1 index, however: While the older Cooperstown speakers who score three and four have the two highest EQ1 indices (+75 and –38, as mentioned above), the EQ1 indices of the three speakers who score two are all below –95, well outside the range of even the lowest fringe city. This suggests that by 30 years ago Cooperstown might already have not been a typical Inland North fringe community; it had a much lower range of EQ1 indices even then. It may have been a village mixed between NCS and non-NCS communities, or one whose phonological system was already in flux. The strange status of Cooperstown will be discussed further in Chapter 5.

It was conjectured above that Oneonta might be undergoing change in away from the NCS, based upon some ambiguous apparent-time statistical results for NCS score, F2 of /o/, and F1 of /æ/. In keeping with that conjecture, Oneonta has the highest mean EQ1 index of any of the low-EQ1 communities on the right side of Figure 3.15, and a statistically significant difference in mean age ($p < 0.005$) between the four speakers with EQ1 indices below –100 and the five above –100.[11] The higher end of the range of EQ1 indices in Oneonta roughly overlaps with the lower end of the ranges of Sidney and other high-EQ1

[11] But not a significant difference in EQ1 index between older and younger speakers.

communities. If, however, Oneonta is (like Sidney) a former NCS community now trending away from the NCS, that trend began long enough ago that no sign remains of the high EQ1 indices and NCS scores that are present among some older speakers in Sidney. The highest EQ1 index found in Oneonta is –39—not low by any means, but certainly within the range of what's found in Western New England. These patterns are suggestive but in my opinion not altogether convincing, and, though keeping them in mind, we will continue to treat Oneonta as a non–Inland North city.

Two communities do show statistically significant correlations at the $p < 0.05$ level between age and EQ1 index, and they are both communities where there is one age outlier 37 years older than the next older speaker in the sample. As mentioned above, Utica is such a city: Janet B., the Utica speaker born in 1942, has an EQ1 index of +280; all the other speakers in Utica were born between 1979 and 1989 and have EQ1 indices between –35 and +109. If Janet is removed from the sample, there is no age correlation among the remaining six younger speakers. Janet herself may be merely an outlier here: not only is her EQ1 index the highest in this dissertation's sample (by a margin of 146 Hz!), but it is higher than *any in the Telsur corpus* as well. In fact, there are only two speakers in the Telsur corpus even within 100 Hz of Janet B.'s EQ1 index (one in Buffalo and one in Detroit, Mich.). Janet's anomalously high EQ1 index, the lack of any other speakers sampled near her age in Utica, and the lack of any age correlation among the six younger speakers makes it tempting to conclude that there is no real correlation between EQ1 index and age in Utica, and this is the one-in-fifty case when a $p \approx 0.02$ correlation ($r^2 \approx 0.70$) is illusory. However, even if we do

regard this as an authentic change in progress away from extremely high EQ1 indices, there is no indication that Utica is abandoning its Inland North status; the range of the younger speakers from –35 to +109 is quite typical of the Inland North as a whole. So if there has been change in progress in the EQ1 indices of Utica, it appears to have stabilized well within the usual Inland North range.

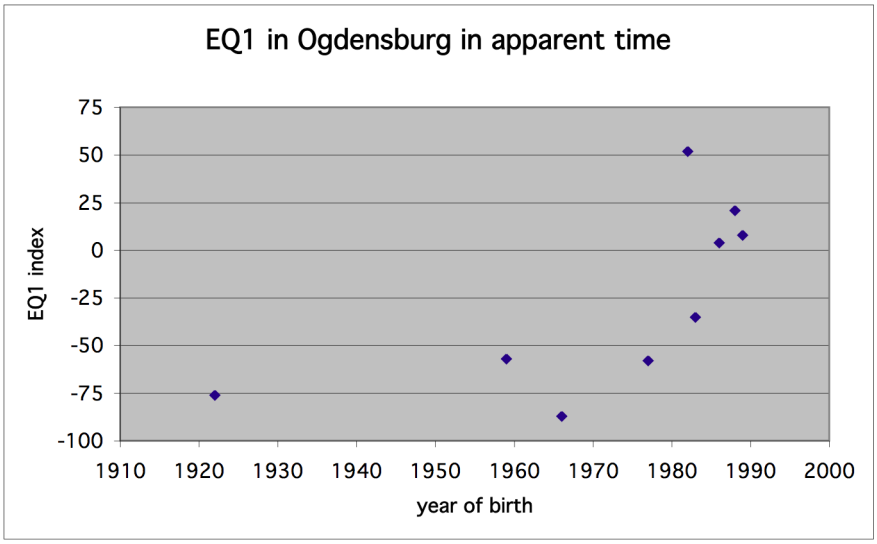


Figure 3.19. EQ1 index by year of birth in Ogdensburg.

In Ogdensburg, there is a clear and significant trend towards *higher* EQ1 indices ($r^2 \approx 0.45$, $p < 0.05$), as shown in Figure 3.19. As seen above, Ogdensburg had a trend toward higher NCS scores as well, but the statistical significance of that disappeared when the oldest speaker (Wanda R., a former waitress born in 1922) was excluded. For the EQ1 index, however, however, the correlation is robust among the seven speakers born after 1958—in fact, excluding Wanda R. *strengthens* the correlation up to $r^2 \approx 0.54$. On the other hand, there is *no* statistical relationship between age and F1 of /æ/ itself, as there is in Utica, Cooperstown, and Sidney. The increase in EQ1 index in Ogdensburg, therefore, must be due to change in progress in F1 of /e/. Indeed, F1 and F2 of /e/ are both significantly

correlated with age in Ogdensburg, as shown in Table 3.20. So the aspect of the NCS that is still robustly in progress in Ogdensburg is not the raising of /æ/, but the lowering and backing of /e/; the raising of /æ/ has apparently already gone to completion. Ogdensburg is the only single community in the data in which F1 or F2 of /e/ is correlated with age at the $p < 0.05$ level.

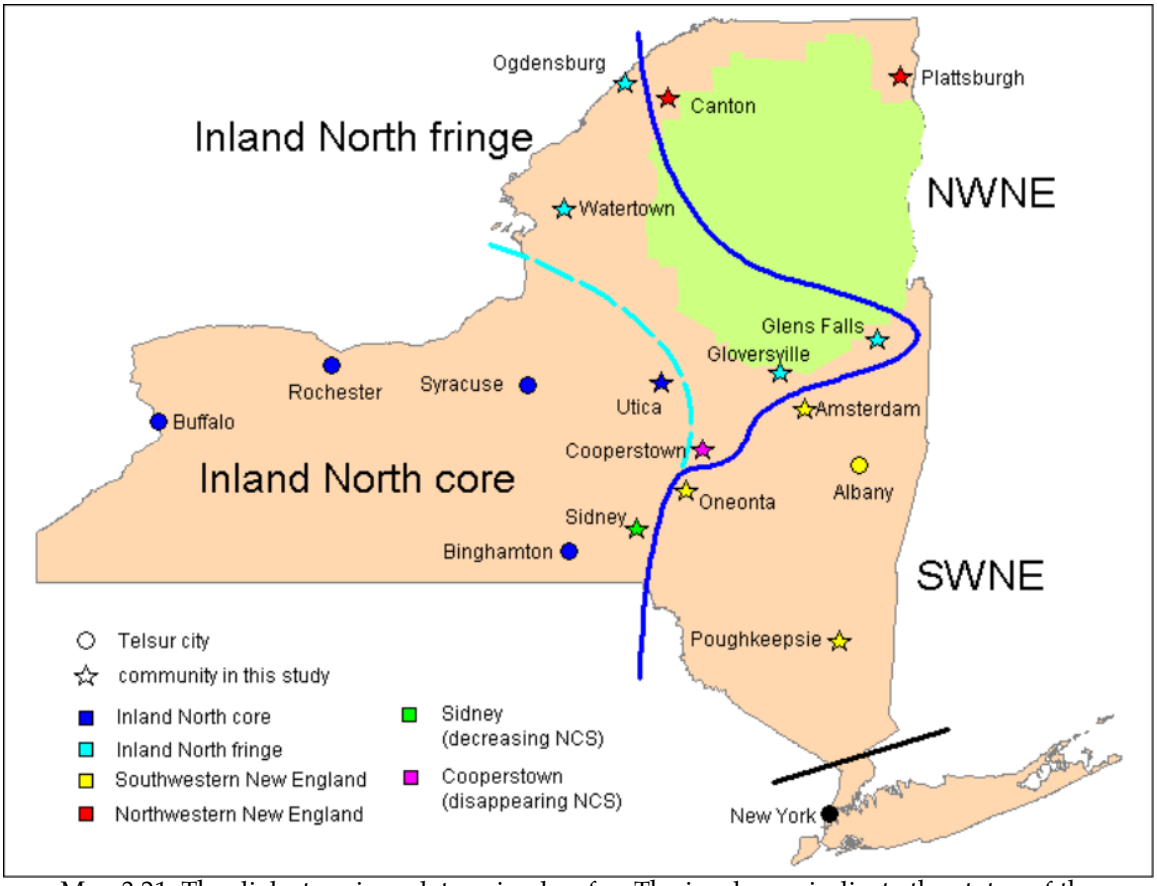
Table 3.20. F1 and F2 of /e/ in Ogdensburg.
F1: $r^2 \approx 0.52$, $p < 0.03$ F2: $r^2 \approx 0.76$, $p < 0.005$

year of birth	/e/ F1	/e/ F2
1922	631	1968
1959	664	1721
1966	664	1601
1977	641	1744
1982	734	1582
1983	731	1493
1986	714	1566
1988	685	1643
1989	713	1464

3.4. Mapping the results

3.4.1. Summary of classification

To sum up, the NCS scores and EQ1 indices together allow us to categorize the twelve communities with seven or more speakers sampled as follows. The Inland North region, where the NCS has a major presence, can be subdivided (in upstate New York, anyhow) into "core" and "fringe" areas. In the core, all or nearly all speakers score three or more, while in the fringe, almost all speakers score between two and four, placing the fringe intermediate in score between the Inland North core and Western New England. The fringe agrees with the Inland North core, however, in its distribution of EQ1 indices.



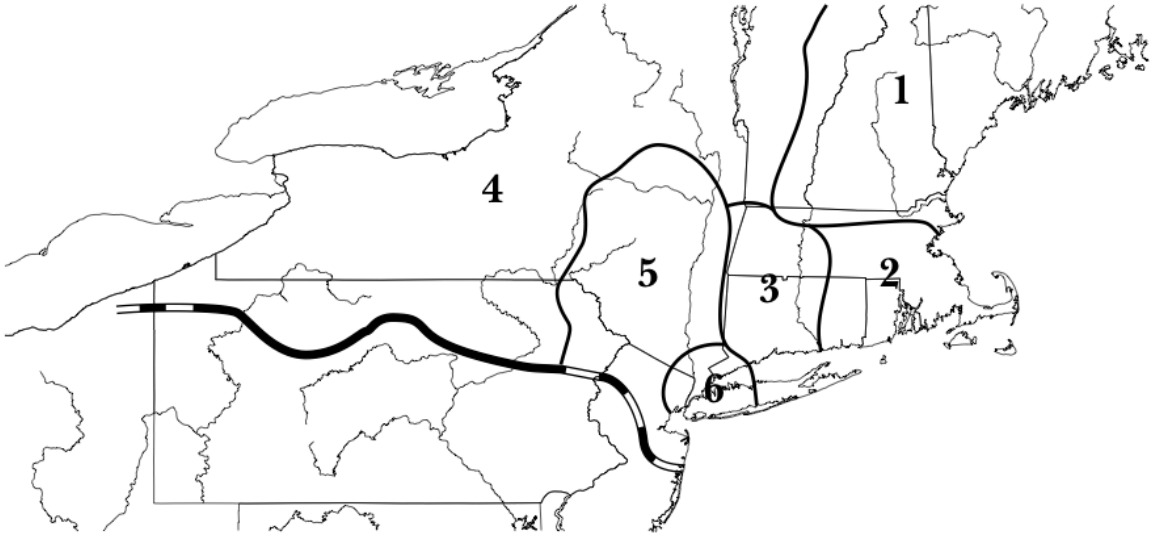
Map 3.21. The dialect regions determined so far. The isoglosses indicate the status of the communities *before* the start of the changes in progress in Cooperstown and Sidney: the dark blue line indicates the limit of the Inland North as a whole, and the light blue line separates the Inland North core from the fringe.

In this data set, Utica is a core Inland North city, and Gloversville, Glens Falls, Watertown, and Ogdensburg are Inland North fringe cities, with the shift possibly still in progress in Ogdensburg. Sidney appears to have been originally in the Inland North core, but the NCS is weakening there, leaving younger speakers as part of the fringe at best. Oneonta, Amsterdam, and Poughkeepsie pattern with Southwestern New England, and Plattsburgh and Canton more or less with Northwestern New England. Cooperstown appears to be an originally Inland North fringe community which is now retreating from the NCS quite rapidly; it is becoming more like Plattsburgh and Canton than any other

communities in this study, although it is not near the northern border of New York like they are. Map 3.21 displays the dialect regions of Upstate New York as determined by this analysis.

3.4.2. The Hudson Valley

ANAE does not identify any other dialect regions between the Inland North and Western New England. The discussion so far in this chapter has more or less agreed with that position, finding Amsterdam, Oneonta, and Poughkeepsie to be relatively similar to Southwestern New England and Canton and Plattsburgh relatively similar to Northwestern New England. However, the southeastern boundary of the combined Inland North fringe and core regions on Map 3.21, separating Sidney, Cooperstown, Gloversville, and Glens Falls on the one hand from Oneonta and Amsterdam on the other hand, seems to correspond roughly to the northeastern boundary of the Hudson Valley region determined by Kurath (1949). Map 3.22 (previously shown as Map 1.3 in Chapter 1) is a copy of Boberg (2001)'s reconstruction of the boundaries Kurath assigns to his Hudson Valley dialect area and adjacent regions. The general location of the boundary between regions 5 and 4 on Map 3.22 does indeed seem, impressionistically, fairly similar to that of the boundary on Map 3.21 between the communities associated with Southwestern New England so far in this chapter and those assigned to the Inland North core or fringe. This suggests, of course, that it is the same boundary; the lexical boundary of the 1940s has become a phonetic or phonological boundary by the 2000s.



1. Northeastern New England
2. Southeastern New England
3. Southwestern New England
4. Upstate New York and western Vermont
5. The Hudson Valley
6. Metropolital New York

Map 3.22. Figure 2 from Boberg (2001), based upon Figure 3 from Kurath (1949). Kurath's lexical dialect regions of New York and New England.

It is difficult to establish exactly which communities Kurath meant to include in the Hudson Valley region: the map on which Kurath presents these regions' boundaries includes no cities or landmarks other than a few sketchily (and none-too-accurately) drawn rivers. Boberg's version of the map is somewhat better, at least in that it shows the rivers more clearly and accurately; but the relationships shown on it between the dialect boundaries and the rivers must be taken with a grain of salt simply because the boundaries are copied from Kurath's own very imprecise map. Based on the positions of the rivers in Boberg's redrawing, Kurath's Hudson Valley region seems to just barely exclude Glens Falls, Utica, and Sidney, and just barely *include* Gloversville and Cooperstown, as well as Oneonta. But due to the overall imprecision of Kurath's map, the precise sets of communities that it appears to include in or exclude from

the Hudson Valley region are of less importance than the fact that the Hudson Valley region seems to correspond fairly well as a general region to the area in southeastern New York excluded from the Inland North fringe and core on Map 3.21, based on the communities sampled in this study.

These communities, of course, were found above to be overall relatively similar to the *ANAE* Southwestern New England communities with respect to the NCS features being examined; and so the question of whether a present-day dialect boundary exists between the Hudson Valley and Southwestern New England has yet to be answered. However, the similarity of Kurath's Hudson Valley boundary to the boundary on Map 3.21 suggests giving Kurath the benefit of the doubt. In that spirit, we will take a cue from Kurath, and identify the region containing Poughkeepsie, Amsterdam, and Oneonta—defined generally as the area of New York state north of the New York City dialect region and southeast of the Inland North fringe, showing NCS scores mostly around 2 and relatively low EQ1 indices—as the Hudson Valley.

3.4.3. Boundaries and communication patterns

At first glance, Map 3.21 seems to indicate that there is a gradual transition between the Inland North and Hudson Valley—from, for example, Utica (core Inland North, full NCS) eastward to Gloversville (fringe Inland North) to Amsterdam (non–Inland North, but with relatively high scores for a non–Inland North city) to Albany and Western New England proper; or from Binghamton (core) to Sidney (diminishing NCS) to Oneonta (weak indications of

diminishing NCS), and so on. Given the observations above that the Hudson Valley appears phonologically similar to Southwestern New England, this is consistent with Boberg (2001)'s conclusion that there is no phonological difference between the Inland North and Southwestern New England. Thus the Hudson Valley should be regarded as basically an extension of the Inland North that the NCS hasn't had its full effect on. But there are irregularities and discontinuities in this picture which suggest that a gradual transition is not the whole story.

Most noticeable is the irregularity in the border itself—the Inland North fringe extends almost all the way to the Vermont border at Glens Falls; but further north or south, at Plattsburgh, Albany, or Poughkeepsie, the NCS is not found anywhere near so far east. Now, there's no reason at all for a gradual transition between the Inland North, the Hudson Valley, and Western New England to imply that the outer boundary of the NCS must be at a uniform distance from the edge of New York State at every latitude; but it still seems in need of some explanation that at Glens Falls the fringe extends so much further from the Inland North core than it seems to anywhere else. If the Inland North fringe, as Boberg's analysis might suggest, is merely the advancing expansion of the NCS towards the Western New England territory that is open to it, then we would expect the fringe to extend furthest from the core along the major routes of communication and travel between the Inland North core and the Hudson Valley—much as, in Illinois, NCS features are expanding outside of the Inland North via the communities along Interstate 55 between Chicago and St. Louis (Labov 2007).

In the case of the Inland North fringe, the chief route of east-west communication and travel is either the New York State Thruway (Interstate 90) or—if we allow for the eastward spread of NCS-like features earlier than the NCS was first reported—the Erie Canal and Mohawk River, and the railroads that follow the Canal. However, neither the Thruway nor the Erie Canal and Mohawk River quite follow the direction of eastern extent of the Inland North fringe. While the Thruway, Canal, and Mohawk, heading east from Utica, pass through Amsterdam and Albany, the Inland North fringe bypasses both Amsterdam and Albany and includes Gloversville and Glens Falls, both some distance to the north. So the eastern edge of the Inland North does not support the hypothesis of NCS features spreading from the east through a dialect continuum that is phonologically open to it.

Another aspect of the relationship between Gloversville, Amsterdam, and Albany seems to call into question the importance of present-day communication patterns in determining the boundary of the Inland North. Gloversville and Amsterdam are quite close together—less than 15 miles apart by road, with three or four sparsely-populated towns in between them—and yet the difference between them in this data set is fairly stark: Gloversville has the highest mean score of any Inland North fringe city, while Amsterdam has no speakers scoring above two; and the two cities' EQ1 indices don't overlap at all (Gloversville's lowest is –61 and Amsterdam's highest is –75). Even more important than the two cities' mere proximity is their regional orientation, as reflected by the interview subjects' responses to questions about their local travel habits. Gloversville and Amsterdam are both regionally affiliated with the Albany area:

residents of both cities watch television channels that broadcast out of Albany[12], read newspapers from Schenectady (which is midway between Albany and Amsterdam on the Thruway), and travel to Albany and Schenectady to go shopping. Each of the twelve in-person interview subjects in Amsterdam and Gloversville reported frequent trips to Albany, Schenectady, or both.[13] But although Amsterdam and Gloversville are both part of the greater metropolitan area of Albany and subject to Albany's regional influence, Amsterdam is part of the same general "Southwestern New England" dialect group as Albany and Gloversville isn't. Similarly, Oneonta appears to be regionally more oriented toward Binghamton than toward Albany, and receives Binghamton and Utica television stations, but does not appear to be subject to the NCS as Binghamton and Utica are. So the present-day regional affiliations and communication patterns of small and medium-sized Upstate New York cities are not a good predictor of which will are included in the Inland North region and which aren't; the spreading of the NCS does not seem to be effectively determined merely by channels of communication.

[12] For example, the Time Warner Cable web site at *timewarnercable.com* lists almost the exact same set of channels available in Gloversville as in Amsterdam; all of the broadcast channels listed are licensed to Schenectady, Albany, or points even further east, except for one local station licensed to Gloversville.

[13] By contrast, all but two said they very rarely or never go to Utica, the next closest larger city and the nearest known Inland North core community.

3.5. Settlement of the communities in the sample

3.5.1 Historians' descriptions of settlement patterns

Kurath (1949) states that "there can be no doubting the fact that the major speech areas of the Eastern States coincide in the main with settlement areas and the most prominent speech boundaries run along the seams of these settlement areas." A striking example of this in Kurath (1939)'s work is the linguistic and settlement boundary between Eastern and Western New England. As for the topic of the current study, *ANAE* and Boberg (2001) contend that the settlement history of upstate New York is important in explaining the origin of the NCS: Boberg focuses on the role of western New England as a "staging ground" for the Anglophone settlement of the Inland North to explain the phonological similarity between the two regions, and *ANAE* argues that the tensing of /æ/ was made possible by the settlement boom drawn into central and western New York by the construction of the Erie Canal. This suggests that the early settlement history of the twelve communities examined so far in this chapter could illuminate the distribution of dialect boundaries.

What is now New York State was founded in the 1620s as a Dutch colony named New Netherland, and only came under English control in 1664. During the New Netherland period, the Dutch founded towns along the Hudson River that still exist today, including not only New York City (then called New Amsterdam) but as far north as Schenectady and Albany (then called Beverwyck). Even after the English gained control of the colony and changed its name and that of its chief city to New York, the Dutch population remained

mobile and new towns were founded by Dutch settlers and their descendants. Poughkeepsie is one such: it was first settled by Dutch families in the 1680s, and Dutch was the main language of Dutchess County[14], of which it is the seat, until almost the 1770s (Platt [1905] 1987).

Amsterdam, although founded much later than the period of Dutch colonial dominance, was another community subject to Dutch influence and settled by the descendants of Dutch settlers, as its name suggests. Amsterdam was founded in the late 18th century (Farquhar & Haefner 2006), and Dutch families such as the Vedders and Hagamans were leaders of the community for several decades (Donlon 1980). At the time when the name of the town was changed from Veddersburg to Amsterdam in 1804, out of recognition for the strong Dutch influence in the community, "the hamlet had acquired a considerable population, with an almost equal proportion of Dutch and Yankees" (Frothingham 1892b).

How, then, does Gloversville differ from Amsterdam? After the American Revolutionary War in the 1770s, the location which would become Gloversville was basically depopulated. The settlement which led to the present-day city was not composed of descendants of the original Dutch New Netherland settlers, but rather by westward migrants from New England: Frothingham (1892a) writes: "The immigration was largely of Anglo-Saxon elements. The Dutch and Germans of the Mohawk Valley were already dwelling upon richer lands. The New Englander, however, was naturally restless." In particular, "among the early

[14] Despite the spelling, the name "Dutchess" has nothing to do with the Dutch; the county was named by the English in honor of the Duchess of York. The counties of New York State are shown on Map 1.4 in Chapter 1.

settlers the Connecticut influence seems to have been strongest. A large element of the population came from the neighborhood of Hartford, and especially from West Hartford." So the difference between Gloversville and Amsterdam is in their sources of settlement: while Amsterdam, like Albany and Poughkeepsie, had from its earliest days a large and influential Dutch population, Gloversville had very little influence from the early Dutch settlements of New York; its population was derived mostly from New England in general and Connecticut in particular. This supports Boberg's conclusion that settlement from Western New England supplied the necessary preconditions for the NCS in the Inland North—in Gloversville, a city settled from Southwestern New England, the NCS is present; in Amsterdam, with little or less Western New England settlement history and substantial New Netherland Dutch influence, the NCS is absent.

This pattern can be tested on the other communities. The area that would become Glens Falls was first settled in 1763 and 1783 by Quakers from Quaker Hill in the present-day town of Pawling in Dutchess County (Brown 1963). Although Dutchess County was part of the original Dutch settlement area, the Quakers of Quaker Hill had settled there after migrating from New Milford and Danbury, Connecticut (Hyde 1936). Moreover, beginning in 1784, Glens Falls had additional settlers originating from Connecticut in addition to the Quaker Hill Quakers, according to the Glens Falls Historical Association (1978): "Joining the Quakers were Yankees, many from Connecticut, in a migration that went on unabated until nearly 1850. For many of these sojourners, residence here was temporary as families continued a westward trek" to western New York and Michigan; this was the start of a "surge of growth" of the community. In other

words, Glens Falls was not only settled by people from Southwestern New England, but those very same Southwestern New Englanders who would go on from there to populate the core of the Inland North.

Utica was first settled in the 1790s, and by 1800 the population was "in main part from New England" (Roberts 1911). Utica lies on the eastern edge of Oneida County (of which it is the seat), and was part of the town of Whitestown before it was incorporated as a separate town; Whitesboro, the town center of Whitestown, lies three miles west of what is now the center of Utica. According to Ryan (1983), "almost 90% of the pioneer families of Whitestown came from Connecticut or Massachusetts." Moreover, Durant (1878) suggests that the line that became the eastern boundary of Utica and of Oneida County was drawn deliberately in such a way as to exclude the nearby Dutch-origin settlements:

> It is recorded by Dr. Bagg that, when Whitestown was erected into a separate township, the east line was located with the view of cutting off the Dutch inhabitants of Deerfield, leaving them still in the original district of German Flats. The line was located through the influence of Whitestown, which was settled by Yankees. When Oneida County was organized in 1798, the east line was located where it is at the present time.

So the earliest settlers of Oneida County in general were on the Yankee side of the line separating the Yankees of Whitestown from the Dutch of German Flatts, in Herkimer County.

Watertown, on the Black River in Jefferson County, was first settled in 1800 (Gould 1969), not long after Whitestown, Utica, and Oneida County themselves were founded. The first landowners in Watertown came "mostly from Oneida County" (Hough 1854), meaning Watertown's early population likewise came principally from the Southwestern New England Yankee side of

the Oneida-Herkimer county line. The web site of the city of Watertown[15] describes the city as having been settled by "New England pioneers".

The available information on Ogdensburg is slightly less detailed. Merriam (1907) writes the following:

> Between 1802–1807, the tide of emigration from New England poured into the Black and St. Lawrence River valleys, which, especially the former, settled with a rapidity seldom equalled[…]. A few of the first settlers with their families entered by the tedious and expensive waterway up the Mohawk to Fort Stanwix, now Rome, thence by canal through Wood Creek, Oneida River and Lake, Oswego River, Lake Ontario and the St. Lawrence to their destination. Others by the equally toilsome and more dangerous route from Lake Champlain up the St. Lawrence.

This does not state exactly what part of New England the preponderance of Ogdensburg's settlers came from. On the one hand, the migration via Rome, in Oneida County, up the Mohawk River, suggests that those settlers were part of the same stream of migration as that which settled Oneida County itself. Indeed, Merriam seems to suggest that the St. Lawrence and Black River valleys were settled as part of the same flow of population movement; with Ogdensburg on the St. Lawrence and Watertown on the Black, this is consistent with the idea that Ogdensburg, like Watertown, was settled largely by Southwestern New England–origin populations. On the other hand, Merriam also mentions settlers coming to Ogdensburg via Lake Champlain, on the Vermont–New York border, which suggests migration from Northwestern New England. However, there is at least some plausible evidence for Southwestern New England origins in Ogdensburg's population.

Thus Ogdensburg, Watertown, Utica, Glens Falls, and Gloversville—all of the cities categorized in this paper as linguistically part of the Inland North core

[15] *http://www.citywatertown.org/index.asp?NID=411* , viewed on 19 December 2008.

or fringe—appear to have been settled predominantly from New England, and most probably Southwestern New England. The communities which are undergoing change in apparent time away from the NCS appear to be the same. With respect to Cooperstown, Cooper (1838) himself writes "During the summer of 1787, many more emigrants arrived, principally from Connecticut, and most of the land on the patent was taken up."

Sidney is located on the Susquehanna River at the northwestern corner of Delaware County, and was part of the town of Franklin until it was incorporated separately in 1801 (*History of Delaware County* 1880). Although Sidney is not mentioned by name, in Murray (1898) we read the following:

> The great mass of the early settlers in Delaware county were from New England.... From the earliest times there was a continuous stream of emigration from the colonies and states of New England, first into eastern New York, then into western New York, and still later into Ohio, Indiana, Illinois and farther west. There was a time, just subsequent to the Revolutionary war, when many of these restless and adventurous New Englanders sought homes near the headwaters of the Susquehanna and the Delaware rivers. The immense town of Franklin which at its organization contained thirty thousand acres of land was largely settled by New Englanders. Sluman Wattles the first settler came thither from Connecticut in 1785 accompanied by his brothers and sisters, and followed by numerous friends who rapidly built up a thriving and intelligent community.... This auspicious beginning led many other New England families who were seeking new homes to come into the valleys of the Delaware and the Susquehanna.

So Delaware County in general was settled from New England. As for Sidney in particular, the *History of Delaware County* (1880) lists the names of 29 pioneer settlers and settler families of Sidney, and mentions the origins of seven of them. Although one early Sidney family, the Sliters, was descended from the New Netherland Dutch, four of the seven are described as having come from Connecticut. One of the remaining two, Jonathan Carley, is described as having come from Dutchess County; however, the Delaware County Genealogy and

History web site displays a transcript of his 1832 war pension application[16] describing him as a native of Wilton, Connecticut before he moved to Dutchess County. The seventh, Isaac Hodges, is described as having come from the town of Florida in Montgomery County, New York, near Amsterdam; but a posting[17] on the genealogy web site *Ancestry.com* indicates that he was born in Connecticut as well. Among the 22 named settlers of Sidney whose geographical origins are not mentioned in the *History of Delaware County*, one is described as a cousin of the above-mentioned Sluman Wattles, who was from Connecticut; another is Jacob Bidwell, the first permanent settler of Sidney Center, who is listed on another genealogy web site[18] as a native of Connecticut. So it seems that we can state with some confidence that the earliest settlers of Sidney, like those of Cooperstown, were predominantly from Connecticut.

So, all of the communities in which the NCS is found in this study derived their early settlement primarily from New England, probably Southwestern New England. Among the non-NCS communities, Poughkeepsie and Amsterdam are both discussed above; Poughkeepsie was settled by Dutch families and Amsterdam was at least half Dutch in its early population. Plattsburgh's early settlers, as listed by Hurd (1880), seem to have been principally from Long Island. Of Oneonta, Campbell (1906) writes "The first settlers were mostly German Palatinates from Schoharie and the Mohawk"; the web site of the city of Oneonta[19] agrees with Campbell but adds the Dutch, saying "The first settlers to

[16] *http://www.dcnyhistory.org/milpensioncarleyjonathan.html*, viewed on 21 December 2008.
[17] *http://archiver.rootsweb.ancestry.com/th/read/HODGE/2006-01/1138520071*, viewed on 21 December 2008.
[18] *http://familytreemaker.genealogy.com/users/k/i/r/Kristen-Kirk-vantassle-IL/GENE3-0009.html*, viewed on 21 December 2008.
[19] *http://www.oneonta.ny.us/oneonta/historic.asp*, viewed on 21 December 2008.

make this area their home were Palatine Germans and Dutchmen from the Schoharie and Mohawk Valleys." Neither source lists New England as a major origin for the settlers of Oneonta, although a few of the individual Oneonta pioneers listed by Campbell have New England origins (just as one of the principal pioneers of Sidney has a Dutch background).

Canton is the fifth non-NCS community in this study, but unlike the four discussed in the preceding paragraph, it in fact was settled from New England. In particular, Hough (1853) writes of Canton that "in 1802, the town began to settle rapidly[…] most of them with families, and from Vermont". It is unsurprising to find that Canton was settled from Vermont, of course; Canton has been assigned in this chapter to the Northwestern New England dialect region, which to date has been described (Boberg 2001) as consisting essentially of western Vermont. So, unlike the preponderance of Inland North communities, which were clearly settled from Southwestern New England, Canton's settlement was derived principally from Northwestern New England. So, although the status of Ogdensburg is slightly unclear from the historical data, if we make the plausible conjecture that Southwestern New England was the principal basis of its settlement[20], we find the boundary of the NCS corresponds to the boundary of Southwestern New England settlement.

[20] The issue of Ogdensburg will be revisited below.

3.5.2. Communication patterns and villages

Inasmuch as the settlement described in the previous subsection took place in the early 19th century, 150 years before the NCS was first described, it is remarkable how stable the outer boundary of the Inland North must have been since that time, especially in the face of communication patterns crossing the boundary. However, the boundary is not completely stable; we can see communities in the data in which the NCS appears to be clearly receding in apparent time. Of the seven communities examined so far in this chapter where the NCS is attested, there are two where this trend is clear: Cooperstown and Sidney, both villages of less than 6,000 people. The other NCS communities are all cities of at least 12,000 people (Ogdensburg is the smallest).

This suggests a possibility that the Northern Cities Shift, as its name suggests, is only stable in cities, and villages in general retreat from it. This hypothesis per se seems extremely implausible—why should a hypothetical village in the middle of the Inland North core region, with no substantial contact with communities outside the Inland North, be expected to spontaneously abandon the NCS? Fortunately, there is a more plausible explanation for Sidney and Cooperstown's retreat from the NCS than merely that they are villages: they are both within 25 miles of Oneonta, which for both villages functions as the nearest city to which people travel for shopping, entertainment, and so on.[21] So it may be that while regional affiliation and contact with a major city does not visibly diminish the NCS in a medium-sized city (like Gloversville with respect

[21] The NCS has clearly diminished more rapidly and completely in Cooperstown than in Sidney; the difference between these two villages will be explored further in Chapter 5.

to Albany), contact with a medium-sized city like Oneonta can diminish the NCS in small villages that are regionally affiliated with it. To put it another way, regional affiliation can affect the NCS on the narrow local level of villages dependent upon nearby cities for commerce and the like, but not on the broader level of regional contacts between communities with their own commercial development. A small city may be more easily able to exert its dialectological influence on villages that are dependent on it than a large city can on smaller cities within its general region.

3.5.3. Interpreting the boundary between Ogdensburg and Canton

If the linguistic boundary is to match up entirely with the settlement history, what must be shown is that Ogdensburg was also settled principally from Southwestern, rather than Northwestern (or conceivably Eastern), New England. Sadly, the available data does not appear to clearly indicate what part of New England the preponderance of the settlers of Ogdensburg came from. The circumstantial evidence of the route via Oneida County suggests that Southwestern New England played at least some role. The route via Lake Champlain suggests migration from Vermont as well, like that in the settlement of Canton; however, the relative magnitudes of these two paths to Ogdensburg is not discussed by Merriam (1907). Moreover, the Lake Champlain path is also in principle consistent with migration from Southwestern New England—it would be a plausible path for a migrant from Connecticut to Ogdensburg to first go north to Lake Champlain and then turn west towards Ogdensburg.

The long campaign discussed by Hough (1853) to get a road built to connect Ogdensburg with Oneida County is not probative in either direction: the settlers of Ogdensburg might have wanted a road connection to Oneida County because heavy migration from Oneida County to Ogdensburg made it desirable to make the route easier to travel; or because travel between Oneida County and Ogdensburg had been so difficult as to have *prevented* substantial migration up to that point. So there appears to be no clear evidence of whether Ogdensburg was principally settled from northwestern or southwestern New England. Hough (1853) reports that an 1839 fire at Ogdensburg destroyed the town records, which may contribute to the difficulty here.

Ogdensburg is less than twenty miles from Canton; both are in St. Lawrence County. The nearest larger city in New York[22] to both of them is Watertown, about 60 miles away from each; residents of Ogdensburg and Canton report roughly the same travel patterns to Watertown and the nearby St. Lawrence County villages of Potsdam and Massena, much as Gloversville and Amsterdam display roughly the same travel patterns to Albany and Schenectady. Given that, there are two explanations for the linguistic difference between Ogdensburg and Canton that would be easily consistent with the other cities considered in this study. The first is merely that Ogdensburg was in fact principally settled from Southwestern New England, and the difference in settlement history accounts for the presence of the NCS in Ogdensburg (like in

[22] Ottawa, in the Canadian province of Ontario, is about the same distance from Ogdensburg as Watertown is, and slightly farther from Canton. The population of Ottawa is about 34 times that of Watertown.

the other Southwestern New England–settled communities) and its absence in Canton.

The other plausible explanation is that Ogdensburg, like Canton, was settled from Northwestern New England, and both Northwestern and Southwestern New England–origin settlements are both potentially subject to the NCS; but Canton either lost the NCS at some point too early to be detected while Ogdensburg retained it, or never developed it in the first place while Ogdensburg did. One argument for the plausibility of this hypothesis is the close dialectological and historical relationship between Northwestern and Southwestern New England. Boberg (2001) argues that the pre-*ANAE* dialectological research on New England shows no robust linguistic distinction between Northwestern and Southwestern New England at all; and he goes on to find the current boundary between the two regions (defined by the relatively recent expansion of the *caught-cot* merger) to be a gradual one. Indeed, according to Kurath (1939), Northwestern New England was itself principally settled from Southwestern New England, during the same time frame as the settlement of northeastern and central New York, which suggests that attempting to draw a distinction between settlement *from* Northwestern and Southwestern New England during that period may be somewhat artificial.

If settlement history does not motivate the difference between Canton and Ogdensburg, what does? One possibility is differences in community size. It was observed above that small villages whose settlement history places them within the Inland North, such as Sidney and Cooperstown, can retreat from the NCS; perhaps Canton—another village of less than 6,000—has already done the same.

Alternatively, according to the "cascade" model of the spread of linguistic change, which Callary (1975) found to apply to the NCS raising of /æ/ in northern Illinois, change in progress will reach larger cities first; perhaps the NCS, having spread to far northern New York only recently, reached Ogdensburg first and has not made it to Canton yet.

Neither of the two possibilities raised in the foregoing paragraph seems extremely convincing, however, chiefly because of the starkness of Ogdensburg and Canton's linguistic differences. The boundary between the two communities is quite sharp: Although in Ogdensburg some aspects of the NCS are still in progress, all the Ogdensburg speakers in the data except the very oldest score at least two, making it solidly an Inland North fringe community; while Canton has the lowest mean score of all the cities sampled, with only two out of nine speakers scoring as high as two. The communities also differ with respect to the *caught-cot* merger, as will be discussed in Chapter 5: in Canton, three of the nine speakers have /oh/ and /o/ merged, and five have them "close" or intermediate, while Ogdensburg has only three speakers intermediate and none fully merged. Meanwhile, although Ogdensburg is a city and Canton a village, Ogdensburg has scarcely more than twice Canton's population (12,364 and 5,882 respectively, as of the 2000 United States Census). Ogdensburg and Canton have roughly the same degree of contact with Watertown, the nearest larger NCS community, and they are relatively close in population; for this reason it seems likely that if the NCS were simply spreading to St. Lawrence County according to the cascade model, by the time it had reached a significant degree of advancement in Ogdensburg there would be at least some evidence of its

progress in Canton. But there's basically no sign of NCS influence in Canton; if anything, it shows less NCS than other non-NCS communities, such as Oneonta and Amsterdam, that are the same distance from NCS cities as Canton is.

The hypothesis that Canton, like Sidney and Cooperstown, has retreated from the NCS is not much more satisfying. This explanation of Cooperstown and Sidney's retreat from the NCS does not support the hypothesis that Canton has abandoned the NCS as well. The two nearest small to medium-sized cities in New York to Canton are Ogdensburg and Watertown; as discussed above, Ogdensburg and Canton share a regional affiliation toward Watertown. Plattsburgh is the nearest city in New York that Canton resembles dialectologically, but Canton is not regionally oriented toward Plattsburgh; residents of Canton report little to no travel there for everyday purposes. Canton also bears some dialectological similarity to Canada, in that it lacks the NCS and shows effects of the *caught-cot* merger; Brockville, the nearest medium-sized Canadian city, is more populous than Ogdensburg and closer to Canton than Watertown is, and Ottawa and Kingston are both large cities substantially closer than any large American city. But again, Canton does not seem to have a substantial regional orientation towards these Canadian cities (although both Canton and Ogdensburg receive some Canadian radio and television broadcasts). Moreover, Ogdensburg is the site of the only United States–Canada border crossing within 40 miles in either direction, while Canton is some 20 miles southeast of the national border. If Canton is regionally oriented toward Canada on a local enough level for the NCS to have been obliterated in Canton as a result of Canadian influence, then surely Ogdensburg, being much closer to Canada

and only about twice the population of Canton, would show at least some local-level regional influence. There is no evidence of such influence on Ogdensburg; especially the younger speakers there show NCS features as much as the sampled speakers in, say, Watertown or Glens Falls. So overall, it seems improbable that Canton was at one time subject to the NCS and lost it totally under influence from Canada or other non-NCS areas, at the same time as it was being initiated in Ogdensburg.

One obvious difference between Canton and Ogdensburg is that Canton is a college town, home to St. Lawrence University and a campus of the State University of New York (SUNY). It is conceivable that the universities' role in attracting people from other regions to move to Canton and settle there might have eliminated the NCS there or prevented it from developing in the first place when it otherwise would have. At first glance this account seems promising, perhaps even as an alternative to the New England settlement explanation of the distribution of the NCS: there are no institutions of higher education above the community-college level located in Ogdensburg, Watertown, Glens Falls, Gloversville, Sidney, or Cooperstown, in all of which the NCS is attested; Plattsburgh and Oneonta each contain a SUNY campus and Poughkeepsie is home to Vassar College. Utica is the only NCS community sampled in this study to contain a college, but it is also by far the largest (over 60,000 as of the 2000 Census); and obviously the larger a community is the less dialectological influence on it population attracted by a college can have—the four Inland North cities in the Telsur sample of New York State also all contain universities. However, Amsterdam, a non-NCS city, does not contain a college or university.

This means that the presence of institutions of higher education cannot be the chief factor in determining whether a small-to-medium-sized community in eastern New York is subject to the NCS; Southwestern New England settlement matches the dialectological categorization better. This argument does not demonstrate that SUNY Canton and St. Lawrence University are *not* responsible for the absence of NCS in Canton, but neither is there really a good reason to suppose that they *are*. It is more parsimonious from the available data to suppose that Northwestern New England settlement history is insufficient to make a community open to the NCS, and Ogdensburg was settled mainly from Southwestern New England.

So the best available conclusion is that, *insofar as clear reports of settlement history can be found*, all the communities where the NCS is observed in this data set were settled principally by populations of Southwestern New England origin, while the other communities were not. Of the various possibilities raised, it seems more likely that Ogdensburg conforms to this pattern than that it does not.

3.5.4. Settlement history and the Hudson Valley

The patterns of settlement further justify identifying Poughkeepsie, Amsterdam, and Oneonta in this study with Kurath's Hudson Valley region. Where the communities of the Inland North all drew settlers from Western New England, Amsterdam, Oneonta, and Poughkeepsie instead all drew settlers from

the original Dutch New Netherland population[23]. Meanwhile, although Kurath draws a dialect boundary between Southwestern New England and Northwestern New England, Boberg (2001) argues that that boundary is not justified by Kurath's data. As Boberg implies, if that boundary is ignored on Map 3.22, all the areas ultimately settled from Southwestern New England—southwestern and northwestern New England as well as northern, central, and western New York—are united in a single dialect region, while the Hudson Valley area is separate. Kurath likewise describes westward migration from Western New England as having set the stage for the linguistic status of Upstate New York. So it makes sense to interpret Kurath's Hudson Valley region as constituting "the region not settled by Western New Englanders", and in particular the region in which Dutch influence was stronger than New England influence. Thus in the first half of the 20th century as well, the dialect regions were found to correlate well with settlement patterns, and the Hudson Valley was considered to be a linguistic region distinct from Southwestern New England. In this light, let us examine the present-day relationships between the Inland North, the Hudson Valley, and Southwestern New England.

[23] Conceivably, the ever-so-slightly more ambiguous status that Oneonta exhibits with respect to the NCS may be related to the fact that the New Netherland Dutch appear to have been a smaller part of the founding population of Oneonta.

3.6. Absence of the NCS in Southwestern New England

3.6.1. The problem

The fact that the distribution of the NCS in central and eastern New York State appears to be determined by settlement from Southwestern New England seems to support Boberg (2001)'s general argument: that Southwestern New England shares the same phonological system as the Inland North, and the settlement of the Inland North from Southwestern New England is the source of the phonological preconditions for the NCS. Despite Boberg's contention that Southwestern New England is *phonologically* identical to the Inland North, it is still the case that according to the criteria used in this chapter, Southwestern New England does not really show the NCS. This is an apparent paradox: if settlement from Southwestern New England determines whether a community in central and eastern New York is subject to the NCS, why is present-day Southwestern New England itself *not* subject to the NCS?

A possible response to this paradox is that Southwestern New England *is* subject to the NCS, but to a lesser degree than the Inland North proper; this is the position Boberg takes. It is true to an extent, in that the seven Telsur speakers in southwestern New England proper (i.e., Connecticut and western Massachusetts) show higher NCS scores than the rest of the Telsur corpus outside of the Inland North ($p \approx 0.005$): three of them score 1, three 2, and one 3, whereas outside the Inland North in general, 66% of speakers score 0. Moreover, the NCS did not take place simultaneously in every community in the Inland

North; this is clear from Ogdensburg, in which apparently the NCS is still in progress after going to completion in the other communities in this study.

Perhaps, then, the NCS originated in central or western New York, and then spread northward and eastward into the communities that now constitute the Inland North fringe. Under this scenario, even if Southwestern New England is in principle open to the NCS, the eastward spreading of the full NCS was never able to *reach* Southwestern New England, simply because Southwestern New England shares no geographical borders with the Inland North core or fringe; the Hudson Valley intervenes. This scenario appears to be supported by the presence of the one Telsur speaker with an NCS score of four in Rutland, Vermont, who was previously dismissed as an outlier: The nearest community to Rutland of more than 14,000 people is Glens Falls, some 50 miles to the southwest, which is the easternmost known point of the Inland North fringe. So, according to this scenario, the reason the NCS has not expanded into Southwestern New England is just because the Inland North does not come very near Southwestern New England; but where the Inland North fringe approaches *Northwestern* New England (which was also originally settled from Southwestern New England), the NCS has been able to make a bit of eastward progress into Rutland.

But this is not a fully satisfactory resolution to the paradox, for two reasons. First, if the NCS can spread into Northwestern New England after all, we are left again with the question of why Ogdensburg displays the NCS and Canton does not. Second, and more important, the seven Telsur speakers in southwestern New England show approximately the same ($p > 0.83$) distribution

of NCS scores as the speakers from the three Hudson Valley cities in the current sample. As in the Hudson Valley, the two most frequently satisfied NCS criteria in Southwestern New England are UD and ED. The mean EQ1 index of the Telsur corpus's Connecticut and western-Massachusetts speakers is –80, perhaps slightly higher than the mean –102 of Poughkeepsie, Amsterdam, and Oneonta but certainly not to a statistically significant degree ($p > 0.34$). So not only does Southwestern New England not display the NCS to the same degree that places that were *settled* from Southwestern New England do, but it is very similar (using the measures employed in this chapter) to places that were *not* settled from Southwestern New England. So: why should the Hudson Valley, which was *not* settled from Southwestern New England, bear a closer linguistic resemblance to Southwestern New England than communities that were? Or to put it another way, if Southwestern New England is in principle open to the NCS, what is it that makes Southwestern New England different from the Hudson Valley, which shows no evidence of being open to the NCS? If the Hudson Valley were as open to the NCS as Southwestern New England is supposed to be, then surely there would be more evidence of it in Amsterdam, for example.

3.6.2. The distribution of individual NCS features

As mentioned above, large majorities of speakers sampled in the Hudson Valley cities in this study satisfy the ED and UD criteria (19 out of 23 for both ED and UD), while at most two satisfy any of the other NCS criteria. Of the seven Telsur speakers in southwestern New England, six satisfy UD, while three satisfy

ED and no more than two satisfy any other criterion. Now, the ED and UD criteria each combine measurements of two distinct features of the NCS: the fronting of /o/ and the backing of /e/ or /ʌ/. These pairs of features, however, are in principle independent of each other: outside of the overall chain-shift structure of the NCS, there is no direct causal relationship between the fronting of one low vowel and the backing of one or two mid vowels; and thus saying that a community outside the Inland North satisfies (for example) the ED criterion obscures the question of whether that community has a fronted /o/, a backed /e/, or both. Since it is in the ED criterion that the Hudson Valley resembles the Inland North and differs from Southwestern New England, let us decompose ED and look at /o/ and /e/ separately.

Table 3.23. Mean /o/ F2 in various sets of communities.

Speakers	/o/ mean F2	*n*
Telsur Inland North	1498	61
Inland North fringe	1461	35
Telsur southwestern New England	1418	7
Hudson Valley	1411	23
other Telsur /o/~/oh/ distinct	1337	242
other Telsur /o/~/oh/ merged	1252	130

"Other Telsur" indicates all communities outside *ANAE*'s Inland North and Western New England regions. "Distinct" and "merged" indicate communities respectively outside and inside the green isogloss of *ANAE*'s Map 9.1, which indicates the areas of completed *caught-cot* merger.

Table 3.23 displays the mean F2 of /o/ in each of several subsets of this study's data and the Telsur corpus. The key finding here is that although /o/ is backer in Southwestern New England and the Hudson Valley than in the Inland North, it is nevertheless a great deal fronter than the average /o/ outside of the Inland North, even when regions where the *caught-cot* merger dominates are

excluded.[24] This means that, compared to the rest of North American English, the Hudson Valley and Southwestern New England have a fronted /o/, though not quite to the same extent that the Inland North region does. While /o/ is backer in the Hudson Valley than in the Inland North fringe ($p \approx 0.013$), southwestern New England's /o/ is very close to the Hudson Valley's but does not reach the level of significant difference from the Inland North fringe ($p > 0.21$).

Table 3.24 displays the mean F2 of /e/ in each of several sets of communities. While Table 3.23 treats all the Telsur Inland North communities as a set, Table 3.24 separates the four New York Inland North cities in the Telsur corpus (Binghamton, Buffalo, Rochester, and Syracuse) from the rest of the Inland North and groups them with Utica, the only core Inland North community sampled in the current study. The purpose of this is to emphasize one of the most striking results on Table 3.24: the backing of /e/ is a great deal more advanced in the New York portion of the Inland North, both core and fringe, than in the rest of the Inland North. Indeed, even the Hudson Valley cities, which are not subject to the NCS, have /e/ at least as backed as the Inland North communities outside of New York State (the difference is not statistically significant), and substantially backer than the rest of the Telsur corpus as a whole ($p < 10^{-6}$). For F2 of /e/, unlike /o/, the seven southwestern New England speakers are markedly different from the Inland North fringe ($p < 0.001$), and the

[24] The difference between southwestern New England and the /o/~/oh/–distinct *ANAE* regions is significant at $p < 0.05$; between the Hudson Valley and the distinct regions, $p < 10^{-4}$.

Hudson Valley appears to sit between the Inland North fringe and southwestern New England.[25]

Table 3.24. Mean /e/ F2 in various sets of communities.

Speakers	/e/ mean F2	*n*
Utica + Telsur New York Inland North	1625	15
Inland North fringe	1644	35
Hudson Valley	1717	23
Telsur Inland North w/o New York State	1759	53
Telsur southwestern New England	1780	7
other Telsur	1850	372

So, to sum up, the relationships between southwestern New England, the Hudson Valley, and the Inland North differ with respect to three key aspects of the NCS. In the raising of /æ/ over /e/, as shown in Figures 3.17 and 3.18, southwestern New England and the Hudson Valley are relatively close to each other (mean EQ1 indices –80 and –102, respectively), and much farther from the Inland North fringe (mean EQ1 index –14). In the fronting of /o/, the Hudson Valley is significantly different from the Inland North fringe while southwestern New England is not; and in the backing of /e/, the Hudson Valley is more similar to the Inland North than southwestern New England is.

The answer to the question asked above about why the NCS does not spread into the Hudson Valley may be that it *does*—partially: the backing of /e/ and fronting of /o/ are NCS features that are robustly present in the Hudson Valley. It is the raising of /æ/ that makes the sharpest distinction between the Hudson Valley and the Inland North. To compare: none of the speakers sampled in the Hudson Valley have /æ/ as raised as the mean /æ/ in the *least* raised

[25] The Hudson Valley and the Inland North fringe differ at $p \approx 0.006$, and the Hudson Valley and southwestern New England at $p < 0.05$.

Inland North fringe city; but fully 30% (7 out of 23) of the Hudson Valley speakers meet the corresponding threshold for /e/, and 30% have /o/ fronter than the mean of *all* Inland North fringe speakers.

Labov (2007) argues that it is easier for changes in individual phonemes to expand past their original isoglosses than for an entire chain shift to spread in the same manner as it originally occurred. So what we see here may be construed as NCS sound changes spreading beyond the Inland North into the Hudson Valley, but the different NCS features do not show uniform behavior across boundary. To begin to explain these different behaviors, let us consider the relative chronology of the different phases of the NCS.

3.6.3. The origin of the NCS

There is disagreement in the literature about the earliest stages of the NCS. As mentioned above, Labov and his collaborators (as exemplified in, e.g., *ANAE*) generally describe the raising and tensing of /æ/ as the first stage of the NCS, creating a pull chain in which /o/ is fronted in order to fill the space left in the low front position by the raising of /æ/. McCarthy (2008), on the other hand, argues that the fronting of /o/ was the first stage of the shift; her argument is based on data from several speakers born in Chicago before 1900, who display fronting of /o/ but little to no raising of /æ/.

McCarthy's contention that /o/-fronting preceded /æ/-raising is consistent with the behavior of /o/ observed in this study. Southwestern New England is the origin of the settlement of the Inland North, and it resembles the

Inland North in that its /o/ is markedly fronter than the /o/ of non–Inland North communities in the Telsur corpus. It does not closely resemble the Inland North with respect to /æ/. This suggests that the fronting of /o/ began early in the history of the NCS, before the present-day Inland North diverged from Southwestern New England speech; thus when the settlers of the Inland North region migrated westward, they already carried with them a somewhat fronted /o/. The Hudson Valley communities that were not settled by New Englanders did not necessarily, under this scenario, already have a fronted /o/, but the fronting of /o/ would have spread to them at a later date from both directions.

The backing of /e/ is a much newer change, as indicated by the fact that it is still in progress in Ogdensburg (and in the Inland North fringe data as a whole, though not in any of the other individual cities) while raising of /æ/ and fronting of /o/ are not. This change apparently originated in the New York State component of the Inland North after it had already diverged from Southwestern New England, unlike fronting of /o/; for this reason, southwestern New England's /e/ is much less backed than New York's Inland North communities while its /o/ is comparable to at least the Inland North fringe. Like /o/-fronting, /e/-backing appears to have spread from the Inland North to the Hudson Valley; and then it must have advanced from there to southwestern New England as well. Thus those two regions have an /e/ that is substantially backer than North American English as a whole, but still not as backed as in the Inland North in New York State.

According to this approach, the raising of /æ would (like /e/-backing) have originated in the Inland North after it had diverged from Southwestern

New England; but then, unlike /e/-backing, /æ/-raising never expanded substantially into the Hudson Valley or, for the most part, New England beyond it. The raising of /æ/ may also have allowed the Inland North to develop a fronter /o/ than its Western New England predecessor system, by opening up additional phonetic space for /o/ to move forward into. But why should the raising of /æ/ fail to spread while the backing of /e/ and fronting of /o/ apparently spread easily into the Hudson Valley? To attempt to answer this, let us return to *ANAE*'s account of the origin of the NCS.

To review, *ANAE* argues that the tensing of /æ/ originated when the construction of the Erie Canal drew settlers from a variety of dialect regions, with a variety of phonological /æ/ patterns, into the same area. This account at face value does not fully account for the distribution of /æ/-tensing in New York State. Several NCS communities in this study are not located near the Erie Canal and did not benefit directly from the increased settlement it drew, but may have benefited from related Canal projects. Of Ogdensburg, for example, Hough (1853) writes that "the Erie canal hindered the growth of this portion of the state," but the Oswego Canal, which opened five years after the Erie Canal was complete and connected the Erie Canal to Lake Ontario "was the first public work that conferred a benefit upon Ogdensburgh, or St. Lawrence county, as they thus gained a direct avenue to market." Similarly, Glens Falls is not located on or near the Erie Canal, but it is on the Hudson River, which connects to the Erie Canal, and close to the Champlain Canal that connected the Erie Canal to Lake Champlain. On the other hand, Amsterdam *is* located along the Erie Canal and was founded and settled in the same general time frame as the NCS

communities in this study; but the presence of the Erie Canal was not sufficient to cause the NCS there.

Combining the Erie Canal explanation with this study's findings of southwestern New England–origin settlement yields a consistent dialectological picture. Under such a combined explanation, the general raising of /æ/ under the NCS would have been not *merely* the result of a koineization of multiple incompatible /æ/ systems in one place. Rather, it is the effect of multiple incompatible /æ/ systems coming into contact with the original /æ/ system of Southwestern New England, in communities that were founded by Southwestern New Englanders but subject to increased migration thereafter as part of the Erie Canal population boom. This explains why Southwestern New England itself did not undergo /æ/-tensing—it did not (at least, at the relevant time) have an inrush of settlers from existing communities with different /æ/ systems. It explains why communities such as Amsterdam that are on the Erie Canal but were not originally settled mostly by southwestern New Englanders did not undergo /æ/-tensing: these communities did not have the same Southwestern New England–derived /æ/ system as the base pattern, and thus did not respond to the phonological pressure of the incoming /æ/ systems in the same way.

Under this analysis, the outcome of the influence of diverse /æ/ phonologies on the underlying Southwestern New England /æ/—i.e., the Inland North general tensing of /æ/—differs in basic phonological structure from the /æ/ found in the Hudson Valley, rather than being merely a different phonetic manifestation of the same phonological features. This hints at why the general tensing of /æ/ did not spread to communities without Southwestern New

England settlement the way /o/-fronting did: although individual surface-level sound changes can diffuse from community to community with relative ease, it is more difficult for a change at the more abstract phonological level to spread directly. The nature of this phonological difference in /æ/, and the nature of the phonological change that would have had to spread into the Hudson Valley in order for full /æ/-tensing to appear there, will be the subject of Chapter 4.

On the other hand, it is still possible for communities in Upstate New York that did not directly experience the Erie Canal population boom but were founded by Southwestern New Englanders to have been affected by /æ/-tensing. These communities would have started with the same Southwestern New England–derived /æ/ system that was the substrate for the development of general tensing in the Erie Canal Inland North cities. By virtue of being in Upstate New York, many of them along major trade routes that connected to the Erie Canal, they would have been *in more or less regular linguistic contact* with communities with a greater variety of /æ/ systems, including the Erie Canal communities themselves. Even if these communities did not experience the kind of intense influence from varied /æ/ systems that the cities on the Erie Canal did, their lesser degree of contact could have been sufficient to bring /æ/-tensing to them in a less general and consistent fashion—i.e., in the fashion characteristic of the communities described in this paper as the Inland North fringe.

A possible fault in this speculative scenario is that it requires Southwestern New England and the Hudson Valley to have had distinct /æ/ systems in the period when the Inland North was beginning to be settled, and there is no direct evidence that they did. Likewise, it does not appear to be the

case that Southwestern New England and the Hudson Valley have distinct /æ/ systems *now*, nor is there evidence in the data of Kurath & McDavid (1961) that they did in the first half of the 20th century. However, it is far from implausible to suppose that such was the case in the late 18th and early 19th centuries. The settlement of the Hudson Valley, as discussed above, was in large part derived from non–English-speaking populations, either the original Dutch settlers of New Netherland, or more recent Dutch and German immigrants. Indeed, as mentioned above, Dutch was a principal language of Poughkeepsie until only a couple of decades before the migration from southwestern New England into the Inland North began (Platt 1987); and Campbell (1906) writes that in the early years of Oneonta's settlement, around the turn of the 19th century, "German was the language of common conversation." So during the decades after the completion of the Erie Canal in the 1820s, much of the Hudson Valley was at best fairly recently English-speaking. It is highly probable that these second-language English speech communities at that time had substantially different phonologies, influenced by the very recent Dutch and German substrates, from those of the long-standing English-speaking communities of western New England.

The sticking point of this speculative scenario is, as usual, the border between Ogdensburg and Canton. Even if Ogdensburg was settled from southwestern New England and Canton from Vermont, why should that prevent /æ/-tensing from spreading to Canton as well? Most of Vermont itself was settled from southwestern New England, and Boberg (2001) argues that the present-day dialectological differences between Southwestern and Northwestern

New England are quite recent in origin, so in all probability[26] the communities in Vermont from which Canton's settlers originated had the same /æ/ phonology as the Southwestern New England origins of the Inland North. This is all the more in need of explanation if we take seriously the speaker in Rutland with a score of 4 as evidence of the NCS extending eastward beyond the Glens Falls area into Vermont, as described above. One possible explanation for the difference between Ogdensburg and Canton is degree of contact with mixed and varied /æ/ systems at the relevant time. Ogdensburg is located on the St. Lawrence River, and as mentioned above it commercially benefited from the Oswego Canal connecting the St. Lawrence to trade from the Erie Canal area; Hough (1853) also mentions the intense importance given at the time to the construction of a road from Ogdensburg to the Mohawk Valley. Canton, on the other hand, is not located on any major trade routes connected to more central parts of New York. If this explanation is the correct one, it may not matter whether Ogdensburg was predominantly settled from Northwestern or Southwestern New England. What matters in this case was that, at the time of the Erie Canal boom, Ogdensburg was in enough contact with the trade boom for its /æ/ system to be affected, and Canton wasn't. Then the raised /æ/ was not able to spread to Canton from Ogdensburg for the same reason it never spread to Amsterdam: underlying phonological changes do not spread as easily as surface-

[26] What Hough (1853) says about the settlers of Canton in general is merely that they were from Vermont; he does not mention what part of Vermont. So it is possible that the preponderance of them came from the eastern part of Vermont, which according to Kurath (1939) was settled more from the Eastern New England dialect region and therefore may have had a different /æ/ phonology than Southwestern New England. (This boundary within Vermont can be seen on Map 22.) This is not a very likely scenario, however, both because the most populous areas of Vermont (and thus the most likely sources of migrants) are in the western part of the state, and because the two Canton pioneers whose towns of origin Hough does identify were both from the western part of Vermont.

level phonetic changes. This explanation is not entirely satisfactory in that it still does not really account for the speaker in Rutland, but it is perhaps the best than can be done with the limited data available.

This scenario reconciles the two accounts of the "initial stages" of the NCS. As McCarthy (2008) argues, the fronting of /o/ was the first step in the NCS, in the sense that it began earlier than any of the other sound changes thought of as being part of the NCS, before the divergence of the Inland North from Southwestern New England. On the other hand, as *ANAE* argues, the tensing of /æ/ was the triggering event of the NCS in the sense that that appears to be the change which uniquely distinguishes the NCS and the Inland North from the surrounding regions and their phonological systems.

It also, of course, resolves the conflicts between the accounts of the nature of the relationship between the Inland North and Western New England given by Boberg (2001) and in *ANAE*. Like *ANAE*, this chapter contends that the NCS raising of /æ/ is a unique phonological feature that is distinct from the phonology of Southwestern New England, and would not have happened in an area that did not have the demographic history of New York State. However, the Southwestern New England phonology is also essential to the history of the NCS, to the extent that communities in central and northern New York that were not settled from southwestern New England did not develop it, even if in other respects they resemble the communities that did. Where Boberg's analysis seems to predict a gradual boundary between the Inland North and Southwestern New England, and the *ANAE* analysis seems to predict a sharp boundary, this chapter finds a null boundary: the Inland North and Southwestern New England do not

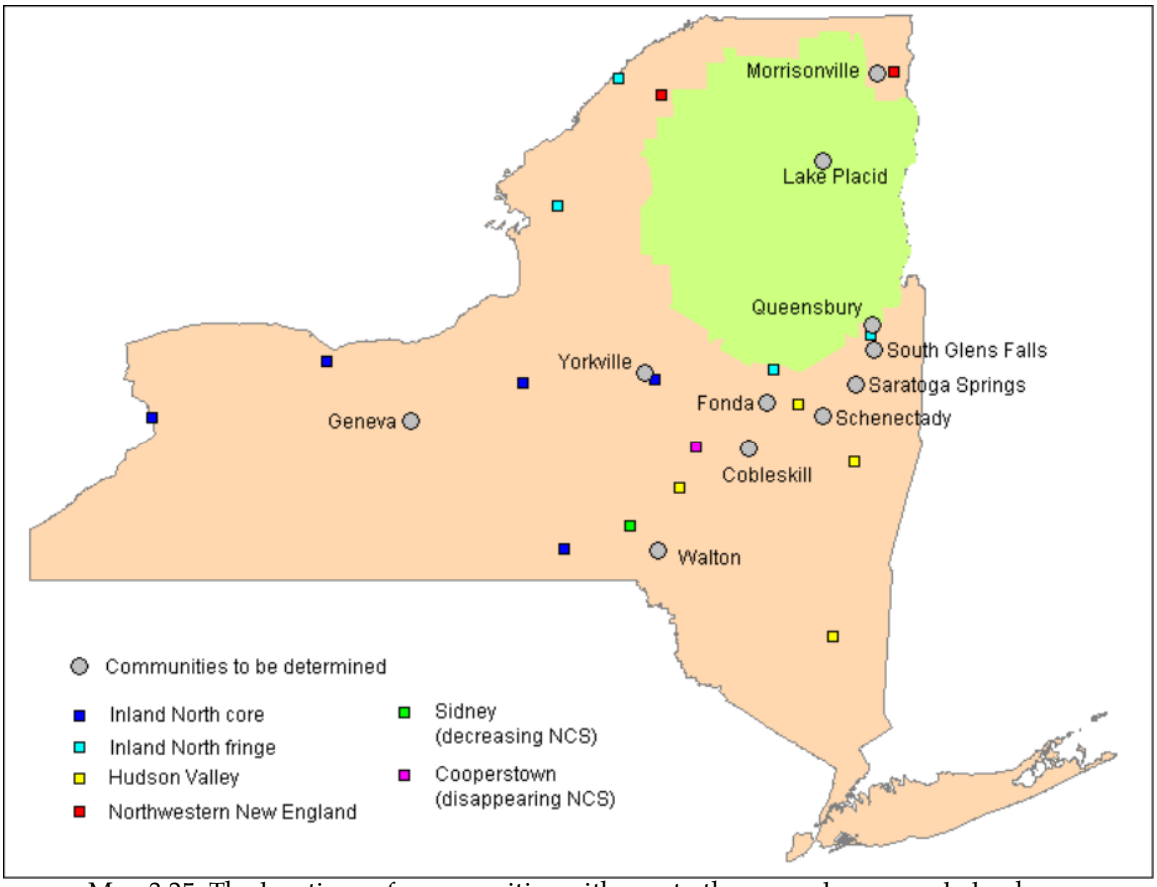
actually meet, but are separated by the Hudson Valley. However, few phonological differences are observed between the Hudson Valley and Southwestern New England, none of them very large or statistically very robust; from that point of view, the Hudson Valley can be considered to be dialectologically united with Southwestern New England in the present day.[27] In that respect, the key feature distinguishing the Inland North from the Hudson Valley / Southwestern New England region is the tensing of /æ/. The boundary appears to be a combination of the gradual and sharp types: between the Inland North core and Hudson Valley is the Inland North fringe, where /æ/ is certainly higher than in the Hudson Valley and the other NCS features are more advanced, but less homogeneously so than in the Inland North core; however, the difference between communities immediately on opposite sides of the boundary can be quite abrupt.

3.7. Adding in the communities with small samples

The discussion above took into account only the twelve communities in which seven or more speakers were sampled; this constitutes 98 speakers out of the full sample of 119. The remaining 21 speakers are from a total of eleven different communities. Now that the general patterns of dialect diversity in Upstate New York have been established in the foregoing sections, this section

[27] The following chapters will discuss a dialect division *within* the Hudson Valley region: the communities closest to the Hudson itself, specifically Poughkeepsie and Albany, exhibit some influence from New York City in both their /æ/ system and their raised /oh/. Amsterdam and Oneonta, however, do not exhibit these features and therefore resemble southwestern New England proper more closely than Poughkeepsie and Albany do, despite being more distant from it.

will attempt to classify these eleven communities, based on the limited data available for them, in terms of the features used to classify the communities with deeper samples. The locations of these communities are shown in Map 3.25; Table 3.26 lists the EQ1 indices and NCS scores of the speakers interviewed in each of them.



Map 3.25. The locations of communities with one to three speakers sampled, whose dialectological status is to be determined.

Some of these communities are easier to assign to dialectological groups than others, on the basis of geography and the data in Table 3.26. In Geneva, which is west of Syracuse and geographically well within the core Inland North region, both speakers interviewed have NCS scores of four and EQ1 indices close to zero; we can describe Geneva with no qualms as a core Inland North

community. Similarly, on the other end of the spectrum, Lake Placid is in Adirondack Park in the northeastern part of New York, closer to Plattsburgh and Canton than to any other communities sampled in this dissertation; both speakers there score zero and have EQ1 indices below –100, making them a good linguistic fit as well with the "Northwestern New England" region that includes Plattsburgh and Canton.

Table 3.26. NCS scores and EQ1 indices for speakers in communities with small samples

community	*n*	scores	EQ1
Cobleskill	2	2, 2	–108, –37
Fonda	2	2, 2	–68, –33
Geneva	2	4, 4	–10, –13
Lake Placid	2	0, 0	–185, –103
Morrisonville	1	1	–139
Queensbury	2	2, 2	–130, –86
Saratoga Springs	2	2, 2	–34, –116
Schenectady	2	3, 2	–119, –95
South Glens Falls	3	2, 2, 4	–84, –144, –60
Walton	2	2, 4	–90, –49
Yorkville	1	3	–66

Two communities have only one speaker in the sample—Morrisonville and Yorkville. These are speakers who at first described themselves as natives of Plattsburgh and Utica, respectively, but then after the interview had already begun clarified that they actually lived in smaller communities outside those cities. Kerri B., from Morrisonville, is easy to group linguistically with Plattsburgh with her low score and EQ1 index. James C. from Yorkville is somewhat harder to group with Utica, since his score of three and his EQ1 index of –66 are both very much on the low side for the Inland North core—only seven Inland North speakers in the Telsur corpus (none in Upstate New York), and none of the current sample of Utica or Geneva, have EQ1 indices below –50. Two

of the seven Utica speakers in the sample score three, so James is in moderately good company there, at least. Despite his low EQ1 index, James (and therefore Yorkville) will be considered to be part of the Inland North core because his NCS score is at least within the range of Utica's scores, and because Yorkville is not only directly adjacent to Utica but also on Utica's west side (i.e., in the direction of the rest of the Inland North core, not in the direction of the fringe and the Hudson Valley), so there is no other candidate region to assign the village to. James C. is also older than any of the speakers in the sample from Utica proper (he was born in 1931, whereas Janet B. was born in 1942 and all other interviewed Utica speakers are 1979 or later) and male, which might merely indicate that he represents a less advanced form of the NCS; but with Janet B. being the most advanced NCS speaker in the sample and no other source of apparent-time data on Utica, this must remain conjecture.

The other seven communities in Table 3.26 are harder to categorize. As Map 3.25 shows, most of them are more or less between the Inland North fringe and Hudson Valley regions established in the previous sections and displayed on Map 3.21; and their scores and EQ1 indices are generally mixed, intermediate, or inconsistent. Schenectady is the easiest to classify; it is between Amsterdam and Albany, both Hudson Valley cities, and both speakers have very low EQ1 indices. Even though one's NCS score is three, which is high for the Hudson Valley, scores of three are found in both Poughkeepsie and Oneonta as well. So Schenectady can be classified as a Hudson Valley community.

Cobleskill, Fonda, Saratoga Springs, and Walton are somewhat more confusing. The scores of the speakers in Walton are two and four; this suggests

that the village should be included in the Inland North fringe, which was first defined as a set of communities whose scores were mostly between two and four. However, their NCS scores are quite low for an Inland North fringe community, and seem more typical of Oneonta than of any of the four fringe cities established so far; Daniel H., a 23-year-old Air Force serviceman with an EQ1 index of –90, would have the lowest EQ1 index in the Inland North fringe sample if Walton were included in the fringe.

Cobleskill, Fonda, and Saratoga Springs are the opposite of Walton in this respect. All the speakers sampled in these communities score two; by the methodology employed earlier in this chapter, on the basis of that score these three communities would be assigned to the Hudson Valley with Oneonta and Amsterdam. However, in each of these three communities one speaker has an EQ1 index around –35, higher than that of any speaker in the Hudson Valley communities discussed above.[28] In Cobleskill and Saratoga Springs, the second speaker's EQ1 index is below –100, deep within the Hudson Valley range; in Fonda, the second speaker's EQ1 index is –68, within the area of overlap between the high EQ1 indices of the Hudson Valley and the low EQ1 indices of the Inland North fringe.

It is noteworthy but not astonishing that these four communities seem hard to classify, mixed, or intermediate between the Inland North fringe and the Hudson Valley in terms of their scores and EQ1 indices—to begin with, as noted above, they are all *geographically* intermediate between the Inland North fringe

[28] Not *much* higher: the highest EQ1 index in Oneonta is –39, and these communities' EQ1 indices are –33, –34, and –37. But the point here is that each of Cobleskill, Fonda, and Saratoga Springs has one speaker with an EQ1 index that would be very high for the Hudson Valley.

communities and Hudson Valley communities determined earlier in this chapter. Moreover, Cobleskill, Fonda, and Walton are villages. From the observation above that the villages of Cooperstown and Sidney (both also along the general boundary between Inland North fringe and Hudson Valley) are losing the NCS in apparent time, it was hypothesized that villages near this boundary might be less stable in their dialectological status than cities in the same area. That hypothesis would predict that other villages along that boundary might show inconsistent or intermediate behavior with respect to NCS features—and so they do. In fact, in all three of the villages, it is the older of the two speakers sampled who exhibits more NCS-like features (i.e., the higher EQ1 index, and in Walton the higher score); this is consistent with the same retreat from the NCS that Sidney shows. Similarly, Novak (2004) found NCS features diminishing in apparent time in Ballston Spa, a village just outside Saratoga Springs.

Unlike Cobleskill, Fonda, and Walton (and Ballston Spa), Saratoga Springs is a city, and here it is the younger speaker who shows the higher EQ1 index. So Saratoga Springs' dialectological status seems to be hard to define based on the data available; two speakers is certainly not enough to establish an apparent-time trend toward the NCS without a suggestion of a similar result from better-sampled comparable communities. Saratoga Springs is also by far the fastest-growing city in the state, having seen a 31.5% increase in population from 1970 to 2000 while the other eleven cities sampled in this dissertation saw on average a 17.4% decline[29], and the five Upstate cities in the Telsur corpus declined by an average of 26.3%; it is the only city it the state to have increased in population

[29] This ranges from 33.8% in Utica to an increase of 0.5% in Plattsburgh.

every decade since 1950 (Population Trends 2004). Saratoga Springs' atypical demographic status makes it hard to predict what dialectological status it might be expected to have.

The two communities adjacent to Glens Falls—the town of Queensbury, which borders it on the north, and the village of South Glens Falls, which borders it on the south—are similarly problematic. South Glens Falls resembles Walton, in that its NCS scores range up to four but its EQ1 indices are all less than –50; and like Walton and the other villages, it is the oldest speaker interviewed from South Glens Falls who has the highest EQ1 index and score. If Queensbury were not immediately adjacent to an Inland North fringe city, it would seem to be very clearly a non–Inland North community; both speakers have EQ1 indices less than –85 and NCS scores of two. It is possible for there to be dialect boundaries within individual communities or between closely related communities, especially when they have separate elementary schools[30]; but the sharply reduced presence of NCS features in these communities, which one might have expected to be in the same speech community as Glens Falls, is nevertheless troubling.

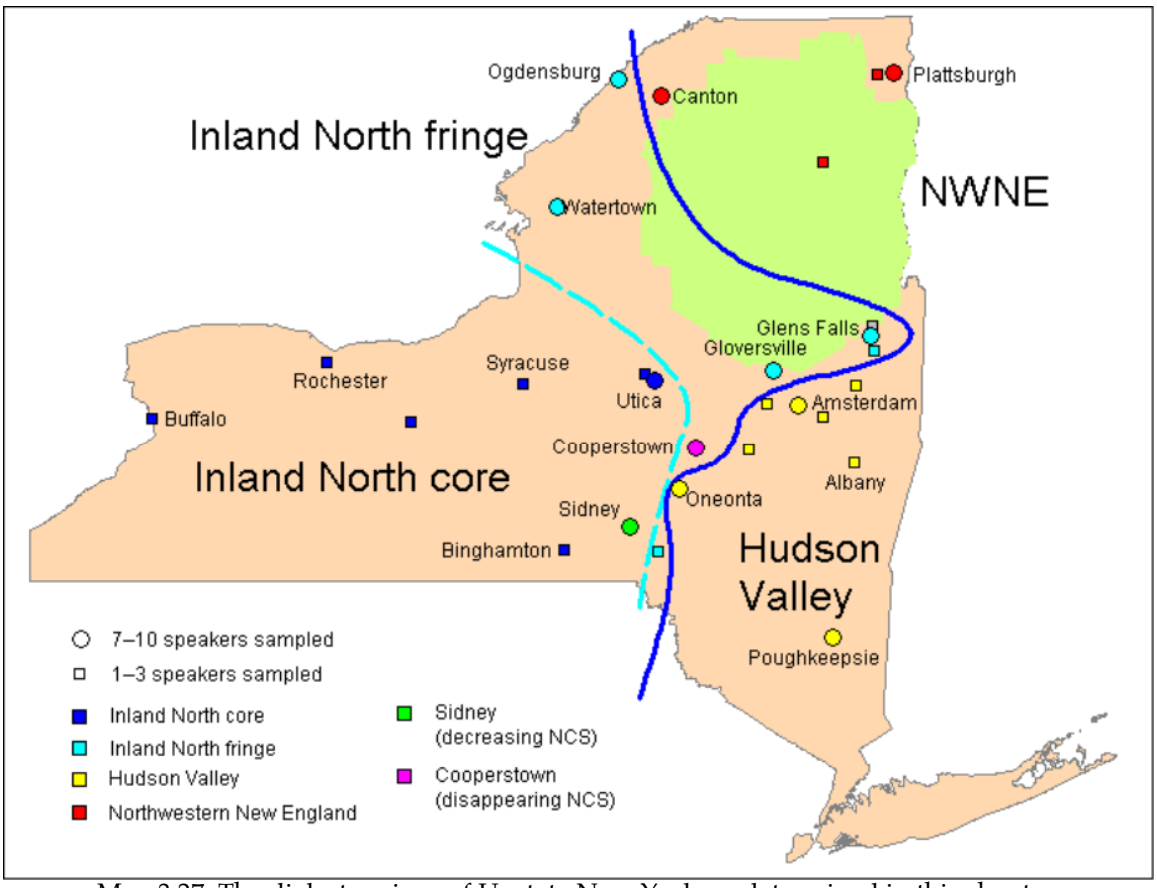
It was hypothesized above that Sidney is retreating from the NCS under the influence of the nearby non-NCS city of Oneonta; but the city with the greatest linguistic influence on South Glens Falls must surely be Glens Falls. Queensbury and Glens Falls were originally a single town; Glens Falls only became a separate city in 1908. The difference between Glens Falls and the adjacent communities here may be an effect of community size and population

[30] Johnson (2007)'s discovery that half of the city of Attleboro, Mass., is in the Rhode Island dialect area while the other half is dialectologically grouped with the rest of eastern Massachusetts is a striking example.

density, if we interpret Inland North fringe cities to be those to which the NCS diffused at a later date from the Inland North core. The cascade model predicts at least that, all else being equal, a linguistic change undergoing diffusion will reach larger communities before smaller communities; and Glens Falls on the one hand and South Glens Falls on the other may well be regarded as a case where all else is equal if there ever was one.[31] However, this explanation doesn't account for why it is the older speaker in South Glens Falls who has the most NCS-like features. A solid explanation for the difference between Glens Falls and the communities adjacent to it may have to wait until more data is available from this area.

For the sake of having every community in a category when communities are grouped for dialectological analysis in later chapters, I will use the NCS scores of each of these intermediate-seeming or confusing communities to classify them. Thus Walton and South Glens Falls, whose scores range up to four, will be considered Inland North fringe communities, while Saratoga Springs, Fonda, and Cobleskill will be considered Hudson Valley communities (although with the caveats detailed above). Queensbury is not included as an Inland North fringe community by this criterion, but it will not be considered part of the Hudson Valley either because it is north of Glens Falls; Queensbury will be included only when "miscellaneous communities" are grouped. Map 3.27 shows the full set of dialectological assignments and isoglosses.

[31] Queensbury is strictly speaking not a "smaller community" than Glens Falls, since it has a larger population; however, cities and towns in New York State are not strictly comparable to each other in this respect. Queensbury has a larger population, but it is much less urbanized than Glens Falls and has approximately one tenth Glens Falls' population density.



Map 3.27. The dialect regions of Upstate New York, as determined in this chapter.

3.8. Conclusion

To sum up, the key dialectological findings of this chapter are as follows:

- The NCS is found in communities a great deal further north and east in New York state than previously observed; however, it is less frequent and less complete in these communities, the Inland North "fringe", than in the previously studied Inland North core communities.
- At least in the area of New York sampled in this dissertation, the NCS is only present in communities whose early settlers were predominantly migrants from southwestern New England. The

persistence of the early-19th-century settlement patterns in the present-day linguistic boundaries is striking; however:

- Small villages can lose the NCS if the nearest city to which they are regionally oriented does not possess the NCS. This does not appear to occur on a broader regional level—small cities do not lose the NCS if their most influential nearby large city lacks it.
- In Upstate New York, even communities which do not have the NCS show some features typically associated with it, such as backing of /e/ and modest fronting of /o/, although to a lesser extent than in New York's Inland North fringe or core communities. However, substantial raising of /æ/, the most distinctive hallmark of the NCS, is not generally present in such communities.

These findings are interpreted as indicating that the fronting of /o/ originated in Southwestern New England and was brought into Upstate New York by the settlers of the Inland North, but the raising of /æ/ originated in the Inland North, as suggested by *ANAE*, as a result of the population and economic growth of the region brought by the construction of the Erie Canal. This NCS raising of /æ/ failed to successfully spread beyond the Inland North fringe, while other NCS features such as fronting of /o/ and backing of /e/ succeeded in expanding southeastward into the region designated here as the Hudson Valley. Labov (2007)'s argument that it is easier for individual phonetic changes to spread beyond their region of origin than abstract structural changes suggests that NCS /æ/-raising depends upon a categorical difference in the underlying

phonological structure of the phoneme; the nature of this phonological difference will be explored in the next chapter.

The geographical findings reaffirm the primacy of early settlement history, rather than present-day communication patterns, in determining the location of the boundaries of major dialect features, with only minor alteration around the edges in places like Cooperstown and Sidney. Overall, the boundary between the Inland North and the Hudson Valley appears to be of the gradual type: shading from the Inland North core to the fringe, where NCS features are clearly present but not uniform; to a series of boundary villages such as Walton, Sidney, Fonda, and Cobleskill, where the status of the NCS appears to be intermediate or in flux; to the Hudson Valley, where the NCS shows little advancement. The next chapters will show further differentiation within the Hudson Valley. But considered merely in terms of cities, the boundary appears much clearer, with for example Gloversville sharply distinct from Amsterdam and Binghamton from Oneonta, while the villages in between may change their affiliation in response to influence from the cities. The boundary also appears quite sharp, for reasons that the current sample is not deep enough to explicate fully, in northern New York between the Inland North fringe and the dialect region including Canton, Lake Placid, and Plattsburgh, which seems to be allied with Northwestern New England.

The issue that introduced this chapter was the nature of the boundary between the Inland North and Southwestern New England. That boundary turns out to be null, of course: the Hudson Valley intervenes between the two regions. *ANAE* did not distinguish between the Hudson Valley and Southwestern New

England; and indeed, until there is a larger sample of dialectological data from Southwestern New England, it remains to be seen whether there is a meaningful present-day linguistic difference between the two regions. But the historical distinction between them turns out to be very important for describing the distribution of the NCS.

The next chapter will use the dialect regions established in this chapter to look in detail at the phonology of /æ/ and how it differs between the Inland North and non-Inland North communities in the sample.

Chapter 4

Short-*A* Phonology and the Structure of the Vowel Space

4.1. *ANAE*'s classification of /æ/ systems

In the previous chapter, it was argued that NCS tensing of /æ/ has not spread eastward beyond the region of New England settlement, while backing of /e/ and fronting of /o/ have, because the NCS /æ/ is structurally different from other dialects' /æ/ on a more abstract phonological level than the difference between NCS and non-NCS /e/ or /o/. It is therefore necessary to look in more detail at /æ/ itself, to test this hypothesis and to determine what the nature of the phonological difference, if any, is. In this chapter I will examine the overall phonological structure of /æ/ across the different dialect regions in the sample, and then consider some broader questions about the organization of the vowel system as a whole.

ANAE describes several distinct phonological configurations of /æ/ found in North American English, which I will take as a starting point for the discussion in this chapter. The relevant /æ/ configurations are the following:

- The **nasal system**: There is a sharp distinction between allophones of /æ/ before nasals and in other environments. Prenasal tokens can be as much as 300 Hz higher than pre-oral tokens for some speakers.
- The **continuous system**: This resembles the nasal system in that the highest and frontest tokens of /æ/ are the prenasal ones; however, there is no sharp gap in phonetic space between the prenasal and pre-

oral tokens, and the highest pre-oral and lower prenasal tokens overlap in the same area of phonetic space.

- The **NCS raised /æ/** system: All or nearly all tokens of /æ/ are raised out of low front position, usually developing an inglide.
- The **New York City split /æ/** system. In this system, /æ/ is split into two phonemes, the low lax /æ/ and a relatively high tense ingliding phoneme notated as /æh/. The distribution of /æh/ and /æ/ is partially predictable on phonetic grounds—/æh/ appears before non-intervocalic non-velar nasals, voiced stops and affricates[1], and voiceless fricatives—but also possesses lexical exceptions and interacts with morphological structure in a way that indicates that the contrast between /æ/ and /æh/ has phonemic status.

Labov (2007) discusses several cases where the New York City biphonemic system has diffused imperfectly to other communities, including Albany, yielding an apparently monophonemic /æ/ that nonetheless exhibits the general phonetic profile of the New York City pattern. In this pattern, which I will refer to as the **diffused system**, /æ/ is raised and tensed before non-velar nasals, voiceless fricatives, and voiced stops, but without exhibiting the subtler lexical and morphophonological patterning of the New York City split. Lexical exceptions do not appear in the diffused system, and the locations of syllabic and morphemic boundaries are not in general taken into account. Thus whereas function words in which /æ/ is followed by a nasal, such as *and* and the auxiliary *can*, are excluded from tensing by the New York City system, such

[1] For the purpose of this chapter, when I refer to "voiced stops" it will be understood to include affricates as well unless otherwise noted.

words are tense in the diffused system. Similarly, the New York City system does not tense /æ/ followed by an intervocalic nasal (as in *animal*, *planet*, or *manner*) unless a word-level morphological boundary intervenes (so tense /æh/ is present in, for example, *planning* and *planner*); the diffused system tenses /æ/ in words such as *animal*, *planet*, and *manner* as well, ignoring syllable structure. The diffused system also differs from the New York City system in that tensing does not occur before /g/, as noted in passing both in *ANAE* and by Labov (2007).

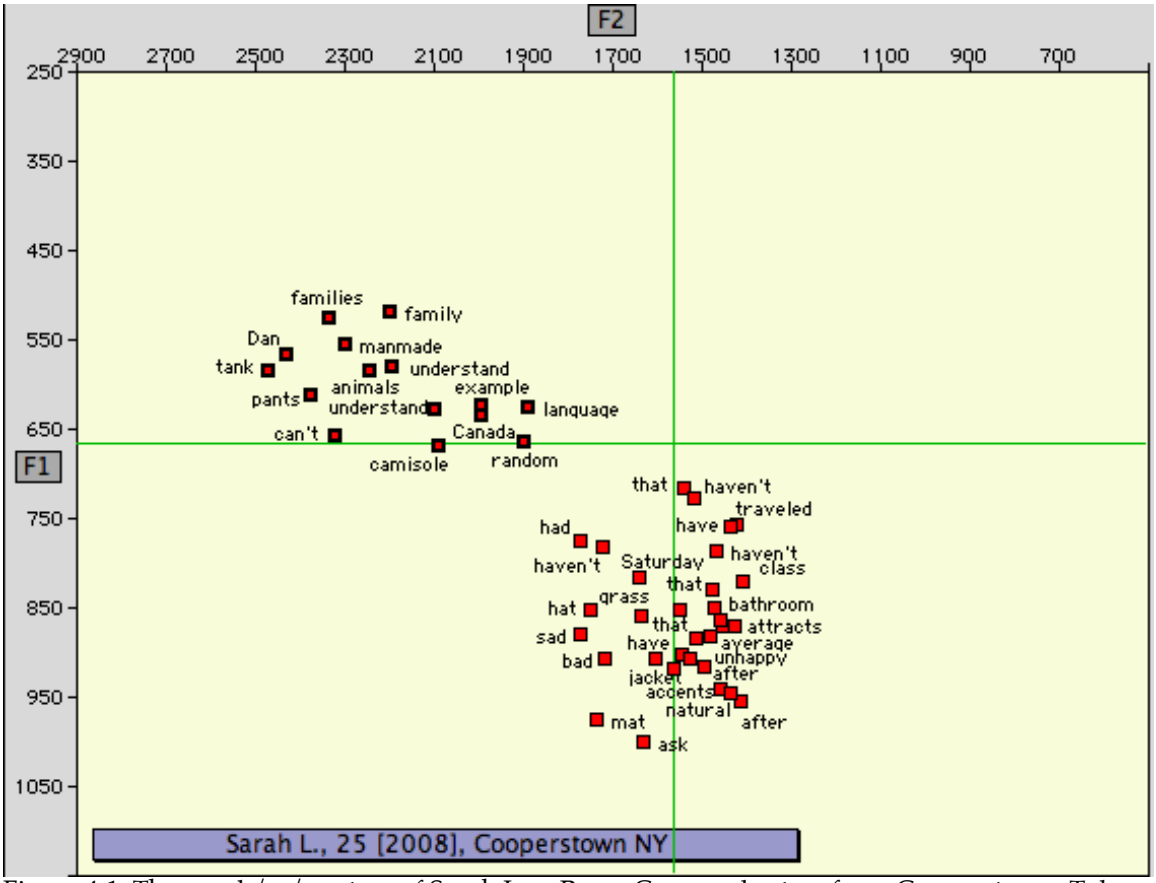


Figure 4.1. The nasal /æ/ system of Sarah L., a Peace Corps volunteer from Cooperstown. Tokens before nasal consonants are marked with a bold outline. Some tokens' labels are suppressed to reduce crowding.

With the exception of the New York City biphonemic system, all of these /æ/ configurations occur in the Upstate New York sample. One of the most extreme cases of the nasal system is Sarah L., a 25-year-old Peace Corps volunteer from Cooperstown, whose /æ/ is displayed in Figure 4.1. All of Sarah's prenasal tokens of /æ/ are found in the raised and fronted (i.e., "tense") cluster, including tokens before intervocalic nasals such as *animals*, *Canada*, *family*, and *camisole*. None of the tense tokens precede nonnasal consonants. The gap between the tense and lax clusters, where no tokens of /æ/ appear, is quite distinct; the mean formant distance between the prenasal and pre-oral tokens is 265 Hz in F1 and 620 Hz in F2.

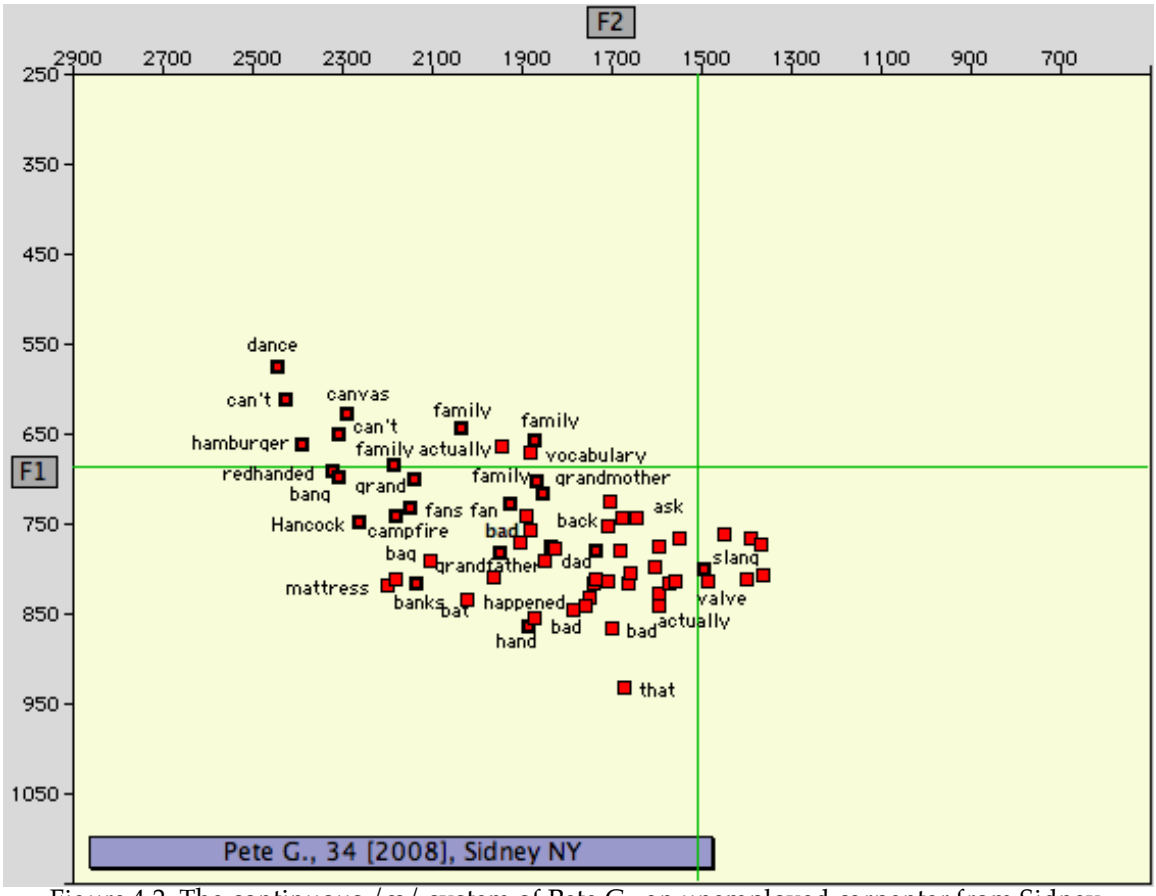


Figure 4.2. The continuous /æ/ system of Pete G., an unemployed carpenter from Sidney.

A continuous /æ/ system is displayed by Pete G., a 34-year-old unemployed carpenter from Sidney, as displayed in Figure 4.2. Pete's highest and frontest tokens are still the prenasal ones, but there is no clear point of division between prenasal and pre-oral allophones—rather, his /æ/ tokens are basically spread out in a continuous smear from low central to mid front. There is some overlap between Pete's prenasal and pre-oral tokens: *vocabulary* and *actually* sit between a few tokens of *family*, an unexpectedly low *hand* is close in F1 and F2 to *happened*, and *grandfather* is adjacent to *bad*. The mean distance between his prenasal and pre-oral tokens is 98 Hz in F1 and 372 Hz in F2.

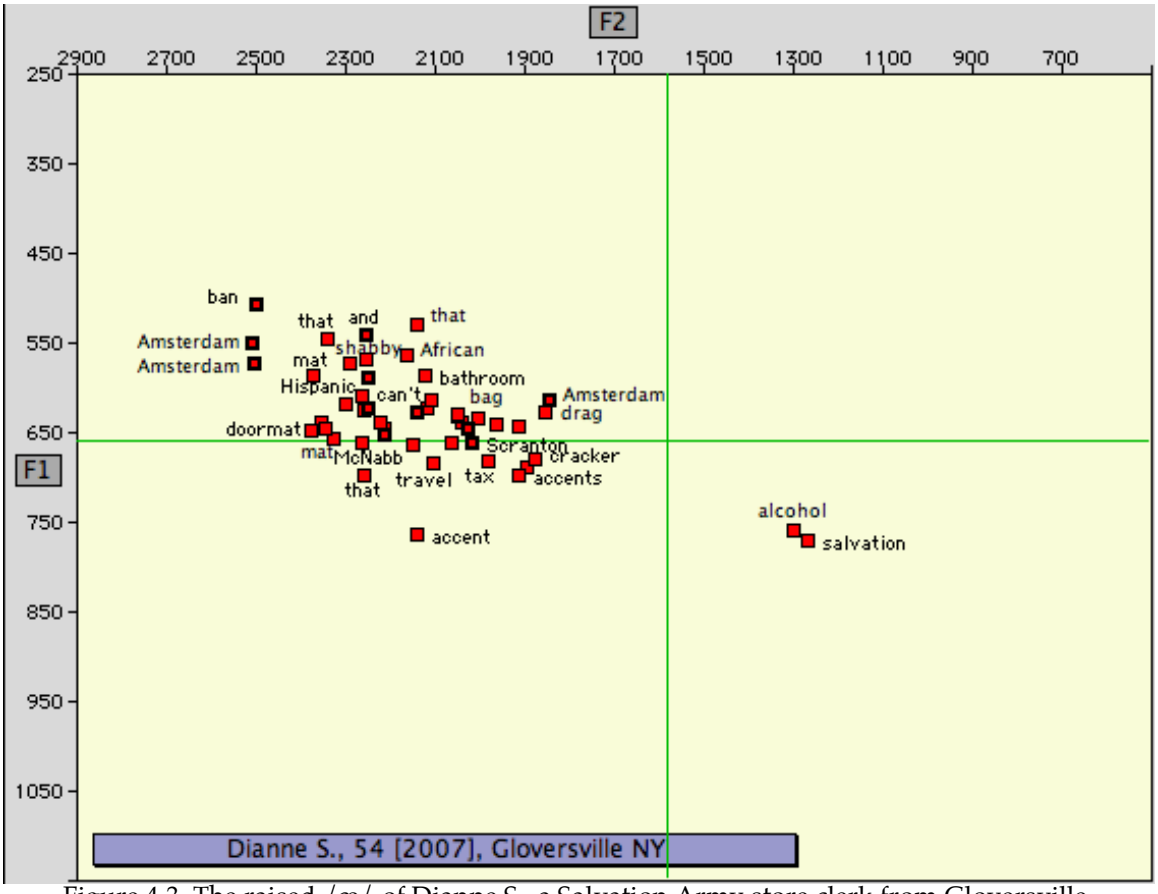


Figure 4.3. The raised /æ/ of Dianne S., a Salvation Army store clerk from Gloversville.

An extreme example of the NCS raised /æ/ pattern is found in Dianne S., a 54-year-old Salvation Army store clerk from Gloversville, as shown in Figure 4.3. With the exception of two extremely back tokens before /l/ (*alcohol* and *salvation*), all of her tokens of /æ/ are raised into the phonetic range that, for speakers such as Sarah L., is occupied by only the prenasal tokens. So extreme is Dianne S.'s raising that there is basically no distinction between her prenasal and pre-oral tokens—prenasal tokens, marked with a bold outline in Figure 4.3, are scattered more or less evenly throughout the whole /æ/ cluster. Her sole concession, as it were, to the general cross-dialectal pattern of having prenasal /æ/ tenser than pre-oral /æ/ is the fact that her three frontest tokens of /æ/ are all prenasal—two tokens of *Amsterdam* and one of *ban*—but even then, her backest token of /æ/ apart from the ones before /l/ is *Amsterdam* also.

Louie R., a 53-year-old retired retail worker from Poughkeepsie, seems to exhibit the diffused system fairly clearly; his /æ/ tokens are shown in Figure 4.4. Although there is not a large discrete gap between tense and lax, it is possible to draw a line across Figure 4.4 to separate Louie's /æ/ tokens into tenser and laxer groups almost exactly according to the criteria predicted for the diffused system. All of the prenasal tokens of /æ/ are above the red line except *bang*, in which /æ/ precedes a velar nasal. Above the line are found tokens of /æ/ not only before coda nasals (*ban*, *Danbury*, *hand*) regardless of function-word status (*and*, *can*) but also before intervocalic nasals (*Janet*, *family*, *manager*) regardless of morphological structure (*planning* and *planners* alongside *planet* and *manners*). Similarly, with very few exceptions, tokens of /æ/ before voiceless fricatives and voiced stops appear above the line (*half*, *laugh*, *last*, *basketball*, *cashew*; *bad*, *cab*)—

even when the voiceless fricative or voiced stop is intervocalic (*cashew*, *national*; the first syllable of *Adirondacks*). These tokens before voiceless stops and voiced fricatives are interspersed among the prenasal tokens; it's not the case that the prenasal tokens are overall the tensest, with tokens before voiceless fricatives and voiced stops intermediate between those and the lax tokens, as might be the case in a typical continuous system. *Bag* appears lax, as expected in the diffused system but not in the New York City system.

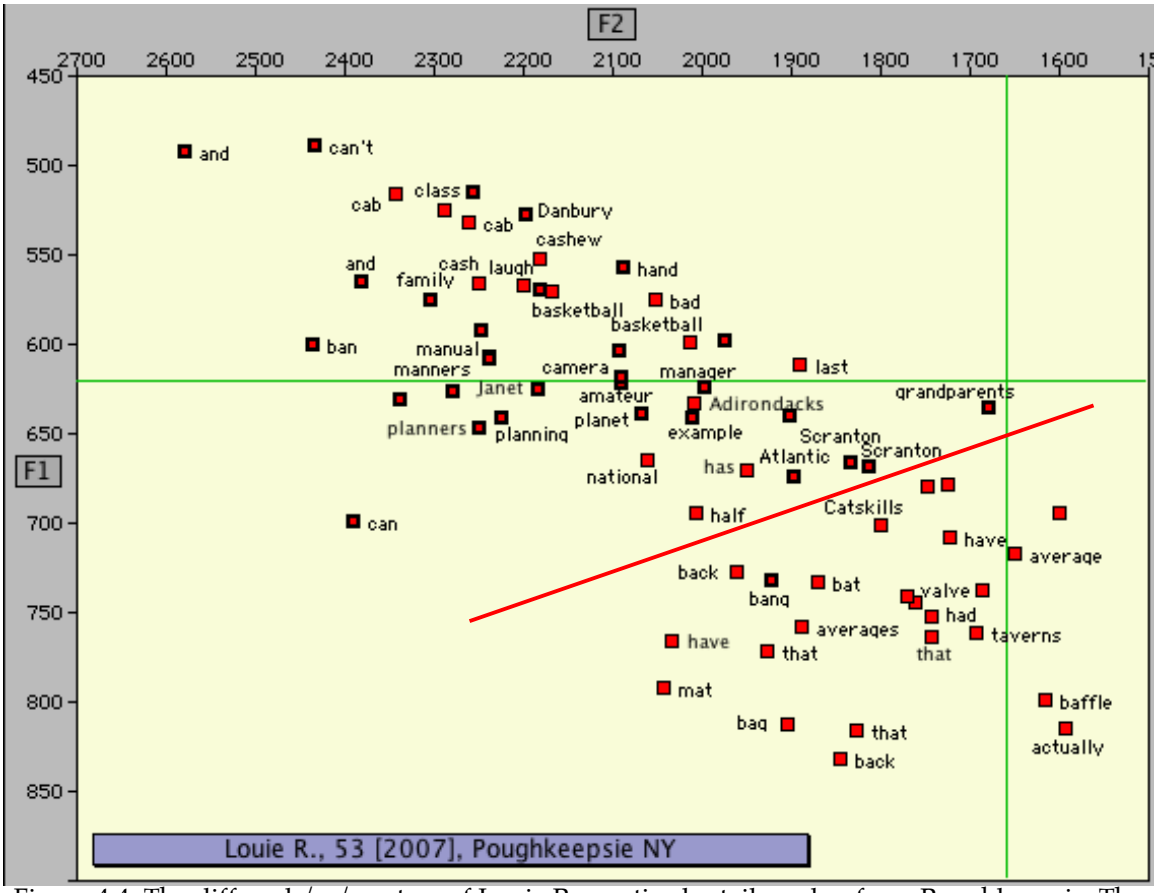


Figure 4.4. The diffused /æ/ system of Louie R., a retired retail worker from Poughkeepsie. The plot is shown at a larger scale than those in Figures 1–3. All prenasal tokens are marked with bold outlines. The solid red line separates the tokens into tense and lax clusters as described below.

Three unexplained exceptions to the expected diffused-system pattern remain in Louie's data: *has*, with a voiced fricative, is above the line[2]; and *had* and *baffle*, with a voiced stop and a voiceless fricative, are below the line. These exceptions are somewhat striking, especially *baffle* (about which more will be said below); but Labov (2007) reports some degree of variability among speakers of diffused /æ/ systems in several communities. I will discuss the diffused system in detail first, before moving on to the relationship of the other /æ/ configurations to the geographic distribution of the NCS.

4.2. The diffused New York City /æ/ system

4.2.1. Structure of the diffused system

To judge whether a speaker displays the diffused /æ/ system, it is certainly too strict to demand that they conform to its outlines (tense before nonvelar nasals, voiced stops, and voiceless fricatives; lax elsewhere) in every token of every word. Such a requirement would obviously exclude even speakers who conform to the diffused system exactly as described but whose measured /æ/ tokens appear to include a few exceptions—which could be speech errors, measurement errors, or style-shifting or hypercorrection as easily as actual phonological exceptions. Moreover, it's useful also to allow some leeway for variability between speakers: the system being described is the result of diffusion of the New York City /æ/ system to other communities, and so we should allow for the possibility that some speakers will represent earlier or later stages in the

[2] Although tensing before voiced fricatives sometimes occurs in New York City, it has not been reported for the diffused system.

diffusion than others, or greater or lesser degrees of contact with the New York City system, or in general that the result of diffusion of the New York City system may differ from community to community.

Therefore the following criterion will be used in this section: a speaker will be described as exhibiting the diffused system if their /æ/ is not generally raised as in the NCS, and it is possible to draw a line across their cloud of /æ/ tokens (as in Figure 4.4 above) in such a way that all or nearly all the tokens before nonvelar nasals are above the line, all or nearly all the tokens in expected non-tensing environments (e.g., before voiceless stops and /l/) are below the line, and at least 35% of their tokens before voiced fricatives and nonvelar voiced stops are above the line, mingled with the prenasal tokens.[3]

Table 4.5. Speakers with the diffused /æ/ system.

speaker	community	y.o.b.	ratio	exceptions	*n*
Vic R.	Poughkeepsie	1932[4]	3 : 4	*cracker*; *and*, *had* (2), *lasted*, *glass*, *class* (2), *classrooms*, *drafted*, *animals*, *graduated*	64
Louie R.	Poughkeepsie	1954	3 : 4	*has*; *had*, *baffle*	64
Fred M.	Poughkeepsie	1970	3 : 4	*that*, *actually*, *Saturday*; *traffic*, *baffle*, *cashew*	55
Nellie M.	Cooperstown	1963	1 : 8	*drastically*, *half*, *Adirondack* (first /æ/), *athletic*, *hassle*	73
Linda K.	Schenectady	1926	1 : 2	*glad*	33
Jasper E.	Albany	1949	2 : 0	none	18
Hazel E.	Albany	1965	2 : 0	*bad*, *had*, *grass*	21

"Ratio" denotes the ratio of speakers with the diffused system to speakers without it in that community's sample. "Exceptions" are tokens that appear unexpectedly tense or lax, given the phonological outline of the diffused system. Unexpected tense tokens are underlined; all others are unexpectedly lax. The total number of tokens of /æ/ (excluding tokens before /r/) is *n*.

Even with these relatively relaxed criteria, only four of the 119 analyzed speakers in the corpus display the diffused system: three in Poughkeepsie and one in Cooperstown. To these four can be added a fifth speaker from outside the

[3] If there was a distinct gap within the distribution of /æ/ tokens, the line was preferentially drawn in that gap.
[4] Vic R. did not state his age during the interview; 1932 is an estimate.

main corpus: Linda K., an 80-year-old woman from Schenectady, whose full vowel system was not analyzed but whose /æ/ wordlist tokens were. The Telsur corpus's two speakers in Albany both display the diffused system as well.[5] This makes a total of seven known speakers of the diffused system in Upstate New York, as summarized in Table 4.5.

The exceptions to the predicted realizations of /æ/ in these speakers' productions can give us a bit more insight into the phonological parameters of the diffused system. First of all—and not mentioned in Table 4.5—these seven speakers confirm the observation that /æ/ is not tensed before /g/ in the diffused system, even though /g/ is as regular a tensing environment as any other in the New York City biphonemic pattern. Only ten tokens of /æg/ were produced by these seven speakers, but not a single one was tensed.[6] Labov (2007) writes the following in noting that tensing before /g/ is absent in the diffused system:

> In the four cases of diffusion of the NYC short-a pattern presented above, phonetic conditioning by the following segment is the common thread, though the phonetic pattern is not perfectly transmitted. The voiced velars are excepted from the voiced stops, and tensing before voiceless fricatives is sometimes generalized to voiced fricatives. But the most regular differences are found at a more abstract level.

The "more abstract level" to which Labov refers is the function-word constraint, and interaction with syllabic and morphemic structure; the diffused system eliminates those more abstract constraints, simplifying the phonemic split to a

[5] For one of the two Telsur speakers from Albany, Hazel E., the data on /æ/ is very sparse and ambiguous enough that it could be interpreted either as a somewhat weak diffused system or a continuous system; it is being construed here as a diffused system because Labov (2007) construes it as such, and because the fact that the other speaker from Albany, Jasper E., clearly has a diffused system biases me in favor of interpreting Hazel's system as the same.
[6] To be fair, Vic R. from Poughkeepsie did produce one token of *bag* fairly high and quite near the boundary I drew between the tense and lax clusters.

regular allophonic pattern. However, the exclusion of /g/ from tensing environments can be understood as an example of a similar kind of phonological simplification, rather than merely imperfect diffusion of the phonological conditioning.

Even considered merely as a set of phonological environments, and ignoring the lexical, morphological, and other effects, the New York City tensing system is not phonologically natural. The environments in which tensing occurs—nasals, voiced stops, and voiceless fricatives—have little in common and don't constitute a well-defined natural class. Attempts to succinctly categorize the tensing environments are muddled even more by the fact that velar voiced stops are included but velar nasals are excluded: not only is there a haphazard collection of manners of articulation, but the different manners of articulation don't even act the same way at different places of articulation. Excluding velar voiced stops from the tensing environment makes for a simpler phonological rule in the diffused system: although the collection of manners of articulation is still fairly miscellaneous, the behavior of places of articulation is at least consistent; speakers don't have to learn to treat velars differently depending on whether they are stops or nasals.

This observation gives us some clearer insight into the constraints on diffusion. Labov argues that the loss of the function-word and syllable-structure constraints is evidence that "the main agents in diffusion are adults who are less likely to observe and replicate abstract features of language structure," and instead only replicate the superficial phonetic patterning. But the case of /g/ shows that they do not replicate the phonetic pattern exactly either. Instead, at

the same time as the abstract structural features are ignored and the lexical exceptions are eliminated, the surface phonetic pattern is streamlined and simplified—the diffused pattern is more phonologically symmetrical. This is reminiscent of Preston (2008)'s account of diffusion in the NCS, which will be discussed more in Section 4.4 below: instead of mimicking the exact phonetic and phonological distribution of the target system, the diffused system reworks it into something more symmetrical. So when dialect features undergo diffusion, it's not only the abstract structural features that get dropped in favor of the more obvious surface-level features; the surface-level features are structurally simplified as well. The agents of diffusion modify the system to be not only more transparent and more lexically regular, but also more phonologically regular. To put it another way, not only does the diffused system eliminate lexical exceptions (such as New York City's tense *avenue*, while *cavern* is lax); it also eliminates phonological exceptions (such as New York City's tensing before /g/, while /ŋ/ is lax).

Although the seven speakers in Table 4.5 show overall relatively few exceptions to the expected diffused pattern—a total of 30 exceptions among 328 tokens of /æ/, or about 9%—we can make some observations about the kind of exceptions we see. For example, most of the exceptions are lax tokens of words that the phonological description of the diffused system would predict to be tense; only five out of thirty exceptions are apparently tense tokens of /æ/ in expected non-tensing environments (*cracker*, *has*, *that*, *actually*, *Saturday*). This is unsurprising: the diffused system has tensing in, for the most part, a strictly larger set of words than either the nasal system or the New York City split

system. Therefore, to the extent that the diffused system is influenced by other /æ/ systems, that influence is more likely to take the form of laxing in expected tensing environments than the reverse. Similarly, only two of the 25 exceptionally lax tokens are prenasal, while the other 23 are before voiced stops and voiceless fricatives. In other words, almost all of the speakers of the diffused system are categorical in their tensing before nonvelar nasals, but almost all are more or less variable in the other tensing environments of the diffused system. Again, this is unsurprising: all of these speakers live in communities (conceivably with the exception of Albany) in which the nasal system is also present among native speakers. Speakers growing up in a community in which both the nasal system and the diffused system are present will have more consistent reinforcement for tensing before nasals than for tensing in other environments.

The existence of exceptions to the expected tensing pattern, including exceptions which appear multiple times in Table 4.5, such as *had* and *baffle*, raises the specter of lexical exceptions to what is argued above to be a regular allophonic rule, diffused by a process that is supposed to eliminate the possibility of lexical exceptions. However, a closer look at the data reduces the likelihood that the words which appear as exceptions in Table 4.5 are actually lexical exceptions to the tensing rule. Many of these word types occur both as exceptions and as non-exceptions, frequently within the same speaker. For example, Fred M. has one tense and one lax token of *actually*; Nellie M. has one tense and one lax token of *half*; Vic R. has one tense and one lax token of *and*; and Hazel E. has one lax and two tense tokens of *bad*. *Baffle* (a word list item) appears lax for Louie R. and Fred M., but tense for Vic R. So what appears to be going on

is not that there are lexical exceptions to a categorical /æ/-tensing rule, but rather either that these exceptions are sporadic speech errors or cases of indistinct recording, or that the tensing rule is variably applied.

If tensing in the diffused /æ/ system is actually a variable, we should expect to see systematic constraints influencing the probability of tensing or laxing in different environments. At a first glance at Table 4.5, at least one such possible constraint pops out: of the 23 unexpectedly lax tokens before voiced stops and voiceless fricatives, as many as ten (43%) are preceded by obstruent-liquid clusters: *glass*, *drafted*, *graduated*, *traffic*, *drastically*, *glad*, *grass*, *classrooms*, and two tokens of *class*. These seven speakers produce fully 80 tokens of /æ/ before nonvelar voiced stops and voiceless fricatives, of which only 14 are preceded by obstruent-liquid clusters. So, to put it another way, ten out of fourteen tokens (71%) with obstruent-liquid cluster onsets are unexpectedly lax, while only 13 out of 66 such tokens (20%) with other onsets (or no onsets) are lax.

In other words, a token of /æ/ has a relatively high probability of being lax if it is preceded by an obstruent-liquid cluster, even if on the basis of the following consonant it would be predicted to be tense. This constraint in itself is not surprising: preceding obstruent-liquid clusters are regularly one of the most disfavoring environments for raising of /æ/ across dialects of American English, in both NCS /æ/ raising and the continuous /æ/ system (*ANAE*: p.177, 180). But it might have been supposed that, in the diffused system, the obstruent-liquid tokens of /æ/ would merely have appeared among the lowest members of the tense class, as they do in the /æ/ systems of speakers from Trenton, N.J. and Baltimore, Md. displayed in *ANAE*; instead, in the diffused system, these tokens

appear within the lax class, and often among the lowest lax tokens.[7] And yet obstruent-liquid onsets do not categorically block tensing in the diffused system, the way following /g/ appears to; there are still four tokens with obstruent-liquid onsets and voiceless-fricative codas that are tense in these speakers' data (*class* for Louie R. and Fred M., *demographics* for Fred M., and *grass* for Nellie M.). Meanwhile, *none* of the 19 prenasal tokens of /æ/ with obstruent-liquid onsets are lax. The general pattern here appears to be one of robustly interacting constraints favoring and disfavoring the application of a variable rule.

A logistic regression of the effects of phonological factors[8] on tensing of /æ/ for these seven speakers yields the results shown in Table 4.6, which do not include many surprises. The near-categorical tensing before nasals and near-categorical laxing before voiceless stops, voiced fricatives, and velars were remarked upon above; most of the variation is in tokens before non-velar voiced stops and voiceless fricatives. An obstruent-liquid cluster in the onset suppresses tensing with a factor weight of 0.277: strong enough to outweigh the relatively weak tensing effect of a voiceless fricative or voiced stop, but not strong enough to prevent tensing before a nasal. On the observation that *baffle*, *hassle*, and *athletic* were all among the exceptions listed in Table 4.5, the presence of /l/ as the *second* consonant after /æ/ was added to the analysis; its effect was found to be

[7] This is reminiscent of the effect of preceding obstruent-liquid clusters on the Great Vowel Shift of Early Modern English, as described by Labov (1994). In the change from Middle English /ɛ:/ to Modern English /iy/, several words with obstruent-initial onsets were left behind as /ey/ (great, break), rather than merely becoming the lowest tokens of /iy/.

[8] Social factors such as age, gender, and community were excluded on the grounds that these seven speakers are a very small sample, and therefore probably not a very representative sample, of speakers of the diffused system.

significant as well, in a sort of mirror image to the effect of obstruent-liquid cluster onsets.

Table 4.6: A logistic regression of the diffused system, with tense /æ/ as the dependent variable. Not significant: place/manner of onset; location of following syllable boundary. *N* = 328.

coda manner:	weight:	coda place:	weight:	liquid in onset:	weight:
nasal	.963	labial	.723	onset is /l/	.669
vls fricative	.648	palatal	.699	no liquid	.541
vcd stop	.554	apical	.680	obs-liquid cluster	.224
vls stop	.038	velar	.013		
vcd fricative	.029				

/l/ next syll:	weight:	style:	weight:
no /l/	.529	reading	.672
/l/ (as in *baffle*)	.116	elicitation	.644
		spontaneous	.399

"/l/ next syll" is satisfied when the *second* consonant after /æ/ is /l/. "Reading" includes reading passage, word list, and minimal pairs; "elicitation" includes semantic differentials and targeted word elicitation.

The only somewhat remarkable result on Table 4.6 is the effect of style. In the New York City /æ/ system, "raising of /æh/ is overtly stigmatized[…] and with any attention given to speech is apt to show correction of raised /æh/ to low front [æ:]" (*ANAE*). In the diffused system, the effect of style is the exact opposite: spontaneous conversation shows less tensing than the formal data-elicitation tasks. I suspect this effect may be more phonetic than strictly stylistic: Words elicited through formal data-collection methods are likely to be heavily stressed and pronounced more slowly than words in spontaneous connected speech. The tensed allophone of /æ/ is relatively long and diphthongized, and therefore it may be that in rapid and fluent speech the shorter lax allophone is more likely to be produced simply because it can be produced more quickly. Labov, Yaeger, & Steiner (1972:92) report a similar (albeit smaller-scale) effect for reading style on tensing of /æ/ in the NCS and among a few New York City speakers who are not sensitive to the stigma on raised /æh/. Whatever the reason for the effect of style shown in Table 4.6, it is fairly convincing evidence

that the New York City stigmatization of tensed /æh/ is absent from the diffused system as it exists in Upstate New York. So just as not all of the phonological and lexical constraints on the New York City /æ/ pattern are preserved when it undergoes diffusion, neither is the social evaluation.

Several of the lax exceptions in Table 4.5 are not accounted for by the phonological features selected as significant in the variable-rules analysis displayed in Table 4.6: *and*, *had* (four times), *lasted*, *animals*, *cashew*, *half*, *Adirondack*, and *bad*. It is to be expected, of course, in a probabilistic grammar such as the variable-rules model posits, that there might be a few tokens that defy the constraints on variation and appear unexpectedly lax or tense. In fact, each of those eight lexical items has at least one tense token[9] among the seven diffused-system speakers. However, it also appears noteworthy that eight out of those eleven lax tokens—all but *lasted*, *half*, and *bad*—are lax in the New York City biphonemic system. Indeed, several of the lax exceptions that *are* accounted for by the phonetic constraints in Table 4.6 are lax in New York City as well: fully 14 of the 25.

When the status of each word in the New York City system is added to the variable-rules analysis, it is selected as a significant factor, as shown in Table 4.7. Including the New York City split /æ/ system as a factor eliminates the effect of following /l/. This is no surprise: the four lax exceptions with following /l/ (*athletic*, *hassle*, and two tokens of *baffle*) are all lax in the New York City system as well.

[9] With the possible exception of *had*—the one token of *had* produced by Fred M. was coded as tense, but was very near the boundary and might have been miscoded. With four lax tokens and one ambiguous, *had* is the closest there is to a clear categorical lexical exception to tensing in this data.

Table 4.7: A logistic regression analysis including status in the NYC system as a factor. Not significant: onset place/manner, syllable boundary, following /l/, style.

coda manner:	weight:	coda place:	weight:	NYC status:	weight:	liquid in onset:	weight:
nasal	.961	palatal	.877	tense	.793	onset is /l/	.614
vcd stop	.411	apical	.646	lax	.286	no liquid	.554
vls fric	.405	labial	.637			cluster	.186
vls stop	.076	velar	.028				
vcd fric	.043						

How should we interpret the emergence of the New York City biphonemic system as a significant factor group in the distribution of tensing in the diffused /æ/ system? The diffused system is crucially supposed to be a monophonemic system, in which knowledge of the individual behaviors of specific words in the New York City system is absent. It would be difficult to explain if the diffused system were found to actively disfavor tensing in function words, for example. A constraint on tensing that is controlled by the morphosyntactic features of the word it applies to, rather than merely the phonetic and phonological features, seems hard to square with a simplified monophonemic system suggested by the elimination of the syllable-structure constraint, the elimination of tensing before /g/, and the seeming lack of lexical exceptions.

Here we begin to rub up against the edges of what the available data can demonstrate. If lexical/functional word status is added to the factor groups in Table 4.6, it is selected as significant. However, the only function words among the lax exceptions are one token of *and* and four of *had*—not a great deal of variety. The laxing of these tokens can be explained as well or better with a purely phonological factor group which is just as statistically robust: namely, a factor group that distinguishes tokens of /æ/ with no onsets or /h/ onsets from

tokens of /æ/ preceded by consonants with place features. There's simply not enough data to determine whether the fact that *and* and *had* are function words contributes to their appearances with lax /æ/ among the diffused-system speakers, or whether it is a coincidence due to the fact that the /æ/ in both words has no consonantal place features preceding it. By the same token, then, without collecting more data it will be difficult to tell if the emergence of the New York City system as a significant factor group in Table 4.7 is an unexpected direct influence of the more abstract constraints of the New York City /æ/ distribution, or just an accident owing to the fact that this set of speakers happens to have produced several words in which /æ/ is preceded by zero or /h/, or followed by a voiceless fricative plus /l/.

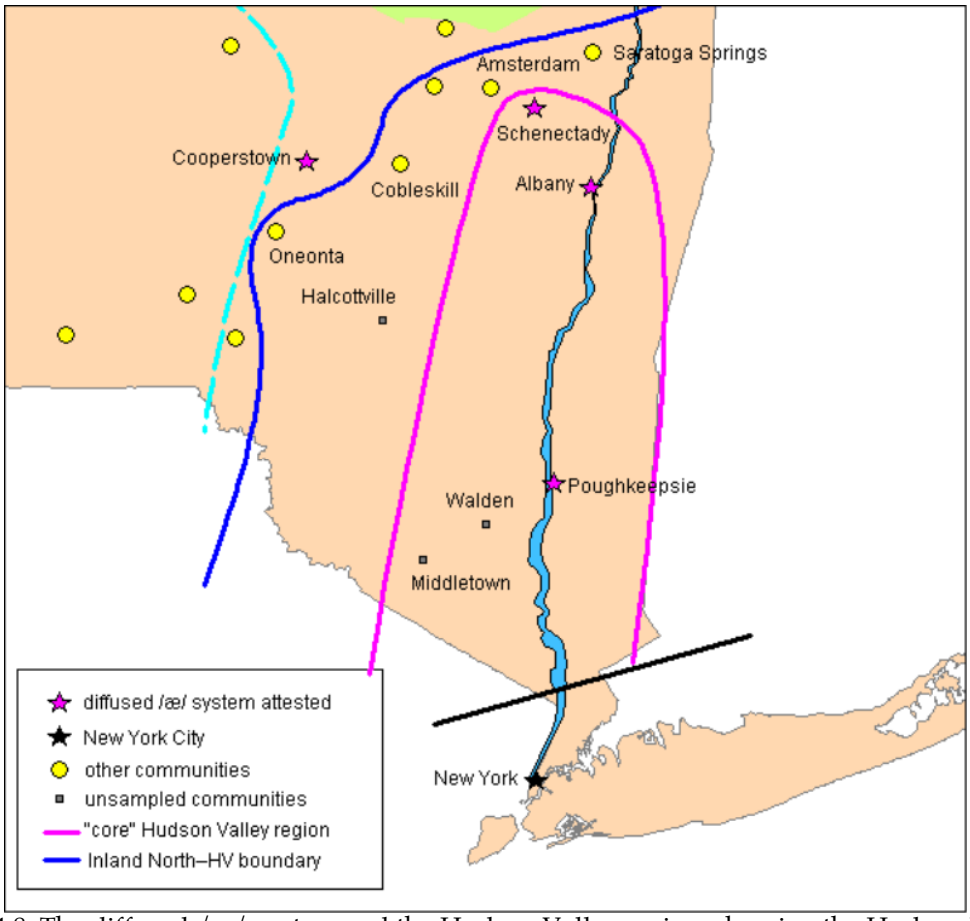
There are some reasons to accept the direct involvement of the New York biphonemic system as plausible even despite the usual interpretation of the diffused system as monophonemic and phonologically regular. These stem basically from the fact that the set of speakers being examined here is not large enough to detect systematic differences in the phonology of the diffused system between demographic groups (age groups, communities, or whatever), and so out of necessity this discussion has assumed that a single diffused system is being described. But there may be reasons for some of the speakers in this small set to have some more direct influence from the New York City system. Fred M.'s mother was born in New York City, and it is possible that he may have ended up with a marginal biphonemic system with some traces of New York City characteristics: although syllable structure was never selected as significant in any of the variable-rules analyses mentioned in this section, all of Fred's lax

exceptions are words that are lax in New York City on account of syllable structure (*baffle*, *cashew*, *traffic*). Vic R. could conceivably be one of the agents of diffusion of the /æ/ system: he is an elderly lifelong Poughkeepsie resident who made frequent trips to New York City for most of his life, and could conceivably have picked up sporadic features of the New York City system which were regularized into the diffused system by the speech community as a whole. But at this point I have clearly entered the domain of speculation far beyond what this sparse data set on the structure of the diffused system can tell me, and had best move on.

4.2.2. Dialectology of the diffused system

The communities in which the diffused /æ/ system is found in at least one speaker are marked on Map 4.8. Given that the diffused system was already known to be present in Albany, it is unsurprising to find it also attested in Poughkeepsie and Schenectady. Poughkeepsie is located approximately halfway between Albany and New York City; the northern terminus of one of New York City's Metro-North commuter train lines is in Poughkeepsie. The presence of this /æ/ system in Albany is thought to be the result of imperfect diffusion of New York City's biphonemic system, and since Poughkeepsie is substantially closer to New York City than Albany and has direct commuter access to it, it seems reasonable to expect the presence of diffused features from New York City to be

found in Poughkeepsie if they are present in Albany.[10] Schenectady is the secondary core city of the Albany metropolitan area, and the city centers are less than 15 miles apart; in general it would be reasonable to expect a linguistic feature that is present in Albany to also be found in Schenectady.



Map 4.8. The diffused /æ/ system and the Hudson Valley region, showing the Hudson River.

In this respect, Poughkeepsie, Albany, and Schenectady appear to form a sort of "core Hudson Valley" region within the general Hudson Valley region defined broadly in Chapter 3 as the area southeast of the Inland North fringe where NCS scores are mostly around two. The core of the Hudson Valley can

[10] Another example of a New York City feature present in Poughkeepsie is the raised /oh/, to be mentioned in Chapter 5: the eight speakers in the sample with highest /oh/ include all seven speakers from Poughkeepsie, of whom three have mean /oh/ less than 600 Hz.

thus be defined as the area, apparently on the whole close to the Hudson itself[11], in which NCS scores are around two *and* there is evidence of the influence of New York City phonological features such as the diffused /æ/ system. From this perspective, Amsterdam and Oneonta, within the broad "Hudson Valley" region but without apparent influence from New York City features, can be regarded as part of a transitional region, between the Inland North fringe and the core of the Hudson Valley, as shown on Map 4.8.

The presence of the diffused system in Cooperstown is somewhat more remarkable. Although Cooperstown's phonology is moving in apparent time away from the NCS, it appears to be at least historically part of the Inland North fringe, not the Hudson Valley. Cooperstown does not appear to share any other unexpected features with New York City; unlike Poughkeepsie and Albany, it doesn't have a particularly high /oh/ and is in fact trending toward the *caught-cot* merger. It does not appear to have a particularly close historical link with New York City. Since only one speaker in Cooperstown out of nine exhibits the diffused system, however, it may be informative to look at her particular history.

Nellie M. describes her parents as having been born and raised in Middletown and Walden. These two communities (shown on Map 4.8) are in Orange County, roughly 100 miles south of Cooperstown, approximately the same distance from New York City as Poughkeepsie is, and within 25 miles of the Hudson River; Middletown is served by the Metro-North railroad. Although I do not possess any direct dialectological information about Middletown and Walden, based on those geographical features they seem likely to be within the

[11] Albany and Poughkeepsie are located on the Hudson River, and Schenectady is obviously less than 15 miles from it.

core Hudson Valley region as defined above. Now, there are three other speakers from Cooperstown in the sample who are of Nellie M.'s approximate generation, who can therefore be assumed to have grown up in a roughly similar dialectological milieu. Their parents' origins are listed in Table 4.9.

Table 4.9. The parents of middle-aged speakers from Cooperstown.

speaker	y.o.b.	Parents
Nellie M.	1963	from Middletown and Walden, Orange County
Sally B.	1957	father from Cooperstown; mother from Groton, Mass.
Peg W.	1957	father from Cooperstown; mother from Boston, Mass. Area
Janet H.	1950	father from Halcottville; mother born NYC, raised in "different places"

Janet H. is the only one other than Nellie who might have any direct connection to the Hudson Valley or New York City /æ/ system, and hers is very tenuous: although her mother was born in New York City, she was not raised there, and apparently lived in "a number of different places around the country" while she was growing up. This makes it relatively unlikely that Janet H.'s mother would have acquired either the New York City /æ/ system or the diffused system.[12] Janet's father grew up in Halcottville, a small and relatively isolated hamlet in the Catskill Mountains in Delaware County, where the diffused system also seems unlikely to be present.

So perhaps Nellie merely acquired the diffused system from her parents, who were natives of the core Hudson Valley region and probably had it themselves. Why, though, would Nellie retain her parents' /æ/ phonology through school and adolescence and into adulthood, rather than imitating the more local /æ/ system of her peers? For the answer to that, we recall the observations made in the previous chapter about Cooperstown's apparent-time

[12] Janet H. did not know where her mother's parents were born and raised, so we can't tell whether *they* might have had the New York City or diffused /æ/ system.

behavior with respect to the NCS. In the previous chapter, Cooperstown was interpreted as originally part of the Inland North dialect region, perhaps the Inland North fringe, but more recently moving away from the NCS. Of the four speakers listed in Table 4.9, one (Peg W.) has an EQ1 index[13] of +75—quite high even for the Inland North fringe—while the other three (including Nellie M.) have EQ1 indices of –99 or lower, lower than any speaker sampled in the Inland North fringe proper. (The younger Cooperstown speakers' EQ1 indices are lower still.) So the picture that seems to emerge is that, in the 1950s and 1960s, Cooperstown was not a typical Inland North fringe community in the sense that, say, Watertown or Glens Falls is today, in which some speakers have the full NCS but even those who don't have a relatively high EQ1 index; rather, it was a speech community already in flux, including both NCS speakers and low-EQ1 Hudson Valley–type speakers, and there were children acquiring both systems.[14] Into that mix come Nellie M.'s parents, with their diffused /æ/ system, which presumably Nellie acquired from them before starting school. Once she started school, ordinarily she might have been expected to start acquiring the /æ/ system of her peers, which would overrule that of her parents. But during the time when Nellie was growing up, it seems as if there wasn't any general community norm for the phonology of /æ/—some of her peers might have had the NCS, with /æ/ generally raised, while others had nasal or continuous systems. If there was no identifiably coherent community /æ/ system among

[13] Recall that the EQ1 index is defined as the difference in Hz in F1 between mean /æ/ and mean /e/—a more positive EQ1 index indicates a greater degree of NCS-like raising.
[14] Particularly notable are Sally B. and Peg W., who are the same age and whose parents have the exact same dialectological background; somehow one of them ended up without the NCS and the other with it.

Nellie's peers, then there would be nothing in particular to replace her parents' diffused system in her own phonology. Thus Nellie's diffused /æ/ system constitutes further evidence that, in the 1950s and 1960s, Cooperstown was a speech community was already in an unsettled and heterogeneous state. The dialectological history of Cooperstown will be touched upon further in Chapter 5.

Cooperstown's /æ/ appears to have settled down somewhat since then. The four younger Cooperstown speakers in my sample, born between 1983 and 1991, all display the nasal /æ/ system and EQ1 indices between –125 and –150—even Kelly R., whose father is from New Jersey and whose mother is from Long Island, both likely suspects for the diffused system or New York City split pattern. It is not surprising that the community settled on the nasal system; outside the NCS communities, as will be seen below, for the most part the nasal system dominates in the sample.

4.3. Short-*a* systems and the Northern Cities Shift

4.3.1. The NCS raised continuous /æ/ system

Criteria for determining whether a speaker exhibits the NCS raised /æ/ system are not stated explicitly in *ANAE*. We could make the assumption that any speaker who conforms sufficiently well to the various indices of the NCS discussed in the foregoing chapter—who has some combination of a sufficiently high NCS score, sufficiently high EQ1 index, and sufficiently low mean F1 of /æ/—should be regarded as an example of the raised /æ/ system. However,

those indices ignore information about the relationship between allophones of /æ/, and therefore, as we will see below, obscure differences between the /æ/ phonologies of different speakers of the NCS. Therefore we will not assume that all speakers who have been described so far as participating in the NCS must *ipso facto* display the raised /æ/ system.

Chapter 13 of *ANAE* mentions two general characteristics of the raised /æ/ pattern. The first of course, is that it involves "the general tensing, raising, and fronting of all short-*a*"; the speaker who is chosen to exemplify the raised system is described as having a distribution of /æ/ in which "the most conservative tokens[…] have vacated the low front area and are established in lower mid position." The second is that "in the raised /æ/ system the pre-nasal allophones are not distinctly separated from the rest of the class"; this stipulation makes the raised system more or less a subspecies of the continuous system, defined earlier in this chapter. To be more precise, then, we may refer to this /æ/ configuration, identified merely as the "raised" system in *ANAE*, as the **raised continuous system**.

These characteristics suggest some criteria that we can employ to classify a speaker as possessing the raised continuous system. First, any speaker who displays a distinct separation between prenasal and pre-oral allophones of /æ/, characteristic of the nasal system, will be excluded. For each speaker in the sample, I have judged impressionistically by eye whether such a "distinct separation" exists, according to the following general guidelines[15]: A speaker was judged to have the nasal system if their prenasal and pre-oral allophones, with

[15] Tokens before /ŋ/ or /r/ were disregarded in making these judgments.

no more than about three exceptions[16], were separated by a relatively broad gap in phonetic space containing no tokens of /æ/. Moreover, if the prenasal tokens were uniformly higher and/or fronter than the pre-oral tokens, with at most *one* exception, the speaker was judged to have the nasal system even if prenasal and pre-oral tokens were very close to each other at several points.

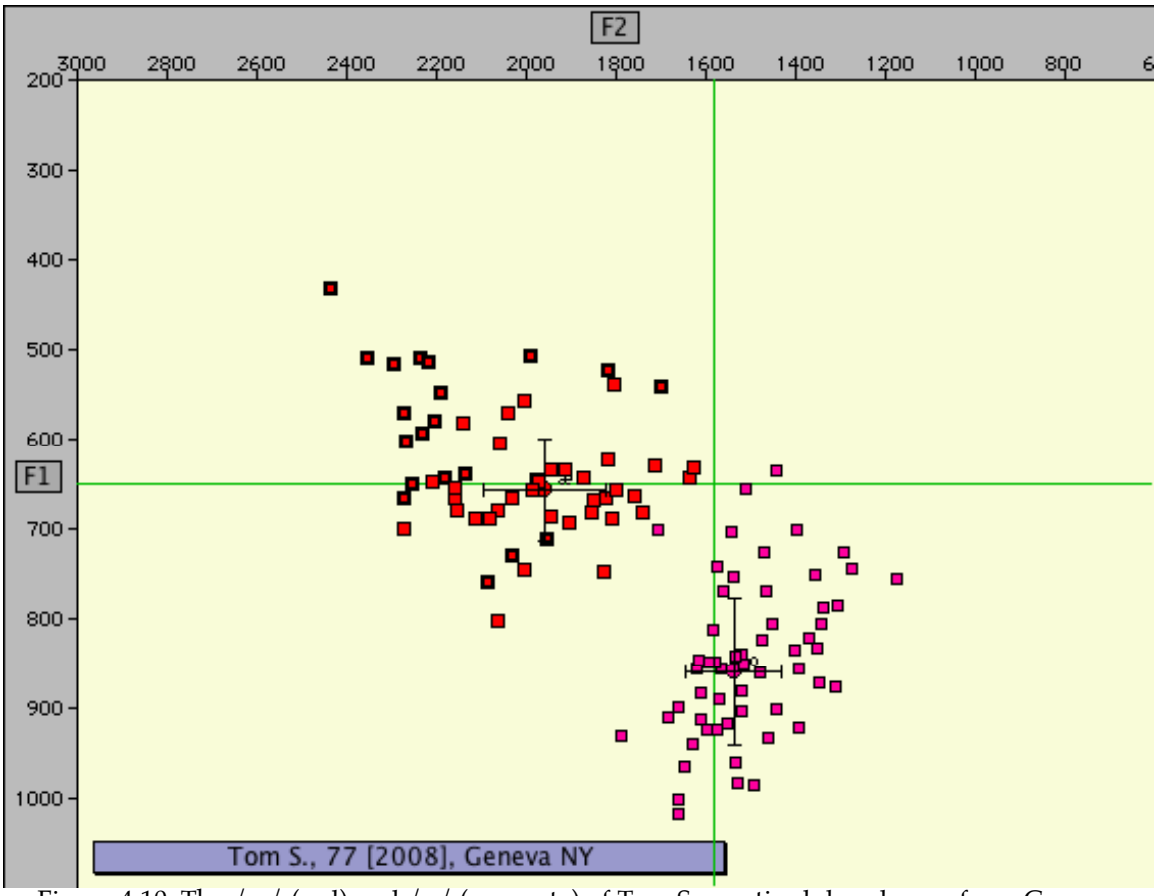


Figure 4.10. The /æ/ (red) and /o/ (magenta) of Tom S., a retired dry-cleaner from Geneva, demonstrating the raised continuous /æ/ system. His prenasal tokens of /æ/ (marked with bold outlines) are not sharply differentiated from the pre-oral tokens; and no tokens of /æ/ range as far down as the mean /o/.

Once speakers with a distinct separation between prenasal and pre-oral are excluded, the raised-continuous speakers will be those whose pre-oral /æ/ is raised out of low position. I made this judgment by using /o/ as the archetype of

[16] I.e., prenasal tokens in the lower/backer cluster or pre-oral tokens in the higher/fronter cluster, possibly constituting speech errors or measurement errors.

a low vowel, and comparing the distributions in F1 of /æ/ and /o/. In particular, /æ/ was regarded as raised out of low position if either the mean F1 of /æ/ was at least two standard deviations[17] less (i.e., higher in the vowel space) than the mean F1 of /o/, or if there were no tokens of /æ/ (or at most one distant outlier) as low in the vowel space as the mean /o/. This is demonstrated in the vowels of Tom S., a 77-year-old retired dry cleaner from Geneva, as shown in Figure 4.10: his single lowest token of /æ/ has F1 of 804 Hz, which is 54 Hz higher than mean /o/ at 858 Hz.

By this definition, 20 speakers in the sample of 119 exhibit the raised continuous /æ/ system, as do an additional six out of the ten Telsur speakers in Upstate New York. All 26 have NCS scores of three or more, EQ1 indices of –66 or higher, and mean F1 of /æ/ at 713 Hz or less. All of them are in communities assigned in Chapter 3 to the Inland North core or fringe, and every fringe or core community in which more than three speakers were sampled is represented. So the raised continuous system is indeed well correlated with the indices of the NCS and the boundaries of the Inland North discussed in the previous chapter. In fact, it's even better correlated with the *more extreme* indices of the Inland North, as Table 4.11 shows. Substantial majorities of the speakers with the very highest NCS scores, EQ1 indices, and ED indices[18] exhibit the raised continuous system, and the raised continuous system has a much greater concentration in the Inland North core than in the fringe. Since the Inland North fringe contains

[17] As usual, these standard deviations are computed ignoring tokens before sonorants and after obstruent-liquid clusters.

[18] The ED index is the quantitative analogue of the ED criterion and has a definition parallel to that of the EQ1 index: it is the difference in F2 between mean /o/ and mean /e/. A speaker whose ED index is higher than –375 satisfies the ED criterion. Only one speaker in the sample has a positive ED index: Janet B. from Utica, whose ED index is +38.

speakers who do not noticeably display the NCS, perhaps that last fact is not so surprising. But even if we restrict ourselves to considering the 25 speakers in the Inland North fringe with NCS scores of three or higher, still only 40% of them display the raised system; on the other hand, 73% of speakers in the Inland North core scoring three or higher have the raised continuous system. Map 4.12 summarizes the geographical distribution of the raised continuous system.

Table 4.11. The distribution of the raised continuous /æ/ system with respect to other indicators of the NCS: what fraction of speakers with each listed feature have the raised continuous system. This table includes speakers in the current sample plus Telsur speakers in Upstate New York.

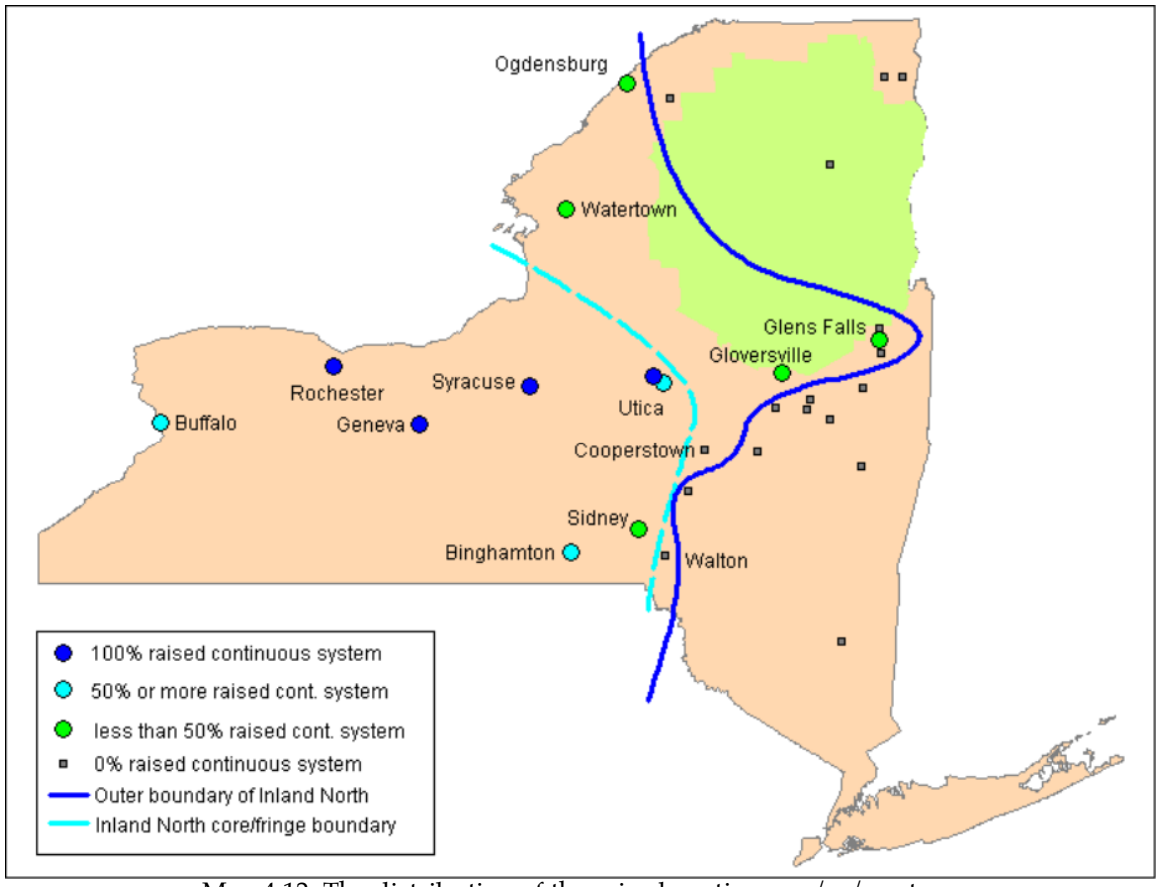
	fraction of total speakers displaying raised continuous system			mean
NCS score	3	4	5	4.15
	4/17 (24%)	14/24 (58%)	8/9 (89%)	
EQ1 index	–66 ≤ EQ1 ≤ 0	EQ1 > 0		+56
	6/38 (16%)	20/29 (69%)		
ED index	–375 < ED ≤ –150	–150 < ED ≤ –75	ED > –75	–133
	11/80 (14%)	8/21 (38%)	7/8 (87%)	
region[19]	Inland North fringe	Inland North core		
	10/45 (22%)	16/23 (70%)		

Unlisted features, such as NCS scores below 3 or EQ1 indices below –66, are exhibited by no raised-continuous speakers. "Mean" indicates mean value among raised-continuous speakers.

The fact that the raised continuous system is found most frequently among speakers with very high EQ1 indices and NCS scores is in some sense inescapable: the definitions of the raised continuous system and the EQ criterion, after all, are just ways of identifying speakers with low F1 of /æ/, measured in slightly different ways and with respect to different benchmarks (/o/ for the former and /e/ for the latter); and measurements of F1 of /æ/ are incorporated into the NCS score as well. The concentration of raised continuous systems among the highest ED indices, however, is more noteworthy, since the ED index

[19] Here and throughout this chapter the fringe is construed as including the five older speakers in Cooperstown, and the core as including the five older speakers in Sidney. The younger speakers in both villages will be included in counts of "non–Inland North" or "miscellaneous" speakers.

depends on measurements that are independent of the criteria for the raised system. This reassures us that the NCS is indeed a unified chain-shift system rather than a collection of independent sound changes, despite the observation in the previous chapter that the backing of /e/ extends into the Hudson Valley even while the raising of /æ/ does not.



Map 4.12. The distribution of the raised continuous /æ/ system.

In *ANAE*, nearly all Inland North speakers in Michigan and Ohio fall into a category labeled as "NCS n > d > g": that is, they exhibit raised /æ/, and within their overall raised distribution of /æ/, the prenasal tokens are the highest, and the tokens before /d/ are higher than the tokens before /g/. There are unfortunately few tokens of /æ/ before /g/ in the current sample—most

speakers have only one, from a word-list token of *bag*, and some speakers interviewed by telephone produced none. The distribution of those tokens of /æg/ that were produced, however, seems to indicate that among raised-continuous speakers in eastern and central New York, the "n > d > g" system is not nearly so prevalent. The 20 speakers of the raised continuous system in the current sample produced a total of 84 measured tokens of /æ/ before /d/ and 21 before /g/. Although /æg/ is on average 44 Hz lower than /æd/ among these 105 total tokens ($p < 0.01$), this difference is by no means consistent from speaker to speaker.

Of the 20 raised-continuous speakers, 17 produced at least one measured token of /æg/ (the exceptions being the two speakers from Geneva and Terri M. from Sidney). Of these seventeen speakers, five have mean /æg/ higher in the vowel space than mean /æd/[20]; another four have at least one token of /æd/ lower than any token of /æg/. The remaining eight have mean differences between /æg/ and /æd/ ranging between 37 and 74 Hz. But of those eight, four have their lowest token[21] of /æg/ only 21 Hz or less lower than their lowest token of /æd/. The remaining four are three speakers from Utica plus the one from Yorkville, whose distance between lowest /æg/ and lowest /æd/ ranges from 60 to 87 Hz. By contrast, in the Telsur corpus, Alma S. from Binghamton has 108 Hz between her *highest* /æg/ and lowest /æd/, and Jeanette S. from Buffalo has fully 200 Hz between highest /æg/ and lowest /æd/; and both have /æg/ as their very lowest tokens of /æ/. None of the raised-continuous speakers in the

[20] Obviously none of these individual-speaker figures are statistically significant; after all, most speakers only produced one token of /æg/.
[21] Only token, for three of them.

current sample have anything like that difference. So in eastern and central New York, among raised-continuous speakers, the "n > d > g" system is much less consistent than it appears to be in the central component of the Inland North—i.e., Michigan and northern Ohio—and, where present, not very robust.

Although all of the raised-continuous speakers fit the criterion of not having a "distinct separation" between prenasal and pre-oral /æ/, there are qualitative differences among them with respect to the relationship between prenasal and pre-oral allophones. Dianne S., whose /æ/ system is displayed in Figure 4.3 above, and Tom S., displayed in Figure 4.10 above, illustrate the contrast. Although Tom's prenasal and pre-oral tokens do not show a distinct separation, and several of his prenasal tokens are relatively low and/or back and among pre-oral tokens, it is still the case that *most* of his prenasal tokens of /æ/ are higher and/or fronter than his pre-oral tokens, and a distinctive cluster of prenasal tokens is discernible at the high front edge of his /æ/ distribution. Dianne S. has no such cluster; her prenasal tokens are distributed within the general cloud of /æ/ tokens and are mostly surrounded by pre-oral tokens. In other words, not only do the prenasal tokens *collectively* not form a cluster of the highest and frontest tokens within the /æ/ distribution, but it is not even possible to isolate *any* large cluster of prenasal tokens among the highest and/or frontest.

Eight of the twenty raised-continuous speakers resemble Dianne in having no identifiable cluster containing only prenasal tokens at the high or front edge

of the /æ/ distribution[22]: one in Geneva, three in Utica, two in Watertown, and two in Gloversville. This excludes Glens Falls and Ogdensburg, the two remotest Inland North fringe communities from the Inland North core. If this is to be interpreted as a meaningful result, it suggests that having a high degree of overlap between prenasal and pre-oral tokens of /æ/ in the raised continuous system is a more advanced feature of the NCS and has not yet reached the most far-flung communities: as /æ/ raises, prenasal tokens lead the movement, while pre-oral tokens catch up with them in the latest stages of the shift. However, this distinction between Glens Falls and Ogdensburg on the one hand and more centrally located fringe and core communities on the other hand does not reach the level of statistical significance[23], and it is noted here merely for the sake of completeness in the discussion of the phonological structure of the raised continuous /æ/ system.

4.3.2. The raised nasal /æ/ system

The raised continuous system was found above to be strongly correlated with the more extreme manifestations of the NCS, and in particular it was found to have a stronger presence in the core than in the fringe of the Inland North:

[22] This criterion does not exclude the possibility that the prenasal tokens may be *on average* higher and fronter than the pre-oral tokens; indeed, in all cases they are at least higher *or* fronter to a statistically significant degree.

[23] It actually does achieve significance at the $p < 0.05$ level if we consider the full set of 19 speakers from Ogdensburg, Glens Falls, and South Glens Falls, and compare them to the 41 speakers in other sampled Inland North fringe and core communities, of whom eight exhibit a raised continuous system with substantial overlap between prenasal and pre-oral tokens. However, this comparison is probably confounded by the fact that, as previously noted, more speakers in the core than in the fringe exhibit the raised continuous system to begin with; a significant result from this comparison may just be reflective of the distribution of the raised continuous system in general rather than of this particular subset of it.

only 40% of the speakers with high NCS scores in the Inland North fringe displayed the raised continuous system. It must be possible, therefore, for a speaker to be clearly subject to the NCS without displaying the raised continuous system.

The raised continuous system as defined above has two components, of course: first, that /æ/ must be substantially higher than /o/ (i.e., raised); and second, that there not be a distinct separation between prenasal and pre-oral tokens of /æ/ (i.e., continuous). Although *ANAE* mentions both these components in its description of the treatment of /æ/ in the NCS, only the raising is a necessary part of the NCS's chain-shift structure. Therefore let us introduce the **raised nasal system**: this configuration of /æ/ resembles the raised continuous system in being raised almost completely out of the low front corner of the vowel space (as above, the criterion will be that the lowest token of /æ/ excluding distant outliers must be higher than mean /o/), but maintains a sharp distinction between prenasal and pre-oral allophones. Pamela H., a 51-year-old former caregiver from Walton, displays this system, as shown in Figure 4.13. Her lowest token of /æ/ is substantially higher than mean /o/; her /æ/ is clearly not a low vowel, and its mean pre-oral F1 is 669 Hz, satisfying the AE1 criterion. But the distinction between prenasal and pre-oral /æ/ is quite clear, with a relatively broad gap between the two clusters of tokens. Only two prenasal tokens of /æ/ appear in the lower cluster, in one of which (*slang*) the nasal is /ŋ/. Pamela's NCS score is four; she clearly demonstrates that a sharp nasal /æ/ system can coexist with NCS in a single speaker.

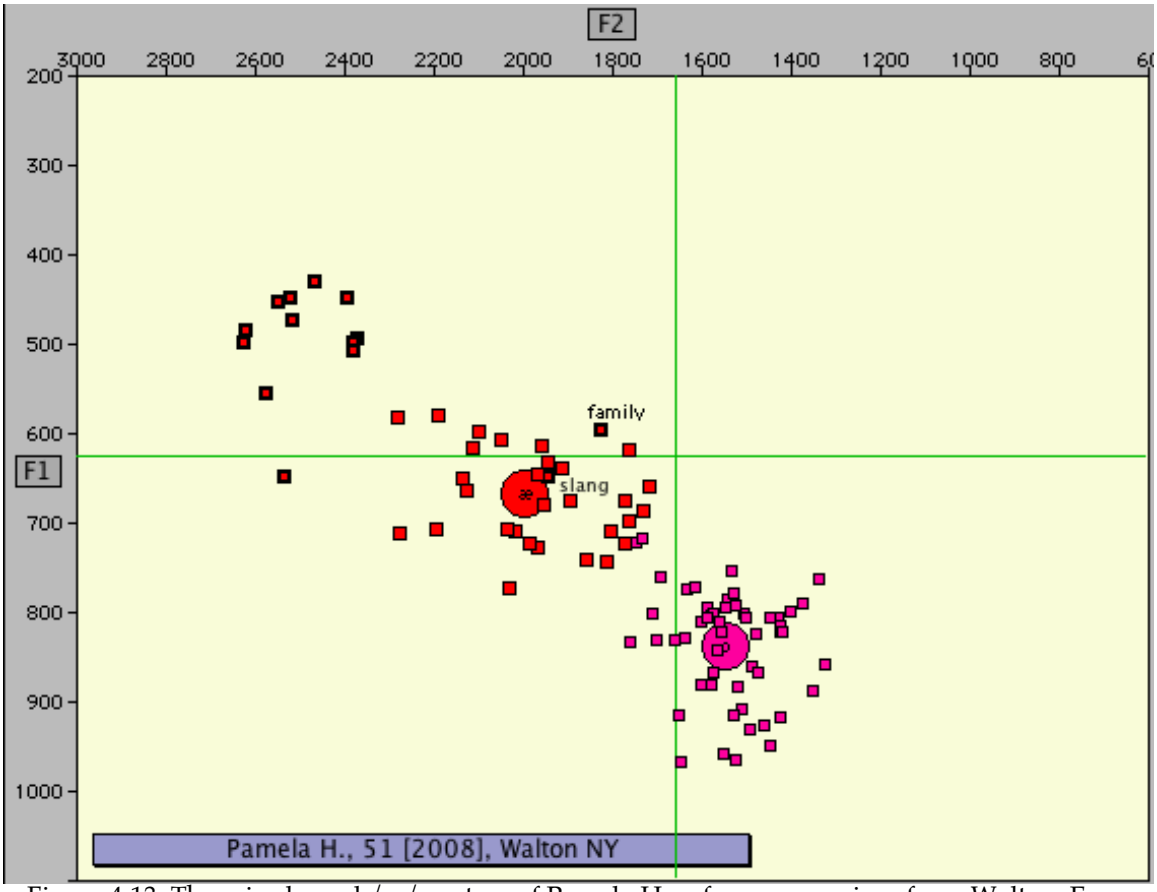


Figure 4.13. The raised nasal /æ/ system of Pamela H., a former caregiver from Walton. Even though /æ/ (red) is raised well out of low front position and is substantially higher than /o/ (magenta), there is still a very sharp distinction between her prenasal (bold outline) and pre-oral tokens of /æ/, with only one token of /æ/ before a non-velar nasal (*family*) appearing in the lower cluster.

20 speakers in the sample demonstrate the raised nasal system, according to the criteria laid out in the previous subsection for judging raising of /æ/ and a "distinct separation" between nasal and pre-oral allophones. Two speakers in the Telsur corpus's Upstate New York sample exhibit the raised nasal system, as well as one in Western New England (Phyllis P., the Rutland, Vermont speaker with the NCS score of four.)

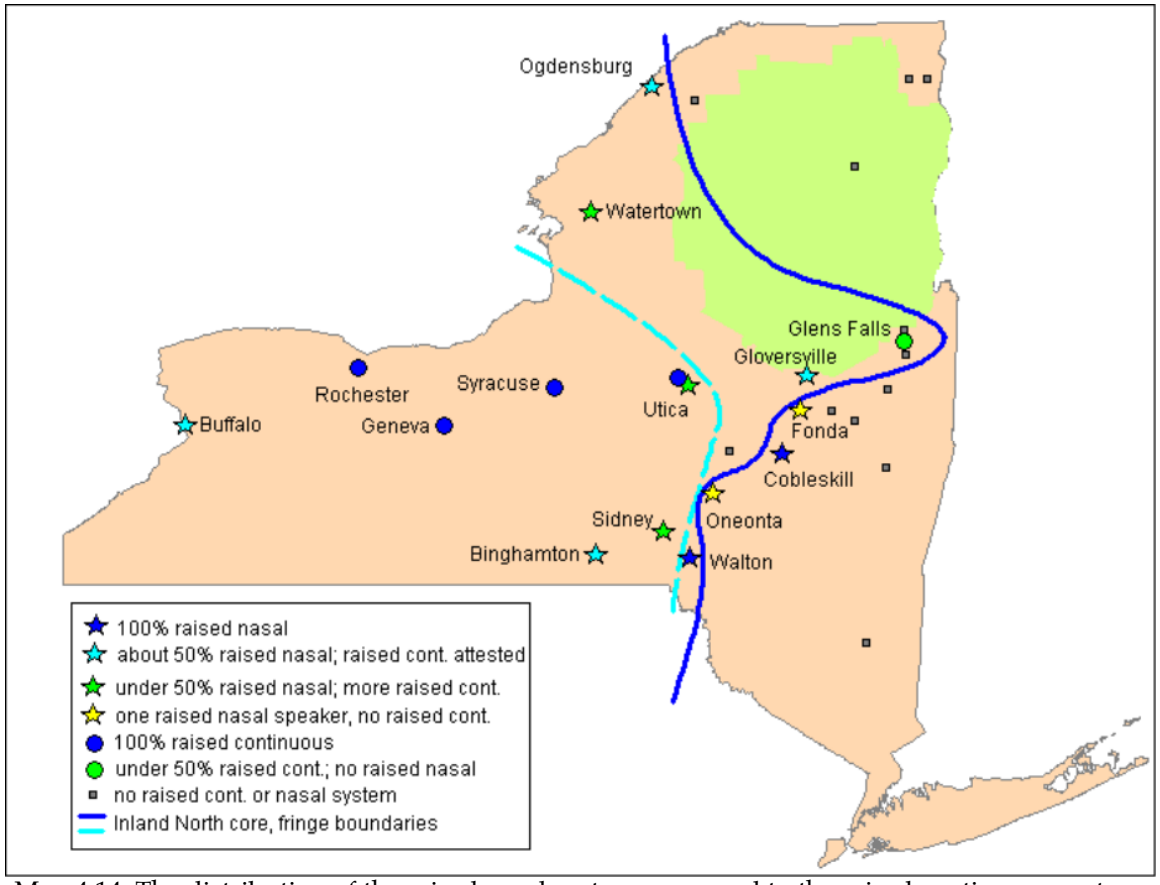
Above, all but seven of the speakers in the Inland North core region (including the current sample and the Upstate New York portion of the Telsur

corpus) exhibited the raised continuous system. Four of those remaining seven—two in Utica, and the Telsur speakers in Binghamton and Buffalo—exhibit the raised nasal system; the remaining three are all in Sidney, which has been found to be retreating from the NCS in apparent time. In other words, every speaker sampled in every apparently stable Inland North core community has either the raised continuous or raised nasal system. It is not a surprise, of course, to find that speakers in the Inland North exhibit a feature, raising of /æ/, that is associated with the NCS. But the uniformity is striking: not all of these speakers satisfy the EQ1 criterion, and one has an NCS score as low as two; some have nasal and some have continuous /æ/ distributions; but all of them have /æ/ raised at least enough that the bottom of the /æ/ cluster is higher than mean /o/.

The Inland North core, however, is not what the raised nasal system was introduced principally to describe; the raised continuous system does a pretty fair job of summing up the core with only a few exceptions. In the Inland North fringe, a region where a majority even of speakers with high NCS scores do not exhibit the raised continuous system, the raised nasal system occurs with slightly higher frequency than the raised continuous system: five speakers in Gloversville, four in Ogdensburg, two in Watertown, and both of the two speakers in Walton. A total of 13 out of 45 speakers in the Inland North fringe therefore have the raised nasal system, versus 10 with the raised continuous system.[24] Moreover, a few raised-nasal speakers appear just barely outside the boundaries assigned to the Inland North in the previous chapter: both of the two

[24] The remaining 22, of course, have non-raised /æ/.

speakers from Cobleskill, one of the two from Fonda, and one of the nine from Oneonta, as well as one of the three younger (and seemingly non-NCS) speakers from Sidney. The distribution of the raised nasal system is shown on Map 4.14.



Map 4.14. The distribution of the raised nasal system compared to the raised continuous system.

Unlike the raised-continuous speakers, the raised-nasal speakers do not all have high NCS scores; in fact, fully 11 of the 23 raised-nasal speakers (including the Telsur speakers in Buffalo, Binghamton, and Rutland, Vt.) have NCS scores of two. As Table 4.15 shows, the raised nasal /æ/ system is most frequent among those subsets of speakers that show moderate degrees of advancement of NCS features, whereas we saw above that the raised continuous system correlates best with highly advanced NCS features. That is, among speakers who show the

raising of /æ/ out of low position associated with the NCS, a sharp distinction between prenasal and pre-oral allophones of /æ/ is more characteristic of those with a moderate degree than an extreme degree of NCS advancement. This is not too surprising, of course, given that almost all speakers in the sample have /æ/ higher before nasals than in other environments. If raising is taken to be the default condition for prenasal /æ/, then a distinct gap between prenasal and pre-oral /æ/ is more compatible with a somewhat less raised pre-oral allophone—there is simply more room a gap between the allophones.

Table 4.15. The distribution of the raised nasal system with respect to other indicators of the NCS. This table includes speakers in the current sample plus Telsur speakers in Upstate New York.

	fraction of total speakers displaying raised nasal system				mean
NCS score	2	3	4	5	2.82
	11/52 (21%)	5/17 (29%)	5/24 (21%)	1/9 (11%)	
EQ1 index	EQ1 < –66	–66 ≤ EQ1 ≤ 0	EQ1 > 0		–22
	3/62 (5%)	13/38 (34%)	6/29 (21%)		
ED index	–375 < ED ≤ –150	–150 < ED ≤ –75	ED > –75		–288
	16/80 (20%)	5/21 (24%)	1/8 (12%)		
region	misc. communities	Inland North fringe	Inland North core		
	5/31 (16%)	13/45 (29%)	4/23 (17%)		

"Miscellaneous communities" here includes sampled communities not assigned to the Inland North core or fringe or Northwestern New England in the previous chapter or to the Hudson Valley core in this chapter.

This seems like a simple observation, but it will be key to the analysis of the phonological structure of the outer boundary of the Inland North. The most obvious interpretation of this observation, of course, is that the raised nasal system merely represents a intermediate stage in the development of the NCS, with /æ/ partially raised; as the non-nasal allophone raises further, the gap between the prenasal and pre-oral allophones will diminish until a raised continuous pattern is achieved. However, the broader geographic patterns of

nasal and continuous /æ/ systems will suggest a different interpretation of the relationship between the raised continuous and raised nasal systems.

Since the raised continuous /æ/ system is associated with advanced participation in the NCS, examining the set of speakers who exhibited it told us little that was new—they were for the most part already speakers who we had a strong reason to categorize as NCS speakers. The raised nasal system, however, being more associated with intermediate degrees of the NCS, can give us yet another way of identifying speakers affected by the NCS who may have escaped some of the criteria employed in the previous chapter. For example, Table 4.15 shows that fully eleven speakers with NCS scores of only two exhibit the raised nasal system. If such speakers were located in cities that were excluded from the Inland North in Chapter 3 because their NCS scores were concentrated around two, such as Oneonta and Amsterdam, that would constitute grounds for reconsidering my judgment that those are not NCS-participating cities.

As it turns out, none of these eleven speakers are in such communities as Amsterdam and Oneonta[25], and so their exclusion from the Inland North is not jeopardized. Fully seven of the eleven are in communities already assigned to the Inland North fringe or core (two from Gloversville, two from Watertown, one from Ogdensburg, one from Walton, and one a Telsur speaker from Buffalo), and therefore help to justify the decision to assign those communities to the Inland North in spite of the presence of low-scoring speakers within them. One is a young speaker from Sidney, a community that appears to be retreating from the

[25] One raised-nasal speaker is in fact from Oneonta; his NCS score is three. In the previous chapter, a single speaker with an NCS score of three was not deemed sufficient reason to consider Oneonta to be part of the Inland North; the fact that that speaker has the raised nasal /æ/ system is no reason to change that judgment.

NCS in apparent time, a judgment not supported by this speaker. The remaining three, however, may be able to give us a bit more information on a couple of communities with small samples.

Fonda and Cobleskill are both villages in which two telephone interviews were conducted, and in both villages both speakers had NCS scores of two. On the basis of that, both villages seem to be classifiable with Oneonta and Amsterdam, in the broadly-defined "Hudson Valley" region of Kurath (1949)[26], and excluded from the Inland North fringe; however, both villages in that case are quite close to the boundary. The EQ1 indices of the speakers in Cobleskill seem relatively typical of a broad Hudson Valley community; at –37 and –108, they seem to cover roughly the same range as Oneonta. Fonda's EQ1 indices, –33 and –68, appear intermediate between the Hudson Valley and the Inland North fringe, in that they lie between the mean and minimum EQ1 indices of fringe cities like Ogdensburg and Watertown and very nearly between the mean and maximum EQ1 of Oneonta[27].

The presence of the raised nasal /æ/ system suggests that these communities near the boundary probably have some degree of influence from the NCS as well—they might constitute an even fringier fringe of the Inland North fringe, or they may represent a transitional region between the Inland North fringe and the Hudson Valley. In Fonda, the one who exhibits the raised nasal system is the one with the higher EQ1 index; Fonda in fact could easily be a typical Inland North fringe village in which, just by chance, I happened to interview two speakers with EQ1 indices and NCS scores on the low side. In

[26] Not to be confused with the *core* Hudson Valley introduced earlier in this chapter.
[27] The actual maximum EQ1 of Oneonta is –39.

Cobleskill, both speakers have the raised nasal system; Mary R., with her EQ1 index of –108, has the lowest EQ1 index of any raised-nasal (or raised-continuous) speaker by a margin of 21 Hz; likewise, she is the only raised-nasal or raised-continuous speaker to have pre-oral /æ/ backer than /e/. Mary R. is 46 years younger than Ronald B., the other speaker from Cobleskill, and appears less advanced than him on almost every measure of the NCS; it may be that Cobleskill resembles Sidney and/or Cooperstown in that it has retreated overall from participation the NCS, but Mary has retained some evidence of her village's history in the raised character of her /æ/. Such specific accounts of the dialectological status of Fonda and Cobleskill are of necessity speculative, of course, owing to the fact that only two speakers were sampled in each of them; although *ANAE* demonstrates that two speakers per community is sufficient to draw a detailed picture or regional variation, it is certainly not enough to infer detailed facts about each individual communities. However, the presence of the raised nasal /æ/ system in these two villages at all does seem to indicate the presence of some influence of the NCS spilling across the boundary that was drawn in Chapter 3 on the basis of NCS scores.

It may also be meaningful that both Fonda and Cobleskill, which collectively show 75% raised nasal /æ/, are villages. Oneonta and Amsterdam, which appear to be about equally as close to the Inland North fringe as Fonda and Cobleskill are, are cities; and they collectively show 6% raised nasal /æ/ (one out of nine speakers in Oneonta, none out of seven in Amsterdam). The example of Sidney and Cooperstown from the previous chapter gives us reason to believe that villages are likely to be more ambiguous or unstable with respect

to their NCS status than cities, at least along the Inland North–Hudson Valley border. Of six sampled villages along that border, two appear to have changed their NCS status over the past several decades, two combine NCS scores and EQ1 indices more typical of the Hudson Valley with raised nasal /æ/ systems that are otherwise almost absent in the Hudson Valley, and two (Walton and South Glens Falls) have NCS scores that seem typical of the Inland North fringe but lower EQ1 scores than any sampled Inland North city.

It is worth emphasizing at this point that the raised nasal /æ/ system is only one of several ways of identifying participation in the NCS, which can combine to give us a more complete picture; it is not a definitive criterion that can dictate independently how we assign membership in a dialectological class. For example, the presence of the raised nasal system in Cobleskill does not immediately cause us to declare that it ought to be regarded as part of the Inland North region after all; rather, we combine Cobleskill's raised nasal system with its relatively low EQ1 indices and NCS scores and describe it as having an intermediate or unstable status. On the other hand, the Telsur corpus includes Doug B., a 28-year-old student from Buffalo with an NCS score of two; the fact that Doug has the raised nasal system suggests that he is not as extreme an outlier as his low score would suggest, and reassures us that Buffalo can continue to be regarded as an Inland North core community.

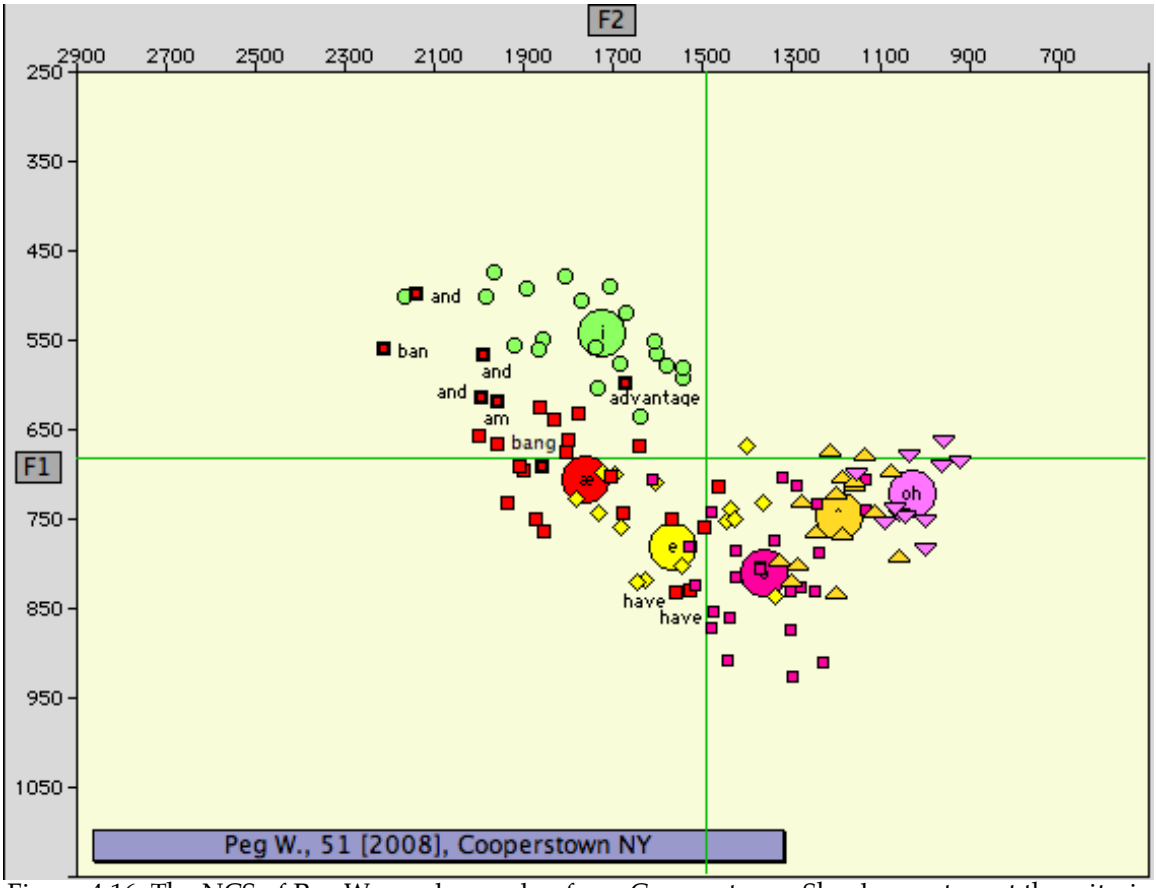


Figure 4.16. The NCS of Peg W., a sales worker from Cooperstown. She does not meet the criteria stated above for the raised nasal /æ/ system because of two tokens of *have* lower than mean /o/.

Similarly, like any categorical criterion, the definitions of the raised nasal and continuous systems do not deal well with borderline cases. For that reason the mere failure of a speaker to satisfy the categorical criteria of one of these raised /æ/ systems does not by itself constitute evidence that that speaker is *not* subject to the NCS. Peg W. from Cooperstown, a 51-year-old sales worker, is a case in point: her EQ1 index is large and positive; her NCS score is three and only misses a fourth point by 8 Hz (her mean F1 of pre-oral /æ/ is 708 Hz); her vowel system, displayed in Figure 4.16, clearly exhibits the NCS impressionistically. But she is not categorized as a raised-nasal speaker by the criteria defined in this chapter because she has two tokens of /æ/ lower than

mean /o/, and the definition stated above allows at most one low outlier. The disadvantage of occasional mischaracterizations of vowel systems like Peg's, however, is outweighed by the advantage of having a reliable objective criterion for classifying /æ/ systems, which can yield meaningful conclusions when looked at across a large number of speakers or in combination with other measures of NCS status.

4.3.3. The nasal and continuous systems overall

In the previous section, it was observed that the status of /æ/ as raised or unraised is more or less orthogonal to the status of /æ/'s allophonic distribution as raised or continuous. In other words, whether a speaker has a sharp distinction between prenasal and pre-oral allophones of /æ/ is in some sense independent of whether pre-oral /æ/ is raised out of the low front region of the vowel space. In that case, considering "raised", "nasal", and "continuous" to be three distinct categories of /æ/ configuration, as is done in *ANAE* and the first section of this chapter, is somewhat misleading. It makes more sense to consider "nasal/continuous" and "raised/low" as two parameters that are free to combine in a two-by-two matrix, as in Table 4.17; more exotic /æ/ configurations, such as the diffused system, the New York and Philadelphia biphonemic systems, and perhaps the Southern "drawl", are separate categories and not part of the matrix.

That said, it is clear that whether a speaker has a nasal or continuous system is not entirely independent of whether pre-oral /æ/ is low or NCS-

raised. Table 4.17 demonstrates that low-/æ/ speakers are much less likely ($p < 0.01$) to have a continuous distribution than raised speakers. And even among speakers classified as raised, the previous sections found that the continuous distribution was much more concentrated among speakers and communities that exhibited higher degrees of raising and other NCS features. So—at least in Upstate New York—a continuous /æ/ system is much more at home with raised /æ/ than with low /æ/.

Table 4.17. Frequency of the four combinations of raised/low and nasal/continuous /æ/.

	raised	low
nasal	20	56
continuous	20	19

Table 4.18. The number of sampled speakers with low continuous /æ/, versus the number of low-nasal speakers in the same communities.

community	low cont	low nasal	region
Amsterdam	1	6	Hudson Valley fringe
Canton	1	8	Northwestern New England
Cooperstown	3	5	Inland North fringe (change in progress)
Glens Falls	4	1	Inland North fringe
Morrisonville	1	0	Northwestern New England
Ogdensburg	1	2	Inland North fringe
Poughkeepsie	1	3	Hudson Valley core
Queensbury	1	1	Hudson Valley fringe?[28]
Saratoga Springs	1	1	Hudson Valley fringe
Schenectady	1	1	Hudson Valley core
Sidney	3	2	Inland North core (change in progress)
Watertown	1	4	Inland North fringe

We can see this even more clearly by taking into account the distribution of the 19 speakers with low continuous /æ/; Table 4.18 lists the communities in which those 19 speakers are found. Although the low continuous system appears in all dialect regions of Upstate New York discussed in this dissertation, the only

[28] Recall from the previous chapter that the status of Queensbury is confusing: geographically, it seemingly ought to be part of the Inland North fringe; but the phonological criteria would classify it with Oneonta and Amsterdam.

communities in which it is found in more than one speaker are NCS communities—Cooperstown, Glens Falls, and Sidney. This in itself is not that informative: there are Inland North communities where low continuous /æ/ is found in only one speaker (Watertown) or none (Gloversville); and many of the non–Inland North communities where only one low-continuous speaker is found are communities where only two speakers were analyzed anyhow. However, if we are to take seriously the decomposition of nasal, continuous, high, and low into a two-by-two matrix as in Table 4.17, we shouldn't be comparing the low continuous system against all other /æ/ configurations on an even footing; rather, we should, for example, compare low continuous only against low nasal, or all continuous speakers against all nasal speakers, varying only one parameter at a time.

Table 4.19. The total number of sampled speakers with low continuous or low nasal /æ/.

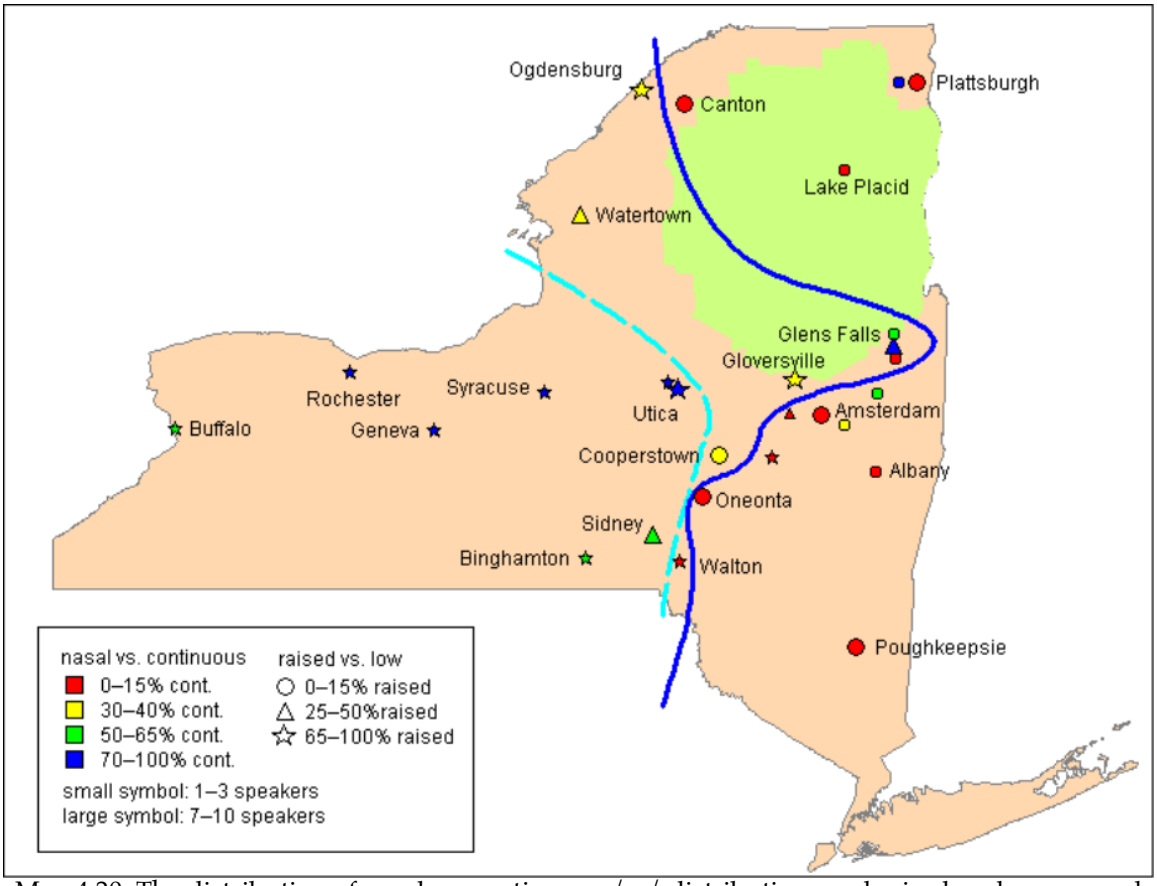
	continuous	nasal
Inland North (core or fringe)	11	13
elsewhere	8	43

Table 4.19 shows that the observation above—that only in the Inland North does the low continuous /æ/ system appear in multiple speakers in a single community's sample—was in fact justified: speakers with low /æ/ are much more likely to have a continuous distribution in the Inland North than outside it ($p < 0.01$). This echoes the finding in the previous sections that a continuous /æ/ distribution appears to be more associated with more advanced NCS: there it was found that the raised continuous system dominated in the Inland North core, while the raised nasal system was somewhat more frequent in the fringe. Analogously, here we find that the low continuous system is found

more frequently in the Inland North than outside it, and outside the Inland North the low nasal system dominates.

Notably, the obvious explanation for the correlation between greater NCS participation and continuous distribution that seemed to apply to raised /æ/ does not apply equally easily to low /æ/. For raised systems, the obvious interpretation was that as pre-oral /æ/ raises in its movement toward the NCS, it closes the distance between itself and prenasal /æ/, and so the raised speakers with the highest degree of raising would be likely to end up with continuous distributions for that reason alone. However, if pre-oral /æ/ is not raised substantially out of the low area of the vowel space to begin with, it's hard to see how such an argument would be relevant. There is little or no difference between the 13 low-nasal speakers and the 11 low-continuous speakers in the Inland North in EQ1 indices or in F1 of pre-oral /æ/, or between the 43 low-nasal speakers and the 8 low-continuous speakers outside of the Inland North.[29] In other words, the speakers classified as low nasal don't have pre-oral /æ/ on the whole substantially lower than the speakers classified as low continuous; they're all about equally low. So the greater frequency of continuous distributions in the Inland North doesn't appear to be the result of NCS /æ/ raising *creating* continuous distributions. Even among speakers with /æ/ not substantially raised, a continuous distribution of /æ/ is simply more frequent in the Inland North than in the Hudson Valley or in the Northwestern New England–like communities of northern New York.

[29] In the Inland North, the mean difference between low nasal and low continuous speakers is only 15 Hz in F1 of pre-oral /æ/ and 9 in EQ1 index. Outside the Inland North, the mean differences are 5 Hz in F1 and 22 in EQ1 index. None of these differences are statistically significant; the closest to significance any of them gets is $p > 0.2$.



Map 4.20. The distribution of nasal vs. continuous /æ/ distributions and raised vs. low pre-oral /æ/, displayed as two orthogonal features. For the purpose of this map, the diffused /æ/ system is regarded as not raised and not continuous.

The finding that continuous distributions are more prevalent in the Inland North than elsewhere becomes even more striking once raised /æ/ systems are admitted back into consideration; this is no surprise, given that *all* the raised continuous /æ/ systems in the sample are in the Inland North. Map 4.20 shows the overall distribution of nasal and continuous /æ/ systems in Upstate New York. Although there is some nonconformance to the pattern among communities with smaller samples, in the better-sampled communities the pattern is strikingly uniform: every community assigned to the Inland North core or fringe in which seven or more interviews were conducted has at least three

continuous-/æ/ speakers, and no community outside the Inland North boundary has more than one.

Why should continuous /æ/ distributions be so rare in the non–Inland North regions of Upstate New York, when they are in principle just as compatible with unraised /æ/ as the nasal distribution is? To answer this question, we consider the phonological structure of the nasal and continuous /æ/ distributions.

4.3.4. Phonological structure, /æ/ systems, and the NCS

Bermúdez-Otero (2007) summarizes the life cycle of a "sound pattern"—a term he uses to encompass phonetic implementation rules, phonological rules, and lexicalized phonological tendencies, each of which is a stage that any sound pattern might go through during its evolution. The first phase in a sound pattern's life cycle as part of the grammar of the language is as a phonetic implementation rule: phonetic rules operate regularly (i.e., without the possibility of lexical exception) and in a gradient manner, involving "a continuous shift along one or more dimensions in phonetic space, such as the frequency of the first formant of a vowel" (§21.2). Structurally, such a rule maps abstract phonological segments to their physical articulatory realizations. Bermúdez-Otero cites the typical behavior of /æ/ in the Inland North core—i.e., the raised continuous distribution—as an example of a phonetic rule, according to which tokens of /æ/ form an unbroken phonetic continuum from the least raised to the most raised, influenced by numerous features of the vowel's

phonetic environments. Clearly the low continuous /æ/ system fits this description as well.

The second phase in a sound pattern's life cycle is as a phonetically abrupt and lexically exceptionless phonological rule. Structurally, such a rule maps one abstract phonological segment to another, rather than mapping a segment to a realization in physical phonetic space. By "phonetically abrupt", Bermúdez-Otero means that, because phonological rules act only on discrete and categorical representations, the allophones created by a phonological rule may "have widely separated targets[…] and their tokens occupy discrete, largely nonoverlapping regions in phonetic space" (§21.2)[30]. Thus phonetic abruptness of this type can be used to diagnose a "sound pattern" as being a phonologically specified allophonic rule, rather than a phonetic implementation rule. From this description it is clear that nasal /æ/ systems fall within this stage.

The next phase of the evolution of a sound pattern is as a relationship between two phonemes, rather than two discrete segments that are allophones of the same phoneme; this introduces the possibility of sensitivity to morphosyntactic structure and lexical exceptions. At the final phase no synchronic phonological relationship at all remains between the former allophones. The New York City biphonemic system inhabits one of these final two phases. The four phases are summarized in Table 4.21; here I will be concerned with the first two phases, since those are the phases represented by the continuous and nasal systems.

[30] This quotation is actually from Bermúdez-Otero's description of the New York City and Philadelphia /æ/ systems, which are of course not at this phase of the life cycle because they are not lexically exceptionless phonological rules. They are, however, phonetically "abrupt" in the sense used here, and this description will serve for the purpose of defining phonetic abruptness.

Table 4.21. The life cycle of phonological patterns (Bermúdez-Otero 2007), summarized.

Phase I	phonetic implementations of phonological features	lexically exceptionless; phonetically gradient
Phase II	allophonic rules changing discrete segments	lexically exceptionless; phonetically discrete
Phase III	rules of lexical phonology relating distinct phonemes	lexical exceptions possible; morphological sensitivity; phonetically discrete
Phase IV	no synchronic phonological rule	residue of phonological rule in lexical distribution

Crucially, this taxonomy of sound patterns assumes a "modular feed-forward" model of phonology, in the terminology of Pierrehumbert (2002): rules of each phase act upon the outputs of the next higher phase, without the ability to "look backward" in the derivation at more abstract levels of structure. So, for example, the phonemic representations that are the output of Phase III rules are the inputs to Phase II allophonic rules; the segments that are the output of Phase II rules are the input to Phase I phonetic rules, and the phonetic rules don't have access to the phonemic representations that were the input to Phase II.

Phase II phonological rules manipulate the discrete phonological representations of the segments on which they operate. This means that two allophones of the same phoneme, if related by such a phonological rule, will have different featural representations in terms of phonological atoms. For instance, since the rule that defines a nasal /æ/ system is a phonological rule of the second stage, the prenasal and pre-oral allophones of /æ/ under such a system will differ on the phonological level—for example, pre-oral /æ/ might be [+low] and prenasal /æ/ might be [–low]. In a continuous system, however, the distribution of /æ/ is governed by phonetic implementation rules, not by phonological rules. That means that prenasal and pre-oral /æ/ do not differ in phonological features.

This chapter began by asking what the nature of the phonological difference is between /æ/ inside the Inland North and outside the Inland North such that the general raising of pre-oral /æ/ does not substantially expand eastward into cities in the Hudson Valley, even while other aspects of the NCS do. The difference between the phonological statuses of the nasal and continuous systems is a step towards an answer: in the Hudson Valley (and in the northern New York communities) the nasal system predominates, meaning that pre-oral /æ/ differs phonologically from its prenasal allophone; whereas in the Inland North prenasal and pre-oral /æ/ are different phonetic realizations of the same phonological segment.

Why should a structural difference of this type prevent the NCS raising of /æ/ from spreading into regions where the nasal system dominates? Consider first the role of chain shifting in the "life cycle". Inasmuch as a chain shift (or any other sound change that might be described as a vowel shift) constitutes a drift of the phonetic target of a particular phoneme through continuous phonetic space, it is clear that a chain shift must be a change in Phase I phonetic implementation rules. According to the modular feedforward model of phonology, Phase I implementation rules don't act on phonemes per se—only on the segments that are the output of the Phase II allophonic rules, regardless of their phonemic status. In other words, if a phoneme has more than one discrete segmental allophone, those allophones will act independently of each other in chain shifting.

This gives a motivation for the non–Inland North regions to react differently to the NCS raising of /æ/ than to the other NCS shifts which they

seem to participate more fully in. There is no apparent discrete allophony in /e/, for example, either inside or outside of the Inland North, so a shift in /e/ (i.e., a change in the phonetic implementations of the unique allophone of that phoneme) diffusing eastward from the Inland North can be straightforwardly interpreted in the Hudson Valley's phonological system and lead to a similar shift in /e/ there. But /æ/ has a different phonological structure in the Hudson Valley than it has in the Inland North, with two discrete allophones on which shifting should be able to act independently. Labov (2007) argues that the abstract structure of linguistic entities and relationships between them are not subject to diffusion. This means that diffusion should not (at least, not directly) change the fact that the prenasal and pre-oral allophones differ in their representations as phonological segments; the only effect of diffusion should therefore be a change in the phonetic implementation of one or both allophones.

Table 4.22. F1 and F2 means of /æ/ both before nasals (/æN/) and in other environments (/æC/) for each of the four combinations of raised/low and nasal/continuous /æ/ systems among Upstate New York speakers (including the current sample and Telsur), and the results of ANOVA analyses comparing systems.

	/æC/ F1	/æC/ F2	/æN/ F1	/æN/ F2
low nasal	776	1704	608	2150
low continuous	740	1802	623	2105
raised nasal	710	1842	595	2188
raised continuous	649	1960	587	2208
F ratio	40.25	24.55	1.93	2.25
p	< 0.0001	< 0.0001	0.13	0.086

There would be little reason for diffusion of NCS /æ/-raising to cause raising of the prenasal allophone, of course: in communities with nasal systems, prenasal /æ/ is already just about as raised as it is in NCS communities. Table 4.22 shows that the differences in prenasal /æ/ between the various combinations of raised, low, nasal, and continuous systems are extremely small

and not statistically significant. So since prenasal /æ/ in even relatively extreme NCS systems is not substantially different from prenasal /æ/ in the low nasal system, contact with NCS communities would not be expected to induce any change in the prenasal allophone in nasal-system communities.

So it is raising of the pre-oral allophone which ought to be subject to diffusion from the Inland North. In fact, below we will see some evidence that, in the Hudson Valley, there is some slight effect of the diffusion of raising of the pre-oral allophone. However, even if it has taken place, diffusion of pre-oral /æ/-raising has been clearly been far less *effective* than diffusion of other NCS features, with a much more substantial difference between Inland North and non–Inland North communities. The reason for this, I hypothesize, is the presence of the prenasal allophone itself, occupying the raised space toward which the pre-oral allophone would be moving. In other words, the existence of a distinct phonological segment in the target raised position in phonetic space prevents the pre-oral allophone of /æ/ from moving into that position as well.

Of course it is not in general the case that the existence of one segment in a particular region of phonetic space is sufficient to prevent another segment from being moved into that region as a result of dialect diffusion; if that were the case, it would prevent the diffusion of phonemic merger, which is known to be a very common phenomenon. In that case, how is the prenasal allophone capable of preventing the pre-oral allophone from raising into its space, instead of allowing it to raise and merging with it?

The key fact here is that prenasal and pre-oral /æ/ are allophones of the same phoneme—i.e., they are related to each other by a synchronic rule in the

speaker's grammar. This synchronic rule is a Phase II rule in the life cycle of sound patterns; it expresses a relationship between two segments with distinct featural specifications. Since dialect diffusion does not directly alter the abstract relationships between linguistic entities, it remains part of the speaker's grammatical knowledge that the prenasal and pre-oral allophones of /æ/ have different representations in terms of phonological features. What this means is that, if one allophone begins moving toward the other in phonetic space as a result of diffusion of a sound change, one phonological segment with a particular set of features is moving towards occupying the same position in phonological space as a segment with a distinct set of phonological features. However, since the speaker knows (because of a single synchronic rule in the grammar) that those two segments have distinct features, that movement is blocked; there is resistance against two productively distinct phonological entities having the exact same phonetic realization. The contrast between this situation and phonemic merger, in which the distinction between the phonological entities is not synchronically productive, will be discussed in Chapter 7.

Anyhow, this analysis gives us an explanation for the status of the NCS in the Hudson Valley. The backing of /e/ and fronting of /o/ can spread into the Hudson Valley from the Inland North because /e/ and /o/ have the same phonological structure in both regions; however, the raising of pre-oral /æ/ does not diffuse effectively because the basic unit of vowel shifting is the (potentially allophonic) segment, not the phoneme, and the already raised prenasal allophone blocks raising of the pre-oral allophone. Thus, the nasal system prevents NCS raising from developing.

The status of the raised nasal distribution is not accounted for by this story, but there are a couple of possible easy explanations for it. One possibility is that a community in which the raised nasal system exists might have had a raised continuous distribution earlier in its history, and then that continuous distribution underwent restructuring into a nasal system where prenasal and pre-oral allophones of /æ/ were distinguished phonologically, although both were already raised. Another possibility is the opposite: that the raised nasal system is in fact the result of advanced diffusion of /æ/-raising into communities with the nasal system, but pre-oral /æ/ isn't able to be raised quite as high as prenasal /æ/ because of the effect described above, and remains distinct from it. It is possible to distinguish these two possibilities: in the first scenario, non-prenasal /æ/ becomes raised first and then becomes phonologically differentiated from the prenasal allophone, whereas in the second, the nasal and prenasal allophones are phonologically distinct before the prenasal allophone comes to be raised.

The region with the highest frequency in the data of the raised nasal system is the Inland North fringe. There are three communities in the Inland North fringe in which both the raised nasal system and at least one other /æ/ distribution are observed: Gloversville, Watertown, and Ogdensburg.[31] If the first account of the origin of the raised nasal system proposed above is accurate, we would expect to find the raised nasal system to be newer in apparent time in

[31] The almost total absence of nasal /æ/ systems in Glens Falls—only one out of seven speakers—is unexplained. This is made all the more confusing by the fact that all three speakers from the adjacent village of South Glens Falls have the low nasal system; indeed, one of them has the second-greatest Cartesian distance between prenasal and pre-oral /æ/ in the entire sample. Despite the small sample, this contrast between Glens Falls and South Glens Falls is statistically significant; $p \approx 0.03$.

these communities than the raised continuous system; if the second or third account is correct, we would expect to find the raised nasal system to be newer than the *low* nasal system. Sadly, neither of these predictions is satisfied: there is basically no difference in age between the speakers identified as showing the raised-nasal system in those communities and the speakers of either of the other two systems ($p > 0.67$ for both). However, we do see a pattern in formant measurements: among all 28 speakers sampled in these three communities, the distance between prenasal and pre-oral /æ/ is increasing in apparent time ($r^2 \approx 0.14$, $p < 0.05$), as shown in Figure 4.23. On the other hand, F1 of pre-oral /æ/ is not changing in these communities; there is no correlation between year of birth and F1 of /æ/ ($r^2 < 10^{-3}$). In other words, while the raising of /æ/ has apparently gone to completion in the Inland North fringe, a separation between prenasal and pre-oral /æ/ appears to be in progress.

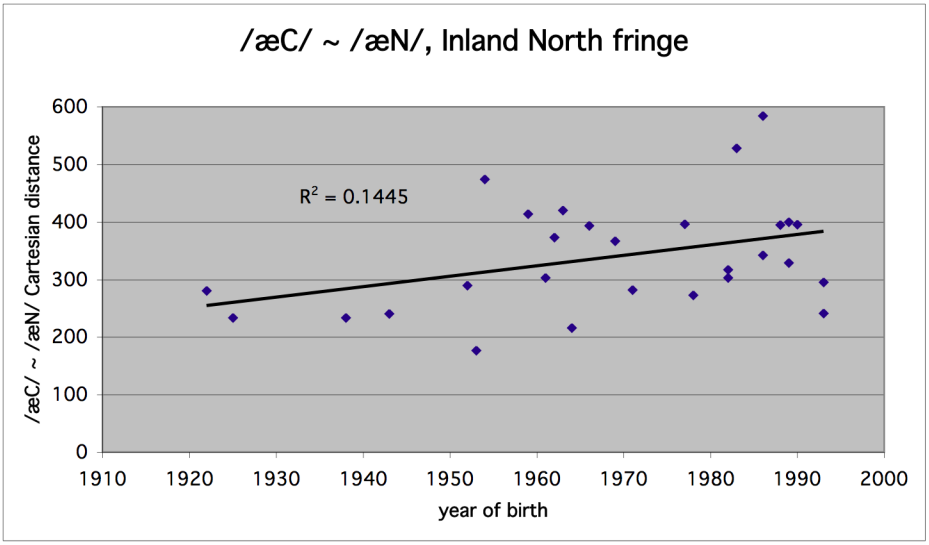


Figure 4.23. The Cartesian distance between prenasal and pre-oral /æ/ in apparent time in Gloversville, Watertown, and Ogdensburg. $n = 28$; $p < 0.05$.

Insofar as the Cartesian F1/F2 distance between prenasal and pre-oral /æ/ can be construed as a proxy for their restructuring into phonologically distinct allophones—and inasmuch as it seems justifiable to regard the means of my measurements of formant values as more reliable than my categorization of speakers /æ/ systems on the basis of admittedly somewhat arbitrary criteria—this is at least suggestive evidence that the nasal system is newer to the Inland North fringe than the general raising of pre-oral /æ/. So to the extent that we may regard one of the hypotheses about the origin of the raised nasal system as better supported by the data than the other, it is that the nasal system is a secondary development in a preexisting raised system. This must be at best a tentative conclusion, of course. If it is true, however, it supports the argument that the key difference between the Inland North and non–Inland North communities (in Upstate New York, anyhow) is the status of the relationship between prenasal and pre-oral /æ/. In the non–Inland North communities, the low nasal system predominates; in the Inland North, even where nasal systems are found there is evidence that they are a relatively recent development.

If the nasal system seems to be relatively new in the Inland North fringe—new enough that the distance between prenasal and pre-oral /æ/ is growing in apparent time, anyhow—the same does not appear to be the case in communities where the low nasal system predominates already. There are four communities in the data with samples of at least seven speakers of whom all but at most one speaker show the low nasal system: Amsterdam, Oneonta, Canton, and Plattsburgh. In these cities, the separation between prenasal and pre-oral allophones of /æ/ appears to have basically gone to completion; the Cartesian

distance between the allophones is not increasing in apparent time. In fact, in two of the communities, Amsterdam and Oneonta, the opposite is happening: the distance between prenasal and pre-oral /æ/ appears to be actually decreasing in apparent time. Now, the allophones are not actually re-approaching one another, as if to reestablish a continuous system: the entire movement, as shown in Figure 4.24, is taking place in the backing of prenasal /æ/, which is raised high enough that its backing does not threaten its margin of security from pre-oral /æ/. (In each city individually, *t*-tests show the younger speakers to have backer prenasal /æ/ than older speakers, significant to $p < 0.05$; the Pearson correlation of F2 with age for both communities together gives $r^2 \approx 0.44$, $p < 0.005$.) But in any event, it seems as if nasal /æ/ systems are not a new development in these communities, but might be a new development in the Inland North fringe.

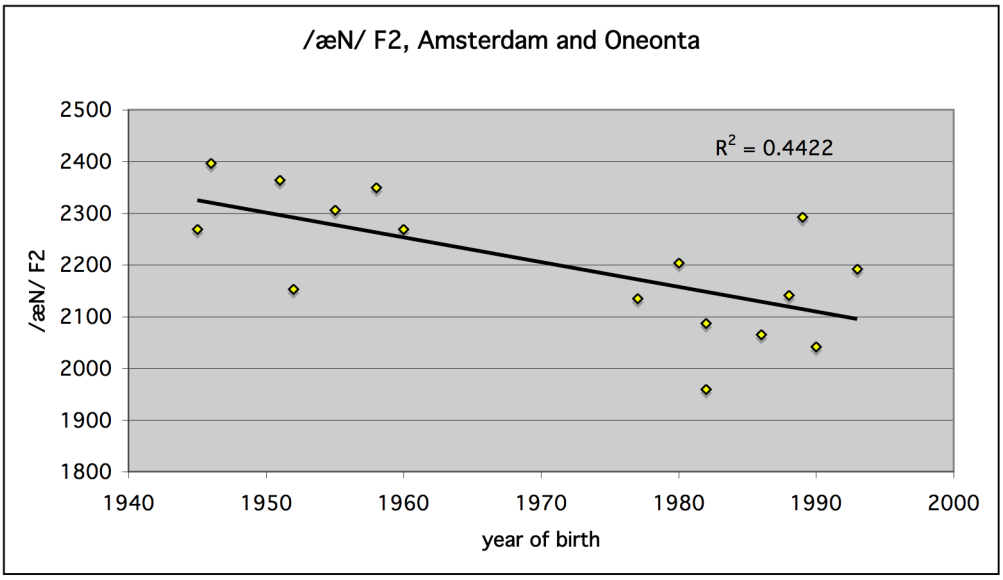


Figure 4.24. The backing of prenasal /æ/ in apparent time in Amsterdam and Oneonta, two cities where the low nasal system dominates.

So at this point we can hypothetically reconstruct the history of the NCS in Upstate New York in approximately the following way. To begin with, the Inland North (i.e., the communities with originally Southwestern New England settlement and Erie Canal commercial influence) had a continuous /æ/ distribution and the non–Inland North communities had a nasal /æ/ distribution. In the Inland North, /æ/ began to raise, setting off a chain shift involving other vowel shifts such as the backing of /e/ and the fronting of /o/—perhaps originating in the Inland North core, and then spreading to the fringe communities somewhat later. These phonetic changes also spread to some extent into the Hudson Valley, but the Inland North's raising of /æ/ was blocked by the Hudson Valley's raised prenasal allophone of /æ/. Somewhat later, the raised nasal system began developing in the Inland North, principally in the fringe communities (though not in Glens Falls), by phonological restructuring of the raised continuous system, possibly with influence from the low nasal system of other communities.

4.4. The syllable-boundary pilot experiment

4.4.1. NCS /æ/ as a long and ingliding phoneme

The most fundamental division among English vowels is the difference between short and long vowel phonemes (*ANAE*)—the short vowels being the class that includes, for example, /i/, /e/, and /ʌ/, and the long vowels including diphthongs such as /ey/ and /aw/, among others. The most salient feature of this split into short (or "checked") and long (or "free") phonemes, as

has been commented on frequently (e.g., by *ANAE*, Veatch 1991, Wells 1990), is that a short vowel phoneme must be followed by a consonant wherever it occurs, whereas long vowels can freely occur with or without following consonants. In the theory of the structure of American English vowels assumed by *ANAE* and defended by Veatch (1991), according to which each vowel consists of a nucleus plus an optional glide, the short vowels are exactly those phonemes that lack a glide component. The set of phonemes that share any one glide component constitute a "subsystem". The short vowels make up one subsystem because they share the absence of a glide component; long subsystems include[32] one with the front upglide /y/, one with the back rounded glide /w/, one with the rhotic glide /r/, and one described as the "long and ingliding" subsystem. In the long and ingliding subsystem, whose glide component is denoted with the symbol /h/, phonemes with high and higher-mid nuclei glide inward in a lower-mid-central direction, while those with lower nuclei either possess inglides or are long monophthongs.

It was first suggested by Labov, Yaeger, & Steiner (1972) that the /æ/ phoneme in the Inland North belongs to the long and ingliding subsystem, and thus is better represented as /æh/; this hypothesis is reiterated in *ANAE* and, as will be discussed further in the following section, advanced by Preston (2008). This analysis is fully consistent with the analysis of /æ/ systems presented in the previous section. Under this hypothesis, /æ/ is long and ingliding/æh/ in the continuous system that underlies the development of the NCS. In the nasal system, which is argued above to block the diffusion of the NCS, /æ/

[32] This division into subsystems is a combination of elements from the subsystem sets used by Veatch (1991) and *ANAE*.

underlyingly belongs to the short subsystem. But since the prenasal and pre-oral allophones of /æ/ have different segmental representations in the nasal system, the prenasal allophone may be part of the long and ingliding subsystem even while the pre-oral allophone remains short. If this is the case, the origin of the NCS and of the nasal system can be reduced to a single sound change originally shared by both Inland North and non–Inland North communities: a raising of the long and ingliding allophone of /æ/, in line with the general tendency of long vowels to rise (Labov, Yaeger, & Steiner 1972; Labov 1994). The difference between the communities inside and outside the Inland North, in this story, would be merely that in the Inland North, the long and ingliding allophone of /æ/ constituted the *entire phoneme*, while outside the Inland North it included only the prenasal allophone.

It seems fairly clear that the prenasal allophone in a nasal /æ/ distribution belongs to the long and ingliding subsystem, regardless of the status of pre-oral /æ/; the prenasal allophone in nasal systems is not only raised and fronted but also typically possesses the inglide characteristic of the long and ingliding subsystem. As shown above in Table 4.22, prenasal /æ/ does not differ substantially between speakers with nasal and continuous /æ/ systems, whether raised or unraised, while the pre-oral allophones show large and statistically significant differences between systems. These phonetic facts support the hypothesis above that there is a greater phonological difference between NCS and non-NCS representations of pre-oral /æ/ than of prenasal /æ/.

This section will present results of a pilot experiment undertaken during this dissertation's fieldwork to test the hypothesis that in the Inland North, pre-oral

/æ/ is part of the long and ingliding subsystem, while outside the Inland North it is part of the short subsystem. As we will see below, the results do not fully prove that hypothesis; however, they relate to broader questions about the general structure of low vowels in English.

4.4.2. Description of the syllable-boundary experiment

The key phonotactic difference between short and long vowels, as mentioned above, is that a short vowel must be followed by a consonant and long vowels may occur freely with no following consonant. If /æ/ is phonologically long in the Inland North, it has become so, in some sense, covertly: there are still no words in which /æ/ occurs without a following consonant, and so it still has the surface distribution of a short phoneme. But if /æ/ is in fact phonologically long, it ought to be possible to make its long-vowel nature emerge via linguistically-innovative behavior. To that end, I carried out a small pilot experiment to see what happens if speakers are "forced" to attempt to use /æ/ without a following consonant.

The experiment was formulated as a "language game", in the sense of Bagemihl (1995). I introduced subjects to a made-up language game called "Ubba", which supposedly operates by adding the infix "ubba" (that is, /ʌbə/) between the syllables of a two-syllable word. If subjects were relatively willing to add "ubba" after /æ/, without an intervening consonant—so that, for example, *tattoo* became *tæ-ubba-too* rather than *tat-ubba-too* or *tat-ubba-oo*—that might be taken as indicating that /æ/ is phonologically long for those speakers.

I carried out several trial versions of this experiment both on the campus of the University of Pennsylvania and in Sidney, Oneonta, and Cooperstown, before arriving at a methodology which produced interpretable results. This version of the experiment was carried out in Ogdensburg and Canton with Short Sociolinguistic Encounter subjects who, after the main interview was complete, were willing and able to take a few more minutes to participate in the experiment. These were supplemented with a few more speakers with whom full interviews were not conducted—either those who were unwilling to participate in a full-length interview but were open to a brief experiment, or those approached after the target number of interviews had been achieved. Even so, I was only able to carry out this experiment with a relatively small number of subjects (six and four respectively, all 26 years old or younger), but the data I did collect in those communities suggest some interesting results, as will be seen below. All such speakers provided their ages and confirmed that they had lived in the community in which I spoke to them since early childhood.

After briefly defining the concept of a language game as a process where "you change the shape of a word according to some rule", and giving Pig Latin as an example ("so in Pig Latin a word like *moonlight* becomes *oonlight-may*"), I explained "Ubba" to them as follows: the only rule is that you add "ubba" to the middle of each word, so for example *moonlight* becomes *moon-ubba-light*. I did not refer directly to syllables, in order to attempt to minimize the effect of any preconceived explicit notions subjects might have about the locations of syllable boundaries—for example, that syllable boundaries coincide with where a word might be hyphenated at a line break. Likewise, I read aloud the list of words for

"Ubba" treatment, rather than giving subjects a written list, in order to attempt to avoid effects of spelling. *Moonlight* was chosen as the sample word because it has a clear syllable boundary, between two consonants and coinciding with a morpheme boundary. The words that speakers were asked to add "ubba" to were mostly two-syllable monomorphemes, with either a single consonant between the two syllables or a cluster that can stand as an onset.

The list of words subjects were given to add "ubba" to in Ogdensburg and Canton are listed below. These 28 words were sorted randomly once, and then given in the same order to each speaker. (The vowel in the first syllable will be referred to as the "key vowel".)

- fourteen words with /æ/ in the first syllable: *address*, *tattoo*, *taffy*, *shallow*, *addict*, *plastic*, *gather*, *tablet*, *haggle*, *racket*, *caddy*, *hassle*, *master*, *asset*
- six words with /o/ (or /ah/): *pocket*, *toggle*, *father*, *fossil*, *swallow*, *goblet*
- four words with /ey/, /ow/, or /uw/: *radar*, *toupee*, *program*, *donate*
- four words with /i/ or /e/: *feather*, *Chester*, *ticket*, *reggae*

4.4.3. Results from Ogdensburg and Canton

Table 4.25 summarizes the results of the "ubba" experiment. First of all, this methodology does apparently succeed in distinguishing short vowels from long vowels in general. In 11 out of 16 cases (69%), the four speakers from Canton inserted "ubba" immediately after the long key vowels in *radar*, *toupee*, *program*, and *donate*, leaving those long vowels without following consonants. The five speakers from Ogdensburg did the same in a very similar 18 out of 24

cases (75%). So on the one hand, subjects in an experiment like this are willing to put the "ubba" infix after a clear example of a long vowel.

On the other hand, with *feather*, *Chester*, *ticket*, and *reggae*, Canton and Ogdensburg subjects resembled each other in being reluctant to leave a short vowel without a following consonant. In 14 out of 16 cases in Canton (88%), and 17 out of 24 in Ogdensburg (71%), "ubba" was added after or within the consonant or consonant cluster following the vowel, as in *tic-ubba-ket* or *Chest-ubba-er*. In another five cases, one in Canton and four in Ogdensburg, "ubba" was added before the consonant, but the short key vowel was replaced with a vowel that can occur freely in open syllables—either /ey/ in *reggae* or unstressed schwa in *feather*. That leaves only one example in Canton and three in Ogdensburg of "ubba" placed immediately after /i/ or /e/.

Table 4.25. Summary of "ubba" experiment results, showing the number of instances of vowels of each type being allowed to precede "ubba" with no intervening consonant.

	Ogdensburg	Canton
ey, ow, uw	18 / 24	11 / 15
i, e	3 / 24	1 / 16
æ	29 / 84	3 / 56
o, ah	17 / 36	2 / 23

On /æ/, however, the two communities differ markedly. In Canton, out of 56 cases, there are only three examples of /æ/ followed immediately by "ubba" as in *tæ-ubba-too*. In Ogdensburg, on the other hand, as many as 29 out of the 84 cases have "ubba" after /æ/; this differs from Canton at the $p < 10^{-4}$ level. So it seems as if speakers in Ogdensburg are more willing than speakers in Canton to allow /æ/ to stand by itself without a following consonant. Since Ogdensburg is in the Inland North fringe and Canton is not, this seems—by the reasoning above—to support the hypothesis that /æ/ is phonologically long

within the Inland North and short outside it. The fact that /æ/ was only allowed to stand in an open syllable in a minority of cases even in Ogdensburg could then be ascribed to lingering effects of its history as a short vowel—subjects could have been influenced by the fact that /æ/ is treated like a short vowel in orthography, and never appears in real words without a following consonant, in deciding whether to place "ubba" before or after the medial consonant, even while the phonology permitted them to do either.

Two of the six Ogdensburg subjects actually produced no instances of "ubba" immediately after /æ/; the remaining four produced between six and ten each (out of a possible 14). We might compare Ogdensburg and Canton at the level of speakers, rather than at the level of tokens—that is to say, Canton has four speakers who put "ubba" after /æ/ twice or less, while Ogdensburg has two who did so twice or less and four who did six times or more. This difference as stated between Ogdensburg and Canton does not achieve the level of statistical significance ($p \approx 0.07$). However, one of the two Ogdensburg subjects who produced no instances of "ubba" immediately after /æ/ in fact produced only one instance of "ubba" immediately after a vowel at all, and that one was *pro-ubba-gram*. *Program* was (inadvertently) the only word on the list with a first syllable that is clearly recognizable as a prefix—so in fact this speaker *never* divided a monomorpheme by putting "ubba" after a vowel. So, arguably, her placement of "ubba" gives us no information at all about the phonology of the vowels in the first syllable. (All other subjects at least divided monomorphemic *toupee* as *tou-ubba-pee*.) If she is excluded as uninformative, the difference between Ogdensburg and Canton appears significant at $p \approx 0.04$.

However, assuming that the difference between Ogdensburg and Canton is meaningful, the results from /o/ call into question the interpretation that /æ/ is phonologically long in Ogdensburg but short in Canton. Of the eighteen speakers interviewed in Ogdensburg and Canton, only one claimed that *father* and *bother* did not rhyme; and for the one speaker who claimed to have a distinction, her five tokens of /ah/ are all contained within the F1/F2 range of /o/, and four of those five tokens are within a single standard deviation of mean /o/. This indicates that the merger of /o/ and /ah/ appears to be complete in these communities. As Labov & Baranowski (2006) point out, this means that /o/ should be regarded as phonologically a long vowel. In Canton, the merger between /o/ and /oh/ is also in progress, as will be discussed in Chapter 5, which adds another motivation for regarding /o/ as a long vowel.

If /o/ is a long vowel, it should more or less freely be allowed to occur without a following consonant—that is, speakers should be relatively willing to insert "ubba" after it in the "Ubba" game. In Ogdensburg, that's what we find: out of 36 possible, there are 17 instances of /o/~/ah/ followed immediately by "ubba". A smaller fraction of instances of /o/ are syllable-final in the "Ubba" game in Ogdensburg than of instances of the upgliding diphthongs in *radar*, *toupee*, *program*, and *donate*; but it is substantially larger than the fraction of syllable-final instances of the short vowels in *feather*, *Chester*, *ticket*, and *reggae*.[33] This is what we would have expected for /o/, based on the findings above for /æ/ in Ogdensburg: it is a synchronically long vowel and so free to appear

[33] Recall that in Ogdensburg there were only three tokens of /e/ or /i/ immediately before "ubba", out of 20 tokens in which /e/ or /i/ was not replaced with some other phoneme. This rate of 3 out of 20 for /e/ and /i/ differs at the $p < 0.02$ level from the 17 out of 36 for /o/.

syllable-finally, with some historic and orthographic association with the short-vowel subsystem leading to a somewhat higher rate of open-syllable avoidance in the "Ubba" task.

In Canton, however—in which the status of /o/ as a long vowel should be as well-established as in Ogdensburg or more, based on the *father-bother* and *caught-cot* mergers—the results are totally different ($p \approx 0.002$). Out of a total of 23 instances of /o/~/ah/[34] in the "Ubba" game in Canton, only two were syllable-final. This very closely resembles the results for /æ/ (3 out of 56) and /e/ and /i/ (1 out of 16). This leaves two possibilities: either the *father-bother* merger is not complete in Canton and /o/ is still phonologically short, or /o/'s status as a long vowel does not prevent it from being treated the same as short vowels with respect to the "Ubba" game in Canton.

There is some evidence for the first possibility in that both instances of /o/~/ah/ followed immediately by "ubba" in Canton are actually instances of /ah/—i.e., the word *father*. That is, in Canton, /ah/ has "ubba" immediately following it in 50% of instances (twice out of four), while /o/ proper never does; despite the sparsity of the data, this difference is statistically significant at $p < 0.03$. There are other interpretations for this result than that /o/ and /ah/ are unmerged, however. It may, for example, be evidence of an orthographic effect: *father* is the only /o/ ~ /ah/ word in the experiment in which the key vowel is not followed by an orthographic geminate or consonant cluster, which could have influenced subjects to syllabify the consonant with the preceding vowel. (Similarly, of the four cases between both communities of an unambiguous short

[34] It ought to have been 24, of course; but one speaker did not recognize the word *toggle* and was unable to give any response at all for it.

vowel followed immediately by "ubba", three are *feather*.) Moreover, three of the four "Ubba"-test subjects in Canton were also subjects of full interviews; as mentioned above, all three stated that *father* and *bother* rhymed for them. Two of the three nevertheless have statistically significant differences in F2 between /o/ and /ah/ in their interview data; but those two are the two who treat *father* like the /o/ words, placing "ubba" after the medial consonant. The one of the three who produced *fah-ubba-ther* has no significant difference between /ah/ and /o/ in F1 or F2 and has all tokens of /ah/ within one standard deviation of mean /o/. So it's not clear that inserting "ubba" after the /ah/ in *father* but not after /o/ in other words is related to maintaining a phonemic distinction between /ah/ and /o/.

That leaves the second possibility—or at least, the second possibility cannot be ruled out: /o/, despite being phonologically long, is treated like a short vowel for purposes of the "Ubba" task in Canton. This means that although the "Ubba" task gives convincing evidence that /æ/ is phonologically long in Ogdensburg, it *doesn't* give convincing evidence that /æ/ is phonologically *short* in Canton. That is, /æ/ is treated the same way as /o/ in Canton; and since /o/ is known (or at least suspected) to be a long vowel, that means we can't strictly rule out the possibility that /æ/ is long as well. So these results support the hypothesis that /æ/ in the Inland North is properly considered a member of the long and ingliding subsystem, which is half of the question that motivated the experiment; however, we don't have clear evidence on the other half of the question, namely whether that constitutes a difference between the Inland North and non-NCS regions. The findings of this section do, however, unexpectedly

relate to other hypotheses on the phonological status of low vowels in English, as discussed below.

4.4.4. Subsystem ambiguity of low monophthongs

Regardless of whether /æ/ is phonologically long or short in Canton, why should /o/, which is almost certainly long assuming the merger with /ah/ is as complete as it seems, behave like a short vowel with respect to the "Ubba" experiment? In fact, this result is generally consistent with other indications that the boundary between the short subsystem and the long and ingliding subsystem is not very stable for low vowels. To begin with, low vowels in the long and ingliding subsystem are described as monophthongal, differing from short vowels only in length (see e.g. *ANAE* p.12, note 6). Labov (to appear, ch.6) suggests additionally that peripherality, another feature which often serves to increase the distinctiveness of short and long vowels, is also not defined for low vowels. This means low short vowels are phonetically a lot closer to long vowels than are short vowels of other heights, at which long vowels involve a substantial glide from one point in the vowel space to another; so it might only take at most a relatively subtle phonetic change to cause a shift of subsystem.

Two very well-known unconditioned phonemic mergers in North American English are mergers between a low member of the long and ingliding class and a low short vowel: /oh/ with /o/ (the *caught-cot* merger) and /ah/ with /o/ (the *father-bother* merger), respectively. Of all the other mergers reported in *ANAE*, the only ones between vowels of different subsystems are

those that are conditioned by some following segment that is in the process of changing its status from consonant to glide: /r/ for the *marry-merry-Mary* merger[35] and related mergers, and /l/ for a collection of mergers such as the *pull-pool* merger and the *hill-heel* merger. In other words, the only unconditioned mergers in North American between vowels of different subsystems, and the only such mergers that occur without a force from outside the syllable tampering with the glide constituent, are between a short low vowel and a low vowel of the long and ingliding subsystem. So it seems fairly clear that, among the low vowels, the barrier between the short subsystem and the long and ingliding subsystem is at best relatively weak.

The fact that (in Canton) even a low vowel that is known to be part of the long and ingliding subsystem acts in this experiment like a short vowel supports the hypothesis that the barriers between the two subsystems are weakened for low vowels. In fact, perhaps it is possible to make an even stronger hypothesis: American English phonology, or at least that of certain dialects, *does not distinguish* between the short subsystem and the long and ingliding subsystem among low vowels. Under this model, low monophthongs are free to show some features of short vowels (such as their behavior in the "Ubba" experiment in Canton) and some features of long vowels (such as the freedom of merged /o/~/ah/ to appear without a following consonant).[36] Obviously, this is a pretty

[35] See Dinkin (2005) for a defense of this analysis of the *marry-merry-Mary* merger, and Veatch (1991) for a defense of treating /r/ as a glide rather than a consonant in American English phonology.

[36] An alternative possibility here is that a difference between subsystems does exist for low vowels, but /o/ has an allophonic alternation that crosses subsystems. In this scenario, merged /o/~/ah/ is underlyingly /ah/, a member of the long and ingliding subsystem, but it has a short allophone (via a Phase II phonological rule, so that the allophones have discretely different segmental representations) that appears in checked syllables. This, together with the fact that in

drastic conclusion to draw based merely on the behavior of four speakers from Canton in a somewhat contrived experimental task, but as a hypothesis it points toward a possible future research program in dialectological phonology. Conjectures such as this could be tested with studies of vowel duration, as demonstrated by Labov & Baranowski (2006).

In Ogdensburg, /o/ is treated differently from the short phonemes /i/ and /e/. This means Ogdensburg's treatment of /o/ in the "Ubba" experiment is different from Canton's, even though in both dialects they are low monophthongs ostensibly in the long and ingliding subsystem. The conjecture presented above about the ambiguous subsystem status of low monophthongs does not explain why a long low monophthong should be treated as a short vowel in the "Ubba" experiment in one community and more or less as a long vowel (or at least, a phoneme intermediate between long and short status) in another. The discussion of overall vowel-system architecture in the following section, however, will hint at an answer for this question.

4.5. Triangular and quadrilateral vowel systems

4.5.1. Background

Descriptions such as those in *ANAE* and Veatch (1991) of the basic structure of the North American English vowel system—the "initial position", as *ANAE* puts it, from which present-day dialect differentiation can be derived—

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nasal systems the presumably short low phoneme /æ/ has a long and ingliding allophone, would then be further evidence for the weakness of the boundary between the long and ingliding and the short subsystems.

assume a rectangular structure. In the initial position, there are six possible height/backness combinations for vowel nuclei (each of which can combine with several, though not usually all, offglides): a front and a back position at each of three degrees of height. Under this system, in the initial position /æ/ is a low front vowel and /o/ is a low back vowel. Preston (2008) points out, however, that with the raising of /æ/ out of the low front position in the NCS, what remains looks like a triangular vowel system, with no front-back contrast among the remaining low vowels. This can be illustrated with the vowel systems of two speakers from the current sample, one without the NCS and one with it.

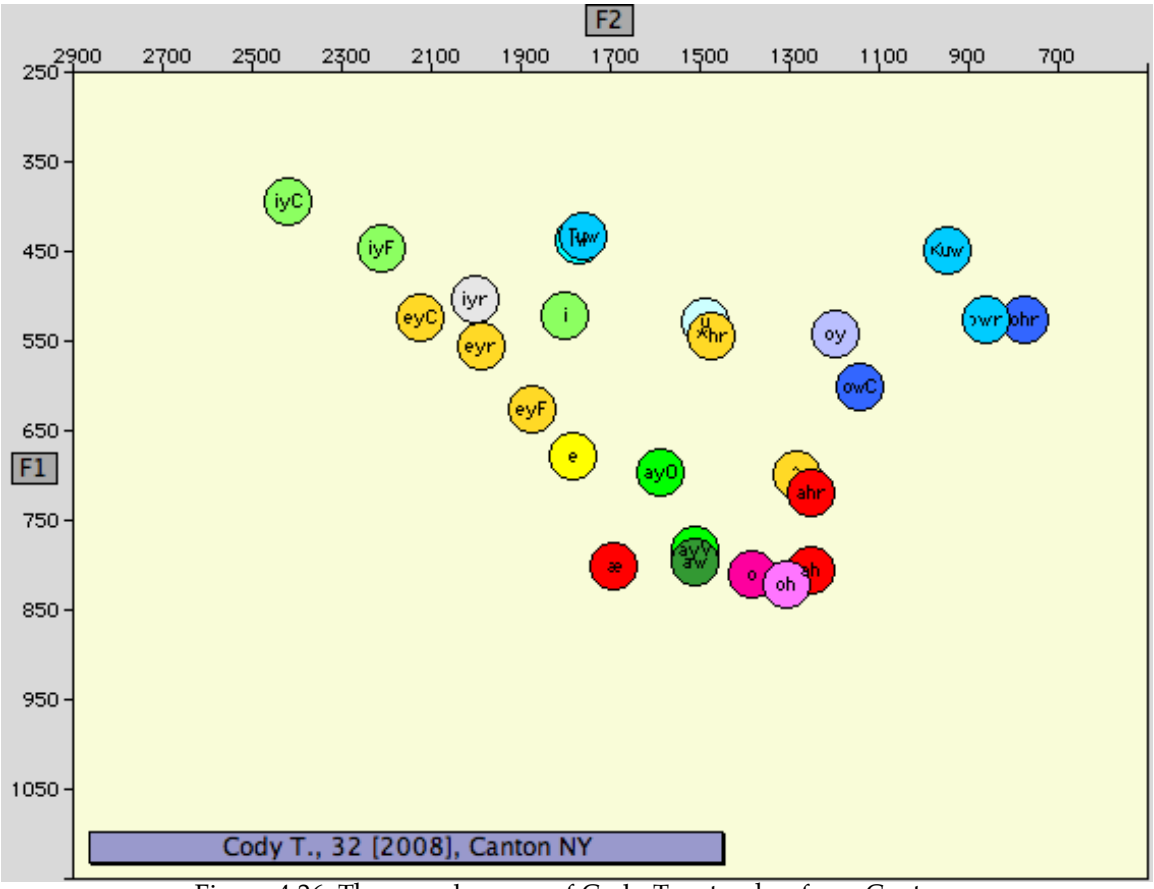

Figure 4.26. The vowel means of Cody T., a teacher from Canton.

Figure 4.26 displays the F1/F2 means of all vowel phonemes for Cody T., a 32-year-old teacher from Canton. He displays a quadrilateral vowel system: he has several low vowel phonemes—/æ/, /aw/, /ay/, and merged /o/~/oh/~/ah/— all at roughly the same height in F1, and spread out over some distance in F2, so that /æ/ is distinctly fronter than /oh/. Obviously the F2 distance between the front and back low vowels is not nearly as large as the distance between the front and back high vowels; but nevertheless Cody's vowel system clearly exhibits what may be termed a bottom side, with multiple phonemes at the lowest degree of height with different front/back positions.

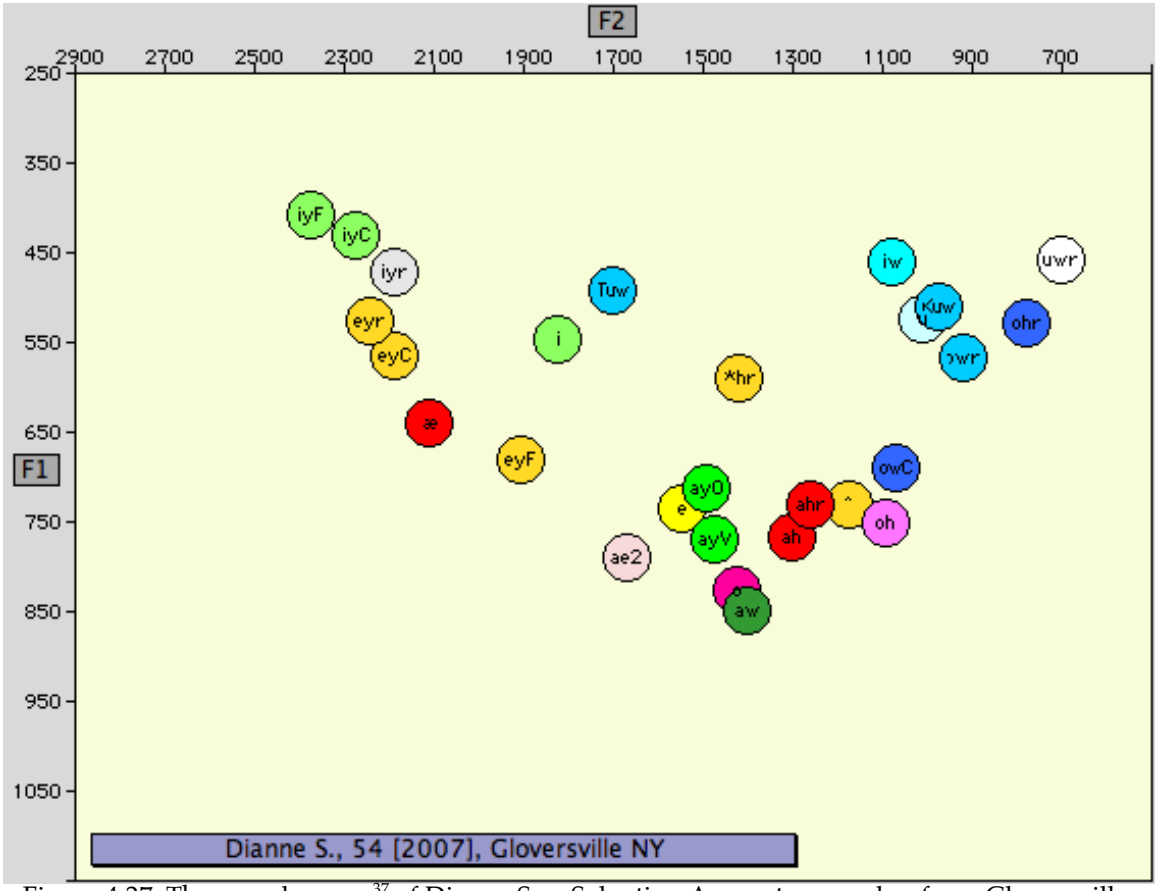

Figure 4.27. The vowel means[37] of Dianne S., a Salvation Army store worker from Gloversville.

[37] The pink circle labeled "ae2" represents the mean of the second component of those of Dianne's tokens of /æ/ that are subject to "Northern breaking", a phenomenon beyond the scope of the investigation in this dissertation.

Compare Cody to Dianne S., the Salvation Army worker from Gloversville whose /æ/ tokens were displayed in Figure 4.3 above; her vowel means appear in Figure 4.27. It is immediately clear that while Cody T.'s vowel system is quadrilateral, Dianne S.'s is triangular. Her vowel system does not have a bottom side at all; the distribution of her means in F1/F2 space comes to a point at the bottom with the shared nucleus of /o/ and /aw/. There is no array of low vowels at the bottom of the vowel space that have the same F1 but are spread out in F2; any phonemes that are fronter or backer than /o/ and /aw/ are also higher.

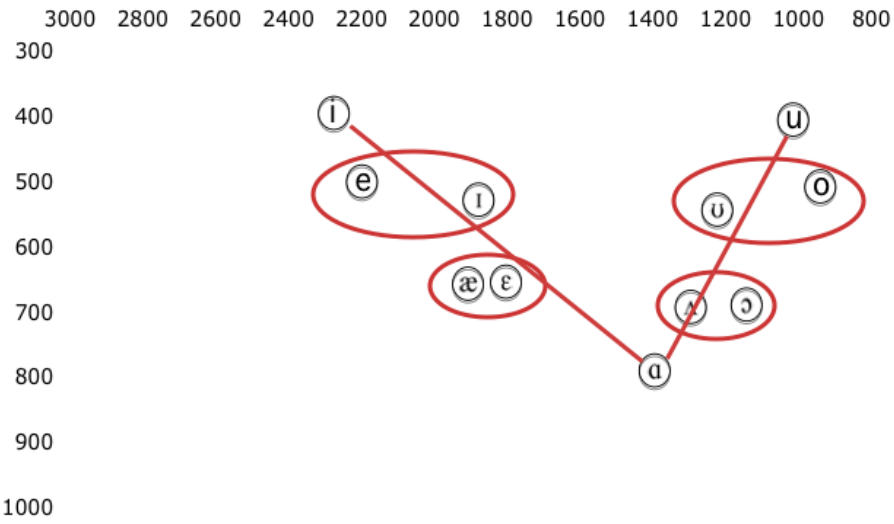

Figure 4.28. A chart from Preston (2008), showing overall means of certain vowels from a rural Michigan community studied by Ito (1999) with Preston's phonological systematization of them.

Preston (2008)'s key insight is the effect of the triangular *phonetic* structure of the NCS vowel system on the NCS's *phonological* structure. Communities to which the NCS has diffused, Preston argues, instead of a vowel system whose basic architecture is two degrees of frontness at each of three degrees of height, possess a vowel system with *four* degrees of height, and front-back contrasts at the three higher positions but not at the lowest. One of Preston's several

examples of such a system is shown in Figure 4.28. Preston characterizes this phonology as having the following features:

- At the three corners of the vowel triangle—the front and back high positions and the single low position—are long vowels with no short counterparts. In our notation, there are /iy/, /uw/, and /ah/ (equivalent to /o/).
- There are four short vowel phonemes, located at the front and back positions of the two intermediate degrees of height—in our notation, /i/, /e/, /ʌ/, and /u/.
- The four short vowel phonemes each have a corresponding long phoneme of the same height and frontness, with a somewhat more peripheral nucleus and an offglide corresponding in direction to the closest corner of the vowel triangle: /i/ is paired with /ey/, /e/ with /æh/ (phonemically long, as discussed in the previous section), /ʌ/ with /oh/, and /u/ with /ow/.

This system represents a drastic reorganization not only of the overall structure of the vowel system—from a rectangle with three degrees of height to a triangle with four degrees of height—but also in the relationships of the various vowel phonemes to each other. Whereas in the "initial position", as the notation suggests, /iy/'s nucleus has the same place features as /i/, /ey/'s as /e/, and /uw/'s as /u/, in Preston's triangular model each of those short vowels is associated with a completely different long vowel. The triangular model is extremely elegant and symmetric, however. Each short phoneme is very close in

F1/F2 space to the nucleus of the long phoneme it is paired with[38], with the long phoneme having a somewhat more peripheral nucleus; these short/long pairs exactly fill a grid of two degrees of height and two of frontness. The unpaired long vowels describe the corners of the triangular vowel space, and correspond exactly to the possible glide components of long vowels, /y/, /w/, and /h/—one high and front, one back and rounded, and one low. (The fourth glide, /r/, also corresponds to a long vowel with no short counterpart, although not one shown in Figure 4.28: the long syllabic /r/ that is the stressed vowel of *nurse*.)

The difference between triangular and quadrilateral layouts is clearly an important fundamental parameter for classifying vowel systems; it amounts to whether or not a variety permits more than one degree of frontness and backness at the lowest degree of vowel height. These two configurations correspond to the two possible resolutions of what Martinet (1952) called the "antinomy between[…] the trend toward phonemic integration and the inertia and asymmetry of the organs"—in other words, the conflict between the structural simplicity of a symmetrical phonological system and the drive toward ease of perception and production in a structurally asymmetrical vowel space. Here the conflict exists because there is less available phonetic space between front and back vowels at the lower levels of vowel height. Thus a rectangular phonology preserves "phonemic integration" in maintaining the same front/back contrast among low vowels as exists among non-low vowels, at the cost of allowing only

[38] Preston ignores diphthongs with longer glide contours, such as /aw/ and /oy/; he implicitly assumes a phonology like that of Veatch (1991), in which long vowel phonemes whose glide components are phonetically close enough to their nuclei to approximate long monophthongs are considered to constitute a single subsystem. Under this model, all the long vowels shown in Figure 26 are in the same subsystem.

a relatively small margin of security between them; a triangular phonology allows a larger margin of security but loses the contrast.

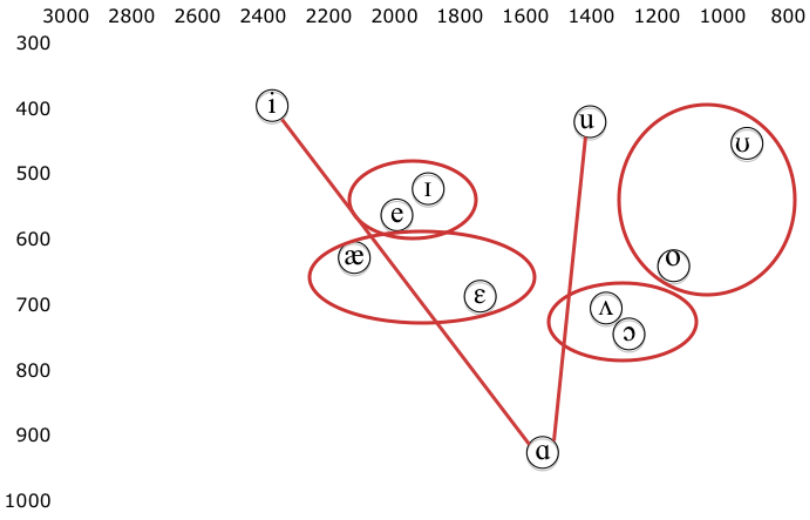

Figure 4.29. A chart taken from Preston (2008) attempting to apply the phonological structure of Figure 4.28 above to the vowels of young speakers in Inland North core urban areas in southeastern Michigan.

Although the triangular system sacrifices phonological symmetry for phonetic symmetry, the triangular system displayed in Figure 4.28 shows (as discussed above) a great degree of structural symmetry both internally and with respect to the overall structure of the vowel system. Preston specifically attributes this *symmetrical* triangular phonological system only to communities to which the NCS has diffused. In core NCS communities, the *phonetic* relationships between the short and long phonemes shown in Figure 4.28 are not nearly so well organized as they are in each of several communities Preston displays which have acquired the NCS more recently. Figure 4.29 displays Preston's illustration of what it looks like to impose the phonological system of Figure 4.28 on the vowels of young speakers in the Inland North core communities of southeastern Michigan: the nucleus of /æ/ is closer to /ey/ and /i/ than to /e/;

/u/ is substantially higher than /ow/; /uw/ is not really at the corner of the system. It may be that the core NCS community displayed in Figure 4.29 has the same phonological structure as that described for the rural mid-Michigan community in Figure 4.28, or some other phonological structure; but in either case, the phonetic distribution of the vowel phonemes is too asymmetric for us to be able to confidently state what the phonological relationships between the non-low vowels is. It remains clear, however, that this community possesses an overall triangular structure, in that there is no contrast between front and back low vowels.

Preston attributes this difference between core NCS communities and diffused NCS communities to the nature of dialect diffusion, as discussed above: diffusion imposes more regular, streamlined phonological structure on a system which in its original community may have seemed phonologically haphazard. Thus, the New York City /æ/ system is phonologically irregular and has numerous non-phonological constraints and exceptions, but when it diffuses to the Hudson Valley it becomes a relatively streamlined, purely phonological allophonic alternation. By the same token, the phonetic changes of the NCS lead to a triangular vowel system, but one in which the phonological relationships between the phonemes are not clear from their surface phonetic distribution; however, when it diffuses to new communities, it takes the form of an extremely symmetrical triangular vowel system whose phonological relationships are closely mirrored in its phonetics.

Preston does not define formal or quantitative criteria for determining whether or not a speaker or community exhibits this symmetrical pattern, and

therefore any attempt to use this methodology to analyze the current sample will necessarily be largely impressionistic and based on eyeballing vowel charts. For that reason the analysis below will in most parts be more exploratory and suggestive than rigorous. Nevertheless, the informal approach of looking at the distribution of triangular vowel systems in the current sample can point us in the direction of useful hypotheses about diffusion and the NCS.

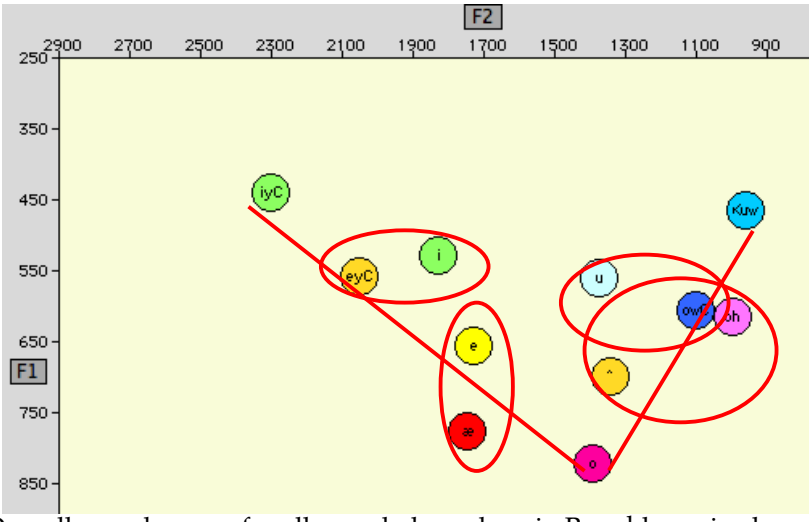

Figure 4.30. Overall vowel means for all sampled speakers in Poughkeepsie, demonstrating that the triangular phonology of Figure 26 does not apply to them.

4.5.2. Clear vowel system shapes in the current sample

To begin with, Figures 4.30 and 4.31 show overall vowel means[39] of two communities in the current data to which the NCS has *not* diffused and therefore the model of Figure 4.28 clearly does *not* apply: Poughkeepsie and Canton. (Plattsburgh, which is not shown, looks essentially the same as Canton.) In these communities, the six vowels /i/, /e/, /æ/, /u/, /ʌ/, and /o/ form a very clear grid of three degrees of height and two of frontness, exactly corresponding to the

[39] These figures show means for /iy/ and /ey/ only when followed by a consonant, and /uw/ when not preceded by a coronal consonant.

"initial position"; the bottom of the vowel space shows a flat pattern, as in Figure 4.26 above, not a triangular pattern as in Figure 4.27.

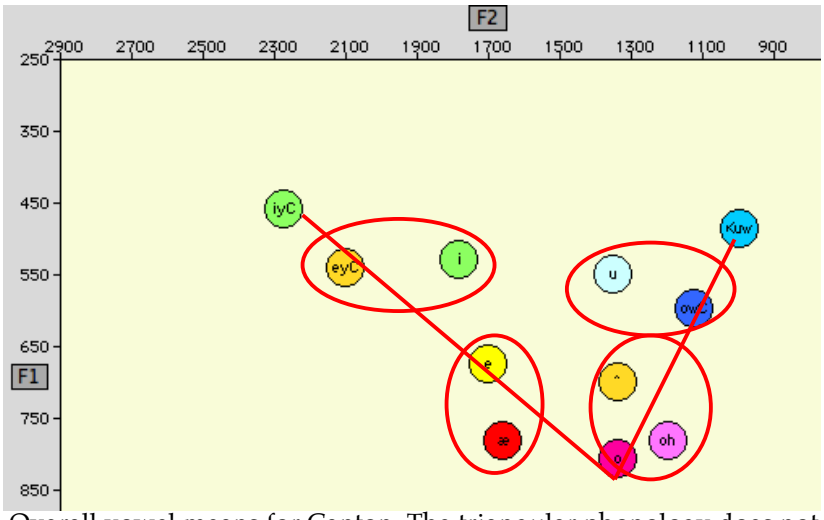

Figure 4.31. Overall vowel means for Canton. The triangular phonology does not apply here.

It would be very difficult to interpret /æ/ and /oh/ as having the same height and backness features as /e/ and /ʌ/ respectively in these communities. However, these charts do resemble Figure 4.28 in that /ey/ and /ow/ line up at roughly the same height in F1 as /i/ and /u/. If the vowel systems of these communities are to be interpreted as having three degrees of phonological height, as the distribution of /i e æ u ʌ o/ strongly suggests, it must be one in which the nuclei of peripheral long vowels are substantially higher than nonperipheral short vowels with the same phonological height; this is not true of the triangular system of Figure 4.28.

On the other hand, the Inland North fringe communities in the current sample conform quite well to the symmetrical triangular phonology posited by Preston. Figure 4.32 shows Gloversville as an example, but it applies to Glens

Falls, Watertown, and Ogdensburg as well.[40] From the point of view of Preston's analysis, then, this supports the hypothesis considered in the previous section that /æ/ in the Inland North fringe is phonologically long in all environments.

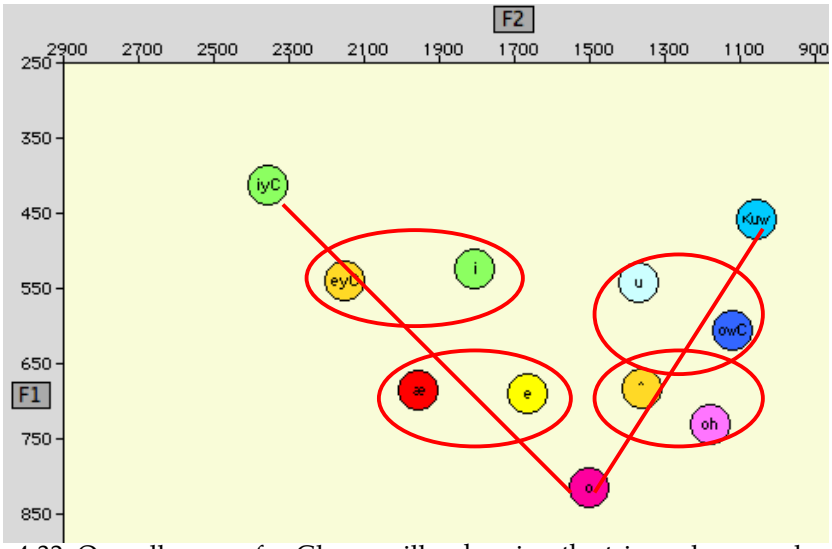

Figure 4.32. Overall means for Gloversville, showing the triangular vowel system.

This model gives a possible explanation for the differing behavior of /o/ in the "Ubba" experiment between Ogdensburg and Canton. Canton exhibits a quadrilateral phonology, in which the low vowels /æ/ and /o/ are part of the same quadrilateral structure as /i/, /e/, /u/, and /ʌ/, and so the low vowels share features of both long and short vowels. In Ogdensburg, /o/ is still low—but it is one of the three corners of the triangular vowel system, rather than one of the three levels of height in a quadrilateral system. In the triangular system, the three corners are unambiguously phonologically long and have no short counterparts, so the sole low monophthong isn't phonologically associated with

[40] In Ogdensburg both /u/ and /i/ are substantially centralized, increasing the distance between them and /ey/ and /ow/ respectively in F2 (but not F1); and in Glens Falls /oh/ is fairly low, about midway between /o/ and /ʌ/ in F1 (but closer to /ʌ/ overall). These mild deviations seemed worth noting, but nevertheless both these cities conform to the triangular phonology as well as many of Preston's examples do.

the short vowels in the way low vowels are in the quadrilateral system. In other words, the low long vowel /o/~/ah/ in Canton behaves differently in the "Ubba" test than the low long /o/~/ah/ does in Ogdensburg because the structure of low vowels is different in the triangular and quadrilateral systems.

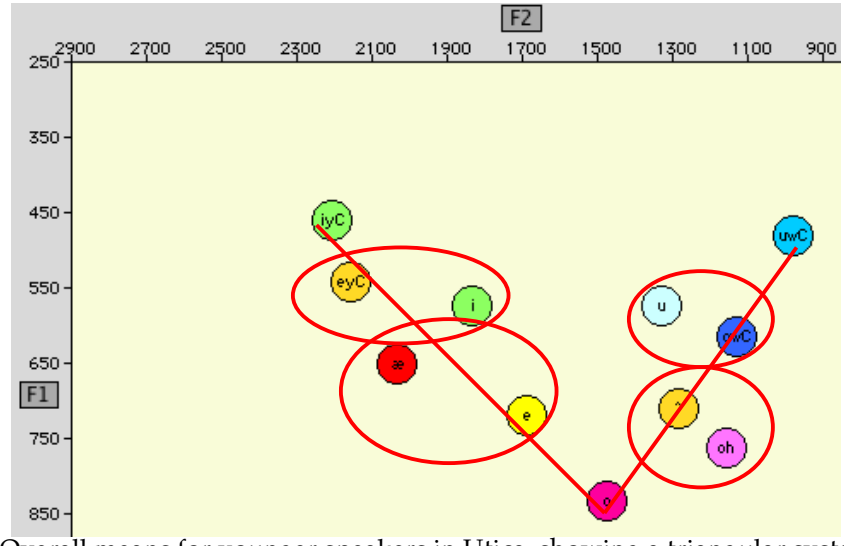

Figure 4.33. Overall means for younger speakers in Utica, showing a triangular system without a clear set of four levels of vowel height.

4.5.3. Evidence for diffusion into the Inland North fringe

The triangular phonologies of the Inland North fringe communities are consistent, according to Preston's analysis, with the proposition that the NCS did not develop naturally in these communities, but rather spread to them (i.e., diffused) from the Inland North core. In Inland North core communities, Preston argues, the overall layout of the vowel system is triangular, but the phonetic parallelism between long and short vowels is not so clear-cut. This holds true in Utica, the well-sampled Inland North core community in the current data. Figure 4.33 shows the overall vowel means of the six Utica speakers in the sample who were born in 1979 or later—i.e., Janet B., who has the highest /æ/ in the entire

sample by a considerable margin, is excluded as an outlier. Despite Janet's exclusion, the mean Utica /æ/ is still high enough to be closer to /i/ than to /e/. This leads to an overall less clear set of vowel height tiers than is seen in 4.32 and 4.28. So based on the structure of vowel systems and Preston's analysis, we get the impression that while the NCS may have originated in the Inland North core, it reached the fringe through dialect diffusion. Is there other support for this hypothesis?

Labov (2007) compares NCS scores in northern Illinois, an area known to be historically part of the dialectological Inland North, with the "St. Louis corridor", a part of the Midland to which the NCS has diffused, including the city of St. Louis, Mo., and several communities in central Illinois. In both these regions, Telsur speakers' scores range between one and five; but Labov finds that in northern Illinois, NCS score is strongly correlated with age ($r^2 \approx 0.55$), whereas in the St. Louis corridor, there is no such correlation ($r^2 \approx 0.04$). Labov argues that this difference is the result of the differing historical status of the NCS in the two regions: in the St. Louis corridor, the presence of the NCS is the result of diffusion of individual components of the NCS by adult speakers rather than incrementation of an ongoing chain shift by adolescents, and so it would not be expected to be systematically more advanced among the youngest speakers.

In the Inland North fringe communities in the current sample, scores range between 1 and 4, and there is no correlation of score with age for the region as a whole ($r^2 < 10^{-3}$). [41] The only community in the Inland North fringe

[41] The Inland North core communities in the current sample *also* have no correlation of score with age: $r^2 \approx 0.005$. However, this need not be taken as evidence that the NCS diffused to the Inland North core *also*. Where northern Illinois and the St. Louis corridor as discussed by Labov (2007)

with a statistically significant correlation between score and year of birth (as mentioned in the previous chapter) is Ogdensburg, in which the only speaker with a score of 1—in fact, the only speaker in any of the sampled Inland North communities with a score of 1—is also the oldest speaker interviewed in Ogdensburg by a margin of 36 years. Inasmuch as both the apparent-time profiles of NCS scores and the distribution of phonemes in phonetic space in the Inland North fringe communities resemble, on the whole, those found by Labov and Preston respectively in communities to which the NCS is known to have diffused, these data suggest that the NCS diffused to the Inland North fringe communities as well, although perhaps more recently to Ogdensburg than to the others.

In Chapter 3, it was found that in the Hudson Valley communities, in particular Oneonta and Amsterdam, /e/ is relatively backed and /o/ is relatively fronted, as in the NCS, but /æ/ is not particularly raised; and, since it was clear that the NCS as a chain shift was not active in those communities, it was conjectured that individual components of the NCS had diffused to the Hudson Valley but that /æ/-raising in particular had not. Now, we find evidence to suggest that something similar is true in the Inland North fringe communities; the difference is that *all* of the components of the NCS have diffused to the Inland North fringe, including the raising of /æ/. And therefore, as suggested earlier in this chapter, the difference between Amsterdam and Oneonta on the one hand and Gloversville, Glens Falls, Watertown, and

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both have scores ranging from one to five, the Inland North core in this data ranges only from three to five. So we can take the absence of an age correlation as indicating merely that the change has gone to completion in the Inland North core.

Ogdensburg on the other hand is merely their degree of openness to the NCS raising of /æ/: communities settled from southwestern New England had continuous /æh/ systems, and Hudson Valley communities had nasal (or diffused New York City–style) /æ/ systems.

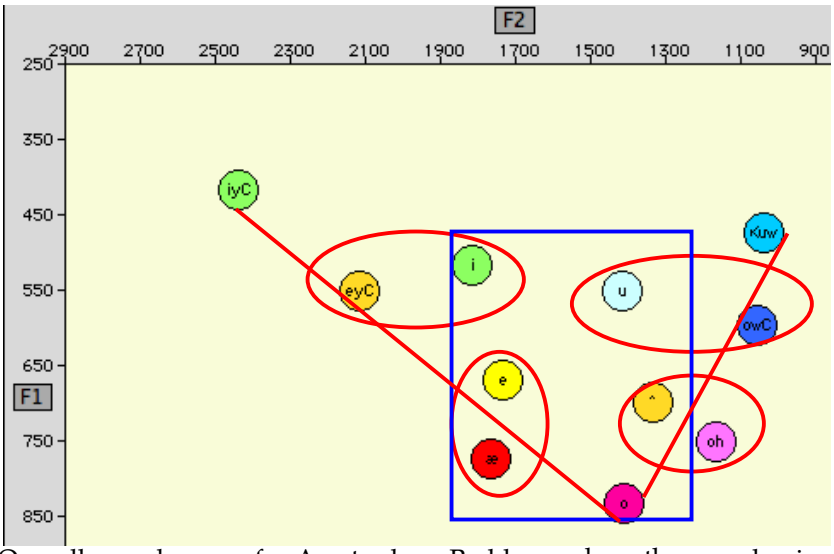


Figure 4.34. Overall vowel means for Amsterdam. Red loops show the vowel pairs according to Preston's diffused NCS system; the blue box outlines the six key positions of the quadrilateral vowel system.

4.5.4. Vowel system shapes in Oneonta and Amsterdam

To conclude the treatment of Preston (2008)'s analysis of the triangular vowel system, let's look at Amsterdam and Oneonta themselves. Figures 4.34 and 4.35 show that both of these cities are actually somewhat intermediate between the clear symmetrical triangular structure of the Inland North fringe cities and the rectangular phonological structure shown in Figures 4.30 and 4.31 for Poughkeepsie and Canton. On the one hand, the phonemes paired by Preston as having the same place features show a symmetrical distribution, although not the exact same symmetrical position in Preston's ideal case: the tense phoneme in

each pair is both more peripheral and lower than its lax counterpart. Meanwhile, /o/ sits at the bottom of the vowel space, with /æ/ and /oh/ roughly symmetrically positioned with respect to /o/ on either side; all of the individual speakers sampled in Amsterdam and six out of nine in Oneonta have /æ/ significantly higher than /o/. On the other hand, in both Figure 4.34 and Figure 4.35 the grid of three degrees of height and two degrees of backness can be clearly seen in /i e æ u ʌ o/, with the difference in F1 and F2 between /e/ and /æ/ being comparable to the difference between /o/ and /ʌ/.

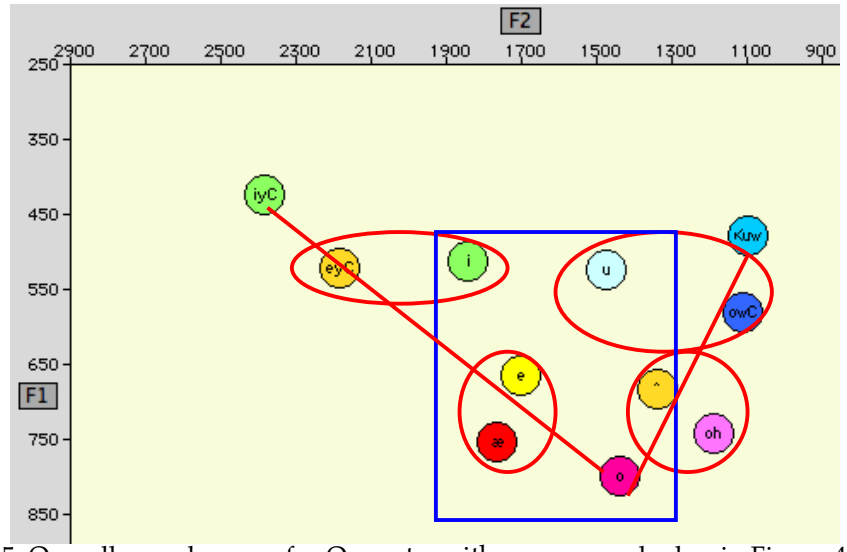


Figure 4.35. Overall vowel means for Oneonta, with groups marked as in Figure 4.28 above.

It's not surprising to find that Amsterdam and Oneonta seem intermediate in some way between the triangular and quadrilateral phonologies. These are communities to which (I have argued) NCS features have diffused, so they may take on the triangular shape of the diffused NCS. But unlike in the Inland North fringe (as has been repeatedly discussed above) not *all* the NCS features have diffused equally successfully to Oneonta and Amsterdam; the raising of /æ/ has been blocked or limited by the dominance of the nasal system. Therefore what

remains in the overall means can be seen either as a symmetrical triangular system with relatively low /æ/ or as a basically quadrilateral system with some phonetic asymmetry among the three heights and two degrees of frontness. Since both phonological models apply fairly well to the overall *average* distribution of phonemes in phonetic space, it may be that some speakers in these two cities have more clearly triangular phonologies and some have quadrilateral phonologies.

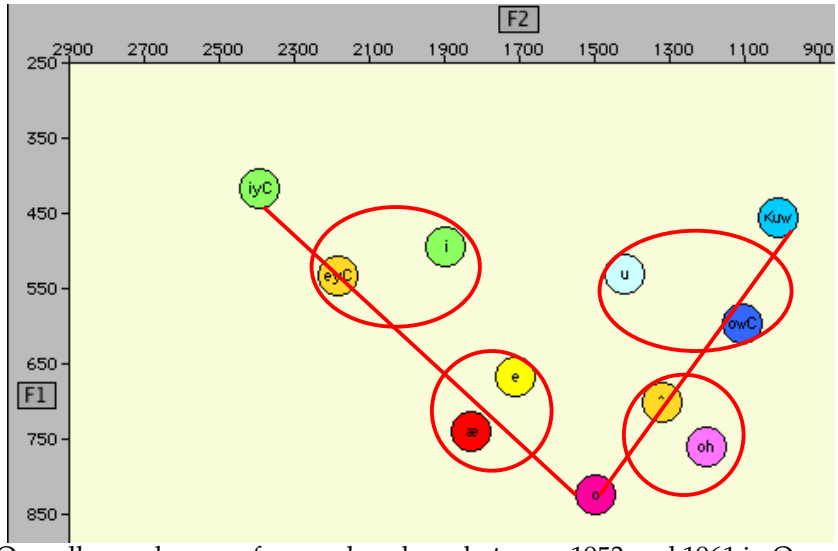


Figure 4.36. Overall vowel means for speakers born between 1952 and 1961 in Oneonta, showing the symmetrical triangular structure.

In Oneonta, it seems to be the case that the four older speakers (born between 1946 and 1960) have fairly recognizable symmetrical triangular systems, while the five younger speakers (born between 1982 and 1990) have basically quadrilateral systems, the averages for each group are shown in Figures 4.36 and 4.37. The presence of the symmetrical triangular phonology among older speakers in Oneonta seems to suggest that at least some amount of raising of /æ/ must have diffused to them after all. On the one hand, they still all have EQ1 indices below –38, which is less than the lowest mean EQ1 index among the

Inland North cities (–25 in Ogdensburg), and only one has an /æ/ that is "raised" by the criteria of this chapter[42]. On the other hand, EQ1 indices between –39 and –63, such as three of these four older Oneonta speakers have, are still uncommonly high for speakers outside the Inland North. More than anything else, in fact, the older Oneonta speakers resemble speakers from the Inland North fringe with relatively low EQ1 indices—that is to say, those Inland North fringe speakers who are the least affected by the diffused raising of /æ/. So the situation appears to be that raising of /æ/ has diffused weakly to these speakers—enough to create a symmetrical triangular vowel system, but not enough to give them EQ1 indices as high as the typical Inland North fringe community.

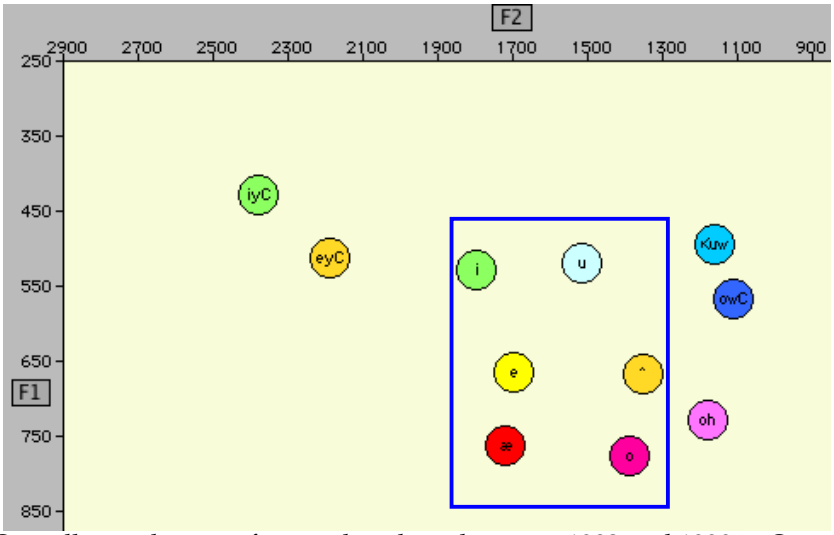


Figure 4.37. Overall vowel means for speakers born between 1982 and 1990 in Oneonta, showing the quadrilateral structure.

The younger speakers in Oneonta exhibit a quadrilateral vowel system overall, having seemingly not developed the triangular structure found among

[42] I.e., having almost all tokens of /æ/, or a range of two standard deviations around mean /æ/, higher than mean /o/.

their elders; this suggests either that the diffusion of /æ/-raising which led to the triangular system among the adults is recent enough that it has not yet been acquired by children in the community (recall diffusion takes place through contact between *adults*), or conceivably that it is of relatively long standing but retreating in apparent time. In Amsterdam, it is both the oldest and youngest speakers who display the most rectangular vowel distributions, with the more triangular patterns toward the middle of the age range. This is consistent with the first of the two scenarios posited for Oneonta, with the older speakers being too old to have been subject to it. At this point, however, we are dealing with small enough numbers of speakers—and impressionistic enough criteria for determining whether a speaker is triangular or quadrilateral—that it is difficult to say anything definitive.

The presence of the symmetrical triangular system among Oneonta and Amsterdam speakers, however, suggests that the NCS raising of /æ/ has diffused weakly into the Hudson Valley, despite the fact that it is /æ/ that defines the sharpest phonetic difference between the Hudson Valley and Inland North fringe. Recall that the symmetrical triangular vowel system, as Preston formulates is, is merely the structured result of the diffusion of NCS features, including the raising of /æ/. The triangular system *itself* is probably not the specific object of diffusion given Labov (2007)'s argument that diffusion does not act upon the structural relationships between linguistic entities. Rather, it is merely the structural consequence of diffusion, based on the principle that the result of diffusion is likely to be structurally symmetrical or unmarked, regardless of whether this is true in the community of origin of the feature

undergoing diffusion; this distinction will be explored further in Chapter 7. So some diffusion of /æ/-raising is probably involved in Amsterdam and Oneonta—even though not as much /æ/ raising is present in these cities as in the Inland North fringe—in order to create the symmetrical triangular configuration.

This is, in fact, what would be expected under the hypothesis advanced earlier in this chapter that it is the presence of the prenasal allophone that stops the pre-oral allophone of /æ/ from becoming as raised as it is in the Inland North. That is to say, the prenasal allophone would not be expected to prevent the pre-oral allophone from being raised *at all*; according to the argument put forward in this chapter, one allophone should only prevent the other from moving *too close to its own phonetic position*. This seems to be what happens in Amsterdam and Oneonta: there is no general obstacle to the diffusion of *some* amount of raising of pre-oral /æ/, any more than there is an obstacle to the diffusion of /e/-backing or /o/-fronting. Rather, the diffusion of /æ/-raising to these cities does take place, enough to cause /æ/ to be higher than /o/ for most speakers and create a recognizable symmetrical triangular vowel system for many; but the prenasal allophone blocks the pre-oral allophone from being raised *too far*.

4.6. Diffusion of allophony

The analysis of the NCS presented in this chapter is based on the hypothesis that the nasal system blocks diffusion of the raising of one allophone

into the other allophone's phonetic space. What this means is that the nasal system seemingly does not, as a result of diffusion from the Inland North, develop into a continuous system. At the same time, we do see evidence of diffusion in the opposite direction—i.e., that the nasal system may have diffused from non–Inland North regions into the Inland North fringe. If we take seriously the hypothesis that the nasal system blocks diffusion of substantial raising of /æ/, then the presence of the raised nasal system in the Inland North fringe implies that the nasal system must have developed there relatively recently. And the raised nasal system is most frequent in Gloversville and Ogdensburg, two cities that have been clearly shown to be very close to the boundary between the Inland North fringe and a region in which the nasal system dominates. So the raised nasal system may well be the result of diffusion of the nasal system into the Inland North fringe, while the continuous system does not appear to diffuse in the other direction.

Of course, continuous and nasal /æ/ systems are not simply a pair of alternative possibilities that have equal linguistic status. The observation guiding the analysis above has been that they occupy quite different positions in Bermúdez-Otero (2007)'s life cycle of sound patterns—the allophony in the continuous system is a Phase I phonetic implementation rule, while the that of the nasal system is a Phase II discrete phonological rule. The order of the phases in the "life cycle" is important here: the model predicts that the natural direction of change is from Phase I to Phase II, and restructuring of a phonetic rule into a categorical phonological one. So it's unsurprising that the raised nasal system should begin to develop—whether arising from diffusion from the non–Inland

North regions or of its own accord—in the Inland North fringe, where prenasal tokens of /æ/ were already the highest and/or frontest in the raised continuous system. But the lack of diffusion in the opposite direction, of the continuous system into the regions where the nasal system predominates, can thus be interpreted as a resistance to the *reversal* of the life cycle of phonological change—of the restructuring of a discrete phonological rule back into a gradient phonetic tendency. In other words, the dialectological evidence seems to reinforce the assumption of an inherent order in the life-cycle phases, and indicate that the restructuring that converts a phonetic rule to a phonological rule is not reversible by diffusion.

A Phase II phonological rule is a step on the way toward phonemic split: the division of a phoneme into discrete allophones with their own feature sets is a necessary precursor, according to the "life cycle", to the further development into contrasting phonemes. However, while phonemic splits themselves do not appear to be capable of successfully undergoing diffusion between communities, there is no reason for a Phase II phonological rule to be subject to the same constraints against diffusion that a phonemic split is. Instead of requiring recipient speakers to learn the unpredictable phonemic incidence of two phonemes in an entire set of words individually, in diffusion of a Phase II pattern speakers need only learn a single exceptionless rule. Given that splits cannot be successfully diffused, the fact that the *precursors* to splits—i.e., discrete phonological rules—*can* be diffused may explain how multiple communities can end up with the same or very similar phonemic splits.

Moreover, a Phase II pattern does not even appear to be at risk of collapsing back into a Phase I pattern through diffusion, based on the analysis earlier in this chapter: continuous /æ/ systems do not seem to diffuse into the regions where the nasal system predominates, as the prenasal allophone appears to block the pre-oral allophone from moving into its space. Phase II, by this account, appears to be the most stable phase in the life cycle, at least from the point of view of diffusion. This relative stability may be justified by the conceptually relatively simple phonological structure of a Phase II rule: it is both categorical and discrete. In other words, a discrete allophonic rule requires speakers neither to memorize the differing behavior of a large number of lexical items, as a phonemic split does, nor to apply a barely-perceptible context-dependent gradient statistical tendency to the pronunciation of a single phonological segment, as a Phase I phonetic implementation rule would; all that is necessary for the speaker to learn is a single mapping from one segment to another based on a reliable rule. Labov (2007) presented the argument that the phonological simplicity of a discrete allophonic rule will lead to the instability of phonemic splits in diffusion; here we find evidence that a similar principle might apply to gradient allophonic phonetic implementation rules, for a similar reason—discrete rules can be more simply represented and conceptualized.

4.7. Conclusion

The key empirical findings of this chapter are the following:

- The "diffused" /æ/ system, observed by Labov (2007) in Albany and other communities across the country with a history of influence from New York City, also exists in Poughkeepsie and to a lesser extent Schenectady, defining a "Hudson Valley core" region.
- The diffused system not only regularizes the New York City phonemic split into an allophonic alternation but also streamlines the allophonic pattern into a somewhat more natural class of environments, excluding tokens before /g/ from tensing and thus treating all velar consonants the same.
- A nasal /æ/ system—i.e., a sharp distinction between prenasal and pre-oral tokens of /æ/—can coexist with the NCS general raising of /æ/. However, the raised nasal pattern is much more frequent in the Inland North fringe than the Inland North core.
- Conversely, continuous /æ/ distributions are extremely infrequent outside the regions where the NCS is dominant; in general, the presence of continuous distributions is correlated with more advanced NCS.
- In a language-game task based on syllable division, subjects in (*caught*/*cot*-merging) Canton treated both /æ/ and /o/ as short vowels, while subjects in (Inland North fringe) Ogdensburg were more likely to treat both as long vowels.

- Despite not having pre-oral /æ/ raised as it is in the Inland North, some speakers in the Hudson Valley fringe cities of Amsterdam and Oneonta appear to have a symmetrical triangular outline of the vowel system characteristic of communities to which the NCS has diffused.

The dialectological findings are interpreted as indicating that the reason /æ/-raising did not spread as effectively into the Hudson Valley as other elements of the NCS did is that the raised prenasal allophone of /æ/ in the Hudson Valley is able to some extent to prevent the pre-oral allophone from raising into its phonetic space. The raised nasal system, on the other hand, developed in the Inland North fringe, perhaps as a result of diffusion of the nasal system from other areas, after the NCS raising of /æ/ had already taken place.

Some broader conclusions and hypotheses about the dialectological diffusion of phonological change are suggested by the findings in this chapter as well, expanding on the pictures of diffusion presented by Labov (2007) and Preston (2008). Labov and Preston both argue that the result of diffusion will be a phonologically relatively unmarked pattern—Labov shows that the result of diffusion is phonologically *regular*, while Preston adds the contention that the result of diffusion will be phonologically *symmetrical*. To these we can add the finding from the closer examination of the diffused /æ/ system in the Hudson Valley core that the phonologically regular result of diffusion is *itself* more phonologically symmetrical than the system from which the diffusion originates, in that tensing is triggered by the same *places* of articulation for voiced stops as for nasals and voiceless fricatives.

The hypothesis that one allophone is capable of blocking another allophone of the same phoneme into its phonetic space rests upon the principle that the fundamental unit of chain shifting is not the phoneme but the discrete phonological segment, whether that segment is an entire phoneme or merely one of two or more allophones. This follows immediately from a modular feed-forward model of phonetic and phonological patterns, especially as formalized in detail by Bermúdez-Otero (2007): since a chain shift is a gradual change in phonetic implementation, the entities on which the shift operates are the outputs of allophonic rules. Since phonetic implementations cannot "look backward" into the derivation of phonological segments, discrete allophones even of the same phoneme must act independently of each other in chain shifts.

Finally, the findings of this chapter suggest further constraints upon diffusion. Insofar as the natural direction of phonological change is for a gradient phonetic pattern of allophony to become a sharp phonologically-specified rule, then it seems that diffusion is not sufficient to reverse that course and merge the two phonologically-distinct allophones back into a gradient phonetic pattern. In other words, it seems as if a community can resist or reject the diffusion of a feature that would reverse the natural life cycle of phonological change in this respect. This can be taken as another example of the tendency for the result of diffusion to be a relatively unmarked structure, in that arguably discrete allophonic rules are less marked than gradient phonologically-conditioned implementation rules. It can equally be taken as an example of the principle that diffusion acts directly only on surface-level linguistic entities, not on the relationships between them, and thus it does not change the fact that the

prenasal and pre-oral allophones of /æ/ are discretely distinct from each other in phonological representations.

Many of the findings and hypotheses advanced in this chapter are of necessity somewhat speculative, on account of the more or less impressionistic criteria used to define many of the key categories employed in the analysis, and because of the relatively small number of speakers on whom some of the conclusions are based. However, the hypotheses are motivated not only by the data but by the overall architecture of phonological structure as articulated by Bermúdez-Otero (2007) and the constraints on diffusion as articulated by Labov (2007). So the analyses in this chapter may be best construed as data-driven conjectures about how these two sets of principles interact, rather than final conclusions to questions of the diffusion of phonological change.

Chapter 5

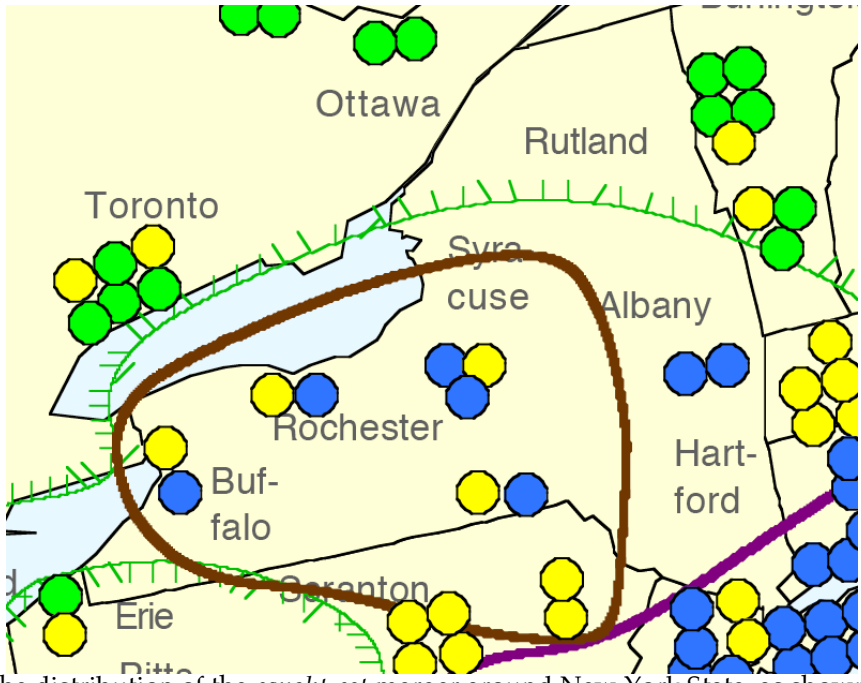
The Low Back Merger

5.1. Expansion and resistance

Labov (1994) states what he identifies as "Herzog's Principle"—the principle that phonological mergers tend to expand across dialect geography, at the expense of distinctions. This is a corollary to "Garde's Principle": once a merger is completed in a given community, it is impossible to reverse by the ordinary means of linguistic change. The reasoning is straightforward; once a merger that is established in one community manages to spread to an adjacent community and get established there, that new community is a permanent addition to the merger's territory. Thus the merger's geographic extent expands, while the distinction contracts.

In this chapter I will examine the status of the *caught-cot* merger in my sample through three indices: merger in individuals' own minimal-pair judgments, the phonetic distance between /o/ and /oh/, and the transfer of an entire class of words from one of the two phonemes to the other. To the best of my knowledge, the merger has not been previously reported in Upstate New York. However, Upstate New York is adjacent to and in communication with several regions where the merger is already known to be complete and of relatively long standing, viz. Northwestern New England, Canada, and Western Pennsylvania. These are shown on Map 5.1: Vermont, Quebec, and eastern Ontario abut northern New York (the area including Ogdensburg, Canton, and

Plattsburgh in the current sample); and northwestern Pennsylvania and the Niagara peninsula of Ontario are adjacent to western New York, which is part of the Inland North core but not sampled in this dissertation. Given Herzog's Principle, we therefore expect the merger to have spread into Upstate New York to at least some extent.



Map 5.1. The distribution of the *caught-cot* merger around New York State, as shown in *ANAE*. Green spots represent speakers with full merger; blue, speakers with full distinction; and yellow, intermediate speakers. The green isogloss sets off the region of merger, brown the Inland North, and purple the area of raised /oh/.

ANAE, however, identifies three regions of North American English as exhibiting "stable resistance" to the *caught-cot* merger, on the grounds that they have undergone sound changes that increase the phonetic distance between /o/ and /oh/. Two of these regions are relevant to Upstate New York. One, of course, is the Inland North, where /o/ is fronted away from /oh/ as part of the NCS. The other is a collection of cities labeled at one point as "the Eastern Corridor", reaching from Providence, R.I., down to Baltimore, Md., by way of

New York City; in these cities, /oh/ is raised away from /o/, becoming an upper-mid back vowel. This chapter will examine to what degree these features are effective at resisting the advance of the merger predicted by Herzog's Principle. To do so, it is necessary to establish which communities exhibit these "resistant" features.

The communities in the current sample where the NCS obtains, of course, have been thoroughly identified in the foregoing chapters. However, it was also observed that the fronting of /o/ has apparently diffused southeastward out of the Inland North into the region identified as the Hudson Valley. In Hudson Valley communities such as Amsterdam and Oneonta, mean /o/ was found to be backer than in the Inland North core or fringe, but still substantially fronter than it is in other dialects that lack the *caught-cot* merger. So perhaps the Hudson Valley communities will share to some degree in whatever resistance to the merger the NCS fronting of /o/ affords the Inland North.

ANAE's standard for inclusion in the Eastern Corridor, which includes New York City, is that /oh/ must be raised to such an extent that its mean F1 is less than 700 Hz. Only one community in the current sample meets that criterion: Poughkeepsie, in which in fact all seven sampled speakers have mean F1 of /oh/ between 575 Hz and 675 Hz. In no other community in the sample does more than one speaker have F1 of /oh/ less than 700 Hz.[1] One other known community in Upstate New York has an *overall* mean /oh/ higher than 700 Hz, though: Albany, whose two Telsur speakers have /oh/ F1 at 603 Hz and 735 Hz,

[1] In fact, only three other speakers in the sample meet this criterion: Buck B. from Cooperstown, Vincent B. from Gloversville, and Carl T. from South Glens Falls. Each is the oldest speaker sampled from his community.

making a mean of 669 Hz. Grouping Albany together with Poughkeepsie is reminiscent of a dialect boundary identified in Chapter 4, in which some speakers in these two communities plus one speaker from Schenectady were found to exhibit the diffused /æ/ system as a result of New York City influence. Those communities were grouped together as the Hudson Valley core. Since raised /oh/ is another New York City feature that may have expanded to areas in close contact with New York City, it is unsurprising to find /oh/ raised above 700 Hz in the Hudson Valley core region.

Now that the areas of potential resistance to the *caught-cot* merger have been identified, the next section will discuss the distribution of the merger itself.

5.2. Minimal-pair judgments

Each speaker in the sample was asked for explicit judgments on at least two minimal or near-minimal /o/~/oh/ pairs. In in-person interviews, *cot ~ caught* and *dawn ~ don* were both on the list of written minimal pairs that interview subjects were asked to judge as sounding the same or different. Telephone interview subjects were asked one exact minimal-pair question (*dawn* and *Don*), and for each of three near-minimal pairs of words (*caught ~ hot*, *sock ~ talk*, *taller ~ dollar*) were asked to judge whether the two words rhymed.

In the entire corpus of 119 speakers, only 12 apparently exhibited the full merger in perception (i.e., described all /o/~/oh/ pairs as the same or rhyming). These twelve speakers are listed in Table 5.2.

Table 5.2. The ten speakers who judged all /o/~/oh/ pairs merged

speaker	community	year of birth	/o/~/oh/ Cartesian distance
Laurence C.	Amsterdam	1993	140 Hz
Cody T.	Canton	1976	79 Hz
Ida C.	Canton	1962	146 Hz
Myke U.	Canton	1992	80 Hz
Sarah L.	Cooperstown	1983	147 Hz
Zara F.	Cooperstown	1990	94 Hz
Amanda N.	Plattsburgh	1972	152 Hz
Eric P.	Plattsburgh	1991	24 Hz
Justin C.	Plattsburgh	1976	150 Hz
Marc F.	Plattsburgh	1955	102 Hz
Wendy H.	Plattsburgh	1981	57 Hz
Christie L.	Utica	1988	401 Hz

mean Cartesian distance is 131 Hz; st. dev 95 Hz

What first jumps out of Table 5.2 is Christie L. from Utica—the only native of a stable Inland North core or fringe community to report both the *caught ~ cot* minimal pair and the *dawn ~ don* minimal pair as sounding the same. Despite her answers in the minimal-pair task, it seems clear that we can regard her as a non-merged speaker. Table 5.2 shows that her mean /o/ and /oh/ from all of her interview and formal-methods data are quite far apart: more than two and a half times as far apart as the /o/ and /oh/ means of any other speaker in Table 5.2. Indeed, Figure 5.3 shows that her /o/ and /oh/ do not even overlap in phonetic space, with the exception of the single token of *don* she produced while reading the minimal-pair list. Although she produced other tokens of /o/ before nasals in spontaneous speech (*John*, *mom*, *monitor*), they do not appear among the /oh/ tokens as *don* does; so although *ANAE* reports that merger tends to take place in prenasal environments earlier than in some other environments, it does not appear that Christie has /o/ and /oh/ merged before nasals. As we shall see below, there are no other speakers in the Utica sample who show a hint of

caught-cot merger—even those whose /o/ and /oh/ are much closer in phonetic space than 401 Hz securely judged the phonemes as distinct in the minimal-pair tasks. Based on all these observations, it seems clear that we can regard Christie's responses to the minimal-pair tasks as essentially an error—perhaps she misread the words she was supposed to judge (as appears to have happened with *don* in Figure 5.3) or perhaps she merely misunderstood the task. At any rate, Christie's example warns us to be cautious in evaluating speakers' merged status only on the basis of their responses to the minimal-pair tasks.

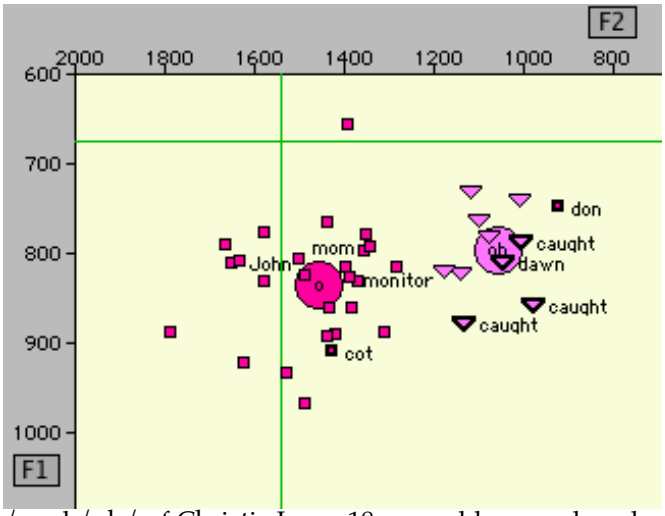


Figure 5.3. The /o/ and /oh/ of Christie L., an 18-year-old unemployed woman from Utica. Magenta squares represent /o/; lavender triangles represent /oh/. Tokens of minimal-pair words are highlighted.

All of the other nine speakers in Table 5.2 show clusters of /o/ and /oh/ tokens with large overlaps in phonetic space. Justin C., a coffee-shop employee from Plattsburgh, is a typical example—in fact, his Cartesian distance between mean /o/ and /oh/ is relatively large compared to some of the other speakers on Table 5.2—and his /o/ and /oh/ are shown in Figure 5.4. Note that near the center of his distribution as shown in Figure 5.4, there is an area where tokens of /o/ and /oh/ are roughly equally concentrated, between about 650 Hz and

850 Hz in F1 and between about 1100 Hz and 1400 Hz in F2; there is a token of /o/ (*revolve*) as far back as his backest tokens of /oh/ and a token of /oh/ (*across*) almost as front as his frontest tokens of /o/.

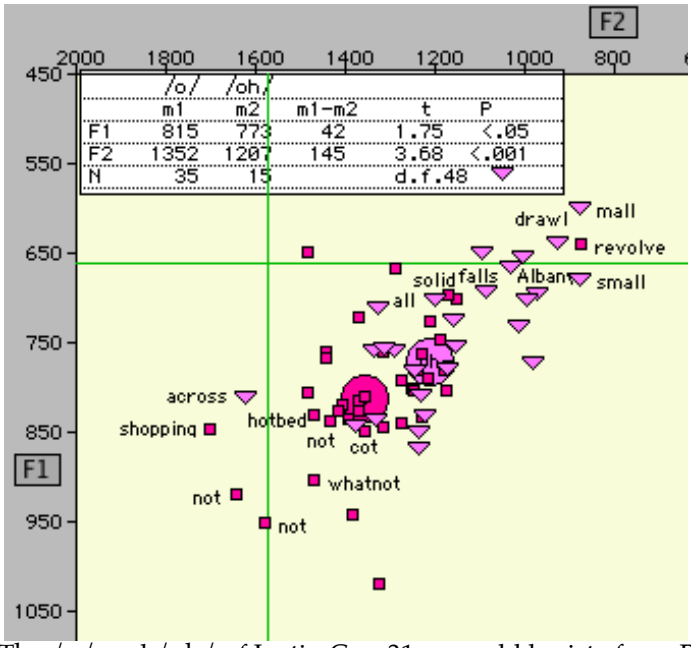


Figure 5.4. The /o/ and /oh/ of Justin C., a 31-year-old barista from Plattsburgh.

Justin C. and nearly all[2] the other speakers listed in Table 5.2 do have a statistically significant difference at the $p < 0.05$ level or better between /o/ and /oh/ in F1/F2 space; many of them, including Justin, also have large clusters of /o/ tokens with almost no overlap with /oh/ and vice versa. This does not, however, mean that these speakers are not authentically merged. As is pointed out in *ANAE*, as a result of the phonological changes that produced the modern /o/~/oh/ contrast in the first place, /o/ and /oh/ are asymmetrically distributed among the potential following consonants—in other words, there are not very many consonants which appear following both /o/ and /oh/ in a large

[2] The exception is Wendy H.

number of common words.[3] And in the case of Justin, for example, the apparent statistical distinction between /o/ and /oh/ is seemingly well accounted for merely by this asymmetrical distribution. For example, almost all of Justin's tokens of /o/~/oh/ preceding /l/ are historically /oh/: *all*, *falls*, *Albany*, *drawl*, etc.; these make up most of the cluster of /oh/ tokens at the back of the distribution. The only two tokens of /o/ before /l/, *solid* and *revolve*[4], are within the cluster of /oh/ before /l/. Similarly, almost all the tokens before nonvelar stops, which make up most of the frontmost cluster, are /o/. The only tokens of /oh/ before nonvelar stops are two minimal-pair–style tokens of *caught*; these are near the center of the overall /o/~/oh/ distribution along with the minimal-pair–style tokens of *cot*. So a close examination of Justin's /o/~/oh/ tokens suggests that the phonemes actually are merged, despite the statistically significant 150-Hz difference in their means, and the merged phoneme merely exhibits a fairly wide range of allophonic phonetic conditioning.

Herold (1990) discusses in some detail the issue of diagnosing a speaker's merger status on the basis of acoustic data without being led astray by the asymmetric distribution of coda consonants between /o/ and /oh/, and finds several statistical acoustic criteria that converge with her impressionistic auditory judgments of merger status. For example, she found that speakers whom she judged impressionistically to have distinct /o/ and /oh/ were those whose /o/ and /oh/ tokens were found by *t*-test to differ in both F1 and F2 at the $p < 0.01$ level. However, determining the precise merger status of individual

[3] For example, before /p/, /o/ is common (*hop*, *stop*, *drop*) and /oh/ is rare; before /ŋ/ the opposite is true.
[4] The behavior of *revolve* will be discussed in great detail later in this chapter.

speakers—for example, whether the some or all of the speakers listed on Table 5.2 maintain an authentic phonological contrast between /o/ and /oh/ that they are unaware of in their subjective judgments[5]—is of less importance for the purpose of mapping the dialectology of New York State than it was in Herold's project of exploring the mechanisms of merger. Each of the communities in Table 5.2 has at least one speaker in the sample who maintains the /o/~/oh/ distinction securely; that is, it is clearly the case that the *caught-cot* merger is not complete in any of them. *ANAE* affirms that merger usually takes place in perception (e.g., in explicit minimal-pair judgments) before production. Therefore what we can say confidently is that these nine speakers (i.e., the ten on Table 5.2 minus Christie L.) are merely the *most merged* in their respective communities and among the most merged in the entire sample, regardless of whether they are actually fully merged or just nearly so; and the argument for excluding Christie L. as an error seems clear enough without having to resort to more advanced statistical techniques.

Table 5.2 includes three speakers in Canton and five in Plattsburgh. On the basis of the presence of the merger in these communities, they were (proleptically) assigned to a "Northwestern New England" region in previous chapters. It is not surprising to find the *caught-cot* merger in this area, of course. This is one of two parts of New York State that are directly adjacent to regions where the merger is complete (Vermont and Canada); the other such part of New York State is part of the Inland North core and thus ostensibly resistant to the

[5] This would be a "near-merger", in the sense discussed in detail by Labov (1994 ch. 12).

merger. So if the *caught-cot* merger were going to be found anywhere in New York State it would be here, in the northeastern corner of the state.[6]

Identifying these communities as dialectologically part of Northwestern New England on the basis of the *caught-cot* merger is a bit of an exaggeration, of course. In Northwestern New England (and Canada) the merger is essentially complete; as Map 5.1 shows, nearly all speakers in the *ANAE* sample in Vermont have the full merger, and none made the distinction securely. In both Canton and Plattsburgh the oldest speaker sampled maintained the distinction for both minimal pairs. So Canton and Plattsburgh are not as advanced in the *caught-cot* merger as Northwestern New England proper (or Canada) is; but they are clearly heading in that direction. From here on, the dialect region in New York State that includes these communities will be referred to as the "North Country"[7].

Ogdensburg, like Canton and Plattsburgh, is in the geographical North Country; in fact, Ogdensburg is located directly on the Canadian border. However, no speakers sampled in Ogdensburg judged all pairs as merged, and it is in the Inland North fringe, not the North Country dialect region as defined above. Ogdensburg seemingly must have at least slightly more direct contact with Canada than Canton does, being located on the border and the site of a border crossing, and is not appreciably farther from Vermont than Canton is. So

[6] In this data, a larger fraction of speakers in Plattsburgh display full merger in perception than in Canton—five out of seven versus three out of nine. This is consistent what would be expected, in that Plattsburgh is close to both Canada and Vermont, and Canton is only close to Canada—especially given Boberg (2000)'s finding that phonological diffusion across the U.S.–Canada border is relatively weak; however, the difference between Canton and Plattsburgh in this respect is not statistically significant. Map 5.8 below shows the location of these communities.

[7] The "North Country" as a conventional region of New York State includes some communities which are not in this dialect region, such as Watertown and Ogdensburg; but no better name for the dialect region seemed available. I was going to call it simply "Northeastern New York", but apparently that conventionally refers to an area quite some distance to the south, including Glens Falls and Albany.

Canton does not apparently exceed Ogdensburg in the availability of communication with communities where the *caught-cot* merger is complete. The only other obvious dialectological difference between the two communities is that the NCS is present in Ogdensburg. So far, then, it seems as if the NCS is doing its job in preventing the *caught-cot* merger from reaching Ogdensburg; but this issue will be discussed more below.

Laurence C., the youngest speaker interviewed in Amsterdam and one of the youngest in the entire sample, is the only speaker sampled in the broad Hudson Valley area to show full merger in perception. He may indicate that Hudson Valley communities such as Amsterdam are in fact relatively more open to *caught-cot* merger than nearby Inland North communities are. However, Laurence is only a single speaker, and all other speakers in the Amsterdam sample have /o/ and /oh/ securely distinct. It may also be worth noting that Laurence's father is described as a native of "Northern New York" (i.e., the region that includes the "North Country"), and therefore may have the merger himself. So Laurence's merger is not sufficient for us to draw any broad conclusions about the status of the merger in the Hudson Valley.

The two speakers from Cooperstown on Table 5.2 will be considered below in conjunction with those on Table 5.5. This table lists speakers whose status with respect to /o/~/oh/ minimal pairs is "transitional" in the sense used by *ANAE*: they could not decide whether the minimal pairs were the same or different, or judged them as "close", or had different judgments for different minimal pairs representing the same phonemic contrast. These therefore represent the subset of speakers on whom the *caught-cot* merger has had enough

phonological effect to confuse their judgments, but not enough to totally collapse the phonemic distinction.

Keeping in mind the example of Christie L. from Table 5.2, we note that Table 5.5 contains three relatively high outliers in terms of Cartesian distance between mean /o/ and /oh/: Pamela H. from Walton, Jess M. from Ogdensburg, and Brandi F. from Watertown—all, like Christie L., from Inland North communities. Pamela H. resembles Christie L. in showing two quite separate clusters of /o/ and /oh/ in F1/F2 space with no real overlap; like Christie L., then, she can probably be regarded as having a solid /o/~/oh/ distinction, and her judgment that *taller* and *dollar* rhyme as a mistake. (Her actual tokens of *taller* and *dollar* are likewise separated by about 300 Hz in phonetic space.)

Table 5.5. Speakers with "close", uncertain, or inconsistent /o/~/oh/ minimal-pair judgments.

speaker	community	year of birth	/o/~/oh/ Cartesian distance
Amanda H.	Canton	1970	177 Hz
Ben S.	Canton	1987	145 Hz
Bob L.	Canton	1951	177 Hz
Elizabeth P.	Canton	1991	153 Hz
Sarah M.	Canton	1989	76 Hz
Emily R.	Cooperstown	1987	192 Hz
Kelly R.	Cooperstown	1991	193 Hz
Annie F.	Glens Falls	1992	168 Hz
Paul R.	Lake Placid	1986	199 Hz
Winter H.	Lake Placid	1989	153 Hz
Kerri B.	Morrisonville	1990	91 Hz
Jess M.	Ogdensburg	1986	329 Hz
Noreen H.	Ogdensburg	1982	239 Hz
Shelley L.	Ogdensburg	1989	205 Hz
Lisa W.	Oneonta	1989	131 Hz
Ben S.	Plattsburgh	1991	25 Hz
Pamela H.	Walton	1957	390 Hz
Allie E.	Watertown	1982	148 Hz
Brandi F.	Watertown	1986	280 Hz

mean Cartesian distance is 182 Hz; st. dev. is 85 Hz

Brandi F.'s /o/ and /oh/ are shown in Figure 5.6. Her /o/ and /oh/ are largely distinct, but the two clusters are very close in phonetic space, without the relatively wide phonetic gap that separates Christie L.'s /o/ and /oh/. A few tokens of /o/ invade the cluster of /oh/: *problem*, and her minimal-pair tokens of *cot* and *don*. A reading-list token of *revolve* is so far beyond the /oh/ cluster that she may well have misread it or produced it with /ow/. Brandi's apparent shift to complete merger in minimal-pair style is a phenomenon that Labov (1994) terms the "Bill Peters effect", after a speaker at the edge of the Western Pennsylvania merged region who was found by Labov, Yaeger, & Steiner (1972) to exhibit a similar pattern. The presence of the Bill Peters effect in Brandi's minimal pairs, combined with the adjacency of /o/ and /oh/ in her F1/F2 space, suggests that she is indeed a speaker for whom the phonemes remain distinct but close, with the merger in progress.

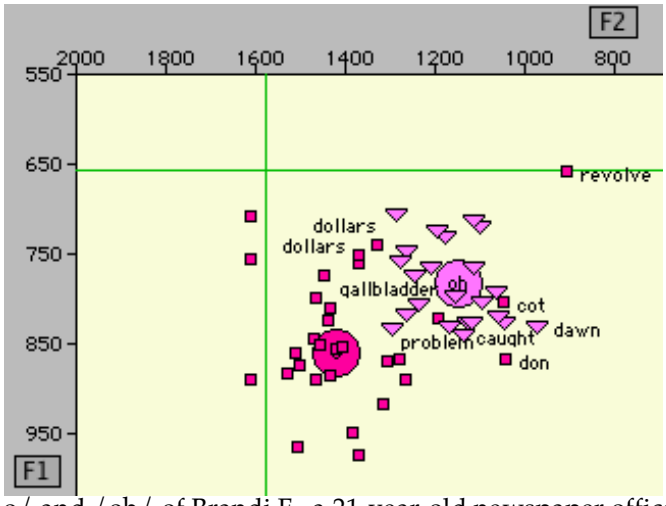


Figure 5.6. The /o/ and /oh/ of Brandi F., a 21-year-old newspaper office employee from Watertown.

Jess M. from Ogdensburg has clusters that are basically distinct with little overlap, as shown in Figure 5.7. Two expected /o/ tokens appear within the /oh/ cluster: *revolve* and *Ogdensburg* itself. *Revolve*, as will be discussed below, appears to have /oh/ for a large number of speakers in the sample, and tokens of historical /o/ before /g/, according to *ANAE*, show great variation between /o/ and /oh/ in American English; so neither of these in some sense counts as a clear indication of any degree of merger in Jess's /o/~/oh/ distribution. She is, however, one of three speakers out of nine in Ogdensburg who gave "close" or inconsistent judgments on minimal pairs; the other two (Noreen H. and Shelley L.) both have some degree of real overlap between their /o/ and /oh/ token clusters. So even though Jess has a clear phonetic distinction between /o/ and /oh/, it makes sense to say that she may be participating in the same tendency towards "close" /o/ and /oh/ that is seen among some other members of her community.

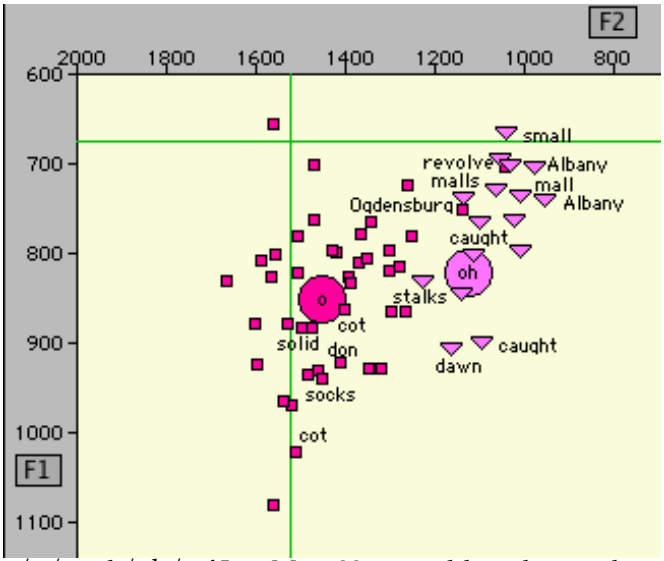
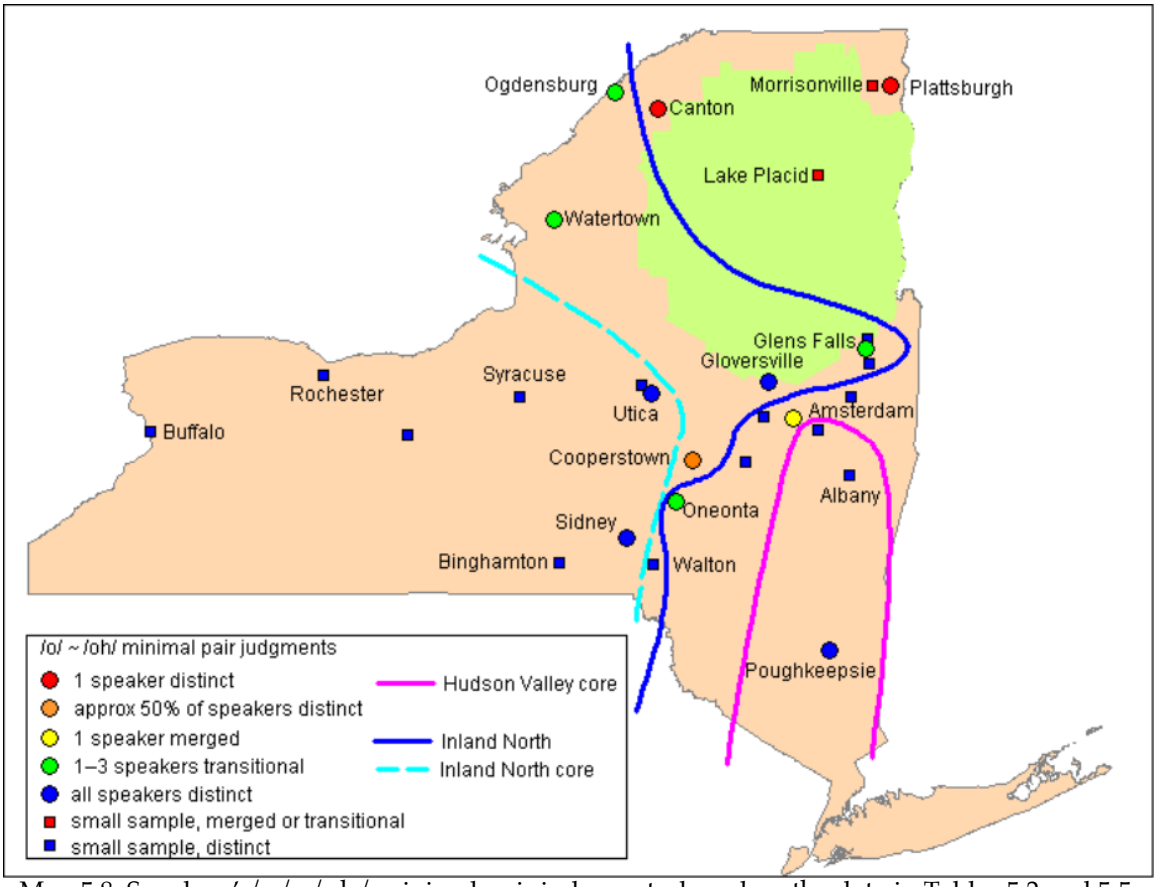


Figure 5.7. The /o/ and /oh/ of Jess M., a 22-year-old student and receptionist from Ogdensburg.

Table 5.5 also includes three low relative outliers—speakers whose Cartesian distance between /o/ and /oh/ is substantially lower than that of the other speakers listed in Table 5.5, and who therefore might actually be more merged than their "transitional" minimal-pair judgments indicate. These are Sarah M. from Canton, Kerri B. from Morrisonville, and Ben S. from Plattsburgh. All three of them are located within the North Country region discussed above, where the greatest number of speakers with fully merged judgments (Table 5.2) was found; it is unsurprising to find the most merged among the speakers with transitional judgments in the same region.



Map 5.8. Speakers' /o/~/oh/ minimal-pair judgments, based on the data in Tables 5.2 and 5.5. One speaker with a merged judgment in Utica and one with a transitional judgment in Walton have been excluded as errors.

In fact, if Pamela H. is removed from Table 5.5 as an error, fully half of the remaining speakers with transitional judgments are from that region: five from Canton, one from Plattsburgh, both speakers from Lake Placid, and the one from Morrisonville. Moreover, all but the two oldest speakers in these four communities appear on either Table 5.5 or Table 5.2. Clearly the *caught-cot* merger is well underway in the North Country, albeit not complete as it is in adjacent Northwestern New England or Canada. Map 5.8, which summarizes the minimal-pair judgments of all the speakers in the sample, shows that the North Country is the only dialect region identified in New York State where the *caught-cot* merger is advanced enough to have an effect on the minimal-pair judgments of the majority of speakers.

Cooperstown was established in earlier chapters as a former Inland North community in which the NCS is diminishing: of nine Cooperstown speakers interviewed, the five born in 1963 or earlier have NCS scores between two and four, and the four born in 1983 or later have NCS scores of zero or one. The minimal-pair data shows that the reorganization of the vowel phonology of Cooperstown extends beyond the NCS to the *caught-cot* merger as well: all of the four younger speakers have merged or transitional minimal-pair judgments, while all of the five older speakers have distinct judgments. By contrast, in Sidney, the other village in which the NCS was seen to be retreating in apparent time, all sampled speakers judge the /o/~/oh/ minimal pairs as distinct, and have Cartesian distance between mean /o/ and /oh/ of more than 200 Hz.

Several speakers in Inland North fringe communities in which the NCS seems stable appear on Table 5.5 as having transitional minimal-pair judgments,

apparently defying the supposed resistance of the Inland North to the *caught-cot* merger. These include three from Ogdensburg, two from Watertown, and one from Glens Falls. The three in Ogdensburg all have NCS scores of three or more and positive EQ1 indices, so it can't just be the fact that not all speakers in the Inland North fringe exhibit the NCS that allows the *caught-cot* merger to begin to penetrate; at least in Ogdensburg, it is NCS speakers themselves who are subject to the influence of the merger in progress. Moreover, unlike Laurence C. from Amsterdam, who had fully-merged minimal-pair judgments, none of them reported having a parent from a region where the merger is advanced.[8] It seems plausible that it is the influence of neighboring merged regions that allows the merger to begin to spread into these communities—Ogdensburg is adjacent to Canada and close to Canton, Watertown is less than 30 miles from the Canadian border as well, and Glens Falls is near Vermont, while Gloversville is separated from the nearest merged region by larger unmerged cities such as Schenectady and Albany—but there are not enough speakers in the sample for the lack of transitional judgments in Gloversville to be statistically robust.

It is worth noting that /o/~/oh/ distinction is still relatively healthy in the Inland North fringe; these transitional speakers are only six out of 40 total speakers sampled in Inland North fringe communities in this dissertation, and there are no fully merged speakers found in such communities. The contrast between Ogdensburg and Canton remains instructive: in Ogdensburg, three out of nine speakers have transitional judgments about the /o/~/oh/ minimal pairs,

[8] Neither did Lisa W. from Oneonta, the other transitional speaker not from Cooperstown or the North Country. To be fair, not all of these seven speakers were able to identify where both of their parents were from.

while in Canton, less than 20 miles away, five out of nine have transitional judgments and three are fully merged.[9] Ogdensburg has the greatest degree of *caught-cot* merger found in a stable NCS community, and from this perspective the NCS seems to be doing a pretty good job holding off or delaying the merger, given all the dialectological pressure Ogdensburg appears to be under. But on the other hand, the presence of three out of nine speakers with transitional merger status does not bespeak *stable* resistance to the merger.

It might be possible to argue that the minimal-pair task is a relatively artificial task, and any sample even of people with a relatively secure phonemic distinction might be expected to include a few who give transitional judgments merely out of confusion or unfamiliarity with the task. Indeed, we have already identified two subjects who appear to meet that description, Pamela H. in Walton and Christie L. in Utica, on the basis of their wide phonetic distances and lack of overlap between /o/ and /oh/. Could it be that the apparent influence of the encroaching merger upon the minimal-pair judgments of other Inland North speakers is really just error in the experimental methods, gone undetected because of smaller Cartesian distances? After all, there are plenty of speakers in the sample with fully distinct minimal-pair judgments whose /o/~/oh/ Cartesian distances are no wider than some of those listed in Table 5.5.

Well, perhaps. But if the appearance of transitional minimal-pair judgments in communities where the merger is not really in progress were just an inescapable consequence of flaws in the experimental methods, one would

[9] If merged speakers are rated as 0, transitional speakers as 1, and distinct speakers as 2, a *t*-test on the advancement of merger in these two communities finds that the difference between them is statistically significant; $p < 0.01$.

expect such errors to be relatively evenly distributed throughout the sample. Now, there are a total of 31 speakers listed on Tables 5.2 and 5.5, with merged or transitional minimal-pair judgments. Two have been excluded as errors already; seventeen are natives of the North Country region, where the merger is already complete in a relatively large number of speakers. That leaves twelve speakers who have merged or transitional minimal-pair judgments in regions where the *caught-cot* merger is not very well attested.

The oldest of these twelve speakers are Allie E. in Watertown and Noreen H. in Ogdensburg, both of whom were born in 1982. The median year of birth of the entire 119-speaker sample is 1974. That means that, if the appearance of transitional judgments in non-merging communities is merely a result of poor experimental design, then all the subjects whose judgments were affected by this flaw were coincidentally in the younger half of the sample—the probability of which happening is approximately 0.00025, well below any statistical significance threshold one might care to choose. Now, it may be that younger speakers are more likely to give confused judgments about minimal pairs even if they have a secure phonemic distinction, merely because, up to a certain age, the speaker's phonology and dialect are still to a certain degree in flux. Labov (2001) shows that many sound changes in progress display a "peak in apparent time" around late adolescence, indicating that speakers younger than that peak are still in the process of acquiring the innovative phonology; it is conceivable that, even if the *caught-cot* merger is not in progress in a given community, sufficiently young speakers may be sufficiently uncertain about their phonological system in general to give mixed judgments on minimal pairs. However, even if that is the

case, not all of these twelve speakers with transitional judgments are young enough for that to be relevant: six of the twelve were 21 years of age or older when interviewed, well above any age that might be suggested to be the point where the speaker's phonology solidifies. And the probability of even six experimental errors all coincidentally appearing in the younger half of the sample is still less than 0.02.

Above, two speakers with merged and transitional judgments were excluded from consideration in those classes on the grounds that their /o/~/oh/ Cartesian distances were wide enough to suggest that their judgments were confused. We ought therefore to see if any speakers with distinct judgments have sufficiently *narrow* Cartesian distances to indicate that they might be more merged than they're letting on. The mean Cartesian /o/~/oh/ distance among sampled speakers with distinct minimal-pair judgments is 315 Hz, with a standard deviation of 89 Hz. Only one speaker's /o/ and /oh/ are more than two standard deviations closer than the mean; this is Mike P., a security officer from Ogdensburg, born in 1977, whose /o/~/oh/ Cartesian distance is (coincidentally) 89 Hz.[10] He is an outlier not only in his distance from the mean, but also in the degree of difference between him and the next-smallest Cartesian distance among speakers with distinct judgments, as Figure 5.9 shows. If we suppose Mike P.'s minimal-pair judgments to be as confused as Christie L's above, and he really has a merged or "close" phonology, then he actually supports the hypothesis that the distribution of transitional judgments is not

[10] There are four speakers with Cartesian distances more than two standard deviations *greater* than the mean: Janet B. from Utica, the most advanced NCS speaker in the sample; and three Poughkeepsie speakers with raised /oh/.

accidental: like the transitional speakers discussed above, he is younger than the median age of the sample; and he is from a city (Ogdensburg) with a relatively large number of transitional judgments in its sample (three out of nine).

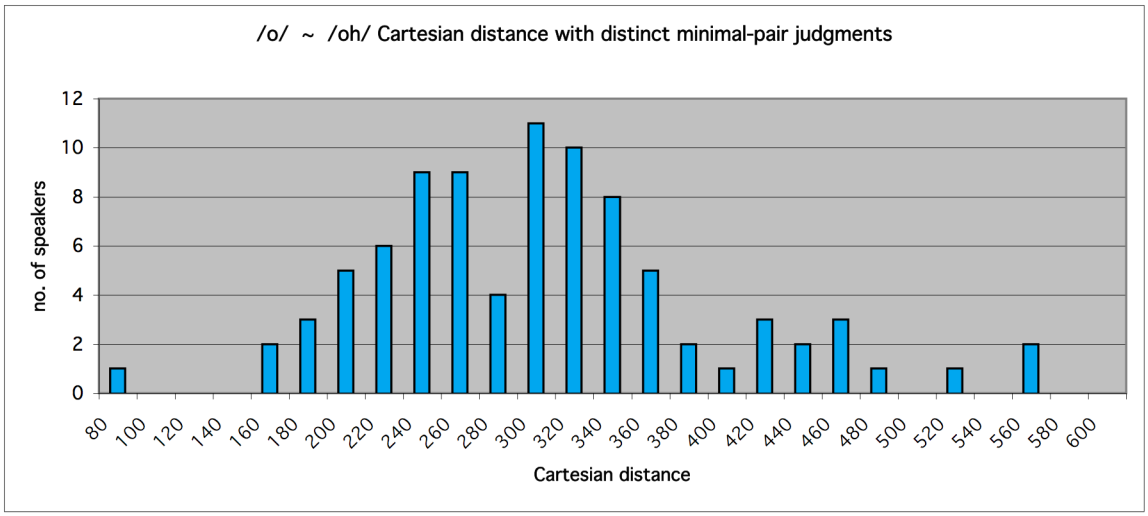


Figure 5.9. A histogram of /o/~/oh/ Cartesian distances among people who judge all minimal pairs as distinct. Mike P. from Ogdensburg is the speaker all on his own between 80 and 100 Hz.

The more likely conclusion, then, is merely the obvious one: The *caught-cot* merger is beginning to have an effect on communities in Upstate New York outside the region where it is already well-established, including Inland North fringe communities. The effect is relatively recent, seeming to appear only in speakers born later than 1982 or so; and relatively weak, affecting only a few speakers in the sample and for the most part causing transitional rather than merged judgments. So it seems that we are seeing early evidence of the expansion of the *caught-cot* merger into new Upstate New York territory, in line with Herzog's Principle.

The fact that the merger has only relatively recently progressed far enough to influence speakers' minimal-pair judgments, and only a few speakers' judgments at that, does not of course mean that we will not be able to locate it by

other means. Presumably before the influence of a merger can reach the point of confusing some speakers' minimal-pair judgments, it must have already had some effect on the phonetics of the phonemes involved. So we can get more information of the effect of the *caught-cot* merger on Upstate New York by looking at the apparent-time behavior of /o/ and /oh/ in F1/F2 space; this will be the focus of the next section.

5.3. The *caught-cot* merger in F1/F2 space and apparent time

5.3.1. The full sample

Looking at the Cartesian distance between /o/ and /oh/ in apparent time shows that, through the entire sample of 119 speakers, the two phonemes are in fact trending towards merger in phonetic space as well as in minimal-pair judgments of a relatively small number of speakers. Figure 5.10 shows the correlation between /o/~/oh/ distance and year of birth: /o/ and /oh/ get about 50 Hz closer together in F1/F2 space for every 19 years of apparent time. The Cartesian distance, of course, is a computation based on four measurements which are in principle independent: F1 and F2 of both /o/ and /oh/. So it is meaningful to ask by what movements of /o/ and /oh/ the Cartesian distance is closing: is /o/ standing more or less still while /oh/ approaches it, or vice versa, or are they both moving towards each other in F1/F2 space?

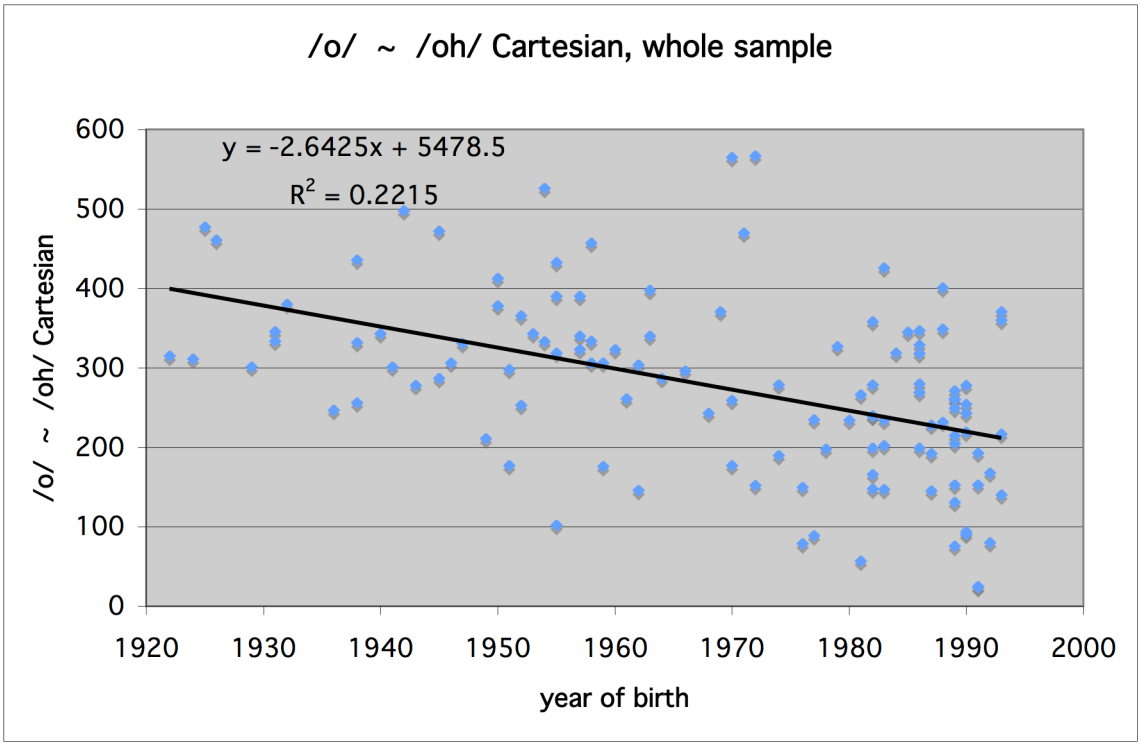


Figure 5.10. /o/~/oh/ Cartesian distance, narrowing in apparent time. $n = 119$; $p < 10^{-7}$.

Table 5.11 shows the Pearson *r*-correlation statistics for correlations between year of birth and both F1 and F2 of /o/ and /oh/. It is clear from Table 5.11 that most of the movement between /o/ and /oh/ is taking place in the backing of /o/. So the backing of /o/, shown in Figure 5.12, is doing most of the work in narrowing the acoustic gap between /o/ and /oh/. In fact, the backing of /o/ is very slightly *more closely* correlated with year of birth than the Cartesian distance between /o/ and /oh/ it; r^2 for F2 of /o/ alone is about 0.26, while r^2 for the Cartesian distance is about 0.22.

Table 5.11 Pearson correlations of F1 and F2 of /o/ and /oh/ versus year of birth.

phoneme	formant	*r* vs. year of birth
/o/	F1	–0.15
	F2	–0.51
/oh/	F1	0.15
	F2	0.05

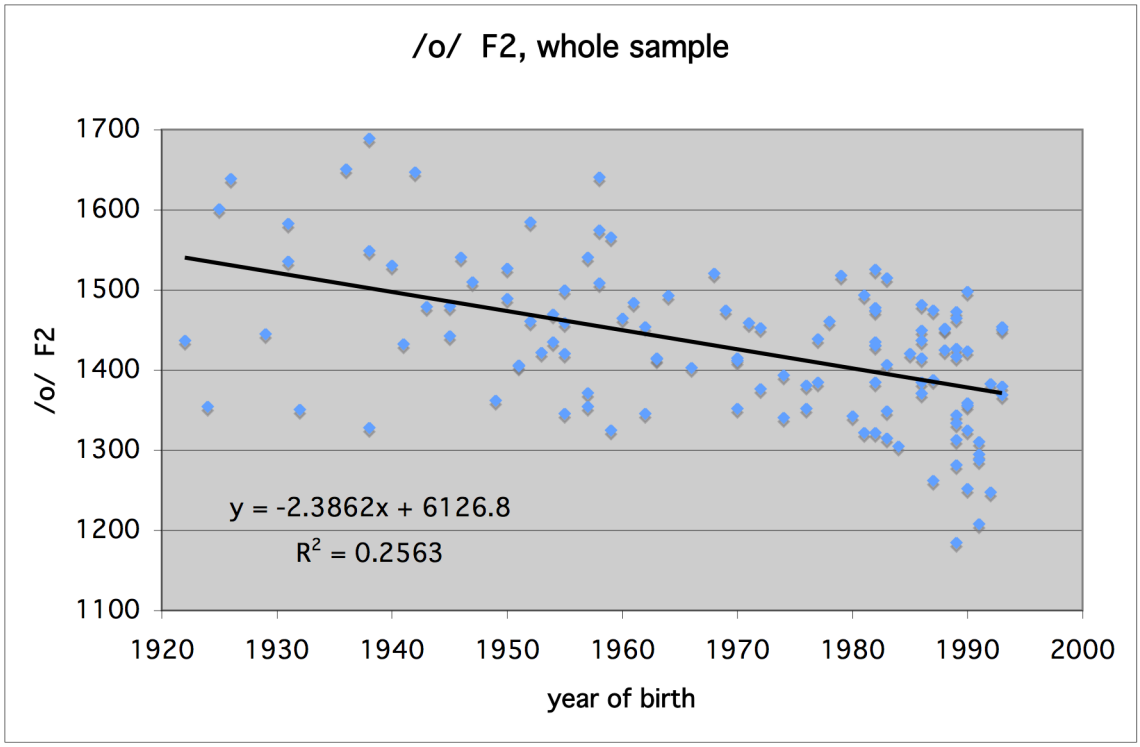


Figure 5.12. F2 of /o/ backing in apparent time. $n = 119$; $p < 10^{-8}$.

Of course, looking at /o/ and /oh/ across the entire 119-speaker sample is not extremely informative; we already know that the sample includes several different dialect regions, in which the behavior of /o/ and /oh/ is likely to be different. So let us now move on to considering each subregion of Upstate New York individually.

5.3.2. The North Country

In the North Country, of course, the *caught-cot* merger is already well underway; only the oldest two speakers interviewed in the region maintain a distinction between /o/ and /oh/ in minimal-pair judgments. Apart from those two speakers, there is no statistically significant difference in age between

speakers with "merged" and "transitional" minimal-pair judgments; from minimal pairs alone there is no direct evidence to indicate that the merger is still in progress after 1950; moreover, if those two older speakers, whose /o/~/oh/ Cartesian distances are both greater than 250 Hz, are excluded, the negative correlation between Cartesian distance and year of birth for the remaining speakers is not statistically significant ($r^2 \approx 0.15$, $p \approx 0.12$). However, F1 and F2 of /o/ provide clear acoustic evidence that the merger is still ongoing in the North Country: /o/ is backing and perhaps raising in apparent time, toward /oh/, which remains stationary.[11] These correlations are shown in Figures 5.13 and 5.14.

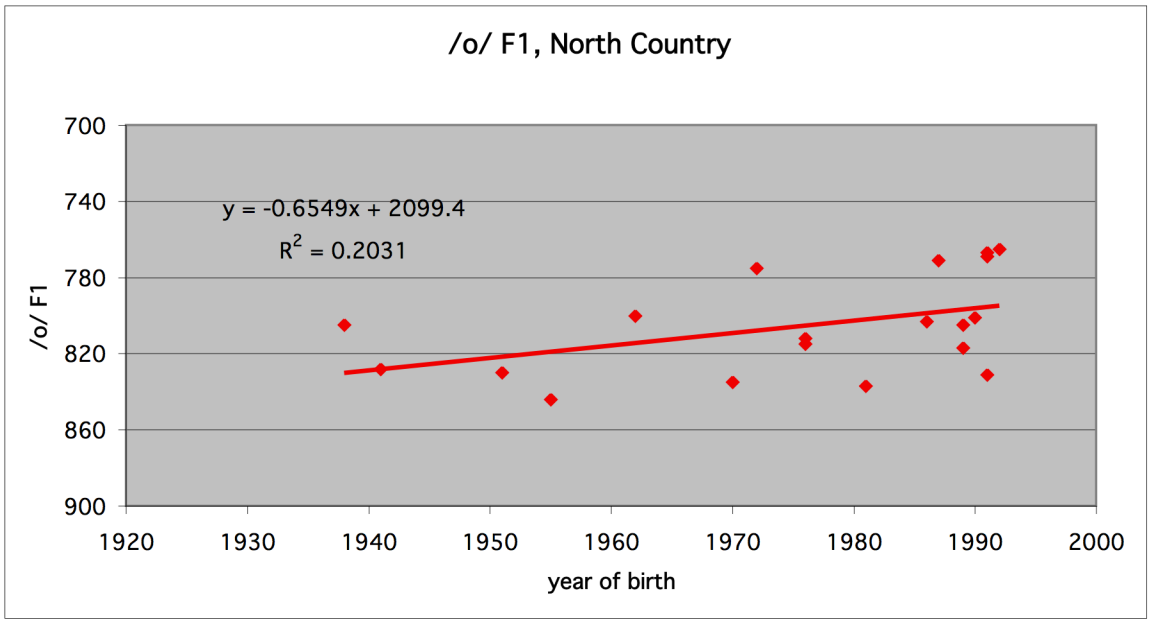


Figure 5.13. Raising of /o/ in apparent time in the North Country. $n \approx 19$; $p \approx 0.053$, but if the two oldest speakers are excluded, r^2 rises to about 0.26 and $p < 0.04$.

The most striking fact about the movement of /o/ in the North Country is in Figure 5.14: the seemingly abrupt backward movement of /o/ among the

[11] On the other hand, Pearson correlation of both F1 and F2 of /oh/ with year of birth gives $r^2 < 0.02$.

seven youngest speakers, who include at least one speaker from each of the four sampled communities in the region. Every one of the seven speakers born after 1988 has F2 of /o/ less than 1315 Hz, and every one of the twelve speakers born before 1988 has F2 of /o/ greater than 1315 Hz; there is no overlap whatsoever. (The difference is statistically significant at $p < 10^{-4}$.) Indeed, all of the apparent-time difference in F2 of /o/ is between the speakers born before 1988 and the speakers born after 1988: if the seven youngest speakers are excluded, no correlation between F2 of /o/ and year of birth is found among the twelve remaining speakers ($r^2 < 10^{-3}$).

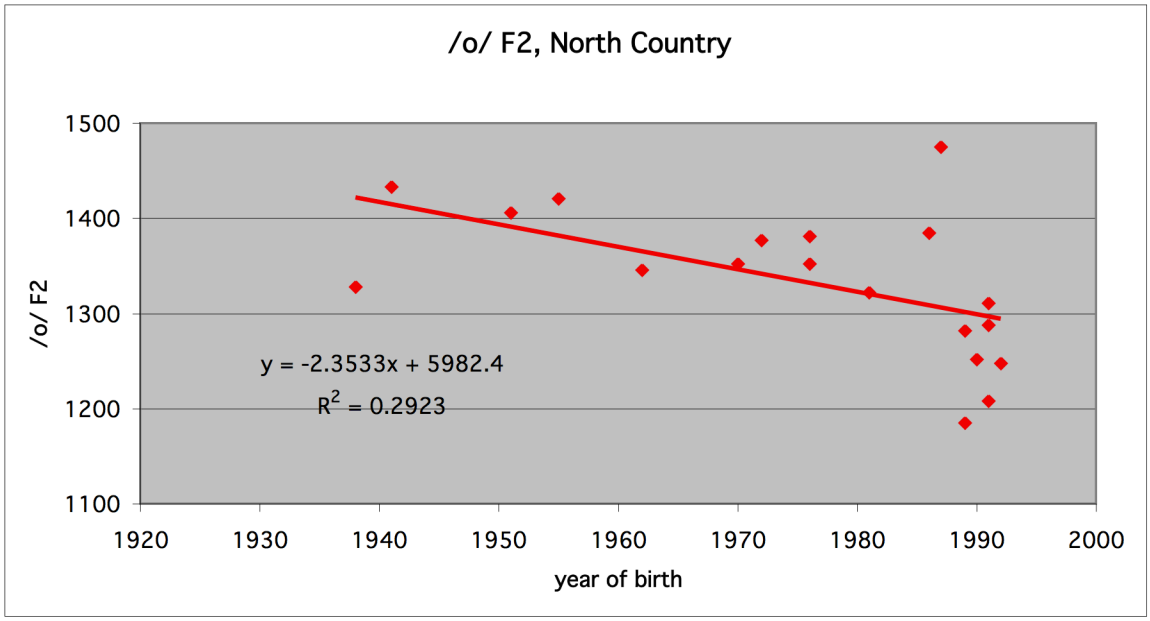


Figure 5.14. The backing of /o/ in apparent time in the North Country. $n = 19$; $p < 0.02$. If the two oldest speakers are excluded, r^2 rises to about 0.35 and p is still less than 0.02.

The difference between the speakers born before and after 1988 is so striking that it is tempting to say something like "1988 is the year the *caught-cot* merger went to completion in the North Country." This is reminiscent of Johnson (2007)'s findings on the Massachusetts–Rhode Island border, where the merger

also appears to have gone to completion relatively suddenly: in each of several communities, children born before after a certain date had full merger, while the merger statuses of those born before that date were mixed and often depended on whether a given speaker's parents were merged.

Johnson's model does not apply directly to the current data, however. First of all, Johnson found the merger going to completion at different times in different consecutive communities, whereas the 1988 date of the abrupt backing of /o/ in the North Country is based on data from several communities, of which the two best-sampled, Canton and Plattsburgh, are roughly 100 miles from each other and not in very close contact. Next, this sudden change in F2 is not well-reflected in other, more direct measures of *caught-cot* merger: the speakers born after 1988 are no more likely than the speakers born before 1988 to have merged rather than transitional minimal-pair judgments.[12] Likewise, the seven younger speakers do not overall have /o/ and /oh/ much closer in Cartesian distance than the ten older speakers: the difference between the seven younger speakers' mean Cartesian distance and the older speakers' is not significant at the 0.05 level ($p \approx 0.055$). Finally, in southeastern New England Johnson attributed the advancement of the merger to an increase in the number of locals whose parents were natives of a merging region; but in the North Country, almost none of the sampled speakers, when asked, described their parents as being from merging regions other than the North Country itself (the only exception is Marc F. from Plattsburgh, whose parents were from Vermont),

[12] In fact, the younger speakers have *fewer* merged minimal-pair judgments than the older speakers—two out of seven versus six out of ten—although the difference is not statistically significant. In this comparison and the next, the two oldest speakers, who have distinct minimal-pair judgments, are excluded.

and if anything, there is a growing number of speakers with parents from non-merging regions[13]; of the nine sampled North Country speakers born later than 1985, only one has neither parent from an non-merging region. There is no noticeable relationship between parents' geographical origin and F2 of /o/, Cartesian distance, or minimal-pair judgments.

There *is* a correlation between parents' geographical origin and F1 of both /o/ and /oh/: /o/ and /oh/ are higher (i.e., F1 is lower) for speakers with parents from non-merging regions ($r < -0.5$ and $p < 0.05$ for both correlations). Figure 5.15 demonstrates how speakers with both parents from unmerged regions have both /o/ and /oh/ higher than do speakers with both parents from the North Country and Vermont (verified by *t*-test: $p < 0.01$ for both /o/ and /oh/). Of course, not all parents from the North Country would have been merged themselves: after all, as has been observed above, the *cot-caught* merger is relatively new to the North Country, and the two oldest speakers sampled in the region make the distinction clearly. The third-oldest sampled speaker in the North Country, Bob L. from Canton, was born in 1951; therefore if we consider only speakers at least 25 years younger than Bob, we can be relatively more confident that all remaining parents from the North Country would have been at least partially merged themselves. In this case the correlation between parents'

[13] Included in "non-merging regions" here are Ogdensburg, New York City, Long Island, Syracuse, Endicott (a village near Binghamton, in the Inland North core), Michigan, and North Carolina. All other parents of speakers in the North Country sample are themselves from Vermont or communities in the North Country, no further west than Canton nor much further south than Lake Placid. The most questionably classified community here is Massena, a village northeast of Canton and Ogdensburg. In the absence of direct data, it is unclear whether to expect Massena to be dialectologically part of the North Country (being further east than Canton) or the Inland North fringe (being, like Ogdensburg, on the St. Lawrence River). It is here classified as a North Country community; but treating it as unmerged would not substantially change most of the results, inasmuch as only one parent of one of speaker is from Massena. If Massena is considered part of the North Country, year of birth is positively correlated with number of parents from non-merging communities ($r^2 \approx 0.27$; $p < 0.05$).

presumed status and F1 of /o/, as shown in Figure 5.16, remains significant ($p < 0.03$), but the correlation with F1 of /oh/ loses its significance.

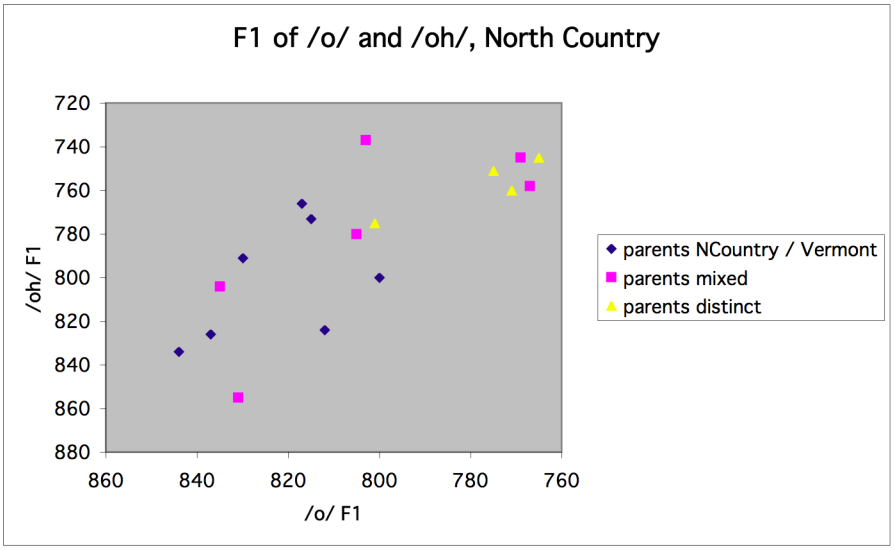


Figure 5.15. The relationship in the North Country between F1 of /o/ and /oh/ and merger status of speaker's parents' native communities, excluding speakers with distinct minimal-pair judgments. Toward the upper right, speakers have relatively high /o/ and /oh/; toward the lower left, /o/ and /oh/ are both relatively low.

Whether speakers born between 1951 and 1976 are included or not, this result is somewhat remarkable: we might have expected speakers with parents from non-merging regions to be slightly less merged themselves, with higher /oh/ but lower /o/; but in fact /o/ is higher for such speakers, and the merger is no less advanced. It is difficult to explain why this pattern appears. It may be merely an accidental correlation, since /o/ is rising in apparent time and younger speakers in the sample are more likely to have parents from non-merging regions; however, the correlation between parents' place of origin and F1 of /o/ has a slightly higher r^2 than the correlation between year of birth and F1 of /o/, and so in a multiple-regression analysis including both parents' origin

and year of birth, parents' origin is selected as a statistically significant factor and year of birth is not.[14]

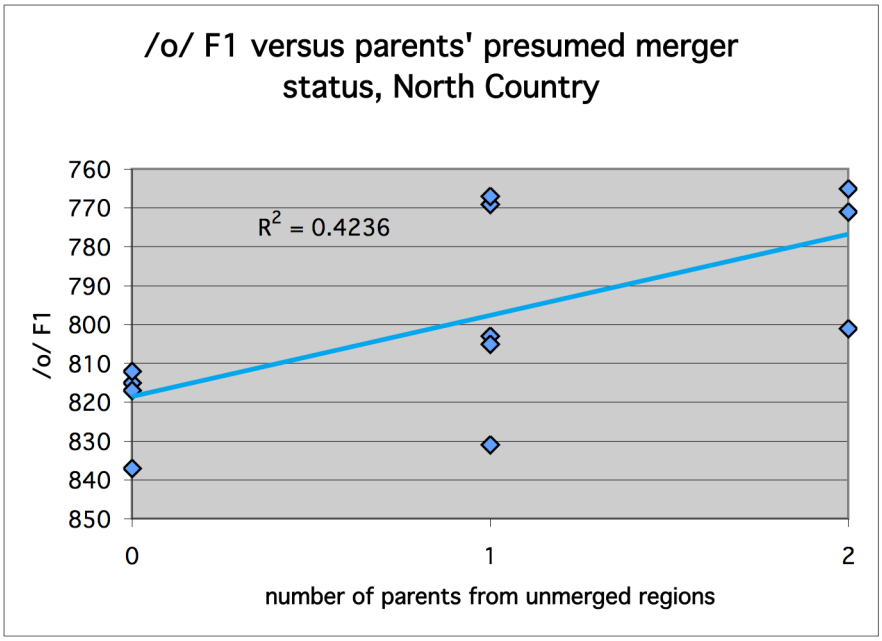


Figure 5.16. The relationship in the North Country between F1 of /o/ and merger status of speaker's parents' native communities, including only speakers born in 1976 or later.

One possible explanation is an indirect one that takes into account both the origins of speakers' parents and the raising of /o/ as a change in apparent time. The 17 speakers being considered here have, among them, a total of 14 parents from non-merging areas (and 20 parents from Vermont and the North Country). Of these 14 presumed non-merging parents, half are from New York City or Long Island, including the parents of three of the four speakers whose parents are *both* from non-merging regions. In other words, not only has the number of natives of the North Country with parents from non-merging regions in general increased in recent years, but in particular people with parents from

[14] This does not mean that /o/ is not *actually* rising in apparent time in the North Country, however: even if the direct cause of /o/-raising is parents from non-merging regions, the fact that the number of parents from non-merging regions is increasing in apparent time still means that /o/ is rising over time in the North Country.

areas with *raised /oh/* may make up a relatively large component of that increase. Speakers in a *caught-cot* merging community whose parents are from New York City or Long Island might end up having a somewhat raised merged /o/~/oh/ phoneme: the parents, by virtue of having a raised /oh/, would have a relatively high (i.e., low-F1) *mean overall distribution* of /o/ and /oh/, and so the children, who fail to acquire the distinction, do nevertheless acquire their parents' raised overall /o/~/oh/ mean. If there are enough children with New York City or Long Island parents in the community, this result could feed back in and cause a general trend toward raising of the merged /o/~/oh/ phoneme in apparent time, affecting even speakers whose parents are not from raised-/oh/ areas.

Obviously the data is not nearly deep enough to prove or disprove this hypothesis; it must basically be accorded the status of conjecture. There is not even a statistically significant correlation of /oh/ with year of birth, as we would expect to find if /oh/ is raising in apparent time. There is evidence, however, that the phonetic distribution of parents' unmerged phonemes can have an effect on their children in merging communities: a multiple-regression analysis finds that North Country speakers with parents from the Inland North have significantly fronter /o/ ($p < 0.02$).

In any event, we have not yet explained the sharp F2 difference in /o/ between North Country speakers born before and after 1988. The apparent suddenness of the change in F2 suggests that it reflects a discrete change in the phonological features of /o/; a mere change in the phonetic implementation of the same /o/ features would be expected to manifest as a more gradual drift through phonetic space, according to the taxonomy of Bermúdez-Otero (2007).

The obvious candidate for such a feature is rounding. The hypothesis that the difference between /o/ in the North Country before and after 1988 is rounding is tentatively supported by my own impressionistic auditory judgments of rounding in listening to speakers' minimal-pair pronunciations: North Country speakers whose /o/~/oh/ minimal pairs sound merged to me sound, impressionistically, to be (with a few exceptions) merged as an unrounded vowel for speakers born before 1988 and as a rounded vowel for speakers born later. Assuming this is the case, what could have made the merged /o/~/oh/ change suddenly from rounded to unrounded in 1988, after seemingly decades of relative stability? One possibility, again, is the increasing presence in the North Country of natives whose parents are from unmerged communities—and who therefore presumably had unrounded /o/ but rounded /oh/. If /o/ and /oh/ were already in the process of merging as an unrounded phoneme, it is possible that an influx of speakers with rounded /oh/, although certainly not sufficient to reverse the merger, might have been sufficient to change the target of the merger to a rounded one.

The Canadian chain shift, as described in *ANAE*, begins with the backing of /æ/ in response to the merger of /o/ and /oh/ in rounded position. Given that /o/ and /oh/ appear to be merging in the North Country in rounded position, and that the North Country is adjacent to Canada, we can also ask if there is evidence that the Canadian Shift is taking place here as well. There is some evidence that it is: at least, /æ/ is (relatively weakly) backing in apparent time, as Figure 5.17 shows; moreover, F2 of /æ/ is even more strongly correlated with F2 of /o/ ($r^2 \approx 0.37$; $p < 0.01$). Overall, /æ/ is quite back indeed: the mean F2

of the 18 North Country speakers sampled is 1663 Hz, noticeably backer than even the Canadian speakers in the Telsur corpus, whose mean is 1725 Hz ($p < 0.02$). There is no apparent-time change in F1 of /æ/ or in either formant of /e/.

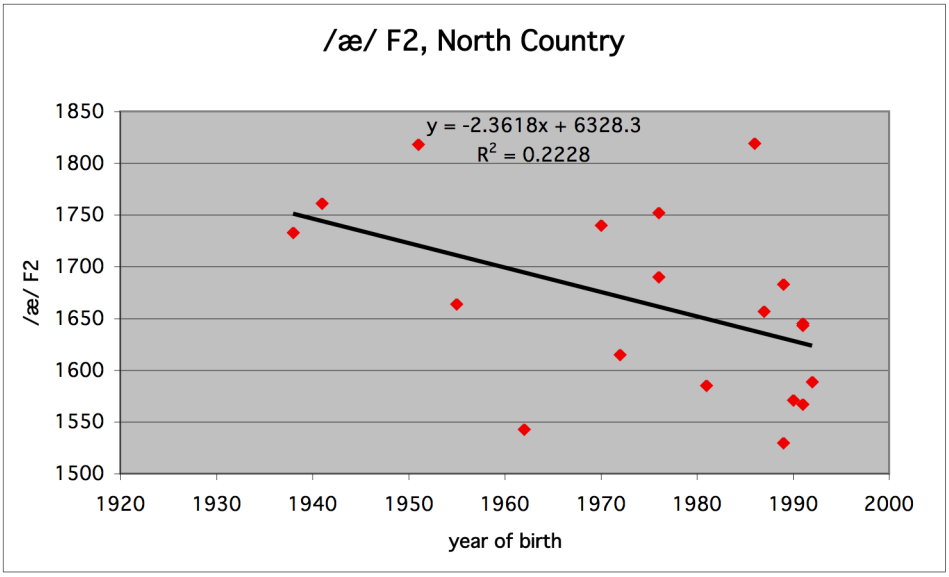


Figure 5.17. The backing of /æ/ in apparent time in the North Country ($p < 0.05$).

Despite the immediate proximity of Canadian English, it is not necessarily the case that the backing of /æ/ in the North Country is the direct result of the diffusion of Canadian Shift features from Canada, especially given the reluctance of phonetic features to spread across the U.S.–Canada border as noted by Boberg (2000). It may just as easily be an independent parallel development, as a result of the raising and backing of /o/ leaving space for /æ/ to shift back; the same development has been noted independently in California, another *caught-cot* merging region (see e.g. Eckert 2008), and *ANAE* finds Canadian Shift sporadically throughout the West.

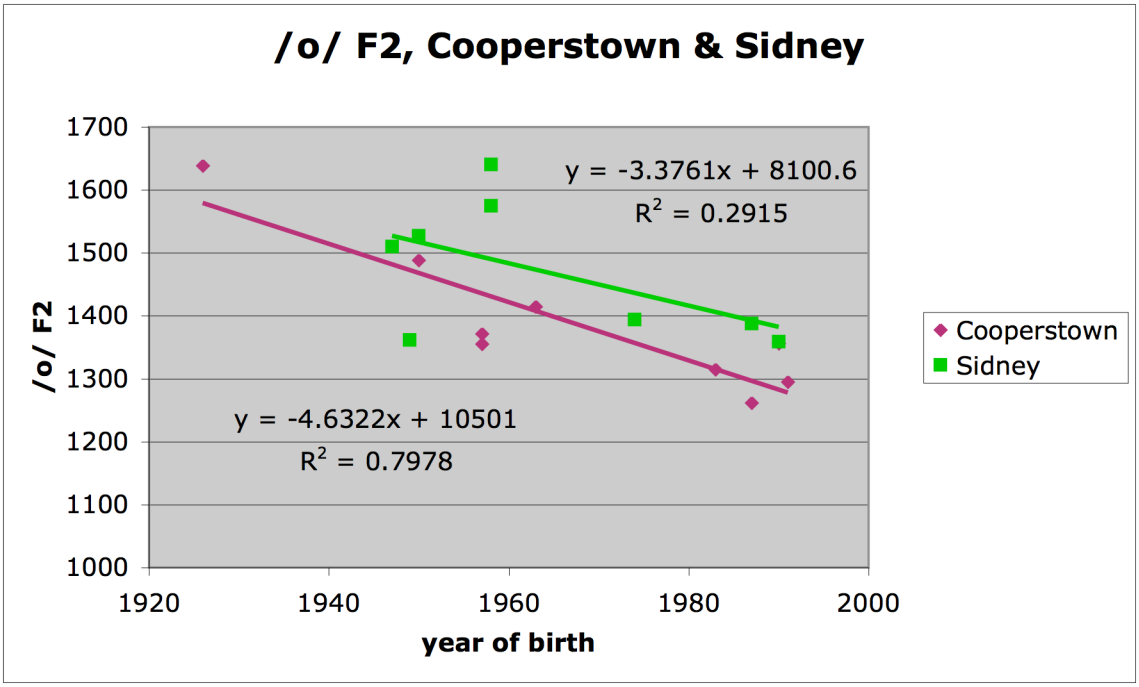


Figure 5.18. F2 of /o/ in apparent time in Cooperstown and Sidney. In Cooperstown, the correlation between /o/ F2 and year of birth is statistically significant ($p \approx 0.001$); in Sidney, it does not reach the level of significance.

5.3.3. Cooperstown and Sidney

The only community in the sample outside the North Country in which multiple speakers had fully-merged minimal-pair judgments was Cooperstown. As mentioned earlier in this chapter, the *caught-cot* merger has taken over Cooperstown quite rapidly: of the nine speakers interviewed in Cooperstown, the five born in 1963 or earlier all had distinct minimal-pair judgments, and the four born in 1983 or later all had merged or transitional judgments. This is reminiscent of Cooperstown's rapid retreat from the NCS, as documented in Chapter 3: the five older speakers all have NCS scores between two and four, and the four younger speakers all score zero or one. Given the retreat from the NCS, it is unsurprising that the phonetic approach to the *caught-cot* merger

should be the backing of /o/; Figure 5.18 displays the backing of /o/ in apparent time in Cooperstown.

In Sidney, whose /o/ is also shown on Figure 5.18, the NCS is also diminishing in apparent time, but the *caught-cot* merger has not had a direct effect on speakers' minimal-pair judgments: all speakers sampled judged all /o/~/oh/ minimal pairs as distinct. Since the NCS is diminishing, we would expect to find /o/ backing in apparent time, as we did in Cooperstown. Now, the Pearson correlation of F2 of /o/ with year of birth does not reach the level of statistical significance ($p \approx 0.17$), although it does have a higher r^2 value (0.29) than F1 of /o/ or either formant of /oh/; and as Figure 5.18 shows, only one of the five older speakers sampled in Sidney has /o/ as back as the three younger speakers do. A *t*-test comparing the five older speakers (mean F2: 1523 Hz) and three younger speakers (mean F2: 1380 Hz) does yield a significant difference, with $p < 0.05$.

5.3.4. The Inland North core and fringe

Earlier in this chapter, indications were found of incipient *caught-cot* merger in the Inland North fringe: six relatively young speakers out of the 40 sampled in the Inland North fringe region had transitional minimal-pair judgments; and one speaker in Ogdensburg had distinct judgments but only 89 Hz in Cartesian distance between /o/ and /oh/. If the *caught-cot* merger has begun relatively recently to have enough of an effect in the Inland North fringe to affect speakers' minimal-pair judgments, then there should be phonetic

evidence of it in apparent time. Figure 5.19 shows the approach of /o/ and /oh/ in apparent time in the Inland North fringe, in seeming defiance of the Inland North's supposed resistance to the merger.

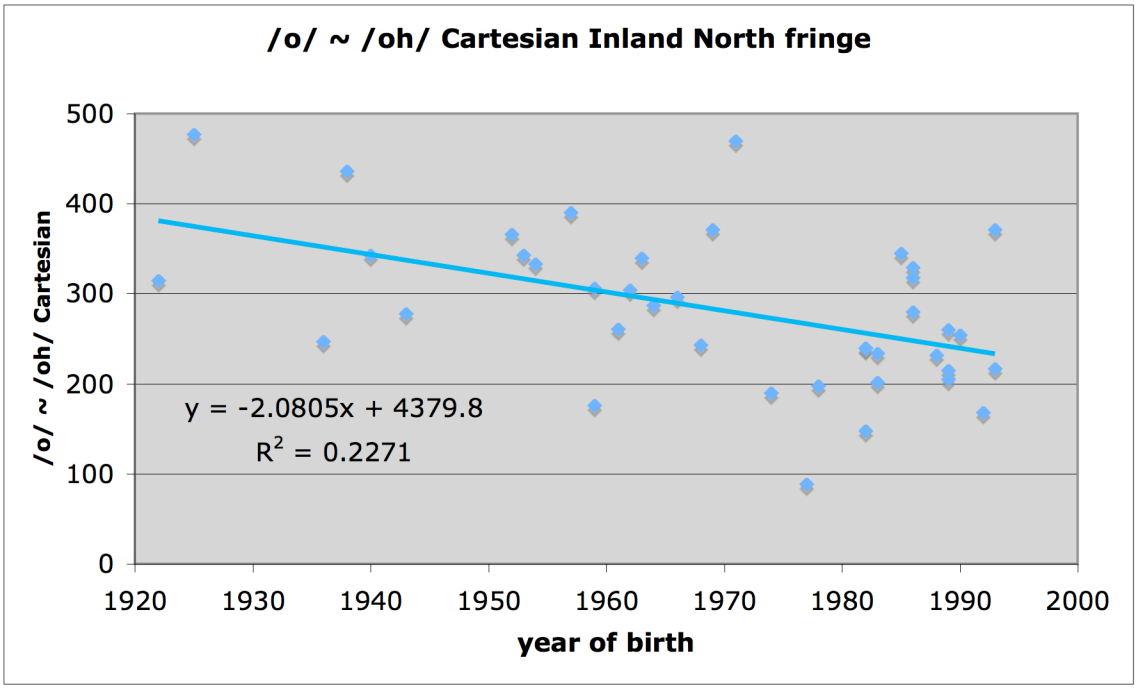


Figure 5.19. The diminishing Cartesian distance between /o/ and /oh/ in apparent time in the Inland North fringe ($p < 0.002$).

As was mentioned in Chapter 2, the sampling methods employed in this dissertation unexpectedly undersampled older females. In the Inland North fringe, for some reason, this undersampling is especially pronounced: of the six speakers born before 1950 sampled in the Inland North fringe, only one is female—the oldest, Wanda R. from Ogdensburg, born in 1922. This means that, in effect, we have a substantially broader range of apparent-time data from males than females in the Inland North fringe; and it will be necessary to take care to avoid confounding change in apparent time with gender-based difference in this subset of the data. For example, F1 of /oh/ in the Inland North fringe appears

significantly correlated with year of birth ($r^2 \approx 0.12$, $p \approx 0.03$) in the sample; but in a multiple-regression analysis in which gender and year of birth are both included as factors, year of birth is no longer selected as significant ($p \approx 0.08$).

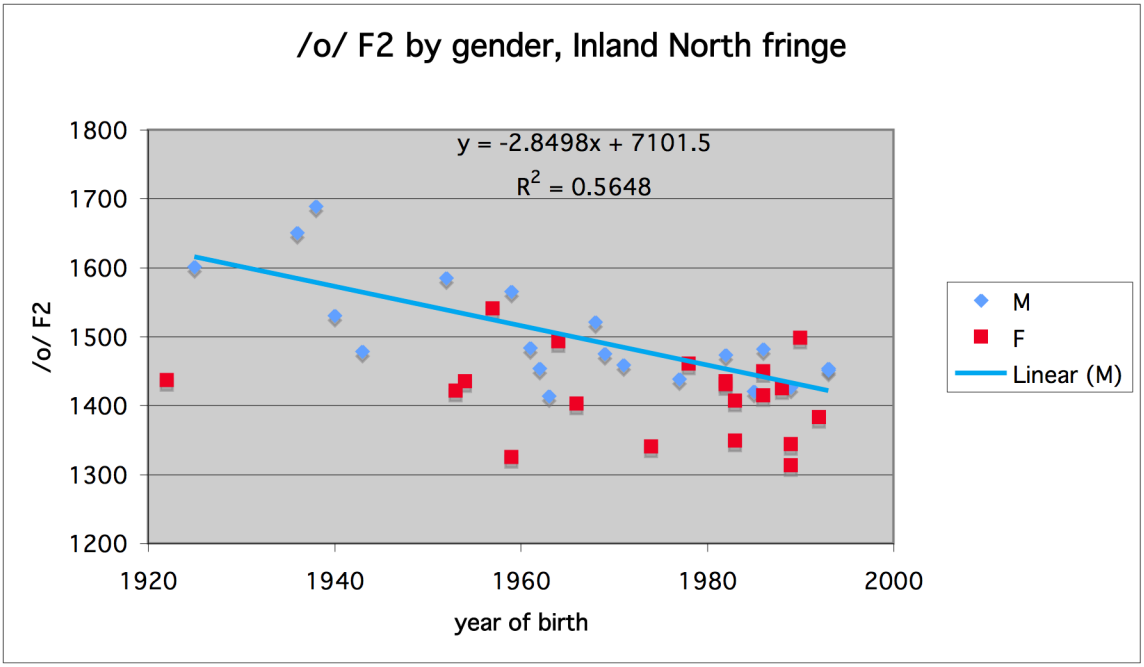


Figure 5.20. The backing of /o/ in apparent time in the Inland North fringe. The blue regression line with $r^2 \approx 0.56$ ($p < 0.0002$) represents the apparent-time trend for males only; the sampled females do not have a wide enough effective age range to show a significant apparent-time trend.

Gender and year of birth are both significant factors for F2 of /o/, however (adjusted $r^2 \approx 0.48$; $p < 0.001$ for each): /o/ is backing in apparent time, with females leading the change, as shown in Figure 5.20. So not only are some younger speakers in the Inland North fringe beginning to feel the effects of the *caught-cot* merger in their minimal-pair judgments, but in fact /o/ is backing in apparent time to make that happen, in an exact reversal of the /o/-fronting of the NCS. In other words, not only is the presence of the NCS in these communities seemingly insufficient to prevent the expansion of the *caught-cot* merger into them, but the structure of the NCS cannot even prevent one of the

key NCS features from being reversed. Females not only lead the backing of /o/ in phonetic space, but they lead the merger in perception as well: all of the sampled Inland North fringe speakers with transitional minimal-pair judgments are female.

The result of interaction between the NCS and diffusion of the *caught-cot* merger in the Inland North fringe therefore appears to be the backing of /o/. This is different from the one other case where the NCS and *caught-cot* merger are known to coexist, namely that of the Telsur speaker Phyllis P. from Rutland, Vermont. Phyllis has /o/ and /oh/ merged in a relatively fronted position at F2 ≈ 1420 Hz: that is, the effect of NCS /o/-fronting on Phyllis is that her entire merged /o/~/oh/ phoneme has been fronted into the range within which /o/ alone is found in the Inland North fringe. A diffusion model can explain this discrepancy relatively easily: if *caught-cot* merger reached Rutland before the diffusion of NCS features from the Inland North fringe did, then the effect on the Rutland phonology of NCS /o/-fronting would be to front the entire merged phoneme, as is found in Phyllis. But in the Inland North fringe in Upstate New York, /o/-fronting happened first, and then the somewhat later effect of the *caught-cot* merger is to begin pulling /o/ back towards /oh/.

The four well-sampled communities in the Inland North fringe—Gloversville, Glens Falls, Watertown, and Ogdensburg—all have negative *r* values for the correlation between /o/ F2 and year of birth. In two, the *r* values are of sufficient magnitude for the correlation to remain statistically significant when restricted to the individual city: Watertown and Glens Falls both have $r^2 > 0.61$ and $p < 0.05$. In Gloversville ($r^2 \approx 0.29$) and Ogdensburg ($r^2 \approx 0.14$), the

correlation does not reach statistical significance. It is easy to understand why the backing of /o/ should manifest relatively weakly in Gloversville, if we interpret the backing of /o/ as the effect of the expansion of the *caught-cot* merger; unlike the other sampled Inland North fringe cities, Gloversville is relatively distant from regions where the merger is known to be complete, and was the only one where all speakers sampled judged all /o/~/oh/ minimal pairs as distinct. Ogdensburg, on the other hand, is adjacent to Canada and very close to Canton, and fully one third of speakers sampled there had transitional minimal-pair judgments; it's slightly surprising, therefore, to see that the backing of /o/ in apparent time is not statistically robust in Ogdensburg.

We can see a possible explanation for the weakness of the backing of /o/ in apparent time in Ogdensburg by recalling that the NCS seems to be newer to Ogdensburg and more active than in the other Inland North fringe communities: it is the only one in which increasing EQ1 index (i.e., the raising of /æ/ over /e/) and decreasing F2 of /e/ show a statistically significant correlation with age within the community sample. If NCS changes are still in progress in Ogdensburg, it may be that the relative stability of /o/ here is, as it were, the result of /o/ moving forward (in the NCS) and backward (because of the expanding *caught-cot* merger) at the same time. Or to put it another way, whereas in Watertown and Glens Falls the effect of the expansion of the *caught-cot* merger is to reverse the NCS fronting of /o/ after it had gone more or less to completion,

in Ogdensburg the expansion of the *caught-cot* merger arrived somewhat earlier relative to the NCS, and its effect is to prevent the fronting of /o/ altogether.[15]

It is important to emphasize that the expansion of the *caught-cot* merger, although it has reversed (or, in the case of Ogdensburg, perhaps prevented) the NCS fronting of /o/, has not halted the NCS entirely in these communities. As noted in the foregoing paragraph, several NCS sound changes other than the fronting of /o/ are still in progress in Ogdensburg. And in fact, over the Inland North fringe region as a whole, the backing of /e/ is still active in apparent time ($r^2 \approx 0.29$; $p < 0.001$; no significant effect of gender)[16]. So this suggests that the expansion of the *caught-cot* merger is in fact fully compatible with the NCS: the presence of the NCS in a community does not prevent the *caught-cot* merger from beginning to expand into it, and once the merger has begun to have an effect on the community's phonetics it does not prevent the NCS from proceeding.

The Inland North fringe is defined as the region in which participation in the NCS varies from speaker to speaker; and it might have been conjectured that it is only among the speakers with weaker or absent NCS that the backing of /o/ is proceeding. This is not the case, however: even if we restrict our attention to the 15 sampled speakers in the Inland North fringe who have an NCS score of 4, the backing of /o/ in apparent time remains strong ($r^2 \approx 0.59$, $p < 0.001$). That is, not only does the backing of /o/ coexist with the NCS in the same communities, but actually among the same speakers.

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[15] Ogdensburg is also the only city in the Inland North fringe sample where /oh/ is significantly lowering in apparent time ($r^2 \approx 0.46$; $p < 0.05$). So the distance between /o/ and /oh/ is still decreasing even without backing in /o/.

[16] In Ogdensburg, as noted above, the backing of /e/ is very robust: $r^2 \approx 0.76$. This is not responsible for the entire backing trend seen in the Inland North fringe, however; even if Ogdensburg is excluded, F2 of /e/ is still negatively correlated with year of birth among the remaining 31 Inland North fringe speakers ($r^2 \approx 0.15$, $p < 0.05$).

Conceivably it is not too surprising that the backing of /o/ can coexist with the NCS in the Inland North fringe. After all, it was argued in Chapter 4 that the presence of the NCS in the Inland North fringe is the result of diffusion—that is, the NCS spread to the fringe communities as a collection of more or less independent sound changes, rather than as a network of interacting vowels in a chain shift (Labov 2007). In such a situation, it's to be expected that if one sound change is interrupted or reversed, the others should still be able to proceed. So it may not be fair to expect the Inland North fringe to be resistant to the merger in the same way the core is supposed to be.

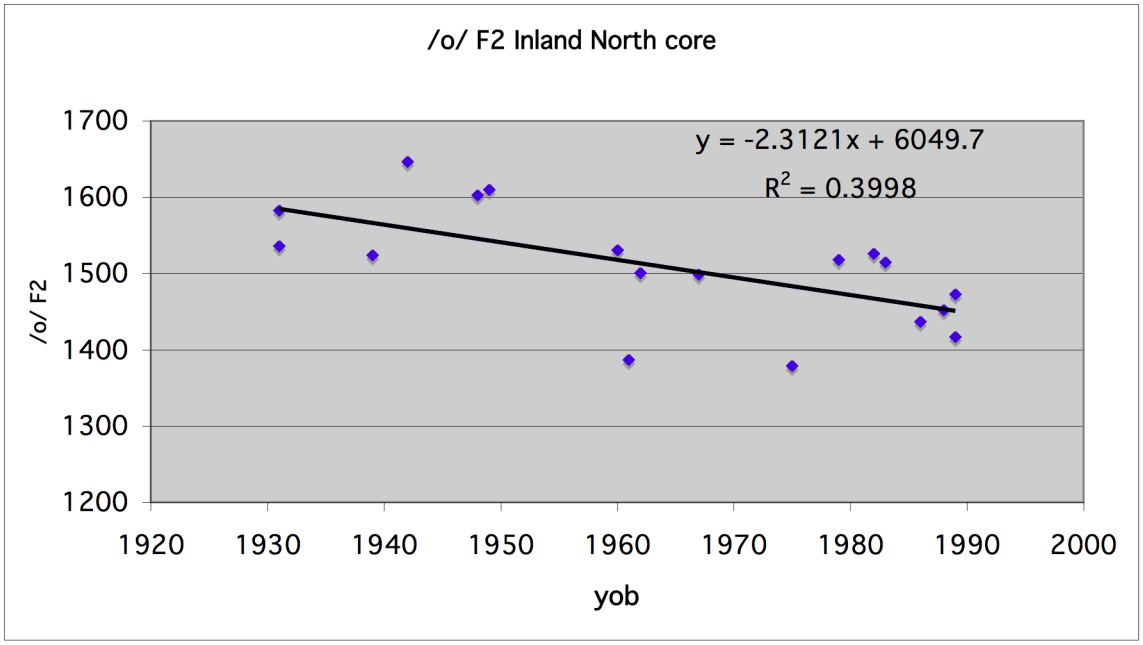


Figure 5.21. Backing of /o/ in apparent time ($p < 0.01$) in the Inland North core: Utica, Yorkville, Geneva, and the Telsur Upstate New York Inland North communities. There is no significant effect of gender, nor of whether the interview was conducted by me or by the Telsur project.

In the Inland North core, the NCS is assumed to have arisen as a unified chain shift. The current sample includes only three communities in the Inland North core (Utica, plus one speaker from Yorkville and two from Geneva), and so in order to get an apparent-time picture of /o/ and /oh/ in the Inland North

core, we will also include the Telsur corpus's eight Inland North Upstate New York speakers in the analysis: two each from Buffalo, Rochester, Syracuse, and Binghamton. Figure 5.21 shows that /o/ is backing in apparent time in the Inland North core as well.[17] In the fringe, it was possible to argue that the backing of /o/ could proceed without disturbing the other NCS features because in communities to which the NCS has diffused, there's not necessarily any particular structural relationship between the different sound changes. In the Inland North core, where the NCS is presumed to be a coherent chain-shift system, that argument is not valid, and we have to accept that the backing of /o/ is capable of coexisting with the NCS as a chain shift.

At this point, we must be open to the possibility that the backing of /o/ in the Inland North core and fringe communities is not a consequence of the expansion of the *caught-cot* merger but an independent internal development of the Inland North vowel system. Perhaps, for example, fronting of /o/ has merely reached some kind of phonetic or phonological limit in the Inland North, "bounced" (as it were) off the front of the vowel space, and ended up moving backward. Now, the overall mean F2 of /o/ of the 18 Inland North core speakers in Figure 5.21 is 1508 Hz. The Telsur corpus includes 53 speakers classified as part of the Inland North region outside of New York state; these 53 speakers have a mean /o/ F2 of 1497 Hz—essentially no different from the mean /o/ F2 of the 18 New York State Inland North core speakers. So if /o/ is backing in the Inland North core in New York State for its own reasons, because it has gone as

[17] Since /o/ is backing, the Cartesian distance between /o/ and /oh/ is also decreasing in apparent time ($r^2 \approx 0.23$, $p < 0.05$); /oh/ and F1 of /o/ show no apparent-time change.

far forward as it can, we should see the same backing of /o/ in the remainder of the Inland North, where /o/ is just as far front.

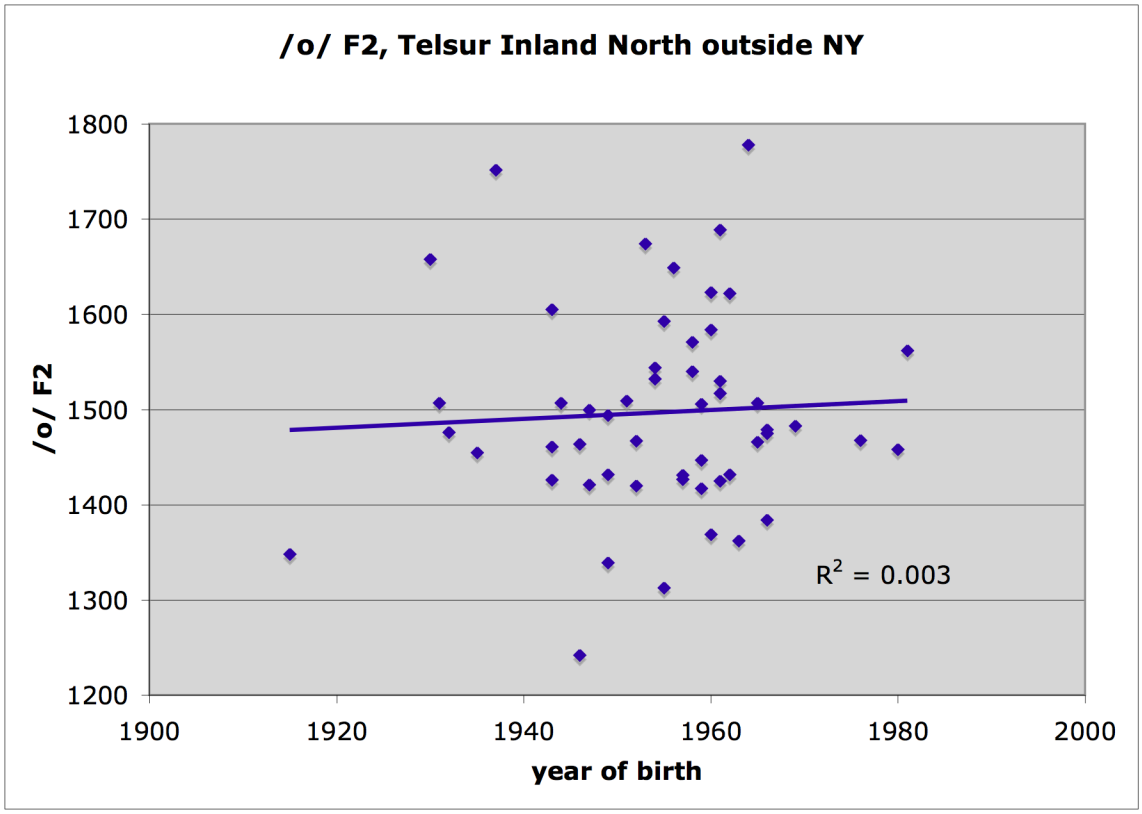


Figure 5.22. The lack of movement of /o/ in apparent time in the portion of the Inland North outside Upstate New York in the Telsur corpus.

Figure 5.22 shows that we see nothing of the kind: there is no correlation at all between year of birth and F2 of /o/ in the component of the Inland North west of Pennsylvania. Now, the Telsur corpus's apparent-time range is somewhat shorter than that of the current sample; the youngest Inland North speaker in the Telsur corpus was born in 1981, and the current sample contains five speakers in Utica plus one in Geneva born later than that. To be strictly fair, we ought to compare the two sets of speakers only over the same age range; for all we know if we had data from younger speakers in the western component they too would show marked backing of /o/. However, if we restrict our

attention to speakers born between 1931 and 1981 (for the oldest speaker sampled in the New York State Inland North core and the youngest speaker in the Telsur corpus in the western component, respectively), the results do not change: over that 50-year span, /o/ is already significantly backing in apparent time in New York State ($n = 12$; $r^2 \approx 0.35$; $p < 0.05$), but stationary in the western component ($n = 51$; $r^2 \approx 0.001$).

So, although the Inland North region as a whole has been described as showing "extraordinary" or "mysterious" uniformity (Labov 2001:515, 2008), the behavior of /o/ is strikingly different between the portion of the Inland North in Upstate New York and the portion to the west. This dialectological difference between two components of the Inland North coincides with a geographic discontinuity: the two components are separated by northwestern Pennsylvania, an area that was found to be part of the North by early dialectological research (Kurath 1949, Kurath & McDavid 1961) but where the NCS never occurred (Evanini 2009). At any rate, this shows that the backing of /o/ that we see in apparent time in the Inland North core in Upstate New York is not merely the next natural stage in the development of the NCS vowel system, common to both Inland North components; it must have some other cause, applicable in Upstate New York but not the western component of the Inland North.

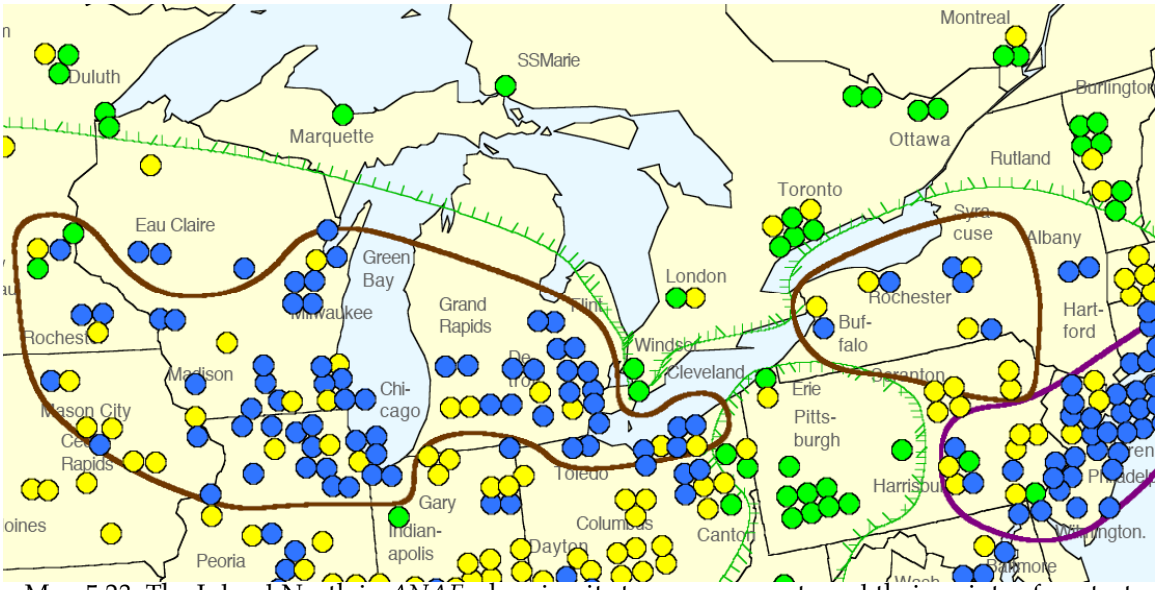
Is it likely that the backing of /o/ in apparent time is the result of influence from the *caught-cot* merger? None of the sampled speakers in the Inland North core have the merger themselves—they all have more than 250 Hz in Cartesian distance between /o/ and /oh/; and they all have distinct minimal-pair judgments with the exception of Christie L. from Utica, whose merged

judgments can be fairly reasonably regarded (as argued above) as a mistake. But is it necessary for the *caught-cot* merger to be actually *present* in a region in order for us to describe that region as subject to the *effect* of the merger? In other words, can the geographical expansion of a merger in accordance with Herzog's Principle have the immediate effect only of initiating a sound change in the direction of merger, without (yet) causing any speakers to actually exhibit the merger in their own phonology?

If we take the transitional minimal-pair judgments in the Inland North fringe to be a case of such geographical expansion, it clearly seems that it can. The oldest speakers in the Inland North fringe sample with transitional judgments, as noted earlier in this chapter, were born in 1982 (excluding Pamela H. from Walton as an error), but the backing of /o/ in phonetic space originated well before that: if we restrict the Inland North fringe sample only to the 23 speakers born before 1982—that is, before the merger has any direct effect on the judgments of sampled speakers—the correlation of F2 of /o/ with year of birth is still relatively strong and statistically significant ($r^2 \approx 0.25$; $p < 0.02$; adding gender to the regression pushes adjusted r^2 up to approximately 0.43). That means that by 1982, roughly speaking, the backing of /o/ had already been in progress for some time before speakers' minimal-pair judgments had begun to be affected by it. So if we interpret what is happening in the Inland North fringe as the expansion of the *caught-cot* merger by diffusion, then that implies that the effect of the diffusion of merger need only be a sound change in the direction of merger; the merger itself may begin to take place in perception some time later. While this does not prove that the backing of /o/ in the Inland North core (or

fringe, for that matter) is caused by geographical expansion of the merger from neighboring areas, it does indicate that that interpretation is possible.

The presence of the backing of /o/ in the Inland North core in New York State but not in the western component of the Inland North may suggest that that backing is in fact the result of expansion of the merger. Both the Inland North core of New York State and the western component, as shown in Map 5.23, are directly adjacent to two other regions that might be a source of diffusion of the *caught-cot* merger, namely Canada and Western Pennsylvania. However, there is some reason to believe that the Inland North component in New York State should be more likely to be subject to diffusion from these regions than the western component is.



Map 5.23. The Inland North in *ANAE*, showing its two components and their points of contact with Canada and Western Pennsylvania.

To begin with, the Upstate New York component is simply *smaller* than the western component, having at most 24,000 square miles to the western

component's at least 60,000 square miles.[18] This means that the communities in the New York component are simply on average *closer* to fully-merged regions than are communities in the western component. Geneva is probably one of the most distant communities in Upstate New York from fully-merged regions collectively, being located approximately 110 road miles from the Canadian border to the west, 150 from the Canadian border to the north, 225 from Vermont to the east, and 150 from Clinton County, Penna., to the south[19]; it seems fairly clear that no place in the Inland North core or fringe in New York State is more than about 150 miles from at least one fully-merged region. By contrast, for example, Chicago, Ill. is about 250 miles from the Upper Peninsula of Michigan, and about 300 from the Canadian border at Detroit, the two closest merged regions. So to the extent that diffusion of linguistic features is more likely to take place over shorter geographic distances, we would expect the New York component of the Inland North, considered as an entire region, to be more subject to diffusion of the *caught-cot* merger than the western component.

Moreover, the larger merged cities are also closer to New York State than to the western component overall. The major Canadian metropolitan areas of Toronto, Ottawa, and Montréal are all closer to the New York State than to the western component; and Pittsburgh, the major city of Western Pennsylvania, is at best about equidistant from the two halves of the Inland North. So to the extent that linguistic changes are most likely to diffuse from major cities than from

[18] The figure of 24,000 includes the area inside the eastern brown isogloss on Map 5.23; that is an overestimate, in that it includes Scranton, Penna., which by the standard used in this dissertation would not be considered part of the Inland North core. The figure of 60,000 excludes the parts of Iowa and Minnesota included in the western brown isogloss; *ANAE* does not formally include Iowa and Minnesota in the Inland North proper in most contexts.
[19] Clinton County is the nearest county to Geneva within the isogloss of *caught-cot* merger shown by Labov (1994:315).

smaller communities, New York State again seems more likely to be subject to diffusion of the *caught-cot* merger than the western component is. And finally, the same applies insofar as changes are more likely to diffuse from larger communities to smaller communities than vice versa: Pittsburgh is substantially larger than Buffalo (which is the largest city in Upstate New York), but smaller than Cleveland, Ohio, the nearest city in the western component, so the direction of diffusion is more likely to be from Western Pennsylvania to Upstate New York than from Western Pennsylvania to the western component of the Inland North.

Now, the argument in the foregoing paragraphs that the backing of /o/ seen in the Inland North core is the result of expansion of the influence of the *caught-cot* merger from neighboring regions is somewhat sketchy. It might, of course, simply be the case that the backing of /o/ originated in Upstate New York for independent reasons, irrespective of the presence of full merger in adjacent regions, and that the reason the same thing did not occur in the western component is merely that, despite their shared NCS and settlement history, the eastern and western Inland North components are disjoint regions in the present day without a particularly great deal of interaction. It will be argued below, however, that even if the backing of /o/ is an independent development of the Upstate New York component of the Inland North core, it still serves as evidence that the Inland North's supposed "stable resistance" to the effects of Herzog's Principle is an overstatement.

5.3.5. The Hudson Valley

The Hudson Valley core was defined in Chapter 4 as the region near the Hudson River which shows direct phonological influence from New York City. Based on the analysis of /æ/ patterns, the two cities in the current sample that were included in that region were Poughkeepsie and Schenectady. With respect to low-back vowel patterns, however, only Poughkeepsie is included: as mentioned earlier in this chapter, every analyzed speaker in Poughkeepsie has mean F1 of /oh/ less than 700 Hz, which is sufficient to classify the city as part of *ANAE*'s "raised /oh/" region of resistance to the *caught-cot* merger. Both analyzed speakers in Schenectady, however, have mean F1 of /oh/ greater than 700 Hz, so for purposes of studying /oh/ and /o/, Schenectady should not be included in the same category as Poughkeepsie. Thus in this chapter, Schenectady will be excluded from consideration as part of the Hudson Valley core. Within Poughkeepsie alone—and within Poughkeepsie plus the two Telsur speakers from Albany, the other known Hudson Valley core community—there is no apparent-time movement in F1 or F2 of /o/ or /oh/ or in the Cartesian distance between them ($p > 0.3$ for all correlations). So at least the raised /oh/, unlike the NCS fronting of /o/, seems to be doing its job in preventing the influence of the *caught-cot* merger.

The remainder of the Hudson Valley—we may as well call it the Hudson Valley "fringe"—is a bit harder to describe, inasmuch as it is a region that is defined negatively: that is to say, it is defined merely as the region where there is not strong evidence in the data for raised /oh/, NCS, or *caught-cot* merger in

perception. That means it is not necessarily the case that the communities assigned to the Hudson Valley fringe form a coherent dialect area that can be characterized by unified sound changes. It is likely that some of the communities classified as Hudson Valley fringe communities would have been characterized as Inland North fringe communities if either somewhat more data had been collected from them or slightly different arbitrary standards had been used in defining the classifications used in the current research; they might in actuality best be described as transitional.

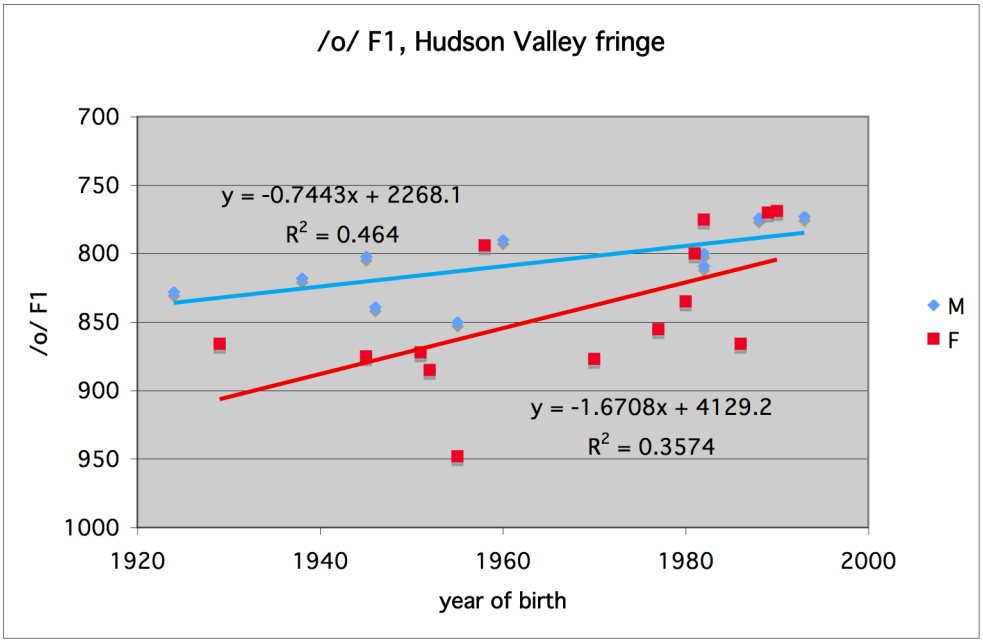


Figure 5.24. Raising of /o/ in apparent time in the Hudson Valley fringe (Amsterdam, Oneonta, Cobleskill, Fonda, Saratoga Springs, and Schenectady), by gender.

Using this definition of the region, but keeping in mind the caveats described in the foregoing paragraph, we find that the Cartesian distance between /o/ and /oh/ is decreasing in apparent time in the Hudson Valley fringe ($r^2 \approx 0.25$, $p < 0.02$; no significant effect of gender). Both raising and backing of /o/ appear to be involved: both formants of /o/ are significantly

correlated with year of birth, while both formants of /oh/ are not. The raising of /o/ is a male-led change, as shown in Figure 5.24; a regression analysis shows that men in the Hudson Valley fringe have F1 of /o/ about 39 Hz lower than women of the same age (combined adjusted $r^2 \approx 0.34$; $p < 0.03$ for each). The backing of /o/ ($r^2 \approx 0.18$; $p < 0.05$) has no significant gender difference; it is shown in Figure 5.25.

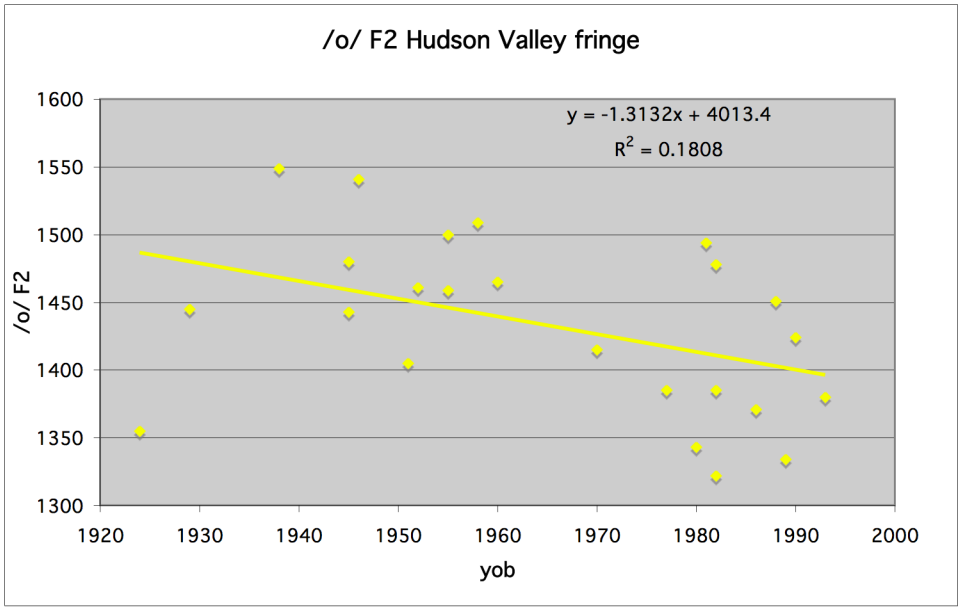


Figure 5.25. Backing of /o/ in apparent time in the Hudson Valley fringe.

Although the collection of communities included in the Hudson Valley fringe is, as noted above, relatively miscellaneous, there are two well-sampled cities—namely Amsterdam and Oneonta—whose inclusion in the Hudson Valley is fairly secure. In these two cities the movement of /o/ in apparent time is more robust than in the region as a whole: only slightly more robust for F1, but extremely so for F2 ($r^2 \approx 0.54$; $p \approx 0.001$). The other four communities assigned to the Hudson Valley fringe, to the extent that it is possible to treat them as a unit, do not appear to be participating in the backing of /o/; in fact, they show a weak

(and not statistically significant: $r^2 \approx 0.1$) correlation in the *opposite* direction, towards fronter /o/ in apparent time. The raising of /o/ in F1 is not statistically significant when restricted to these four communities either, although the correlation is at least in the right direction.

The backing of /o/ in Amsterdam and Oneonta is led by women, as it is in the Inland North fringe; in a multiple linear regression, women have /o/ about 51 Hz backer than men ($p < 0.05$; combined adjusted $r^2 \approx 0.54$). So the apparent behavior of /o/ in Amsterdam and Oneonta consists of a gradual trend toward raising, possibly led by men[20], accompanied by a sharper backing, led by women. The absence of clear movement in /o/ in the data from the other communities assigned to the Hudson Valley fringe reinforces the impression that the dialectological affiliation of these other communities is for the most part ambiguous, or at least not fully determinable from the data.

5.3.6. Sudden sound change?

Above it was noted that the apparent-time movement of F2 of /o/ in the North Country resembled a sudden drop more than a gradual change: all speakers born later than 1988 had /o/ backer in F2 than all speakers born earlier than 1988, with no overlap and no detectable apparent-time change on either side of the 1988 cutoff. This sudden change was interpreted as representing a categorical change in the phonological representation of /o/, from an unrounded to a rounded phoneme.

[20] The trend toward raising of /o/ is still present when the data is restricted to Amsterdam and Oneonta; however, the gender effect loses its statistical significance ($p > 0.15$).

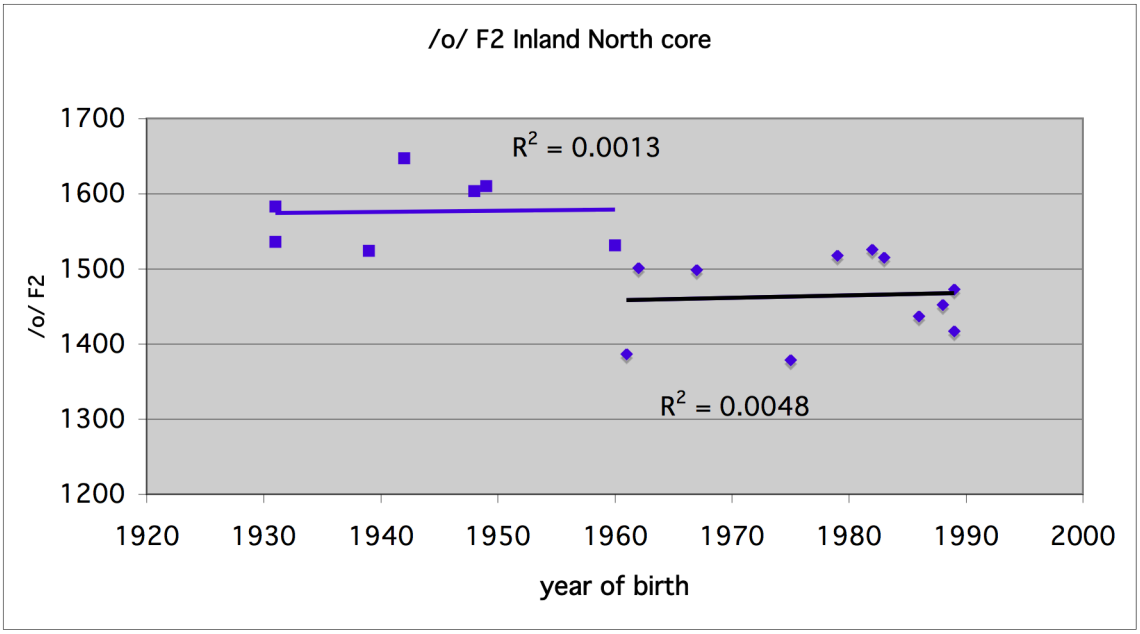


Figure 5.26. F2 of /o/ in the Inland North core, as in Figure 21 above, split into two apparent-time halves between 1960 and 1961, with no correlation between F2 and age in either.

Unexpectedly, a similar pattern in F2 appears in each of the other three sets of communities in which /o/ is backing in apparent time, in which few or no speakers have full merger in minimal-pair judgments. It is the clearest in the Inland North core, as shown in Figure 5.26 (including, again, both the Inland North core speakers of the current sample and the Inland North speakers in Upstate New York from the Telsur corpus). The seven speakers born in 1960 or earlier all have F2 of /o/ between 1524 Hz and 1647 Hz, while the eleven speakers born in 1961 or later all have F2 between 1379 Hz and 1526 Hz: the two halves of the sample overlap by only 2 Hz in range, and differ by 112 Hz in mean; and within either half there is no correlation between F2 and year of birth.[21] Treating age merely as a binary variable—born in or before 1960 versus

[21] Putting the break between 1950 and 1959, rather than between 1960 and 1961, yields a similar result; the overlap in F2 ranges is marginally larger—7 Hz rather than 2 Hz—and in this case the

born later than 1960—accounts for the variation in F2 better than treating age as a continuous variable ($r^2 \approx 0.56$ for the binary age variable versus $r^2 \approx 0.40$ for a continuous age variable).

The difference between the older and younger halves of the apparent-time range is remarkably similar to the difference between the speakers born before and after 1988 in the North Country. In both regions, the speakers older than the cutoff point have mean F2 of /o/ about 120 Hz greater than the younger speakers. In each region, speakers on either side of the cutoff point have a standard deviation in /o/ F2 of about 50 Hz, and the highest F2 among younger speakers differs from the lowest among older speakers by only a few hertz. These similarities are summarized in Table 5.27: the Inland North core and North Country differ a great deal in the apparent-time date of the sudden F2 change, and in what the actual F2 values are; but they resemble each other with respect to the relationship between the older and younger speakers' F2 of /o/.

Table 5.27. Comparison of the distribution of F2 /o/ before and after a seeming cutoff point of sudden apparent-time change in the Inland North core and North Country.

	Inland North core	North Country
cutoff year	1960	1988
older speakers' mean	1576 Hz	1381 Hz
younger speakers' mean	1464 Hz	1253 Hz
diff. btw older & younger means	112 Hz	128 Hz
older speakers' st. dev.	47 Hz	46 Hz
younger speakers' st. dev	53 Hz	45 Hz
diff. btw highest young & lowest old	+2 Hz	–11 Hz
r^2 for binary age variable	0.56	0.67
r^2 for continuous age variable	0.40	0.29

oldest six speakers have if anything a trend toward *fronting* of /o/ (though not a statistically significant one given the sample size) which is interrupted by the sudden leap back around 1960.

In the North Country, the sudden change in F2 around 1988 was explained as being the result of a categorical shift of /o/ from rounded to unrounded. Despite the strikingly similar apparent-time profile of the sudden change in F2 around 1960 in the Inland North core, it's hard to come up with a comparably satisfying phonological explanation for it. There is no clear structural difference between younger and older Inland North core speakers' vowel systems, or the relationship of /o/ to the other vowels in them. For example, all 18 speakers are subject to the NCS, and have either triangular vowel systems (as discussed in Chapter 4) or quadrilateral systems with /o/ and /oh/ as the two low vowels instead of /æ/ and /o/. There are speakers with both positive and negative EQ1 indices among both the older and younger groups; the same is true of both triangular and low-/oh/ quadrilateral vowel structures. From viewing the speakers' vowel systems holistically, it is not immediately obvious that the younger speakers have consistently backer /o/ than the older speakers; it only becomes evident when the /o/ data is isolated as in Figure 5.26. For this reason, it is tempting to dismiss the apparent suddenness in the backing of /o/ as merely an odd but accidental characteristic of the data. Nevertheless, the notion of sudden backing of /o/ is also supported, though weakly, in the Inland North fringe and the Hudson Valley fringe.

As Figure 5.28 shows, there is a gap in apparent time in the sample of Oneonta and Amsterdam; no speakers born between 1961 and 1976 were interviewed in either city. That leaves two age clusters in the Amsterdam and Oneonta sample: seven older speakers, born between 1945 and 1960, and nine younger speakers, born between 1977 and 1993. The contrast between these two

age clusters' F2 of /o/ is relatively sharp, and reminiscent of the contrast between the age clusters of the Inland North core and the North Country: the difference between the older and younger speakers' mean /o/ F2 is 103 Hz; the standard deviation within each age cluster is approximately 42 Hz; and there is no hint of backing in apparent time within either cluster. The two clusters have a fairly small overlap in /o/ F2—all of the younger speakers have F2 of 1451 Hz or less, while all of the older speakers except one (Marilyn R. from Amsterdam, who was born in 1951 and has mean /o/ F2 of 1405 Hz) have 1461 Hz or more. To put it another way, the overlap between the older and younger speakers only occupies a range of about 50 Hz.

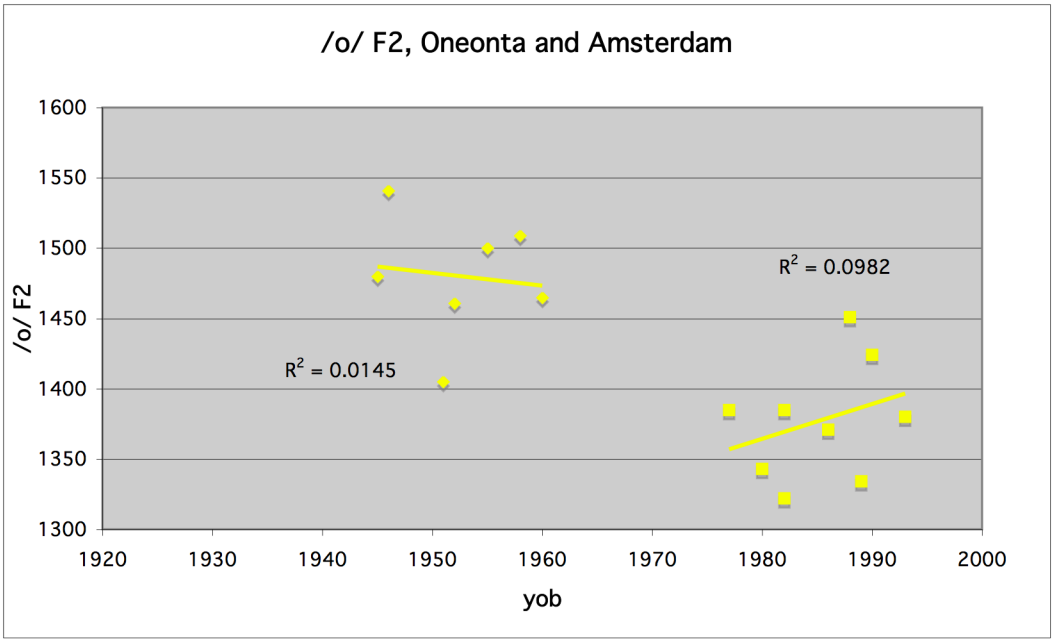


Figure 5.28. F2 of /o/ in Amsterdam and Oneonta, split into two apparent-time halves.

Obviously the large gap in the apparent-time distribution of the sample prevents us from concluding that there was a sudden F2 change here the way there appears to have been in the Inland North core or the North Country; it may

be that if speakers from that missing decade and a half had been sampled, their /o/ would show a gradual transition between the older and younger age groups of the actual data. However, the distribution of /o/ F2 within and between the two age groups in the actual data is similar to the distribution of /o/ F2 in and between the age groups in the regions in which a sudden change is seen. Moreover, for the data as it exists, treating age as a binary variable (i.e., merely comparing the older cluster to the younger cluster) accounts for the variation in F2 better than a continuous linear correlation with year of birth does ($r^2 \approx 0.62$ for a binary variable versus $r^2 \approx 0.45$ for the continuous age correlation).

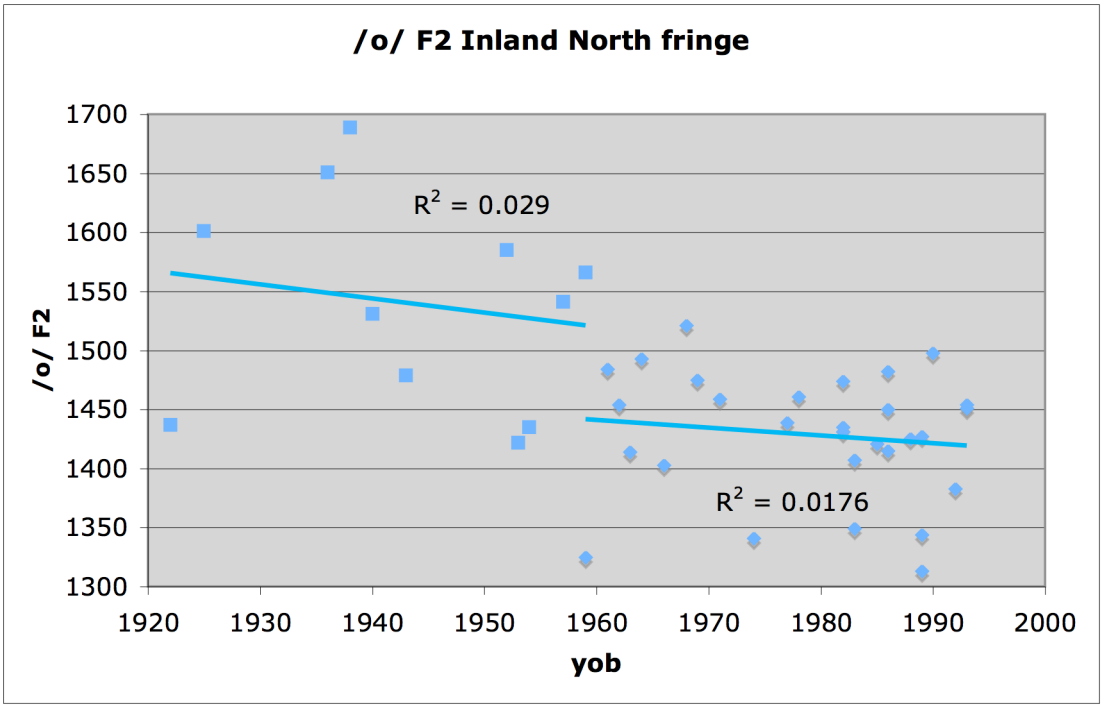


Figure 5.29. F2 of /o/ in the Inland North fringe, split into two apparent-time halves in 1959, with no correlation of F2 and age in either half.

The Inland North fringe also displays some evidence for relatively sudden backing of /o/, as displayed in Figure 5.29. Here there is substantial overlap in F2 range between the older and younger groups because there is greater overall

variability in backness of /o/—speakers born later than 1959[22] range from 1313 Hz to 1521 Hz, while older speakers range from 1422 to 1689. However, the difference between the means of the older and younger speakers is 111 Hz, roughly the same as the difference between the older and younger F2 means in the Inland North core, the Hudson Valley fringe, and the North Country.

So yet again, the entire range over which F2 of /o/ varies seems to have suddenly shifted backward by slightly more than 100 Hz, with no correlation between F2 and year of birth on one side of the jump or the other. Again, modeling the effect of age as a simple binary opposition between older and younger speakers accounts for more of the variation in /o/ ($r^2 \approx 0.38$) than does modeling F2 as a linear function of year of birth ($r^2 \approx 0.33$). In the Inland North fringe, the issue is confused somewhat by the undersampling of women in the older age group; however, restricting this analysis to male speakers yields substantially comparable results: a difference between older and younger speakers of 128 Hz; better r^2 from binary than continuous age variable (this time 0.65 versus 0.56); no correlation between year of birth and F2 on either side of the 1959 line ($r^2 < 0.09$ for both).

In the Inland North fringe, like the Inland North core, there is no clear phonological correlate of the sudden-seeming phonetic change. Younger

[22] Selecting the point in apparent time to split the sample is slightly tricky: there are two Inland North fringe speakers whose year of birth is coded as 1959, of whom one (Dan L. from Ogdensburg) has a relatively front /o/ at 1566 Hz, and the other (Betty C. from South Glens Falls) has a relatively back /o/ at 1325 Hz. However, whereas Betty C. stated that she was born in 1959, what Dan L. said—in his interview on August 20, 2008—was that he was 49 years old. Given this, there is a 36% chance that Dan was actually born in 1958, which adds up to an 80% chance that he is older than Betty C. Based on that, it seems arguably justified to place the apparent-time division between Dan and Betty; doing so creates the sharpest division in F2 between older and younger speakers, and that is the division I use in this discussion. Including Dan L. in the younger group, however, would not substantially change the character of the results here.

speakers are no less likely than older speakers to have triangular vowel systems or to exhibit NCS features, and no change in the relationship of /o/ to other vowels is suggested by impressionistic examination of the vowel charts of Inland North fringe speakers. In Oneonta, and perhaps to a lesser extent Amsterdam, the younger speakers are in fact more likely to have quadrilateral vowel systems and the older speakers triangular systems.

Because of gaps in the apparent-time distribution of the data, it is not possible to identify the date of the "sudden" backing of /o/ with equal precision in all regions. In the North Country, 1988 is clearly the only possibility; and in the Inland North fringe, 1959 gives the best results. In Amsterdam and Oneonta, the break could be anywhere between 1961 and 1976; in the Inland North core, a break between 1960 and 1961 gives the cleanest results, but it could be placed as early as 1950 without changing much. However, outside the North Country,[23] a date within one or two years of 1960 works for all of them. This suggests that it is possible that this sudden backing of /o/ occurred essentially simultaneously in all parts of Upstate New York where the *caught-cot* merger was not already substantially in progress. If we do not assume the backing of /o/ occurred simultaneously throughout the state, then it must have happened first in the Inland North core and last in the Hudson Valley fringe—much in the same way that it was conjectured Chapters 3 and 4 that the NCS *fronting* of /o/ diffused from the Inland North core to the fringe and the Hudson Valley.

[23] A previous discussion of this data (Dinkin 2008b) suggested a sudden backing around 1960 in apparent time in the North Country also. However, that analysis grouped Telsur speakers in western Massachusetts and in Scranton, Penna., who also showed transitional minimal-pair judgments, with North Country speakers as a general category of "communities where the *caught-cot* merger is well in progress". This is unsupportable on strict dialectological grounds, however, and the data from the North Country alone is not sufficient to show a sudden change in /o/ around that apparent time if it does exist.

A phonological reason, if any, for the suddenness of the backing of /o/ is difficult to think of. As noted above, it appears to correlate with a shift from triangular to quadrilateral vowel systems in the Hudson Valley fringe, but not in the Inland North. The possibility must be entertained that the backing of /o/ was in fact not a sudden categorical change but a gradual change that appears sudden in the apparent-time data. As Labov (2001:449) notes, the linear correlation between year of birth and progression of sound change is an oversimplified model; "many convergent findings indicate that linguistic change follows a logistic progression… in which change starts out slowly, reaches a maximum rate at mid-course, and slows down again asymptotically at the end." The apparent sudden change in /o/ in apparent time in Upstate New York may well be merely a manifestation of a continuous logistic change with messy data.

With a sufficiently fast (albeit gradual) slope of change, and variation or error within the data that is sufficiently large relative to the magnitude of the change, a change that follows a logistic curve can end up looking like a sudden change between earlier and later segments, with no discernable change within either segment. Figure 5.30 displays a simple example of a logistic curve with noise looking like a sudden change in the same way as the data on /o/-backing from Upstate New York looks like a sudden change. So what we are dealing with here may not actually be a sudden phonological change, but a gradual phonetic change whose progress is obscured by its rapidity, by gaps in the apparent-time coverage of the data, and by other sources of variation. In fact, inasmuch as no consistent direct phonological correlates of the backing of /o/ are apparent, it seems more likely that it originated as a rapid but gradual change throughout

Upstate New York, which ultimately caused a reorganization from triangular to quadrilateral vowel organization in Oneonta and Amsterdam, rather than as a discrete phonological change from the beginning.

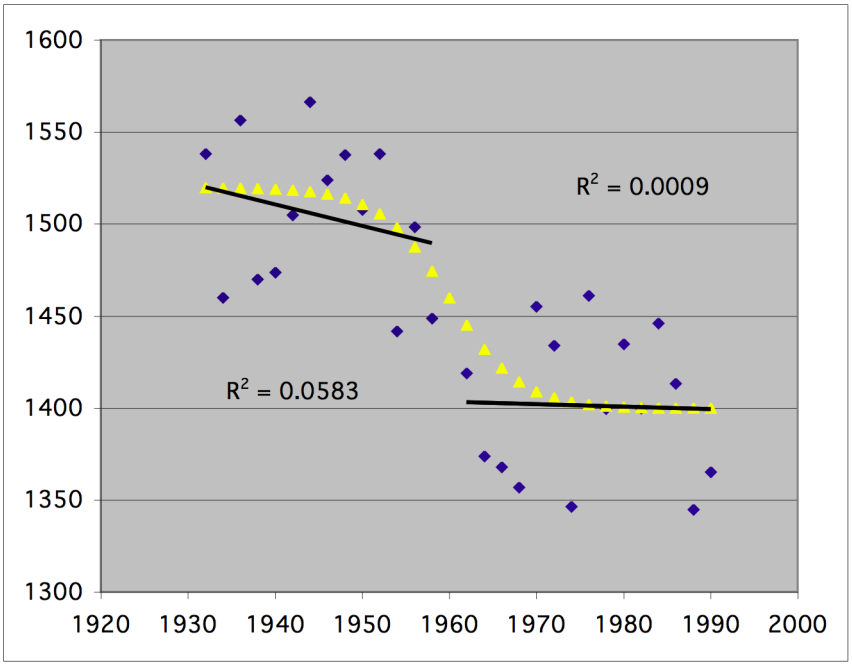


Figure 5.30. A schematic representation of how a gradual change on a logistic curve can appear sudden in apparent time with noisy data. The yellow triangles represent a hypothetical logistic curve from 1520 Hz to 1400 Hz, crossing the midpoint in 1960, with a slope of –0.25. The blue diamonds represent the same logistic curve plus a random error between –60 Hz and +60 Hz. The segments before 1960 and after 1960 show little overlap and no independent apparent-time correlation even though the change is gradual, because the data is noisy and the change is rapid.

It is not necessary, however, for the change in F2 of /o/ to actually have been sudden in order for us to learn something from it. Whether gradual or discrete, we see basically the same change in /o/ either occurring simultaneously or near-simultaneously in three different regions, or occurring first in the Inland North core, from which a change in /o/ (i.e., the NCS /o/-fronting) is already known to have diffused to the others. That suggests that the backing of /o/ in all of these regions is a single phenomenon, rather than having originated independently in each of them.

The three regions being considered here—the Inland North core and fringe and Hudson Valley fringe—differ in their degree of participation in the NCS, as has been well established in Chapters 3 and 4. In the Inland North core, all speakers sampled show robust effects of the NCS; in the Inland North fringe, participation in the NCS is more variable and there is evidence that the NCS diffused there rather than arising there naturally; in the Hudson Valley fringe, /o/ is fronted and /e/ is backed, but substantial raising of /æ/ is not found. Although /o/ may not be as front in the Hudson Valley fringe as it is in the Inland North regions, it still seems front enough to fall into *ANAE*'s category of resistance to the *caught-cot* merger: six of the seven speakers in the older cluster in Figure 5.28 above have F2 of /o/ fronter than 1450 Hz, which is the criterion used in *ANAE* to identify the North as a region of resistance.

The findings of this section, however, suggest that the apparent resistance to the spread of the merger identified by *ANAE* in the Inland North is really an illusion. Having /o/ fronter than 1450 Hz is not sufficient to prevent a sound change that narrows the distance between /o/ and /oh/ in Amsterdam and Oneonta; having /o/ fronter than 1450 Hz *in conjunction with other NCS sound changes* is not enough to prevent it, as in the Inland North fringe; and *having the entire NCS chain-shift structure* is not enough to prevent it, as in the Inland North core. In fact, if anything, the backing of /o/ took place *first* in the Inland North core—the region which the *ANAE* analysis seems to suggest should be the most resistant to backing of /o/, because the entire phonological system ought to be organized in a way that reinforces the frontness of /o/. So if even the part of the Inland North that ought to be most resistant to *caught-cot* merger can be subject

to a rapid backing of /o/ towards /oh/, it seems that neither the frontedness of /o/ alone nor the NCS as a general phonological system is capable of preventing the progress of the *caught-cot* merger.

Strictly speaking, we have not actually established that the reason for the backing of /o/ in Upstate New York is the expansion of the *caught-cot* merger. It is still conceivable, after all, that the backing of /o/ might have originated independently in the New York State component of the Inland North core, with no particular influence from merged communities; Labov (to appear) points out that low vowels have been relatively free to move back and forth between relatively front and relatively back positions at multiple times throughout the history of English with no particular external stimulus. However, even if that is the case, then the fact that /o/ is free to rapidly move back 120 Hz basically of its own accord in the Inland North would seem to undermine anyhow the idea that the Inland North's fronted /o/ is supposed to be able to resist influence from the *caught-cot* merger: if /o/ is able to be moved back *without* even the effect of diffusion from merged communities, surely it should be even *more* susceptible to backing when there is direct influence from the merger. So we can conclude from this that *ANAE*'s characterization of the Inland North as a region that resists the *caught-cot* merger was somewhat rash: rather than having a phonological system that actively *resists* the merger, it was merely a region that, as of the Telsur data set, had not happened to be directly influenced by the merger *yet*. In any event, the next section will display more direct evidence for ongoing *caught-cot* merger in Upstate New York beyond the North Country.

5.4. Phonological transfer before preconsonantal /l/

5.4.1. Mechanisms of merger

Herold (1990) discusses two mechanisms by which merger can take place, and introduces a third herself. These three mechanisms are as follows:

- **Merger by approximation**. The two phonemes which are in the process of merging move toward each other in phonetic space gradually over time via regular phonetic change; the merger is completed when the phonetic distance between the two original phonemes gets sufficiently close to zero.
- **Merger by transfer**. Individual words that historically contained one of two phonemes begin one at a time to be pronounced with the other. The merger is completed when all of the words from one class have been moved to the other.
- **Merger by expansion**. This third type of merger, discovered by Herold in Tamaqua, Penna., goes to completion very rapidly. Whereas in merger by approximation the contrast between the two phonemes remains while the merger is in progress up until they are too close in F1/F2 space to be discriminated, and in merger by transfer the contrast remains as long as at least one word remains in each category, in merger by expansion the phonemic contrast is lost immediately, and all the words with either historical phoneme come to be distributed across the entire region of phonetic space formerly occupied by both of them.

Labov (1994) states that mergers that proceed by approximation are most likely to be those that occur as the result of general principles of vowel movement, whereas mergers by transfer are likely to be the result of change from above the level of consciousness, away from a phonemic contrast that is not made in the standard language. Herold suggests that merger by expansion can be attributed to a sudden large increase in contact with speakers who do not have the contrast.

These three mechanisms of merger are not entirely independent; it is possible for two (or more) of these mechanisms to be involved in a single case of merger, or for one to evolve into another. For example, Johnson (2007) argues that, in communities on the Massachusetts–Rhode Island border, the *caught-cot* merger goes to completion suddenly once the proportion of children in a given community whose parents were natives of merging regions exceeds a certain threshold. The data he presents suggests that merger by approximation and merger by expansion are both involved in this process: the younger children in Seekonk, Mass. who have full merger have both older siblings and parents who consistently maintain the /o/~ /oh/ distinction, but the parents have /o/~/oh/ separated by a much wider distance in F1/F2 space than the older siblings do. So what appears to have happened in Seekonk is that the merger began to proceed by approximation sometime between the parents' generation and the older siblings' generation, but once the population of children with merged parents in the community had become sufficiently large, the younger siblings lost the distinction completely in a case of merger by expansion.

Herold (1990:53–54) mentions a variant form of merger by transfer that we may call **phonological transfer**, characterizing it as follows: "phonologically conditioned two-way transfer in which all words with a following /l/, for example, are transferred into the set of words pronounced with X, while words with a following /p/ are transferred into the Y set." In other words, rather than individual lexical items being transferred one at a time from one phonemic class to the other until the merger is complete, entire phonological classes are transferred simultaneously. While merger by transfer is in progress, the phonological contrast still exists, with in principle as great a phonetic distance between the two phonemes as it's always had; the same is true in cases of phonological transfer. In phonological transfer, however, the phonemic distinction is weakened because it no longer exists in certain contexts. For example, if all words with a following /l/ are transferred into phonological class Y, in Herold's example, phonemes X and Y are no longer contrastive before /l/—they have undergone a conditioned merger (which may, of course, continue on towards becoming a full merger by means of additional phonological transfer or any other merger mechanisms, but doesn't have to). Of course, phonological transfer is not the only route to conditioned merger. If a merger is in progress by approximation, then as Harris (1985:332, quoted by Herold) puts it, "some allophonic subsets of a particular phoneme may show a greater propensity than others for overlap with allophones of a neighbouring phoneme". In other words, if two phonemes are approaching each other through regular phonetic change, then if a certain phonetic environment is most

advanced in the change in both directions, the phonemes will merge in that phonetic environment first.

In Bermúdez-Otero (2007)'s model of the life cycle of phonological change, the relationship between (conditioned) merger by phonological transfer and merger by approximation is clear: phonological approximation is merely the result of phonological restructuring of the phonetic subregularities of the gradual phonetic approximation. To unpack that: in a case of merger by approximation, or any other gradual phonetic change, some phonetic environments will be somewhat more advanced in the change, and others somewhat less advanced; the position of each allophone within the general distribution of the phoneme in phonetic space is, in Bermúdez-Otero's words, "exquisitely sensitive to a broad range of properties of its phonetic environment". Let us suppose, as in Herold's example, that the closest allophone of phoneme X to Y in phonetic space is the allophone before /l/— for the sake of concreteness, let's suppose that that Y is backer than X and thus X's allophone before /l/ is the backest allophone in X's phonetic distribution. If this phonetically gradient rule should undergo what Bermúdez-Otero terms restructuring, it will become a discrete phonological rule: instead of the pre-lateral allophone of X being merely the backest part of the phonetic range of X, it will move to a distinct position in phonetic space, represented by a different set of phonological features. And if X and Y are sufficiently close, that set of phonological features may simply be the features of Y, so the words that formerly contained the allophone of X before /l/ now contain the allophone of Y before /l/. This all seems fairly trivial, but it actually makes two concrete predictions about the behavior of allophones in a case of

merger by phonological transfer. First, a phonetic environment in which merger by phonological transfer occurs will be one in which, before restructuring, the allophones of the original phoneme were closest to merger already—e.g., if X before /l/ has merged into Y by phonological transfer, then prior to the phonological transfer the allophones of X before /l/ must already have been the closest allophones to Y in phonetic space. And second, after phonological transfer has taken place, there will be no distinction within the phonetic distribution of the target phoneme between tokens of the two historical phonemes—e.g., words that originally contained X before /l/ will appear among the other tokens of Y before /l/, not necessarily on the side of Y's phonetic extent closest to X.

According to *ANAE*, the *caught-cot* merger is more advanced in North American English as a whole before /n/ than in the other environments tested by the Telsur project; but it does not state whether the merger before /n/ takes place by means of approximation or phonological transfer. The apparent-time movement of /o/ found in the previous section suggests that the *caught-cot* merger in Upstate New York is proceeding by approximation. In this section, however, I will examine the role of phonological transfer in the merger.

5.4.2. Definition and motivation of (olC)

Earlier in this chapter, a few speakers whose /o/~/oh/ distributions were presented in detail were seen to have tokens of the word *revolve*, which historically and according to dictionaries contains /o/, among tokens of /oh/.

The /o/~/oh/ chart of one such speaker, Jess M. from Ogdensburg, is reproduced in greater detail as Figure 5.31. As Figure 5.31 shows, Jess M. has two tokens of expected /o/ within her phonetic distribution of /oh/: *revolve* and *Ogdensburg*. As mentioned above, according to *ANAE* (p. 58) "extensive dialect variation" exists with respect to which words with historical /o/ still contain /oh/, with marked lexical inconsistency; so *Ogdensburg* seems like a likely candidate for an individual lexical transfer, and there is little that can be said about it given the absence of other tokens of either /o/ or /oh/ before /g/ in Jess's sample.

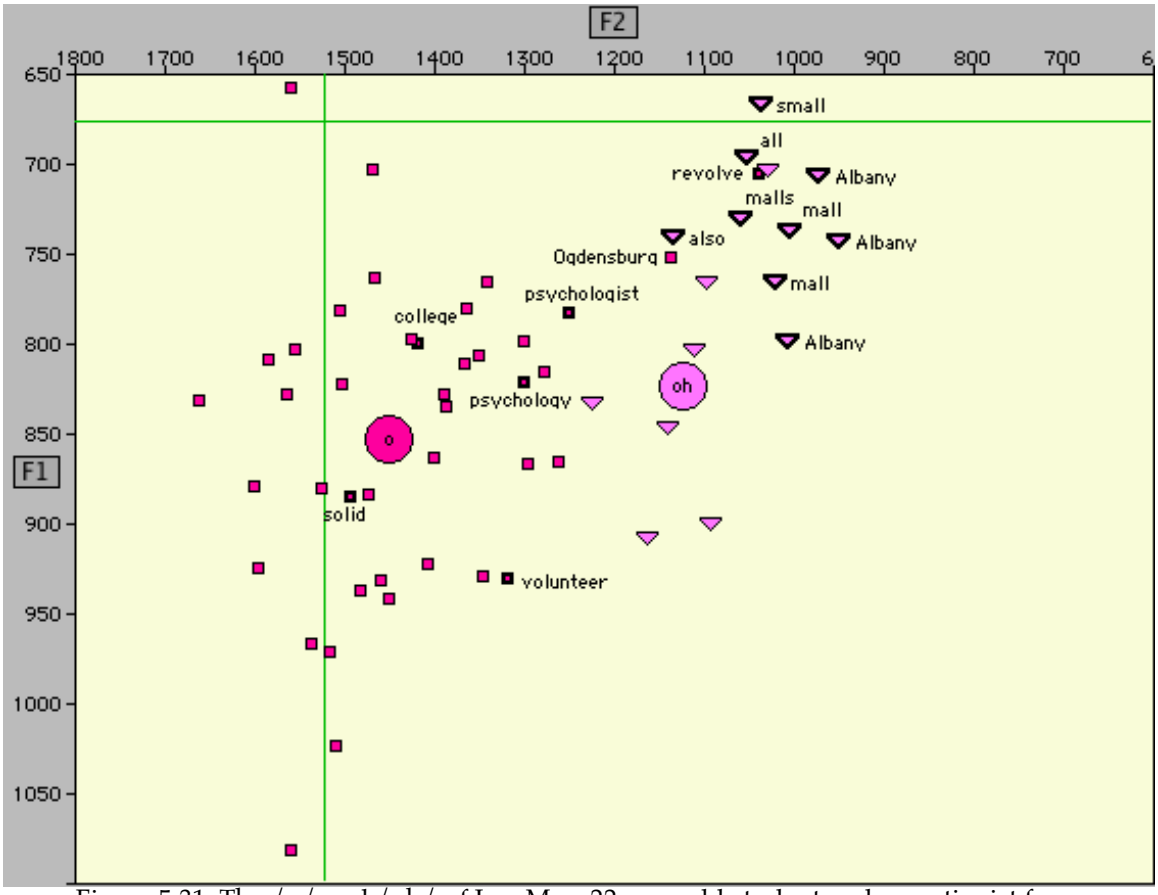


Figure 5.31. The /o/ and /oh/ of Jess M., a 22-year-old student and receptionist from Ogdensburg, highlighting tokens before /l/.

However, *revolve* is a likely case for phonological transfer. It satisfies both of the expected allophonic criteria for phonological transfer mentioned at the end of the previous subsection: First, the position before coda /l/ is an environment which produces back allophones of many vowel phonemes, as is documented thoroughly in *ANAE* with respect to /ow/ and /uw/ in particular, so it is to be expected that a word like *revolve* would be among the backest tokens of /o/ if it were to be among tokens of /o/ at all. And second, *revolve* is quite clearly found among a large cluster tokens of /oh/ before /l/—some word-final, such as *all* and *small*, and some preconsonantal, such as *Albany*—and not at all close to other tokens of /o/, whether before /l/ or otherwise; indeed, *revolve* is among the highest and backest /oh/ tokens. It would be implausible to claim that this high, back *revolve* merely contains an extremely high and back token of /o/; everything about its phonetic position suggests that *revolve* contains /oh/ for Jess M. So the phonetic environment of *revolve* is a good candidate in which to look for merger in progress by phonological transfer. For Jess M. at least, /o/ before intervocalic /l/ does not become /oh/: *solid*, *college*, *volunteer*, and *psychology* all clearly have /o/, not /oh/. So the environment of interest is specifically a following preconsonantal /l/[24], which we can refer to by the notation (olC).

The sample contains a total of 86 tokens of (olC). This includes fully 53 tokens of *revolve*, which was used as a wordlist item in several of the communities studied. It also includes three tokens of *resolve* and one of *evolve*

[24] Word-final /l/ is not considered in the present analysis because only one word containing /o/ before word-final /l/ (namely *doll*) was produced by any of the speakers sampled; it was included in the formal methods in Oneonta and Watertown. Several speakers appear to have /oh/ in *doll*, but inasmuch as there are no other words with /o/ before word-final /l/ in the data, it is not strictly possible to tell if this is the result of phonological transfer or individual lexical transfer.

(each of them a misreading of the wordlist item *revolve*), eleven of *involved*, two of *involvement*, 14 of *golf*, and one each of *involving* and *volcano*.[25] *Revolve* was a wordlist item in eight communities—Canton, Cooperstown, Ogdensburg, Oneonta, Plattsburgh, Poughkeepsie, Sidney, and Watertown—and therefore we have at least one (olC) token from each in-person interview subject in each of those communities (including Kerri B. from Morrisonville, who was interviewed in Plattsburgh), and can get a relatively clear picture of the status of the variable in them. In addition, between one and three speakers produced at least one token of (olC) in each of Amsterdam, Cobleskill, Glens Falls, Gloversville, and Utica.

For each token, we can judge whether it remains /o/ or has been transferred to /oh/ based on whether it appears among other tokens of /oh/ before /l/, and/or higher and backer than the mean /oh/. If (for instance) *revolve* appears lower and fronter than mean /oh/ and relatively close to other tokens of /o/, while most tokens of /oh/ before /l/ are higher and backer than the mean, *revolve* will be considered to still contain /o/. Speakers for whom the *caught-cot* merger is already complete, to the extent that the highest and backest tokens of /oh/ occupy the same area of phonetic space as those of /o/, are excluded.

[25] For all but one of these tokens, the consonant after /l/ is /f/ or /v/. Therefore it may be that the environment of interest here is not /ol/ before a consonant in general, but before a labiodental fricative in particular. The analysis of phonological transfer is obviously not affected by this choice.

5.4.3. Overall results

Of the 86 tokens of (olC), nine were produced by speakers who were judged to have the complete merger. Of the remaining 77, only 20 were identified as having been produced with /o/, and the results appear to confirm the hypothesis that the presence of /oh/ in (olC) words is the result of phonological transfer rather than the result of the transfer of individual lexical items. The three most frequent (olC) words in the sample, as noted above, are *revolve*, *golf*, and various inflected or derived forms of *involve*. Two of these share the morpheme *-volve*; the third is unrelated. As Table 5.32 shows, these three lexical items all have basically the same frequency of /o/ versus /oh/, plus or minus a single token. Thus neither lexical identity nor morphological identity has any effect on the likelihood of an (olC) word to be produced with /o/; the transfer from /o/ to /oh/ is phonologically regular.

Table 5.32. The frequency of /o/ vs. /oh/ in the most frequently occurring (olC) words, excluding fully merged speakers.

word	total tokens	total /o/	total /oh/	percent /o/
revolve	45	11	34	24%
golf	14	4	10	29%
involved etc.	13	3	10	23%

The twenty cases in which /o/ was used for (olC) include all eight tokens produced by natives of Poughkeepsie, over an apparent-time span from 1932 to 1993; so we can be confident that the phonological transfer of (olC) to /oh/ is not taking place in Poughkeepsie. The remaining twelve tokens of /o/ for (olC) are listed in Table 5.33. Two of the speakers listed in Table 5.33 produced (olC) words with both /o/ and /oh/: Pat S. from Amsterdam produced one token of

involved apparently with /o/ and one apparently with /oh/; and Larry R. from Oneonta produced *revolve*, *volcano*, and two tokens of *golf* with /oh/ but one token of *golf* with /o/.

Table 5.33. Speakers not native to Poughkeepsie who produced (olC) words with /o/.

speaker	community	year of birth	word(s)
Fred B.	Amsterdam	1945	*golf* (× 2)
Pat S.	Amsterdam	1955	*involved*
Monica M.	Canton	1938	*revolve*
Buck B.	Cooperstown	1926	*resolve*
Janet H.	Cooperstown	1950	*revolve*
Peg W.	Cooperstown	1957	*revolve*
Carol G.	Oneonta	1952	*evolve*
Larry R.	Oneonta	1946	*golf*
George S.	Sidney	1947	*involved, revolve*
Lisa S.	Sidney	1949	*revolve*

All speakers in Table 5.33 were born in 1957 or earlier. Even more strikingly, in every case but one, every speaker from a given community who produced (olC) with /o/ is older than every speaker who produced (olC) with /oh/. In other words, e.g., George and Lisa S. (a husband-and-wife pair) were the oldest two speakers interviewed in Sidney, and they both produced (olC) as /o/; all speakers younger than them from whom any tokens of (olC) were measured at all used /oh/. The same is true in all other communities except one in which both /o/ and /oh/ were found for (olC). The exception is Oneonta, in which Carol G., who produced *evolve* with /o/, is younger than Larry R., who produced four tokens of (olC) as /oh/. Larry did still produce one token of (olC) as /o/, so he is not *categorically* an exception to the otherwise absolute age difference found in (olC). What this suggests is that, at least in Oneonta, (olC) is variable between /o/ and /oh/ over some span of apparent time, but Larry R. is

the only speaker sampled in this city[26] who produced enough tokens for variation to appear.

Although it is hard to say anything about intra-speaker variation in (olC), inasmuch as only two speakers produced it, at least we can say that there is probably no effect of style on the choice of /o/ or /oh/ for (olC): 27% (thirteen) of the 49 word-list tokens of (olC) used /o/, as did a basically-identical 25% (seven) of the 28 spontaneously produced tokens.[27] Again, the intra-speaker variation cannot merely be attributed to lexical diffusion, where some words get shifted to /oh/ for some speakers while other words remain unshifted; the two speakers who show variation both show variation within an individual lexical item.

5.4.4. Phonological transfer by region

It is possible that the transfer of (olC) from /o/ to /oh/ is not related to the *caught-cot* merger, but is rather an independent phonological change—much as the transfer of /o/ before voiceless fricatives to /oh/ (as in *cross*) in the prehistory of American English cannot be considered to be evidence that the *caught-cot* merger was in progress at that time. Several facts, however, indicate that the transfer of (olC) in Upstate New York is indeed part of the merger in progress. Most obvious is the complete absence of /oh/ for (olC) in

[26] Keith M. from Sidney, born in 1958, produced five tokens of (olC), all /o/.
[27] It is conceivable, given that *golf* and *involve* were only produced spontaneously and *revolve* only in word-list style, that style and lexical identity interact in a manner that is invisible in the data. For example, the word *revolve* might strongly favor the use of /o/, while word-list style strongly disfavors it in a way the exactly cancels out the effect. I see no reason to take this possibility seriously.

Poughkeepsie, a Hudson Valley core community in which /oh/ is raised to have F1 less than 700 Hz for all sampled speakers and in which there is no evidence of backing of /o/ or narrowing of /o/~/oh/ Cartesian distance in apparent time.

On the other hand, of the regions where sufficient data exists to tell, the transfer of (olC) to /oh/ is the most complete in the Inland North fringe: no Inland North fringe speaker produced a single measured token of (olC) as /o/. And the Inland North fringe is, apart from the North Country, the region where the *caught-cot* merger is most advanced in perception, having six speakers with transitional minimal-pair judgments. In the North Country itself, only one speaker shows /o/ for (olC)—namely Monica M. from Canton, who is the oldest speaker in the North Country sample and apparently predates the *caught-cot* merger in the region, and who is from the one of the two well-sampled North Country communities where the merger is slightly less complete than the other. So the relative dialectological distribution of /o/ and /oh/ for (olC) suggests that the use of /oh/ is correlated with the influence of the *caught-cot* merger.

The apparent-time evidence points in the same direction: as far as the data indicates, the shift of (olC) to /oh/ appears to have gone to completion everywhere except Poughkeepsie sometime around 1960—roughly the same time that /o/ appears to have been moved back by about 120 Hz in several regions of Upstate New York.[28] The general patterns of correspondence in apparent-time and geographical distribution between backing of /o/, phonological transfer of (olC), and *caught-cot* merger in speakers' minimal-pair judgments suggests that they are all different reflections of the ongoing influence

[28] Note that the shift of (olC) to /o/ does not *contribute* to the backing of mean /o/; for the purposes of this dissertation, tokens before /l/ are disregarded in computing means.

of the merger, which is proceeding simultaneously by approximation and by phonological transfer.

In most communities, the transfer of (olC) is the most advanced of those three measures of progress of the *caught-cot* merger: the use of /oh/ in (olC) words is found among speakers born before the apparent-time /o/-backing cutoff and with no evidence of merger in their minimal-pair judgments. Cooperstown is an exception to this: of the five in-person interview subjects in Cooperstown, all of the three oldest, as listed on Table 5.33, used /o/ for (olC); while only Kelly R. (born in 1991) clearly had /oh/.[29] This is striking for a couple of reasons. First, in terms of its NCS scores in apparent time, Cooperstown appeared in previous chapters to be an Inland North fringe village in retreat from the NCS, which means that the older Cooperstown speakers should be less different from the Inland North fringe than the younger speakers. But all speakers sampled in the Inland North fringe proper, including four born before 1960, use exclusively /oh/ for (olC); the Cooperstown speakers from its period as an Inland North community, even those with NCS scores of three and four, differ sharply from that, using only /oh/.[30] The older Cooperstown speakers' retention of /o/ for (olC) is even more striking because the *caught-cot* merger is otherwise noticeably more advanced in Cooperstown than in the Inland North fringe—all of the four speakers in the Cooperstown sample born in 1983 or later have at least transitional minimal-pair judgments and Cartesian /o/~/oh/

[29] The fifth in-person interview subject in Cooperstown, Zara F. (born in 1990), already has full *caught-cot* merger.

[30] Despite the small number of speakers producing categorizable (olC) in Cooperstown, the difference between Cooperstown's three-out-of-four /o/ tokens and the Inland North fringe's 24 /oh/ tokens is significant at the $p < 0.002$ level.

distances less than 200 Hz. By comparison, in Ogdensburg, the most merged Inland North fringe community, two of the five youngest speakers have fully-distinct judgments and all have more than 200 Hz in Cartesian distance. So although Cooperstown is distinguished from the rest of the sampled region by the rapidity with which the *caught-cot* merger is taking place there, the phonological transfer of (olC) does not seem to have substantially preceded the merger in perception the way it apparently has in most of the other communities sampled.

Sidney resembles Cooperstown in that it is trending away from the NCS in apparent time, but that is about as far as the resemblance goes. In Sidney, six speakers produced tokens of (olC). Of these, the two oldest, as shown in Table 5.33, used /o/ in them, while all of the rest (including Keith M., born in 1958, who produced five (olC) tokens) used /oh/. This might not seem at first glance to be a difference between Sidney and Cooperstown—after all, if in Sidney speakers born in 1958 and later use /oh/ for (olC) while in Cooperstown speakers born in 1957 and earlier use /o/, that is prima facie no difference at all. Where Cooperstown and Sidney differ, however, is in the relationship between (olC) and other indicators of merger. Apart from the use of /oh/ for (olC), the influence of the *caught-cot* merger is not very well attested in Sidney: it is the only well-sampled community other than Poughkeepsie in which year of birth does not have a statistically significant linear Pearson correlation with F2 of /o/[31], F1 of /oh/, or Cartesian distance between /o/ and /oh/. The presence of /oh/ for

[31] In this case a *t*-test finds that the older and younger speakers are significantly different; the weakness of the Pearson correlation, however, indicates that the difference between younger and older speakers is not as distinctive or clear-cut as in most of the other communities sampled.

(olC) therefore indicates that Sidney is not altogether different from most of the other communities sampled: the phonological transfer of (olC) appears to have gone to completion by 1958 in apparent time, acting as an early indicator of *caught-cot* merger influence in a community long before there is direct evidence of the merger itself. In Cooperstown, however—at least in the present sample—/oh/ only appears in (olC) once the *caught-cot* merger has already appeared in minimal-pair judgments.

The status of (olC) in the Inland North core is somewhat hard to identify. Keith M. from Sidney has an NCS score of four and is old enough to have grown up when Sidney was still an Inland North core community; so his /oh/ in (olC) words may indicate to some extent that the phonological transfer is of relatively long standing in the Inland North core. In stable Inland North core communities, however, data is sparse: only two sampled speakers in Utica—both born in 1989—produced (olC) at all, both using /oh/. Among the eight Inland North speakers in Upstate New York in the Telsur corpus, only one produced any tokens of (olC): Simon Z. from Syracuse, born in 1948, produced three tokens (two of *involved* and one of *Solvay*, the name of a village near Syracuse), all as /o/. To the extent that this tells us anything about the status of the Inland North core in New York State as a whole, it seems to line up more or less with the behavior of (olC) in some of the other communities sampled: one speaker born earlier than 1961 uses /o/, but by 1989 in apparent time, the transfer to /oh/ had gone to completion. So, if we interpret the use of /oh/ for (olC) as evidence for merger in progress by phonological transfer, this weakly supports the hypothesis

that the backing of /o/ in the Inland North core is related to the expansion of *caught-cot* merger, rather than an independent sound-change development.

Utica can be contrasted in this respect with Poughkeepsie. Poughkeepsie and Utica both have features that *ANAE* describes as resistant to the *caught-cot* merger—Poughkeepsie because of its raised /oh/ and Utica because of its NCS. But while Poughkeepsie has completely avoided the phonological transfer of (olC) to /oh/—even Natalie I. from Poughkeepsie, born in 1993, uses /o/ for both of her (olC) tokens—in Utica it exists at least among young speakers. This is further evidence for the observation made above that raised /oh/ seems to be successful at imparting "stable resistance" to the merger, while the fronted /o/ of the NCS does not appear to have that effect. Two different mechanisms of merger are in evidence in the Inland North core in apparent time, namely approximation and phonological transfer, while neither appears in Poughkeepsie.

The Telsur corpus only contains two more Inland North speakers with measured tokens of (olC), in both cases the word *dolphin*: Tricia K. from Flint, Mich., born in 1947, and Alice R. from Cleveland, Ohio, born in 1962. Both appear to use /o/ in *dolphin*, although the phonological identity of Tricia K.'s vowel in *dolphin* is somewhat ambiguous based on its position in the vowel space. In any event, neither is young enough to give any clear suggestion about whether the western component of the Inland North has proven any more successful at resisting merger by phonological transfer than the New York component has, as it has been more successful at avoiding the backing of /o/. On the other hand, numerous Telsur speakers without full merger in the

Midland—a region where the merger is known to be in progress—display /oh/ in (olC); the phonological transfer is not a phenomenon restricted to Upstate New York.

Meanwhile, seven[32] Telsur speakers from the "Eastern corridor" have a total of ten (olC) tokens measured in the corpus. One of these tokens—*golf*, produced by Alexa L. from Wilmington, Del., born in 1966—contains /oh/, indicating that the use of /oh/ for (olC) is perhaps not *entirely* absent from the Eastern corridor. However, it may be that Alexa's /oh/ in *golf* is merely an individual lexical transfer, and therefore not necessarily related to the phonological transfer seen elsewhere; Alexa also has two tokens of *involved* with /o/. It may also be worth noting that Alexa is the only one of these seven speakers outside the direct sphere of influence of New York City; the others are all in New York City itself, northern New Jersey, or Middletown, Conn. In any event, finding at most one use of /oh/ out of a total of 18 tokens of (olC) in raised-/oh/ communities (including both the eight tokens from Poughkeepsie and ten from the Telsur corpus) is a far cry from the 57 /oh/ out of 72 (olC) found in the rest of Upstate New York (including Simon Z. from Syracuse). So the Telsur corpus appears to support the hypothesis that the raised /oh/ resists the phonological transfer of (olC) to /oh/—although, again, only two of these seven speakers (Alexa L. herself and Tiffany M. from New York City, born in 1982) were born later than 1960.

[32] An eighth speaker, Rosanne V. from Philadelphia, Penna., has two tokens of the placename *Folcroft* which are coded as /o/ and appear in or near the /oh/ phonetic cluster. However, the individual who answered my phone call to the Folcroft borough office tells me that *Folcroft* is correctly pronounced with /ow/, so these tokens are of unclear relevance to (olC) and are not considered here.

5.5. Cooperstown and Sidney

In Chapters 3 and 4, the differences between Cooperstown and Sidney were mentioned but largely glossed over—they were both merely taken as examples of the apparent fact that small villages on the border between the Inland North and the Hudson Valley were relatively unstable in their dialectological status, trending away from the NCS while larger cities equally near the dialect boundary did not. However, as observed in this chapter, the difference between Sidney and Cooperstown is more thoroughgoing than that. In Sidney, the younger speakers sampled do not exhibit the NCS, but apart from that they are not dissimilar from speakers in other nearby communities. Like the majority of speakers sampled in the nearby city of Oneonta, they have NCS scores of two; they have /oh/ in (olC) words but no merger in their minimal-pair judgments. In Cooperstown, on the other hand, the NCS has disappeared much more rapidly than in Sidney; younger speakers' scores are all zero or one. And at the same time, the younger Cooperstown speakers are all either transitional or merged in their minimal-pair judgments. In these respects, younger speakers in Cooperstown resemble the North Country, and are quite different from speakers in any of the sampled communities nearer to Cooperstown. In this chapter, it was found that Cooperstown speakers do not appear to have used /oh/ in (olC) words prior to the *caught-cot* merger taking place in perception, unlike most other Upstate New York communities. Another anomaly in Cooperstown phonology, discussed Chapter 4, is one speaker's diffused New York City–style /æ/ system; it was concluded that she acquired this /æ/ system from her

parents during a period in which the village was in dialectological flux enough that there was no identifiable community norm /æ/ system for her to acquire from her peers.

Thus Sidney basically moves in an orderly way toward the phonology of Oneonta; while Cooperstown abandons its NCS system, goes through a period during which its phonology was sufficiently in flux that it did not have a well-defined community /æ/ system, and ends up resembling neither of the dialect regions of the cities it's close to. Why, then, do these two villages undergo their retreats from the NCS in such completely different ways? To answer this, we will look at the villages' economic and demographic makeup.

Sidney is basically a manufacturing community. Somewhat atypically, it still contains (or contained, at the time of the research) two major manufacturers that employ village residents (Mead, the paper company, and Amphenol, an aerospace company), long after the collapse of major industries in other communities in this part of the state, such as the former glove industry of Gloversville and the carpet industry of Amsterdam. The presence of industry in Sidney does not appear to have been able to draw people to it from a wide geographical area, however; although the population of the village of Sidney grew throughout most of the 20th century[33], only two of the eight speakers interviewed in Sidney, both born earlier than 1951, have parents who were raised anywhere farther than about 25 miles from Sidney.

Cooperstown is completely different from Sidney in this respect. The economic activity of Cooperstown is centered not around industry but around

[33] Thanks for this information are due to whoever answered the phone at the library of the New York State Historical Association.

tourism; the village is home to the National Baseball Hall of Fame, and an entire baseball-themed tourism and summer-camp industry has grown up around it. When I visited in mid-July, the sidewalks in Cooperstown were packed with visitors walking between the Hall of Fame, souvenir stores, and baseball-themed eating establishments; in Sidney the same week, the streets seemed desolate by comparison. One interview subject suggested that a property owner in Cooperstown could make more money by renting to tourists for the three months of the summer and leaving the apartment vacant the rest of the year than by renting to someone who intended to live there year-round. Apart from baseball tourism, the largest employer in Cooperstown is not an industry but a hospital. And—perhaps most relevantly for dialectology—Cooperstown appears to have attracted not only tourists but also migrants from the New York City area and beyond. Of the eight parents of the four younger speakers interviewed in Cooperstown, only one was described as coming from anywhere in the general vicinity of Cooperstown (specifically Oneonta). The others include one from Ohio, one from Pennsylvania, three from the New York City area—one from the city, one from New Jersey, and one from Long Island—and Zara F.'s parents, who are from Russia. Among the ten parents of the five older speakers, four were from Cooperstown itself, one from Halcottville (a relatively isolated hamlet some 60 road miles southeast of Cooperstown), and the rest from the Hudson Valley core, New York City, or Massachusetts.

In short, while the speakers sampled in Sidney were for the most part not only natives of Sidney but children of natives of the region as well, most speakers in the Cooperstown sample—especially relatively recently—are the children of

migrants to not only the village but to New York State as a whole. Based on these demographic facts, the difference between Cooperstown and Sidney's retreats from the NCS in apparent time is easy to explain. Sidney's present-day linguistic situation is presumably more or less the outcome of the evolution through generational transmission of its previous linguistic situation, probably with some amount of diffusion from communities such as Oneonta with which it is in contact. The dialect of Cooperstown, on the other hand, was apparently suddenly upended by migration into the village from a diverse collection of locations in and beyond New York State.

And in fact, the Cooperstown data seems exactly in line with what would be expected in a community containing migrants and the children of migrants from diverse dialect backgrounds, according to the theory of new-dialect formation (see e.g. Trudgill et al. 2000, Kerswill 2002). In a mixed-dialect community, speakers of the second generation are expected to show considerable inter-speaker variability with respect to which features of which contributing dialects they exhibit; "there is no single peer-dialect for children to acquire, and the role of adults, especially perhaps of parents and other caretakers, will therefore be more significant than is usually the case" (Trudgill et al. 2000:306). This is exactly what we seem to see among the four sampled Cooperstown speakers born between 1950 and 1963. One of the four, as mentioned above, shows the diffused /æ/ system and has parents from the Hudson Valley core. Another exhibits the NCS, and her father is a native of Cooperstown. The other two have neither the NCS nor the diffused /æ/ system, and they have low EQ1 indices comparable to those of Hudson Valley fringe communities and

continuous /æ/ distributions. Such a variety of features—especially among speakers of comparable age—is not seen in any other community sampled in this dissertation.

The third generation in a dialect-mixed community is expected to show leveling and simplification. These are defined by Trudgill (1986:126) respectively as "the loss of marked and/or minority variants" and "[the process] by which even minority forms may be the ones to survive if they are linguistically simpler[…] and through which even forms and distinctions present in all the contributory dialects may be lost." If the speakers born between 1950 and 1963 are the second generation in the process of new-dialect formation, then among the speakers born between 1983 and 1991 we should expect to see the effects of leveling and simplification. And indeed we do: the younger speakers show no trace of the NCS or the diffused /æ/ system, which are marked and cross-dialectally unusual patterns, and uniformly exhibit the relatively unmarked and common nasal /æ/ system; this is a case of leveling. They all have merged or at least transitional /o/~/oh/ minimal-pair judgments, which are entirely absent from the older Cooperstown speakers in the sample (even though two of the older speakers have a parent from eastern Massachusetts, a merged region); this loss of a distinction is a case of simplification.

Therefore it seems that the sharp difference between Sidney's and Cooperstown's behavior in retreating from the NCS is due to the differing demographic situations in the two villages. The composition of the population of Sidney has remained more or less stable over the past decades, and its dialect has moved gradually away from the NCS apparently through diffusion from the

influence of Oneonta. Cooperstown has attracted migrants from multiple regions, bringing with them a variety of dialect features that wiped out the NCS by means of the leveling and simplification that arises from new dialect formation.[34] This scenario must remain a hypothetical one, of course, until a much deeper sociolinguistic study with a much larger sample can be conducted in Cooperstown and Sidney to ascertain the exact demographic profile of the NCS and other dialect features in both of them. Nevertheless, the limited data from these communities collected in the current study matches the hypothesis of new-dialect formation in Cooperstown very closely.

5.6. Stable resistance reevaluated

The evidence presented in this chapter generally suggests that *ANAE*'s description of the Inland North as a region of stable resistance to the *caught-cot* merger was incorrect, while the description of the raised-/oh/ region as resistant to the merger was correct. Both regions were described as resistant because they are subject to sound changes that increase the phonetic distance between /oh/ and /o/—and indeed, /oh/ and /o/ are no farther apart in the /oh/-raising Hudson Valley core than among the older Inland North core speakers (i.e., those prior to the obvious backing of /o/)[35]. Why then should that margin of security successfully insulate the Hudson Valley core, as predicted by *ANAE*, from

[34] Strikingly, the population of the village of Cooperstown has consistently declined over the course of the 20th century and into the 21st; it is as if the migrants have replaced, rather than added to, the native population.

[35] The seven Inland North core speakers born before 1961, including the current sample and the Telsur Inland North sample, have a mean Cartesian distance of 427 Hz. The nine Hudson Valley core speakers, including the seven sampled from Poughkeepsie and the two Telsur speakers from Albany, *also* have a mean Cartesian distance of 427 Hz.

participating in the effects of *caught-cot* merger—even such a relatively innocuous effect as the lexical transfer of (olC)— while the Inland North defies *ANAE*'s prediction?

The answer, of course, is that not all margins of security are created equal; raising /oh/ away from /o/ does not necessarily have the same effect on openness to the merger as fronting /o/ away from /oh/ does. The raising of /oh/, especially in the area of New York City influence, is the raising of a vowel with a tense nucleus along the periphery of the vowel space. Movement in this direction exactly follows one of Labov (1994)'s three general principles of chain shifting; and these principles, Labov (to appear) emphasizes, tend to be "unidirectional" changes. It is not entirely impossible for such a unidirectional change to reverse direction, but it takes place "rarely" and under "special circumstances"—thus Johnson (2007) finds *caught-cot* merger in communities on the Massachusetts–Rhode Island border that are historically part of the raised-/oh/ region, but it took major demographic changes to bring it about.[36] On the other hand, the fronting or backing of a low vowel, as long as it remains low, is a bidirectional change; low vowels have moved forward and backward several times in the history of English, only remaining permanently front or permanently back once they had left the low vowel tier. So by the general principles of unidirectional and bidirectional vowel changes, it's not surprising that the fronting of a low vowel in the Inland North should be relatively easily

[36] Becker (2009) has recently and unexpectedly reported /oh/ to be lowering in apparent time among white speakers in New York City's Lower East Side; whether it took a special demographic situation to bring this change about is not yet clear.

reversed by pressure toward merger, while the raising of a tense vowel in the Hudson Valley core is not.

Labov (to appear: ch.7) suggests that "the movement of /o/ is not easily reversed, since it is locked into the larger context of the NCS." However, as this chapter has shown, the NCS structure is not sufficient to prevent the reversal of /o/-fronting. This is further evidence that it is Herzog's Principle—i.e., the expansion of the *caught-cot* merger—driving the backing of /o/ in the Inland North, rather than an independent development. The structure of a chain shift depends upon the robustness of the contrasts between the phonemes involved in a shift; apart from the general principles of vowel shifting, what drives a chain shift on its unidirectional way is the fact that if any of the phonemes involved were to reverse course, it would collide with the next phoneme moving up behind it in the chain. If the phonemic contrast is weakened, however, perhaps as a result of influence from communities in which those two phonemes are merged, the structure of the chain shift will not be sufficient to prevent the motion of the shift from being reversed.

Now, the only raised-/oh/ community in the current sample is Poughkeepsie, which is not particularly close to any regions where the merger is complete; so it might be possible to argue that the only reason no effect of merger in progress is seen in Poughkeepsie is merely that Poughkeepsie has less direct access to speakers from merged regions than the Inland North core. However, although the Inland North core as a whole shares a border with Canada and Western Pennsylvania, Utica itself—the best-represented Inland North core community in the current study—is quite distant from any known fully-merged

regions, and younger speakers in Utica have backed /o/ and (to the extent the data shows) /oh/ for (olC) anyhow. So if direct geographic proximity to merged communities is not necessary for the weakening of the distinction in Utica, there's no reason to expect it to be necessary in Poughkeepsie. Moreover, consider again the Massachusetts–Rhode Island border, historically a raised-/oh/ region directly adjacent to a highly influential merged region. Johnson (2007:349) suggests that even there, "non-migratory adult-to-adult contact [i.e., diffusion] does not lead to lasting change in low vowel systems"; the spread of the merger is directly correlated with migration into raised-/oh/ communities of merged speakers and their children. In Utica, no such demographic change apparently exists: out of the 14 parents of the seven Utica speakers sampled, only one was from a merged region, and nearly all of the rest were from Utica or its immediate vicinity. Mutatis mutandis, the same is true for Poughkeepsie. So with respect to the influence of the *caught-cot* merger, Utica and Poughkeepsie do not appear to differ noticeably in either geographic or demographic access to merged speakers; the only difference is the nature of the sound change that would be required to bring about merger.

This tells us a great deal about the relative strength of Herzog's Principle of merger expansion and the ability of individual dialects to resist mergers by maintaining large margins of security between the implicated phonemes. In the Inland North core, diffusion of the merger can weaken the distinction between the phonemes to the point where a part of a chain shift can be reversed—but only when such a reversal does not violate one of the general principles of vowel shifting. In the regions of raised /oh/, where narrowing the space between /o/

and /oh/ would require the lowering of a tense peripheral vowel, simple diffusion of the merger through contact is not sufficient to cause the phonemes to move toward each other; substantial demographic change is necessary to allow the merger to spread into such regions. So a sound change of the "bidirectional" type, like fronting or backing of a low vowel, seemingly cannot actually impart resistance to merger merely by increasing the phonetic distance between two phonemes.

Now, in general, the results of both this chapter and of Johnson (2007) are a vindication for Herzog's Principle over "stable resistance" to merger; both find trends toward merger, or merger itself, expanding into regions described as resistant to it by *ANAE*. But the difference in the manners by which these expansions take place is instructive. On the Rhode Island–Massachusetts border, individual communities are undergoing the merger as a result of demographic change, not unlike what happened in Cooperstown in the present study. From a certain point of view, this can be construed not as merger expanding into the Rhode Island dialect region, but rather as these communities *leaving* the Rhode Island dialect region, in that a sufficiently large portion of their population originates from a different origin. No such thing, as far as we can tell, is the case in Utica; the community shows evidence of progress toward the merger even though the population does not appear to have undergone a great deal of migration from outside the Inland North. So to be more specific, although the *caught-cot* merger can spread into the raised-/oh/ region in a purely *geographical* sense, it is still meaningful to say that raised /oh/ does impart some degree of stable resistance to it: the phonological system of raised-/oh/ regions is not

compatible with diffusion of the merger, and it takes direct introduction of a large number of merged children (what Johnson has referred to as *transfusion*) to change the phonology and allow the merger to spread. The Inland North's phonological system, however, as we have seen here, seems quite compatible with the spread of the merger.

It may seem somewhat perverse to describe the Inland North, as we have done, as less resistant to the spread of *caught-cot* merger than the raised-/oh/ region is, when the merger itself is still essentially unattested in the Inland North. But "stable resistance" to the merger, the term *ANAE* uses, cannot simply mean the same thing as *absence* of merger. For "stable resistance" to exist, there must be a feature of the phonological system that actively prevents diffusion of the merger from taking place. Otherwise, we would have to describe any unmerged dialect which has simply never had substantial contact with a merged dialect as "resistant" to it—when in reality such a dialect may be fully susceptible to the merger but has merely never yet had any stimulus to undergo it. The reason for the illusion of stable resistance in the Inland North is clear, of course, and is exactly what *ANAE* identified as the reason for stable resistance. The frontedness of the NCS /o/ means that, even when influence from the merger is felt and /o/ is backed toward /oh/, the contrast between the two phonemes remains robust: it would take much more than 120 hertz' worth of backing to bring /o/ and /oh/ close enough to cause full merger in the Inland North core. But the mere fact that the influence of the merger on the Inland North core has not (yet) been extensive enough to cause the merger itself in speakers' perception or production does not mean that the Inland North can be described as resistant to the effects of

the merger in the same way that the raised-/oh/ region is. A large margin of security between phonemes means that diffusion of the merger may not cause the phonemes to actually merge immediately; but it does not mean that diffusion of the merger will have no effect at all, as would be necessary for a true situation of "stable resistance". The Inland North's fronted /o/ delays, rather than prevents, the *caught-cot* merger.

5.7. Conclusion

The key empirical finding of this chapter is that the *caught-cot* merger is in progress throughout most of Upstate New York. It is only in far northern New York, the region referred to herein as the North Country, that the merger is nearing completion to the extent that nearly every speaker sampled shows some degree of merger in perception. However, in almost every other region, there is evidence of movement toward the merger: /o/ is backing in apparent time, and words containing (olC) such as *revolve* have been or are being transferred from the /o/ class to the /oh/ class. The only region where there is no such evidence of the effect of merger is the Hudson Valley core, where /oh/ is raised away from /o/ to high mid position.

The influence of the merger appears to be spreading southward from the North Country, inasmuch as the merger's progress appears to be more advanced in the Inland North fringe, which is adjacent to the North Country, than in the Hudson Valley fringe. There are more speakers in the Inland North fringe sample with transitional minimal-pair judgments than in the Hudson Valley

fringe, and in the Inland North fringe the transfer of (olC) appears to have already gone to completion. The Inland North fringe city where the greatest number of speakers have transitional judgments is Ogdensburg, which despite being in the Inland North fringe is squeezed up between Canada on one side and the North Country on the other. This could be taken as further confirming that the weakening of the /o/ ~ /oh/ distinction is the result of diffusion of the merger from the North Country; however, the samples are small enough that the difference between Ogdensburg and other Inland North fringe cities in this respect does not reach the level of statistical significance. It may also be the case that the influence of the merger is also diffusing northeastward from Western Pennsylvania into the Inland North core, in that backing of /o/ is seen in the Inland North core about the same time as it is in the Inland North fringe, although the core is farther from the North Country; but there is not enough data available from the Inland North core west of Utica to be able to say anything certain about the path of diffusion there. Different aspects of the merger may take place at different speeds in different regions: while transfer of (olC) seems to have gone to completion relatively early in the Inland North fringe, the backing of /o/ took place at the same time as in the Inland North core or later.

Cooperstown is the only community sampled outside the North Country where the merger is advanced enough that multiple individuals have fully merged minimal-pair judgments. However, the merger in Cooperstown is not directly related to the diffusion of the merger from other areas; here it is the result of phonological simplification as part of new dialect formation in a dialectally-diverse community.

From these results we can draw the following conclusions of more or less general relevance to the study of dialectology, and of North American dialectology in particular:

- A merger expanding by diffusion into new communities does not necessarily have direct effects on speakers' minimal-pair judgments immediately; it may just weaken the contrast enough for other phonetic or phonological trends toward merger to begin, which may only effect perception directly some decades down the line.
- Merger can proceed simultaneously by more than one of the mechanisms listed by Herold (1990); here phonological transfer and phonetic approximation coexist in the progress of a single merger.
- Having a large phonetic distance between /o/ and /oh/ is not sufficient to block the merger from affecting a region: *ANAE*'s hypothesis that fronted /o/, as in the NCS, makes a community resist diffusion of the *caught-cot* merger was mistaken.
- However, raised /oh/ as in the Hudson Valley core does appear to provide relatively stable resistance. This can be accounted for because, according to the general principles of vowel shifting, fronting a low vowel is a reversible change, while raising a peripheral vowel is a unidirectional change.
- The supposed unity of the Inland North as a homogeneous dialect area from Utica to Milwaukee is being broken up: /o/ is backing in Upstate New York, but not in the western component of the Inland North.

In general, the results of this chapter are a vindication for Herzog's Principle that mergers expand at the expense of distinctions. Neither the present-day dialect boundary between the Inland North fringe and the phonologically very different North Country nor the settlement-history boundary between the Inland North fringe and the Hudson Valley fringe is sufficient to prevent the merger from expanding. Herzog's Principle is not strong enough on its own, however, to reverse the general principles of vowel shifting as described by Labov (1994); relatively stable resistance does in fact exist. With sufficient population movement and demographic change, however, as found by Johnson (2007), merger can even overwhelm stable resistance of that sort. But such demographic change is not necessary for caught-cot merger to advance by diffusion into the Inland North, the chain-shift structure and fronted /o/ of the NCS notwithstanding.

Chapter 6

Secondary Stress on *-mentary*

6.1. The structure of *-mentary* variation

To the best of my knowledge, no previous research has been published on the distinctive pronunciation of *elementary* and other words ending in *-mentary* in Upstate New York. As the results presented below will show, most speakers across the region pronounce such words with secondary stress on the penultimate syllable (this may be loosely notated as "*eleméntàry*")—a pronunciation shown in apparently no major dictionary of English. This chapter will examine the dialect geography of this feature in the main data set and in a supplementary rapid and anonymous telephone survey.

Although the stressed-penultimate pronunciation has seemingly escaped notice so far, it is not hard to conjecture a plausible origin for it. The large majority of words ending in the morpheme *-ary* standardly have a secondarily-stressed penultimate in American English—consider *dietary*, *missionary*, *planetary*, *fragmentary*, *tributary*. Of the two pages of *-ary* words in Muthmann (2002), very few have a standard American English pronunciation with an unstressed penultimate: several *-mentary* words such as *elementary*, *anniversary*, a few trisyllabic words such as *glossary* and *rosary*, a few words in *-iary* such as *auxiliary* and *judiciary*, and perhaps one or two others. Many of these words with unstressed *-ary* are, as far as the individual speaker is concerned, synchronically monomorphemic, whereas *dietary*, *planetary*, and so on have transparent

morphological structure. The shift to a stressed penultimate in words of the *-mentary* type, then, is a simple analogical change—it is a regularization of the pronunciation of the morpheme *-ary* to be the same in *-mentary* words as it is in the large majority of other words in which it appears.

In this dissertation, data on pronunciation of words of the *-mentary* type was chiefly collected by means of the wordlists subjects were asked to read at the conclusion of their interviews. The wordlist used in Utica, the first in-person interview site, included *elementary*, *sedimentary*, and *rudimentary*. Since one Utica speaker explicitly expressed unfamiliarity with the word *rudimentary*, for in-person interviews in later communities *rudimentary* was removed from the wordlist and replaced with *complimentary* and *documentary*. In telephone interviews, *elementary* and *documentary* were both elicited. In total, 118 wordlist or telephone-elicited tokens of *elementary* were recorded, 111 of *documentary*, 84 of *sedimentary*, 80 of *complimentary*, and 8 of *rudimentary*. In addition to wordlist tokens, 24 speakers produced tokens of *elementary* in connected speech (at least, 24 did so in the portion of their interview that was analyzed), usually in response to questions about where they had gone to school, and often as part of the name of a specific school. This adds up to a total of 425 tokens of *-mentary* words[1]; every speaker in the sample produced at least one recorded *-mentary* token.

The status of the penultimate syllable of each token of a *-mentary* word was coded by ear according to the classification listed in Table 6.1. Four principal possibilities for the penultimate syllable—the *-a-* of *-mentary*—were discerned: it

[1] Actually 427, as one speaker—Cody T. from Canton—produced three tokens of *elementary* in connected speech, all with penultimate secondary stress. These three tokens of the same word from the same speaker in the same style produced with no variation have been condensed into a single data point for analysis.

could be completely deleted; it could be present but completely unstressed and reduced to schwa; it could be secondarily stressed, producing a clash with the primary-stressed antepenultimate; or it could be secondarily stressed with no clash, with the antepenultimate unstressed and reduced. Only in the relatively rare case that I was unable to determine by ear after several listenings whether a token had a reduced or secondarily-stressed penultimate did I resort to classifying it as "intermediate or ambiguous"; in several such cases I had the impression that the vowel of the penultimate syllable was schwa, but that the preceding /t/ was aspirated in a manner indicative of at least some amount of stress on the syllable.[2] It is not clear to what extent such tokens actually represent a possible fifth phonological variant, with a stressed schwa in the penultimate syllable, and to what extent they merely represent inescapable phonetic variation in production of one of the other principal phonological variants causing the choice of variant to be obscured.

Table 6.1: Coding of *-mentary* words.

code	meaning	example	*n*	% of total[3]
0	complete deletion	ˌɛləˈmɛntɹi	35	8%
1	reduction to schwa	ˌɛləˈmɛntəɹi	51	12%
2	intermediate or ambiguous forms	(ˌɛləˈmɛnˌtəɹi)	15	4%
3	secondary stress	ˌɛləˈmɛnˌtɛɹi	304	72%
4	reduction of antepenultimate	ˈɛləmənˌtɛɹi	20	5%

In any event, "intermediate or ambiguous forms" are infrequent enough that it seems they can be safely ignored. Discarding those leaves 410 tokens of *-mentary* that will be the focus of the discussion in this chapter. Out of 119 speakers, 44 show variation between the remaining four unambiguous variants,

[2] See Wells (1990) for the relationship between stress and aspiration in English syllable structure.
[3] These numbers do not appear to add up to 100% because of rounding effects.

producing *-mentary* words using at least two of the four. Six speakers exhibited *intra-word* variation—i.e., they pronounced *elementary* one way in connected speech and another way in wordlist style. Based on this data, we will regard *-mentary* as a linguistic variable involving a choice among variants 0, 1, 3, and 4.

To analyze the patterns of variation in *-mentary* it will be necessary to define the envelope of variation by establishing the derivational relationship between the different variants. Two obvious possibilities for the derivation of *-mentary* variants can be modeled as decision trees in the following ways:

(1) a. Primary stress on antepenultimate?

If no, then variant 4: ˈɛləmənˌtɛɹi

If yes, then:

b. Secondary stress on penultimate?

If yes, then variant 3: ˌɛləˈmɛnˌtɛɹi

If no, then:

c. Delete penultimate?

If no, then variant 1: ˌɛləˈmɛntəɹi

If yes, then variant 0: ˌɛləˈmɛntɹi

(2) a. Secondary stress on penultimate?

If yes, then:

b. Primary stress on antepenultimate?

If no, then variant 4: ˈɛləmənˌtɛɹi

If yes, then variant 3: ˌɛləˈmɛnˌtɛɹi

If no, then:

c. Delete penultimate?

If no, then variant 1: ˌɛləˈmɛntəɹi

If yes, then variant 0: ˌɛləˈmɛntɹi

Both models group variants 1 and 0 together as what we might call the "reduced" variants, but they differ with respect to the relationship of variants 3 and 4. Model (2) seems more in line with the analogical analysis of *-mentary* given above. If the morphological motivation behind the variation in *-mentary* is analogy with the stress pattern of *-ary* in other words containing the morpheme, then that motivation justifies grouping together as a single class variants 3 and 4, which respect the analogy, against the reduced variants, which do not. Choices (2b) and (2c), then, are each just a choice between different methods of building the stress pattern of the rest of the word once choice (2a), the choice of whether to respect the analogy, has been made. On the other hand, model (1), which groups together variant 3 and the reduced variants against variant 4, has no particular relationship to the morphological analogy which appears to be behind the variation in the first place.

The pattern of variation in the data may also support model (2). Every speaker who produced one or more tokens of variant 4 also produced one or more tokens of variant 3. Now, under model (1), there's no reason to expect variants 3 and 4 to be well correlated with each other—speakers with high probabilities of choosing variant 4 at point (1a) should have correspondingly low probabilities of choosing any of the other three variants, including variant 3. On the other hand, under model (2), we would expect a higher degree of correlation between variants 3 and 4; to the extent that speakers have a high probability of selecting "yes" at choice (2a), they will have relatively high probability of both variants 3 and 4 and a lower probability of the reduced variants. So the

distribution of variant 4 with respect to variant 3 in the data supports model (2) over model (1) of the derivational structure of variation.

The distribution of variant 4 in the data might even go too far in that direction, however—not only do all speakers who produce variant 4 also produce at least one token of variant 3, but *no* speaker who produces variant 4 produces a single reduced token. To put it another way: the 76 speakers who produced no reduced tokens of *-mentary* produced a total of 237 elicited tokens of variant 3 and 20 of variant 4. So among this subset of the sample, for whom the probability of selecting a stressed penultimate at choice (2a) approximates 100%, the probability of choosing variant 4 at choice (2b) is about 7%. There are 24 speakers in the sample who produced both variant 3 and reduced tokens, with a total of 53 elicited tokens of variant 3 among them. If they had the same 7% rate of selecting variant 4 at choice (2b), they would be expected to produce about three or four tokens of variant 4. But in fact, they produced none at all; the difference between zero and the expected 3.5 tokens is significant at the $p < 0.05$ level.

So it may be the case that *no* individual speaker's grammar actually includes the entire decision tree shown in (2) or (1); some speakers choose between variant 3 and variant 4, and others choose between variant 3 and the reduced variants, but none have all four variants available to them. In spite of this, the decision tree in (2) will be used as a model for the structure of *-mentary* variation in Upstate New York, under the principle that the object of study in language variation is the speech community, rather than the individual speaker. Although variant 4 and the reduced variants do not co-occur in the tokens

produced by any individual speaker, they do co-occur in the same communities; in fact, every community in which variant 4 occurs also has at least one token of one of the reduced variants.

Variant 4 is the least frequent variant in the data—as noted above, even among speakers who produce no reduced tokens at all it occurs only 7% of the time. It appears only in wordlist reading style—never among the 24 spontaneously-produced tokens of *elementary*, and never in telephone-elicited tokens. For this reason I conjecture that it is a hypercorrect spelling pronunciation, influenced by the stress pattern of the corresponding nouns *element*, *document*, and so on. The relationship between variants 3 and 4—i.e., choice (2b) above—will be touched upon later in this chapter. However, because of the rarity of variant 4 and its apparent restriction to wordlist style, the majority of the discussion in this chapter will focus on choice (2a)—the choice between the stressed-penult variants 3 and 4 and the reduced variants 0 and 1.

6.2. Results from interview data

6.2.1. Overall results

The large majority of tokens of *-mentary* used stressed-penult variants: 324 out of 410 tokens, or 79%. Out of 119 speakers, 64% (76) produced only the stressed-penult variants, while only 16% (19) produced exclusively reduced variants and 20% (24) showed variation between reduced and stressed penult. Among those 24 speakers who show variation, the stressed penult is still fairly dominant: 14 used stressed-penult variants in more than half of their tokens of

-mentary, while only three used more than half reduced variants. Over the whole sample of 119, the average speaker stressed the penult 77% of the time.

Not all words of the *-mentary* class behave the same way, however—Table 6.2 shows that the stressed penult occurs in *elementary* with the lowest frequency, at approximately 70%; *complimentary*, *documentary*, and *sedimentary* all exhibit the stressed penult above 80% of the time. A χ^2 test comparing elicited tokens of *elementary* on the one hand with *complimentary*, *documentary*, *sedimentary*, and *rudimentary* on the other finds that this difference between *elementary* and the other three is statistically significant ($p < 0.005$).

Table 6.2: Frequency of stressed penult in each *-mentary* word in the corpus.

word	% stressed penult	*n*
elementary (phone & wordlist)	70%	114
elementary (spontaneous)	70%	20
rudimentary	75%	8
documentary	81%	108
complimentary	84%	79
sedimentary	86%	81

The difference between *elementary* and the other lexical items is emphasized even more by looking only at the speakers who show variation. The 24 variable speakers produced a total of 31 tokens of *elementary* (including both elicitation and spontaneous speech), of which only 11, or 35%, used the stressed-penult variant. On the other hand, out of 53 tokens from these speakers of the other four *-mentary* lexical items, fully 44 (i.e., 83%) used the stressed penult. In other words, speakers who produce both stressed-penult and reduced *-mentary* are substantially less likely to use the stressed-penult variant for *elementary* than for other *-mentary* words.

Two of the five lexical items show statistically significant change in apparent time. Speakers who produced elicited tokens of *elementary* with a stressed penult had a mean year of birth of 1973, while the mean year of birth of those using a reduced penult was 1962—differing at $p < 0.02$. For *complimentary*, the corresponding mean years of birth are 1972 and 1960 for stressed and reduced penult respectively, differing at $p < 0.05$. So both *elementary* and *complimentary* appear to be changing in the direction of increased use of the stressed penult. Looking more closely at the interaction between lexical item and speaker age, however, yields a striking difference between *elementary* and *complimentary*.

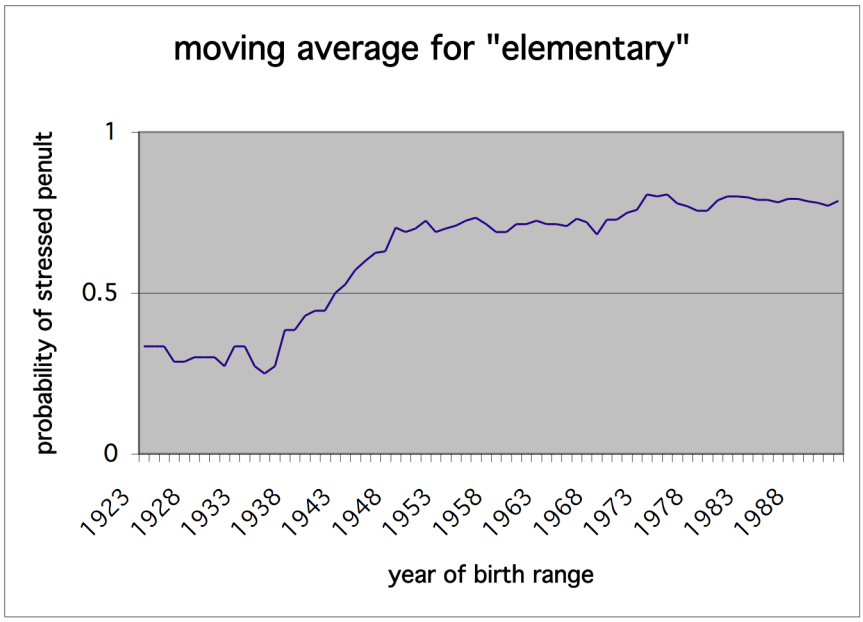


Figure 6.3. A moving-average plot of the probability of stressed penult in elicited tokens of *elementary*, averaged over 20-year spans in apparent time.

Figure 6.3 shows an apparent-time moving-average plot for elicited tokens of *elementary*: for each year is plotted the percentage of stressed penult among

sampled speakers born within ten years before or after that point.[4] For example, exactly 50% of speakers born between 1933 and 1952 produced a stressed penult in elicited tokens of *elementary*, and so the curve on Figure 6.3 crosses 50% at 1943. From Figure 6.3, it is clear that the probability of a stressed penult in *elementary* is approximately 30% for speakers born before about 1940, and increases to approximately 70% for speakers born after about 1947, with essentially no change after that point. In other words, the frequency of stressed penult in *elementary* seems to have undergone a very sharp increase over the course of the apparent 1940s, and then stabilized.

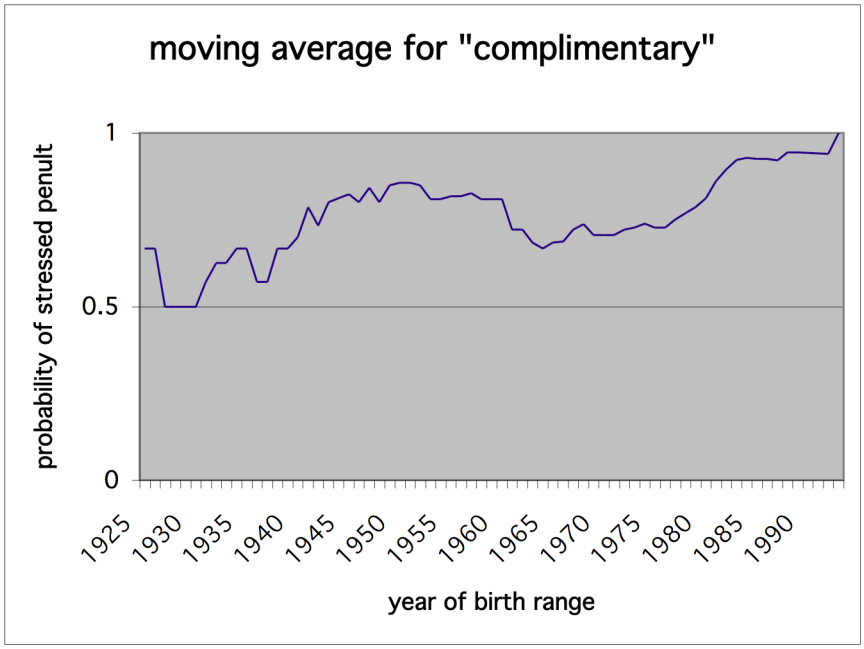


Figure 6.4. A moving-average plot of the probability of stressed penult in elicited tokens of *complimentary*, averaged over 20-year spans in apparent time.

[4] A 20-year age bracket seems quite coarse for an apparent-time analysis; however, it was necessary to ensure that each plotted point is the average of at least nine speakers in each full-size bracket; the distribution of the older speakers in particular is quite sparse. For 20-year brackets that extend back beyond 1923, the year of birth of the oldest speaker, the averaged sets are of course even smaller.

Figure 6.4 shows the same plot for *complimentary*. While the general overall trend towards increase in the stressed penult is clear, the picture is quite different from *elementary*. While *elementary* has a sharp increase during the 1940s, and seems to settle into a period of stability thereafter, *complimentary* increases much more gradually, with erratic upswings and downswings—hovering around 80% in the 1950s, dropping to 70% through most of the 1960s and 1970s—before finally reaching 100% stressed-penult among speakers born in 1983 and later. There's no sharp and stable increase in *complimentary* as there is for *elementary*, and *complimentary* is above 50% stressed-penult for basically the entire apparent-time span.

These results can be interpreted as a general change in apparent time from reduced to stressed penult in *-mentary*, in which different lexical items proceed at different rates—*documentary* and *sedimentary* are near enough to completion that no change in apparent time in those lexical items is visible in the data; *complementary* is still increasing, but slowly; and *elementary* is noticeably lagging behind the other words, only having caught up to the general pattern of stressed penult in the majority of cases since the 1940s.

Table 6.5 shows the results of a logistic regression of *-mentary* against the following factor groups:

- community (Amsterdam, Canton, Cooperstown, etc.)[5]
- age group (year of birth 1923–1942, 1943–1960, 1962–1980, 1981–1993)
- gender (female, male)

[5] As will be discussed in the following section, in five communities *only* stressed-penult tokens were produced: Cobleskill, Geneva, Saratoga Springs, Morrisonville, and South Glens Falls. To avoid "knockouts", the 26 tokens from these communities were excluded from the logistic regression.

- lexeme (*elementary*, *sedimentary*, *documentary*, *complimentary*, *rudimentary*)
- style (connected speech, telephone elicitation, wordlist)

Table 6.5: A logistic regression of *-mentary*, with stressed penult as the positive value; $n = 384$. Not sig.: lexeme, gender. Community was found to be significant, and will be treated elsewhere.

age group	weight	style	weight
1923–1942	.271	wordlist	.555
1943–1960	.519	phone elicitation	.263
1962–1980	.414	connected speech	.198
1981–1993	.583		

Of these five factor groups, three were found to have statistically significant effects: community, age group, and style. Variation in *-mentary* between communities will be examined in detail in the following section; Table 6.5 shows the factor weights for age group and style. The logistic regression finds that less careful styles favor the use of reduced variants, and agrees with the superficial analysis above in showing that use of the stressed penult for *-mentary* is roughly increasing in apparent time. However, the difference between *elementary* and the other *-mentary* words is not found to be statistically significant in this regression analysis.

On the other hand, it was observed above that the greatest prima facie difference between *elementary* and the other lexical items is in the oldest age group, for which *elementary* appears to have a stressed penult only about 30% of the time. In age groups born later than the 1940s, the stressed penult appears in *elementary* about 70% of the time, which is not too different from the rates shown by other lexical items in all age groups. Table 6.6 shows a detailed cross-tabulation between age group and lexical item, demonstrating specifically that *elementary* in the oldest subgroup has a distinctly lower rate of stressed penult than any other combination.

Table 6.6: Cross-tabulation between elicited lexical item and age group. *Elementary* in the oldest age group is the only combination that shows less than 50% stressed penult.

age group	*elementary*	*complimentary*	*sedimentary*	*documentary*
1923–1942	4/12 33%	4/7 57%	6/8 75%	7/10 70%
1943–1960	20/28 71%	16/19 84%	16/17 94%	21/26 81%
1962–1980	16/22 73%	12/17 71%	13/17 76%	15/19 74%
1981–1993	40/51 78%	30/32 94%	31/35 89%	36/43 84%

Taking our cue from that, we might consider the possibility that even if a logistic regression does not select lexical item as an independently significant factor group in *-mentary* variation, there may still be a significant *interaction* between age group and lexical item. Therefore, let us introduce to the logistic regression discussed above a new independent variable which classifies *-mentary* tokens simply into the following four groups: *elementary* produced by speakers born between 1923 and 1942; *elementary* produced by speakers born later than 1942; any other lexical items, produced by the 1923–1942 age group; and lastly, all other tokens.

Table 6.7. Logistic factor weights for stressed penult of a cross-product between age group and lexeme; $n = 384$. Not significant: age group alone, lexeme alone, gender, style.

lexeme	age group	factor weight
elementary	oldest	.093
elementary	other	.396
other	oldest	.422
other	other	.592

Introducing this cross-product of age and lexical item into the regression eliminates the statistical significance of style and of age group as an independent effect—the only factor groups now selected as significant are community and the interaction of age and lexical item. Table 6.7 shows, as expected, that *elementary* does indeed disfavor the stressed-penult variants relative to the other lexical

items—and *elementary* as produced by the oldest set of speakers disfavors it extremely.

Inasmuch as the cross-product of age and lexical item was introduced post-hoc in a transparent attempt to make the statistics reflect the prima-facie observation that reduced variants seem to appear for *elementary* more frequently than for the other lexical items, it is not quite clear whether the regression including or excluding the cross-product factor should be taken as more reliable. Either way, however, the factors that are identified as favoring the stressed penult are those that might have been expected to favor it in any case.

The change toward the stressed penultimate in *-mentary* was described above as a case of analogical change. It is commonly understood[6] in historical linguistics that more frequently-used words are relatively resistant to analogical change, and therefore we should expect the most common of the *-mentary* words to be the least advanced in the shift to the stressed penult. Data from the first release of the American National Corpus[7] indicates that *elementary* is by far the most frequent *-mentary* word in spoken American English: *elementary* appears in the spoken portion of the corpus 99 times, while all other *-mentary* words combined make a total of 21 appearances. This being the case, we would expect *elementary* to show the greatest resistance to the stressed penult—and that seems to be exactly what we find.

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[6] Commonly understood, and therefore quite difficult to find a citation for; but see e.g. Bynon (1977:43): "Perhaps their stability and resistance to [analogical] change [sc. that of words such as *tooth*, *foot*, *be* and *go*] is due to their very high frequency of occurrence in discourse and to the fact that their forms are therefore acquired by the child at an early stage before the respective grammatical rules have been acquired." Hooper (1976) cites this observation as far back as the late 19th century (Paul [1890] 1970), and provides some quantitative evidence for it in the case of analogical weakening of strong verbs.

[7] Available via *http://www.americannationalcorpus.org/frequency.html*; downloaded 14 August 2009.

Moreover, the same prediction is made if we consider the stressed penult as a phonological change, rather than a morphologically-based analogy. From a phonological perspective, the innovation in the pronunciation of *-mentary* words is a case of fortition—replacement of a weak ("reduced", central, unstressed or outright deleted) sound with a strong (stressed, more peripheral) one, the opposite of which is lenition. I have described elsewhere what I refer to as "Phillips's Principle" (after Phillips 1984) on the behavior of variable lenition as follows: "more frequent words are more subject[…] to lenition—that is, variation in the direction of reduced articulatory effort, whether part of a sound change in progress or not" (Dinkin 2008a). But Phillips's Principle appears to imply its own converse, at least in the current case: a change in progress toward fortition will be regarded by any individual involved speaker as variation between a stronger form and a weaker form; and in a case of variation of that type, according to Phillips's Principle, relatively frequent words will favor the weaker form more than relatively infrequent words. In other words, in this case, Phillips's Principle predicts as well that that *elementary* will favor the reduced-penult variants more than the less frequent *-mentary* words do; which again is what the data appears to show.

If, as in Table 6.5 above, we do not include the interaction between age and lexical item in the logistic regression, we find a significant effect of style on *-mentary*: relatively less careful styles favor the reduced penult. This pattern is likewise explained naturally by considering fortition as merely the flip side of lenition. For speakers who vary between stressed-penult and reduced variants, the reduced variants may be synchronically considered to be just that—reduced

forms of the full stressed-penult citation form. If that is the case, it is unsurprising that the reduced form appears more in connected speech and even telephone-elicited tokens than in reading from a wordlist.

6.2.2. Geographical results

As shown in the previous section, the stressed-penult variants of *-mentary* occur in the large majority of tokens in the data. Moreover, the stressed-penult variants are also well attested throughout the geographical extent of the sample: in every community sampled, at least half the speakers from whom elicited tokens of *-mentary* were recorded[8] produced at least one stressed penult. In other words, at least half the speakers sampled in each community appear to have the stressed penult in *-mentary* available to them at least in relatively careful speech. The stressed penult is attested at a relatively high frequency throughout the entire geographic range of eastern Upstate New York sampled in this dissertation. There is nevertheless, however, noticeable regional variation in the frequency of *-mentary* among the sampled communities, and that regional variation is the topic of this section.

Every speaker in the sample can be assigned a numerical score representing the relative frequency of the stressed penult in the tokens of *-mentary* they produced; this score is simply the fraction of their tokens of *-mentary* in which the stressed penult was used. Thus, for example, a speaker

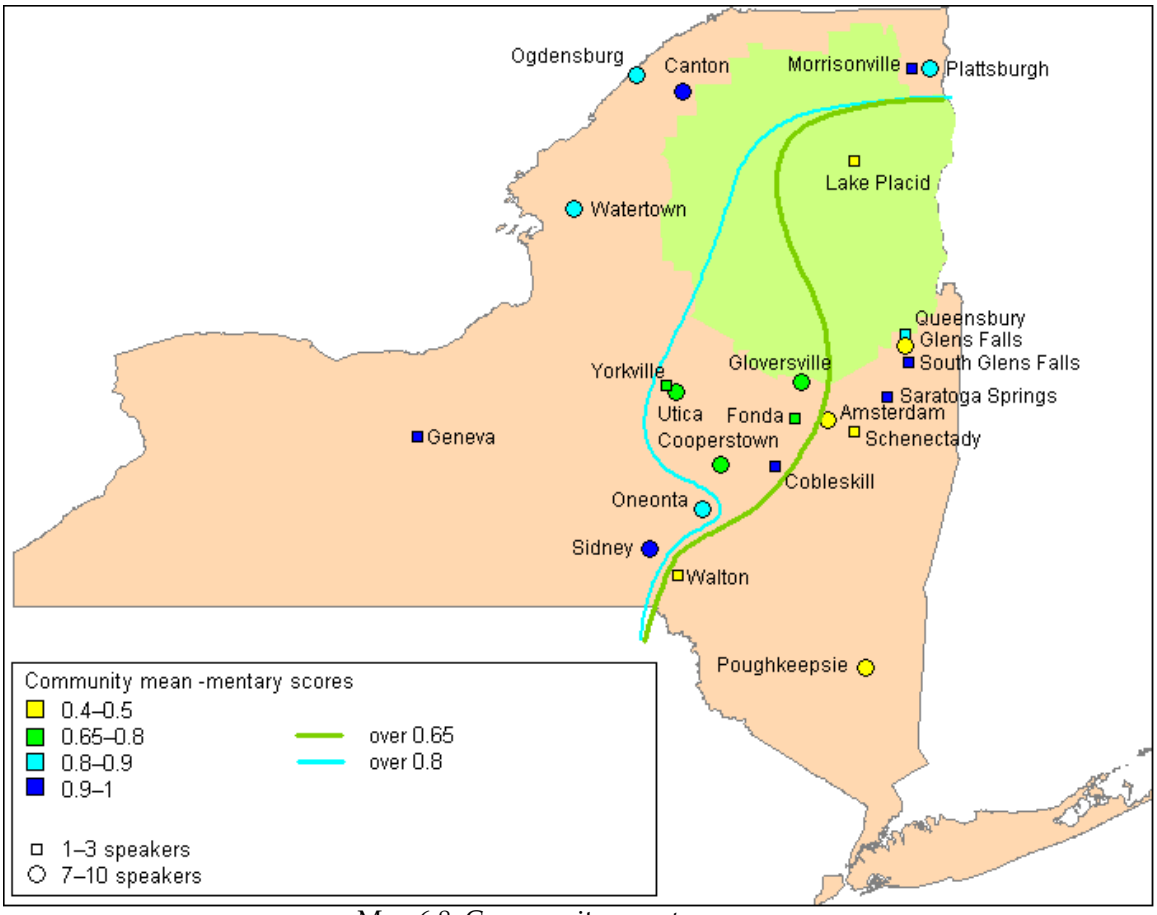
[8] The one exception who makes this caveat necessary is Allison S., a 23-year-old barista from Poughkeepsie. Due to an equipment failure during her interview, her reading of the wordlist was not recorded; she did say *elementary* once in connected speech, pronouncing it with the penult deleted (i.e., as variant 0).

who produced only stressed-penult tokens gets a score of 1; a speaker who produced only reduced tokens gets a score of 0; and a speaker such as Robert O. from Gloversville, who produced a reduced penult in *elementary* but stressed penults in *documentary*, *sedimentary*, and *complimentary*, gets a score of 0.75. The score of a community can be defined merely as the average of the scores of the speakers interviewed from that community.

Five communities have *-mentary* scores of 1—i.e., in these five communities, no reduced-penult tokens of *-mentary* were produced at all: Cobleskill, Geneva, Saratoga Springs, Morrisonville, and South Glens Falls. Each of these five communities had three or fewer speakers interviewed; Morrisonville had only one. The highest mean *-mentary* score from a community with seven or more speakers interviewed was 0.98, in Canton: here all elicited *-mentary* tokens had the stressed penult, and only one speaker produced a connected-speech reduced token. The lowest community score was 0.43, in Poughkeepsie. The exact score of each community is listed in Table 6.9 below.

As Map 6.8 shows, an unexpectedly clear geographic pattern appears in the community *-mentary* scores, with higher scores further west and north, and lower scores further east and south. The only exceptions to the isoglosses on Map 6.8 are a few communities in which only two or three speakers were interviewed—Queensbury, South Glens Falls, Saratoga Springs, and to a lesser extent Cobleskill—which have higher *-mentary* scores than the communities

surrounding them; but the samples in these communities are small enough that some of their relatively high scores might merely be statistical accident.[9]



Map 6.8: Community *-mentary* scores.

The isoglosses on Map 6.8 separate the communities with 7–10 speakers into three regions perfectly. The three with scores of 0.5 or lower—Glens Falls, Poughkeepsie, and Amsterdam—fall in a region along the eastern border of New York State, reaching as far north as Lake Placid and as far west as Walton if

[9] For example: the lowest-scoring community in the low-scoring region of yellow points on Map 6.8 is Poughkeepsie, where three speakers scoring 1 and four scoring 0 make a total score of 0.43. In South Glens Falls, three speakers were interviewed, all scoring 1. Fisher's exact test finds that the probability of the difference between South Glens Falls and Poughkeepsie being the result of sampling accident is $p \approx 0.17$: not high by any means, but certainly not so low that we could say with certainly that South Glens Falls is out of keeping with the other communities on this side of the isogloss.

small-sample communities are included. Communities with scores of 0.8 or higher arc around from Plattsburgh in the northeast down to Oneonta and Sidney in the south, and, if the two speakers in Geneva are to be believed, extending further west into the core of the Inland North. In between these two areas are a small collection of communities with scores between 0.65 and 0.8, including Utica, Gloversville, and Cooperstown.

Table 6.9. Mean *-mentary* scores for each community versus their factor weights in each of two logistic regressions on stressed penult ("A" without and "B" with age/lexeme interaction term). Heavier lines separate groups of communities marked in different colors on Map 6.8.

community	mean score	factor weight A	factor weight B	*n*
Poughkeepsie	0.43	.167	.170	7
Glens Falls	0.44	.131	.156	7
Schenectady	0.45	.307	.308	2
Amsterdam	0.50	.188	.175	7
Lake Placid	0.50	.284	.174	2
Walton	0.50	.311	.174	2
Yorkville	0.67	.461	.547	1
Utica	0.71	.319	.364	7
Cooperstown	0.75	.524	.493	9
Fonda	0.75	.577	.397	2
Gloversville	0.79	.429	.438	9
Ogdensburg	0.83	.711	.692	9
Watertown	0.84	.534	.528	10
Oneonta	0.86	.471	.541	9
Plattsburgh	0.86	.554	.585	7
Queensbury	0.88	.524	.586	2
Sidney	0.91	.789	.754	8
Canton	0.98	.905	.892	9
Cobleskill	1	excluded	excluded	2
Geneva	1	excluded	excluded	2
Saratoga Springs	1	excluded	excluded	2
Morrisonville	1	excluded	excluded	1
South Glens Falls	1	excluded	excluded	3

Now, it might be argued that computing average *-mentary* scores is not the best way of determining each community's degree of advancement in the change toward stressed penult: after all, it was found in the previous section that at least one or two other factors (such as style, age of speaker, and lexical identity) have statistically significant effects on the choice between reduced and stressed-penult variants of *-mentary*, and these features might not be evenly distributed among the sampled communities. Table 6.9, therefore, displays the comparison between community *-mentary* scores as defined here and the factor weights for each community as calculated by logistic regressions both including a cross-product between age and lexical identity (as in Table 6.7 above) and excluding it (as in Table 6.5).

As Table 6.9 shows, the logistic regressions justify the major isogloss of Map 6.8, the dark green isogloss separating the communities with scores of 0.5 and lower and those with scores of 0.65 and higher. The six communities with the lowest *-mentary* scores are also those with the lowest factor weights in *both* logistic regressions: every community with a *-mentary* score of 0.5 or lower has a factor weight less than any community with a score higher than 0.5, regardless of whether the interaction between age and lexeme is included in the logistic regression. Now, although these six communities are consistently the six least favorable to the stressed penult by all three measures, some seem more favorable to it than others: Schenectady in particular has factor weights in both logistic regressions closer to those of Utica than to Poughkeepsie, Glens Falls, or Amsterdam. However, it is the three cities in this set with samples of seven speakers that have the lowest overall factor weights—all three are below .200 in

both regressions and differ by at least .131 from the next highest-weighted well-sampled community. So the logistic regressions strongly support the dark green isogloss on Map 6.8 as drawn with respect to the well-sampled cities, and weakly with respect to some of the communities with smaller samples.

The light blue isogloss on Map 6.8 is less well supported by the logistic regressions. Regression B, which includes the age/lexeme interaction term, still largely distinguishes the communities with scores above 0.8 (and factor weights above .500) from those with score below 0.8 (and factor weights below .500), with only the single speaker from Yorkville as an exception. However, communities with factor weights above and below .500 come quite close together on either side of that line, with Cooperstown and Watertown's factor weights differing by only .035. Regression A would group Oneonta with the green communities of Map 6.8 (a grouping that is not geographically unmotivated), while Fonda rises to a relatively high factor weight. Finally, if the six communities with low *-mentary* scores are removed and new logistic regressions run on the remaining communities, community is no longer selected as a significant factor—indicating that the difference between *-mentary* scores above and below 0.8 on Map 6.8 is not statistically very meaningful.

So the intermediate region of communities in green on Map 6.8 should be taken at best with a grain of salt. The statistical results support, however, the dark green isogloss separating the sampled region into a large central, northern, and western area of very high use of the stressed penult (the mean score for all of the 85 speakers in this area is 0.84) and a southern and eastern region of

relatively low incidence of the stressed penult.[10] Combined with the finding from the previous section that the stressed-penult variants appear to be increasing in apparent time (at least for the lexical item *elementary*), this gives us a general picture of the change toward the stressed penult advancing eastward across New York State over time. In this model, the stressed penult has reached the eastern edge of the state only relatively recently, and therefore the change toward the stressed penult is further from completion there; but its presence is still clearly noticeable and shows a high degree of inter-speaker variability. For the sake of conciseness, I will for the time being refer to the region of relatively low stressed-penult incidence as "the eastern region".

6.2.3. Analysis of geographical results

The most striking fact about the eastern region is its almost complete lack of correspondence to the dialect regions defined in earlier chapters on the basis of phonological features. In fact, the eastern region is extremely phonologically diverse: it includes Poughkeepsie, a Hudson Valley core city, with raised /oh/ and diffused /æ/ system; Amsterdam, a Hudson Valley fringe city; Glens Falls, an Inland North fringe city, with the NCS; and Lake Placid, a North Country village, with the *caught-cot* merger. This means that the *-mentary* isogloss cuts across the phonologically-defined regions, separating Lake Placid from the rest

[10] But only *relatively* low, compared to the rest of the sampled area. Of the 34 speakers on the yellow side of the dark green isogloss, fully 16 (47%) produced *only* the stressed penult, and another six (18%) produced at least one stressed-penult token; the average *-mentary* score for these 34 speakers is 0.57. Considered independently, and not in comparison to the other sampled communities that still seems pretty high.

of the North Country, Glens Falls from the rest of the Inland North, and the phonologically very similar Amsterdam and Oneonta from each other. Meanwhile, although the sharpest phonological isogloss in the entire sampled region is that between Ogdensburg and Canton, these two communities are grouped together by their treatment of *-mentary*. And while (as repeatedly noted throughout this dissertation) the younger speakers in Cooperstown are phonologically completely dissimilar to the speakers in the other communities in their vicinity, their mean *-mentary* score of 0.69 is very much in keeping with the surrounding area. The eastern region does appear to include the entire Hudson Valley core region; and like the NCS isogloss, the *-mentary* isogloss separates Amsterdam from Gloversville; but that's as close as the dialect regions defined by *-mentary* get to resembling the phonologically-defined regions.

Although it is a pronunciation variable, the choice between the *-mentary* variants deals only with the pronunciation of a small family of lexical items (or of a single morpheme, *-ary*); it does not interact with the general structure of the phonological system. For this reason, as Evanini (2009) points out, it makes more sense to consider *-mentary* as a lexical dialect feature than a phonological feature. And it is, of course, well understood that the regions defined by present-day lexical isoglosses need not correspond well to the dialect regions defined by phonological change. Famously, as *ANAE* and Campbell (2003) both show, the boundary between the regions using *pop* and *soda* to mean 'soft drink' separates the Inland North core cities of Syracuse and Buffalo—Syracuse (and Binghamton) joining with the Hudson Valley and points to the east in using *soda*,

while Buffalo and points west use *pop*[11]—while simultaneously uniting most of the Inland North with the Midland into a single large *pop* region, defying the sharpest phonological divide in the United States. So *-mentary* resembles *soda*/*pop* in having an isogloss that is seemingly independent of phonologically-defined dialect regions.

The status of *-mentary* as a fundamentally lexically-defined variable, moreover, suggests something about the potential objects of dialect diffusion. Labov (2007) argues that, since diffusion takes place through contact between adults from different dialect regions, it can directly affect only relatively surface-level linguistic entities, such as regular phonological rules or individual lexical items; speakers fail to take note of the structured relationships between linguistic objects. In the case of the diffusion of the New York City /æ/ system in particular, speakers do not take note of words' internal morphological structure; unlike in the New York City system, tensing of /æ/ in the diffused system does not depend on the location of morpheme boundaries. However, the pattern of *-mentary* variation indicates that in at least some cases speakers do take note of morpheme boundaries during dialect diffusion.

The data presented so far suggests that the stressed penult has spread relatively recently to the eastern region, and that the most frequent *-mentary* word, *elementary*, lags as expected in an analogical change. Indeed, *elementary* appears to lag not only in the area where the stressed penult is most prevalent, but also in the eastern region itself. Only four speakers out of the 35 sampled in

[11] The status of Rochester appears to be intermediate: of the two Telsur speakers in Rochester, one uses *soda* and the other *pop*; Campbell (2003) finds Monroe County, which contains Rochester, to be about two-thirds *pop*-using and one-third *soda*.

the eastern region show variation between reduced and stressed-penult variants. These four individuals produced only one stressed-penult token of *elementary* against five reduced tokens (including one in connected speech), but six stressed-penult tokens of other *-mentary* words and only one reduced. This difference is significant at the $p < 0.05$ level; it remains significant if restricted only to the three speakers who exhibited variation between elicited tokens, or expanded to all speakers in the eastern region.[12]

This is not what would be expected in a scenario where speakers in the process of diffusion never pay attention to lexeme-internal morpheme boundaries. If the object of diffusion were strictly the lexical item, one would expect the most frequent lexical item to be the *most* advanced in a change in a region that the change had diffused to: diffusion acting on lexical items only would simply have more opportunities to affect pronunciations of more frequent words than of less frequent words. But for *elementary* in the eastern region the opposite is the case; the most frequent word is still the least advanced in the change. This suggests that what is undergoing diffusion in this case is not the individual lexical items *elementary*, *documentary*, and so on, but rather the analogical change in the morpheme *-ary* itself. That is to say, it seems that diffusion is capable of directly transmitting changes in a bound derivational morpheme. Insofar as that diffusion only directly affects surface-level linguistic entities, the morpheme *-ary* appears to be sufficiently superficial to be thus affected.

[12] If expanded to the entire eastern region, there are as follows: *elementary* has 16 stressed penults out of 35 (46%), and the other lexical items have 49 out of 74 (66%); this is significant at the $p < 0.05$ level. If the two tokens of *elementary* produced in spontaneous speech, both reduced, are excluded, however, p rises to approximately 0.08.

The *-mentary* isogloss of Map 6.8, of course, does not define the outer limits of stressed-penult use; the entire sampled region is within the area of stressed-penult use, and the green isogloss merely separates two sub-regions within that area. In order to gain a clearer understanding of the forces influencing the distribution of the stressed penult, it will be necessary to go beyond the region sampled by the current project and attempt to find the outer boundaries of the distribution of the stressed penult. Before moving on to the broader search for the geographic boundaries of the stressed penult, however, let us briefly look at the pattern of variation *between* the two stressed-penult variants.

6.2.4. The reduced-antepenult variant

Variant 4, as defined above, may be referred to as the reduced-antepenult variant: the *-ment-* of *-mentary* is reduced to minimal stress, so that the stress pattern of the word is *élementàry*. It is attested only in wordlist style, and only from speakers who produced no tokens of reduced variants. It was posited above that the reduced-antepenult variant is a spelling pronunciation or hypercorrect alternative to variant 3, the other stressed-penult variant; and therefore in this section we will consider only the variation between the two stressed-penult variants, disregarding reduced tokens.

The reduced antepenult is very infrequent in the data: among 274 tokens of stressed-penult *-mentary* in wordlist style, the reduced antepenult only occurs a total of 20 times, or about 7%. Table 6.10 shows the results of a multiple logistic

regression on 266 of these 274 wordlist-style tokens (excluding the eight tokens of *rudimentary*, of which none had a reduced antepenult) against four factor groups. The only factor group not found to have a significant effect is region, defined in terms of the three regions on Map 6.8. In other words, for example, although the stressed-penult variants are less frequent overall in the eastern region containing Amsterdam, Poughkeepsie, and so on than they are further west and north in New York State, the stressed-penult tokens that are found in the eastern region are not significantly more or less likely to have a reduced antepenult in the eastern region than elsewhere. Gender, lexical item, and age all have significant effects on the choice between variants 3 and 4, with factor weights as shown on Table 6.10.

Table 6.10. A logistic-regression analysis of variation between the two stressed-penult variants, with reduced antepenult as the positive value; $n = 266$. Not significant: region.

gender:	weight:	lexical item:	weight:	age group:	weight:
male	.675	*sedimentary*	.787	1923–1942	.364
female	.335	*complimentary*	.569	1943–1960	.771
		elementary	.466	1962–1980	.638
		documentary	.183	1981–1993	.318

Sedimentary's status as the lexical item most favorable to the reduced antepenult is not too hard to explain. *Sedimentary* is almost certainly the least familiar of the four *-mentary* words considered here; and as observed above, less familiar words are more likely to subject to analogy.[13] And just as the stressed penult in *-mentary* words is the result of analogy with other *-ary* words, the reduced antepenult can be construed as the result of further analogy: in other lexemes in which *-ary* is used a suffix, the stress pattern of the *-ary* word mimics

[13] Although *documentary* has the lowest factor weight, it is not the most familiar of the *-mentary* words. However, in a comparison between *documentary* on the one hand and *complimentary* and *elementary* combined on the other, Fisher's exact test shows no significant difference ($p > 0.1$); *sedimentary* vs. *complimentary* and *elementary* does show a significant difference ($p < 0.05$).

that of the root: *missionary*, *dietary*, and *planetary* all bear primary stress on the first syllable, just as *mission*, *diet*, and *planet* do. In *-mentary* variant 3, the majority stressed-penult variant, this is not the case: *sediméntàry* does not share the stress pattern of *sédiment*. Pronouncing *sedimentary* with the reduced antepenult, therefore, is the result of analogy in two ways: bringing the pronunciation of the derived *sédimentàry* in line with that of the root *sediment*, and allowing the suffix *-ary* to have the same phonological relationship to its root in *sediment* as it has in other words.

The reduced antepenult is favored by males. A possible explanation for this tendency might lie in the cognitive differences that have been found between males' and females' degree of reliance on memory versus real-time derivation in the production of morphologically complex words: Ullman et al. (2002) report the results of several experiments that support the hypothesis that "females may tend to memorize previously encountered complex representations (e.g., regular past-tenses; *played*) that males generally compose on-line (*play* + *-ed*)." This hypothesis would seem to predict that males should be somewhat more likely than females to resort to an analogical pronunciation for a morphologically complex item encountered on a wordlist (i.e., to compose the pronunciation "on-line"), while females would be more likely to employ the pronunciation that is most common in discourse. That prediction is borne out by the *-mentary* data, which therefore supports the analysis of the reduced antepenultimate as an analogical spelling pronunciation.

The effect of age on the reduced antepenult seems somewhat complicated, from the logistic-regression results: it is the intermediate age groups, born

between 1943 and 1980, that show the highest rate of the reduced antepenult, while the youngest and oldest groups appear to disfavor it. However, the oldest age group's low factor weight and low apparent rate of reduced antepenult may be merely a statistical accident due to the relatively small number of older speakers in the sample and (proportionally) even smaller number of stressed-penult tokens produced by them: only 22 stressed-penult tokens were produced by speakers born before 1943, of which one had a reduced antepenult (for a rate of 4.5%). The intermediate age groups have a total of 16 reduced-antepenult tokens out of 117 stressed-penult tokens, for a reduced-antepenult rate of 14%, but Fisher's exact test shows that the oldest age group does not differ significantly from the intermediate groups ($p > 0.2$). On the other hand, the youngest age group *does* differ significantly from the intermediate age groups ($p < 0.001$), and even from all three other age groups combined ($p < 0.002$), with three reduced-antepenult tokens out of 127 stressed-penult tokens (2.4%). So perhaps it would be best to disregard the undersampled oldest age group for the purposes of this analysis, and treat the age-group profile as indicating merely an apparent-time decline in the reduced antepenult.

Such an apparent-time decline is relatively surprising, inasmuch as the stressed penult itself appears to be increasing in apparent time. If the origin of the stressed penult is an analogical change, and the reduced antepenult is, as argued above, merely a further analogy in the same direction, one might have expected the reduced antepenult to be the next stage in the same change, and therefore to be *increasing* at the expense of the stress-clash form *eleméntàry*. But the opposite is happening—the reduced-antepenult forms are receding, and

there is no evidence of them extending beyond wordlist style into any less careful style. This may indicate that as the shift toward the stressed penult goes to completion—i.e., as there is less and less variation in the community between stressed and reduced penults in *-mentary* words—individual speakers are less likely to feel uncertain of the pronunciation of a *-mentary* word, and therefore less likely to resort to an analogical spelling pronunciation (such as the reduced-antepenult variant) when such a word is encountered in a written wordlist.

6.3. Moving beyond the current sample

The region this dissertation is principally focused on is the eastern half of the state of New York, since the chief dialectological goal of the project was to identify the eastern boundary of the NCS, which was already known to be east of Syracuse. Therefore nearly all of the speakers sampled for analysis in this dissertation are located in the eastern half of the state, and so the discussion in the preceding section can give us a clear idea of the distribution of the stressed penult in *-mentary* only in that core sampled region. In the current sample, the only direct indication we have of the extent of the stressed penult outside of the eastern half of New York is two speakers from Geneva, both of whom produced only stressed-penult tokens of *-mentary*, suggesting that the use of the stressed penult extends much further west than the core region of study. To these can be added two speakers whom I interviewed but did not analyze from Brockville, Ont., located about ten miles upstream (southwest) from Ogdensburg on the opposite side of the St. Lawrence River, which marks the U.S.–Canada border.

The two Brockville speakers used reduced variants for all *-mentary* words, which suggests that the dominance of the stressed penult in New York's North Country does not extend across the boundary into Canada.

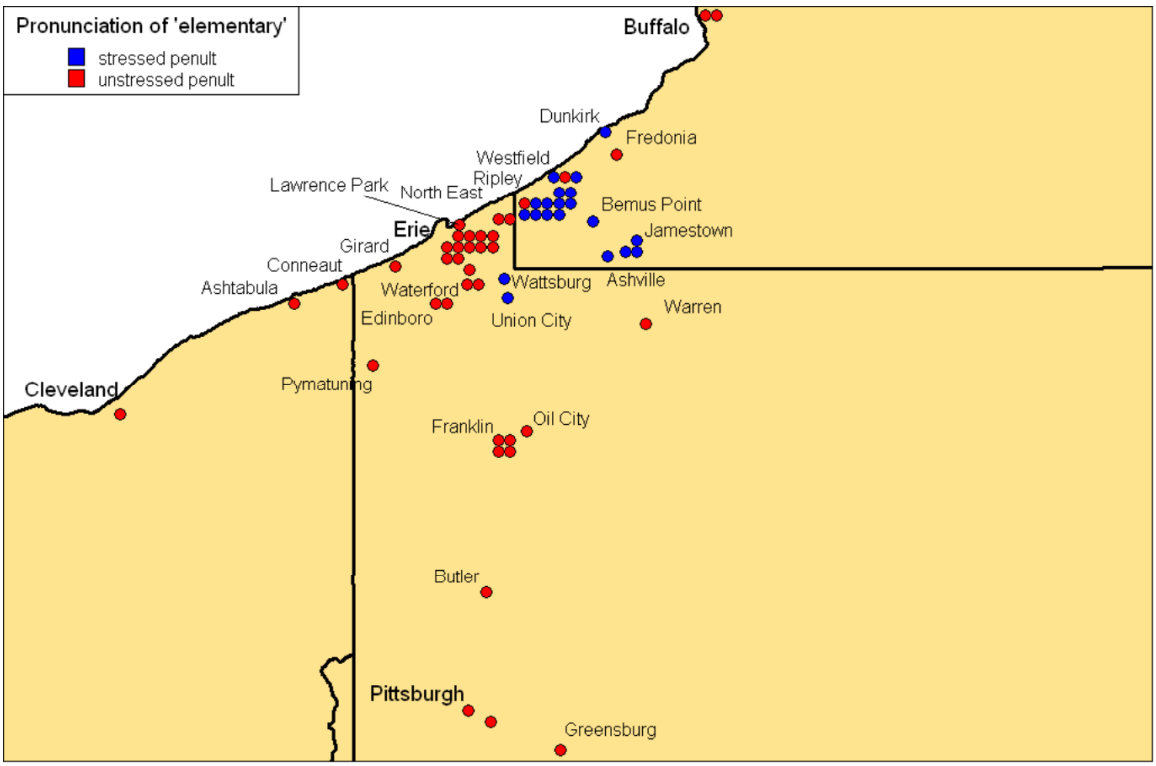
As mentioned above, other data on the status of *-mentary* beyond the eastern part of New York State is hard to find. One unexpected, though unreliable, source of information on *-mentary* is Wikipedia. The Wikipedia article on Central New York[14]—defined as the region centered around Syracuse and Utica, and thus spanning the western boundary of the core region sampled in this dissertation—reports the following:

> Many Central New Yorkers pronounce elementary as /ɛlʌmɛntɛɹi/ instead of the General American pronunciations of /ɛlʌmɛntɝi/ and /ɛlʌmɛntri/. The r-colored vowels in documentary and complimentary follow suit.

This remark was added to the Wikipedia article on 19 September 2007, with no reference or explanation, by an anonymous contributor. While it is unwise to take unreferenced claims made in Wikipedia as reliable data for research purposes, at any rate this constitutes evidence that at least one other person has seemingly independently noticed the stressed-penult pronunciation of *-mentary* words, and in a region that extends somewhat further west than the bulk of my sample.

Extending the known range of the stressed penult somewhat farther west, Sinhababu (2007) performed, at my request, a small amount of informal fieldwork in Rochester. He reports: "Four out of five women who grew up in Rochester and go out on Thursday night pronounce 'documentary' with the stress on the next-to-last syllable. The woman from Syracuse does too."

[14] *http://en.wikipedia.org/wiki/Central_New_York*, viewed on 16 August 2009.



Map 6.11. Figure 8.2 from Evanini (2009), showing the distribution of reduced (marked in red) and stressed-penult (blue) tokens of *elementary* in wordlist style in far western New York, western Pennsylvania, and northeastern Ohio.

Apart from my own work, however, the only other serious research on the stressed penult in *-mentary* of which I am aware was carried out by Evanini (2009) in far western New York and northwestern Pennsylvania, as shown on Map 6.11. Evanini finds that at the western edge of New York State, the border between stressed and reduced variants of *elementary* is very sharp and corresponds remarkably well with the Pennsylvania–New York state line. Of 23 speakers he interviewed in Western New York, fully 18 produced a stressed penult in *elementary* in wordlist style—a rate of 78% that is not appreciably different from the corresponding 86% rate much further east in the communities within the blue isogloss on Map 6.8. Meanwhile, immediately across the state

line in Erie County, Penna., 20 out of 22 speakers (91%) produced reduced variants.

This juxtaposition of 78% stressed-penult immediately across the border from 91% reduced (or more, if we were to include data from further south in Pennsylvania) is unlike anything seen in the eastern half of New York State, where even the relatively high rate of reduced *-mentary* in the so-called eastern region reaches only 52% in wordlist-style *elementary*, hardly 91%. This seems to amply justify identifying Chautauqua County—the westernmost county in New York—plus the two stressed-penult speakers in Erie County, Penna. as the extreme western limit of the stressed penult.

Evanini's finding that the stressed-penult variants of *-mentary* exist at the far western edge of New York State, combined with the scattered and less reliable data from between Evanini's region of study and my own, suggests that stressed-penult *-mentary* may be found throughout the entire width of the state. Moreover, while in the eastern part of New York State it is the oldest speakers who show the *lowest* rate of stressed penult in *elementary*, Evanini's work makes a suggestion in the opposite direction: the only two speakers in Evanini's sample in Pennsylvania who produced the stressed penult were both over the age of 75 at the time they were interviewed, suggesting that the stressed penult may actually be of relatively long standing but disappearing in apparent time on the Pennsylvania side of the border. This seems to (weakly) support the hypothesis that the stressed penult is expanding from west to east—in the eastern part of New York State it is relatively new in apparent time, in that older speakers are

the least likely to use the stressed penult, but at the western edge of its (known) distribution it at least appears to be of somewhat longer standing.

6.4. The rapid and anonymous school-district telephone survey

In order to gain a clearer picture of the distribution of the stressed penult in *-mentary*, I carried out, with the assistance of Keelan Evanini, a rapid and anonymous telephone survey of the pronunciation of *elementary* across the entire state of New York and parts of adjacent states (Dinkin & Evanini 2009). The methodology of this survey was inspired by a rapid and anonymous survey of the *caught-cot* merger carried out by William Labov in 1966 and described in *ANAE* as follows:

> At that time, long distance telephone operators were more locally situated than at present. The basic paradigm was to ask for the number for a name pronounced as [hæri hak], using a low central vowel for the surname. *Hawk* is a more common surname than *Hock*, and in the areas where the merger was dominant, the operators would unhesitatingly search for *Harry Hawk*. The name was usually not found. The investigator then asked the operator if she had looked for *Harry* [H-A-W-K]. In the one-phoneme area, the answer was normally 'yes'; in the two-phoneme area, the normal response was 'no'. (p. 65)

Just as it was relatively easy in 1966 to elicit perceptual judgments of minimal pairs from telephone directory-assistance operators, since part of their job was to infer the spelling of names pronounced to them by people over the telephone, there is a class of people from whom it is relatively easy to elicit pronunciations of *elementary* over the telephone: receptionists at schools and school-district offices. In order to map the distribution of the stressed-penult pronunciation of *elementary*, the word was elicited during telephone calls to

district offices and elementary schools in 185 school districts across New York and nearby parts of adjacent states.

In 56 of the 62 counties[15] in New York State, pronunciations of *elementary* were collected from two school districts as part of this study. In most cases the districts chosen were the one containing the most populous city or village in the district, and a second one in a geographically distinct part of the county from the first one. When it proved impossible to elicit a token of *elementary* from two districts meeting that collective description, we simply called whatever two districts we could get data from, as far apart geographically as possible. Data was also collected from counties in Pennsylvania, Massachusetts, Vermont, and eastern Ontario along the border with New York State, and additional districts as far into each as necessary until stressed-penult tokens stopped appearing. In some of the Northern Tier of counties in Pennsylvania, data was collected from more than two districts in order to be able to define the outer geographical limit of the stressed penult more precisely; and in the two most populous counties located just south of the Northern Tier (Lackawanna County, containing Scranton, and Lycoming County, containing Williamsport), a much larger amount of data was collected in order to have a better sample of the most densely-populated parts of northern Pennsylvania.

The question asked to elicit the token of *elementary* varied depending on what type of office was reached. Typical questions used when calling school-

[15] The six exceptions were Hamilton County and the five counties that make up New York City. Since New York City is a single speech community and (as will be seen) apparently well outside the range of the stressed penultimate, only one school was called and one data point collected in the city. No data was collected in Hamilton County because Hamilton County is extremely sparsely populated and contains very few schools, none of which seem to contain the word *elementary* in their names.

district offices included "How many schools of each age group are there in this district?" ("…three elementary schools") in districts containing a large number of schools, and "What are the names of the principals of the schools in this district?" ("The principal of the elementary school is…") in districts containing a relatively small number of schools. When phoning elementary-school offices, frequently-used questions included "What is the full name of this school?" (with the hope of eliciting, for example, "Banford Elementary School") and simply "Is this a middle school?" ("No, it's an elementary school"). In a few cases, we were lucky enough that the person answering in an elementary school office would simply state the name of the school, including the word *elementary*, upon picking up the phone. Whenever it could be done realistically, the investigator would then say "I'm sorry, say that again?" in order to elicit a second token of the word *elementary*, following the technique originally developed by Labov ([1966] 2006) in the well-known rapid and anonymous study of rhoticity in New York City department stores.

More district offices than individual school offices were called, on the grounds that calls were being made in the summer (of 2008) and therefore district offices were more likely to be staffed. Whenever a voicemail message was encountered that contained the word *elementary* (e.g., "You have reached Banford Elementary School" or "To reach the elementary school office, press 2"), the pronunciation of *elementary* was noted, but every effort was made to reach an actual speaker. However, districts in which it proved impossible to reach a living speaker but one or more tokens of *elementary* were collected from voicemail recordings are included in the data. This includes only six school districts in New

York State, but larger fractions of those in the adjoining states, many of which were called later in the afternoon or evening when the offices were more likely to be closed. In particular, nearly all of the data collected from school districts in Pennsylvania further south than the Northern Tier of counties is voicemail data only.

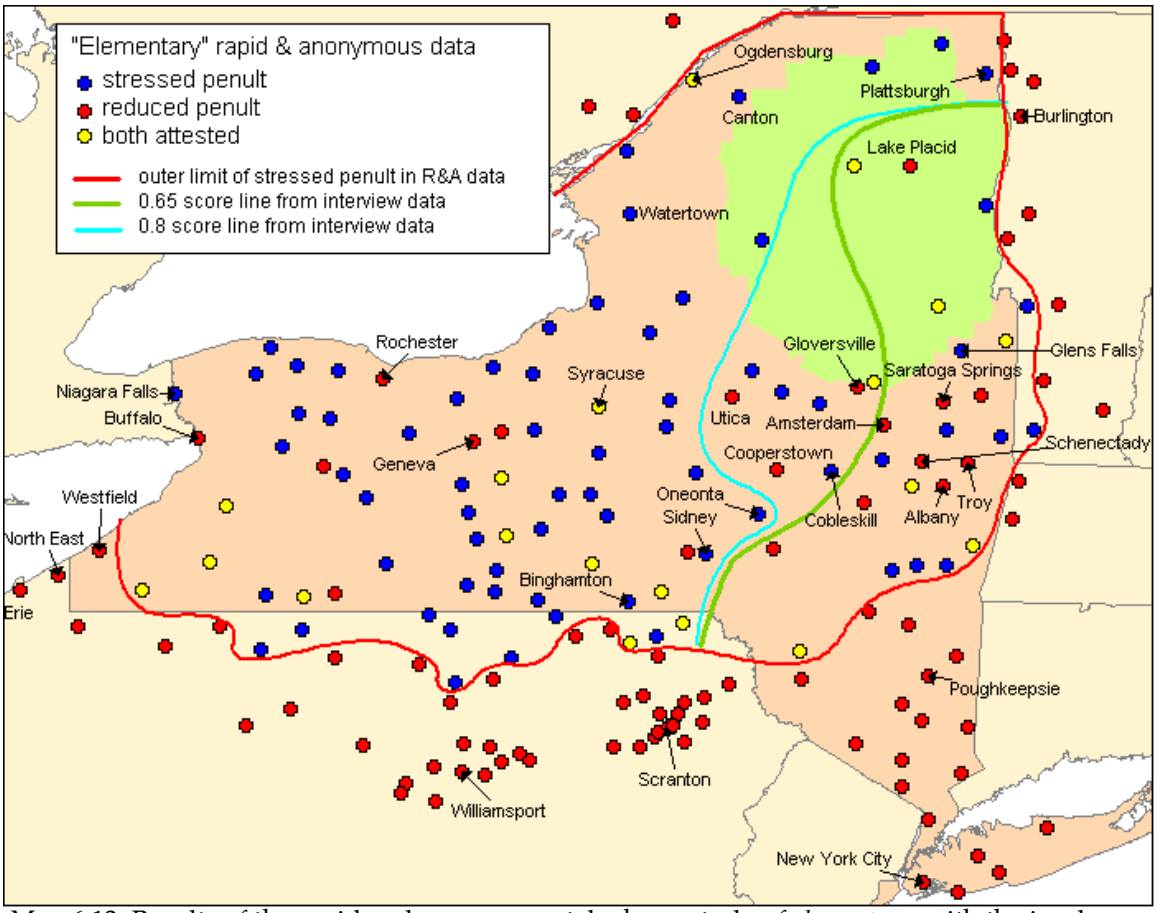
This rapid and anonymous school-district study suffers, of course, from the disadvantage of all rapid and anonymous studies: it is impossible to be certain that the respondents—the people who work in schools or school-district offices—are natives of the communities in which they work. This leads to an inescapable level of imprecision in the data. We cannot deny the possibility, of course, that the secretary of the superintendent of schools in any particular community in Upstate New York may have moved to New York State as an adult and therefore not pronounce *elementary* in a manner representative of the community she is taken as a sample of; however, the regional consistency of the stressed penult, as will be seen below, seems to indicate that this is not too serious a concern. More probably of importance in the interpretation of the results, however, is the possibility that individuals may commute across the isogloss. That is to say, the results of Evanini (to appear) on the western edge of the New York–Pennsylvania border indicate a very sharp boundary between regions where the stressed-penult and reduced variants of *elementary* dominate; it is therefore possible that a speaker might be a native and resident of a community in (for example) the stressed-penult region, but work in a school-district office of a community a few miles away in the reduced-penult region. For this reason the *exact* location of the isogloss between stressed-penult and reduced

variants should not be taken as totally reliable, although it can be taken as indicating general regions.

Moreover, the results from the school-district study are not strictly comparable to the interview results. The school-district study collected only tokens of *elementary*, while the interview results contain a variety of *-mentary* words. It was observed earlier in this chapter that *elementary* is the lexical item least favorable to the stressed penult, and so it may well be that some of the school-district speakers who produced reduced variants of *elementary* would have produced stressed-penult tokens of, for example, *documentary* if those had been elicited. Furthermore, the great strength of the rapid and anonymous methodology—that it elicits natural speech from respondents who are unaware their speech per se is being observed—is actually a disadvantage in this case, as it was found above that more natural speech styles may actually inhibit the production of the stressed penult. This implies that the interview data, in which the majority of *-mentary* tokens were elicited through formal methods, would show a higher probability of stressed penult than a rapid and anonymous school-district inquiry in the same community. In other words, for both lexical and stylistic reasons, the school-district study is likely to underestimate the density and geographic extent of the stressed-penult *-mentary*.

Map 6.12 shows the results of the school-district study, representing districts where only stressed-penult tokens were collected with blue points, districts where only reduced tokens were collected with red points, and districts where both were collected (either from multiple speakers or in multiple tokens of *elementary* from a single speaker) with yellow points. The red isogloss outlines

the full geographic extent of the stressed penult in the school-district data; only reduced variants were produced outside the red line.



Map 6.12. Results of the rapid and anonymous telephone study of *elementary*, with the isoglosses from Map 6.8 above superimposed.

As predicted, the red isogloss outlines a smaller area than that in which stressed-penult *-mentary* is known to be attested: both Westfield and Poughkeepsie fall outside the isogloss but have stressed-penult tokens of *elementary* recorded in interview data. Similarly, there are several communities in which a majority of interviewed speakers produced stressed-penult *elementary* in elicitation style but only reduced variants were collected in the school-district study: Saratoga Springs, Gloversville, Utica, Cooperstown, Geneva, Rochester

(according to Sinhababu 2007), and Westfield. By contrast, there are six communities in New York State with both interview data and school-district data in which less than a majority of interviewed speakers produced stressed-penult *elementary* (Lake Placid, Glens Falls, Schenectady, Amsterdam, Poughkeepsie, Buffalo); Glens Falls is the only one of these six to have *any* stressed-penult tokens produced in the school-district study.

Although the total geographical area in which the stressed penult is found in the school-district study is smaller than the area in which it is known to exist in interview data, the school-district study agrees with the interview data in showing that the frequency of the stressed penult declines from west to east. In the area enclosed between the red and green isoglosses on Map 6.12—i.e., within the area of incidence of the stressed penult in the school-district study, but in the "eastern region" where *-mentary* scores from interview data are 0.5 or less—there are a total of 25 sampled districts (including two in Vermont). Among these 25, the stressed penult and the reduced variants are about equally frequent: there are ten blue points (representing exclusive used of the stressed penult) and nine red points (representing exclusive reduced variants). In the area between the green and blue isoglosses, where the interview data shows *-mentary* scores between 0.65 and 0.8, the distribution is about the same as in the eastern region: four blue points and three red points. In the large northern, western, and central region, however, the picture is quite different: there are 73 districts sampled in the area bounded by the red and blue isoglosses (including ten in Pennsylvania); among these there are only seven red points and fully 54 blue points: a ratio of eight to

one in favor of the stressed penult, in contrast to the more or less even split in the eastern region (from which it differs significantly: $p \approx 0.001$).

There may be an effect of city size playing a role in the results of the school-district survey. The nine most populous cities within the region in which the stressed penult is attested are Buffalo, Rochester, Syracuse, Albany, Schenectady, Utica, Niagara Falls, Troy, and Binghamton, all of which had populations of more than 40,000 as of the 2000 U.S. Census. In only one third of those nine cities (Syracuse, Niagara Falls, and Binghamton) were stressed-penult tokens collected in the school-district survey; whereas fully 87% of the remaining 97 districts (i.e., 84 of them) produced at least one stressed-penult token. Despite the small number of cities of 40,000 or more, this difference is significant at the $p < 0.001$ level. This may represent a greater resistance of larger cities to the spread of the stressed penult in *-mentary*, though it may merely mean that larger cities are more likely to have people answering the telephones in school offices who were born outside of the region. The possibility that larger cities resist the stressed penult is weakly supported by the fact that Buffalo, the largest city in Upstate New York, is also the only community in New York State with interview data from more than one speaker (in this case two speakers, interviewed by Evanini) in which only reduced-penult tokens of *elementary* were collected, even in wordlist style.

6.5. Analysis of isoglosses

Map 6.12 indicates that the stressed penult in *elementary* is nearly, but not exclusively, limited to the state of New York. Two towns in Vermont show the stressed penult in the school-district study, both of which are directly on the New York state line; of the communities in Pennsylvania in which the stressed penult is found, none is more than 20 miles or so from the New York border. So it would be only a slight exaggeration to say that the stressed penult in *-mentary* is a feature proper to New York State.

The closest match between a *-mentary* isogloss and the boundary of New York, as seen on Map 6.12, is found in the North Country, at the New York–Ontario[16] border and the northern end of the New York–Vermont border—here none of the Vermont or Ontario districts show the stressed penult, and most of the New York districts do, including the ones closest to the border. The coincidence between the sharp isogloss and the international boundary is reminiscent of some sharp lexical isoglosses found by Chambers (1994), coinciding with the boundary between Western New York and the "Golden Horseshoe" region of Ontario, and seems to support Boberg (2000)'s hypothesis that the international boundary impedes the diffusion of linguistic change. The boundary between New York and Vermont here is formed by Lake Champlain, which is spanned by road bridges only at its extreme northernmost and southernmost points—thus, for example, although Burlington, Vt. and Plattsburgh, the two largest cities on Lake Champlain, are only 20 miles apart on

[16] We did not attempt collect data from Quebec because of the unlikelihood of finding Anglophone schools close to the border with the word *elementary* in their names.

opposite sides of the lake, it takes over an hour to get from one city to the other by car and ferry. The correspondence here between the isogloss and the state boundary may therefore be a simple case of a linguistic boundary coinciding with a natural obstacle to transportation and communication.[17]

Evanini (2009)'s data shows that, at the western edge of New York State, the *-mentary* isogloss corresponds relatively closely to the state line, with 86% of speakers in Chautauqua County, but only two out of 22 speakers on the Pennsylvania side of the boundary, using the stressed penult. The sharpness of the boundary is emphasized by the communities of Ripley, N.Y. and North East, Penna., which are immediately adjacent on opposite sides of the border. In North East, the two speakers sampled by Evanini use reduced variants in wordlist-style *elementary*; in neighboring Ripley, ten out of eleven use stressed-penult variants. The sharpness of the boundary is all the more striking in its lack of correspondence to the phonological isoglosses—Evanini finds that Ripley patterns phonologically with communities on the Pennsylvania side of the boundary, rather than with the Inland North communities elsewhere in Chautauqua County, in that it lacks the NCS and has a well-advanced *caught-cot* merger.

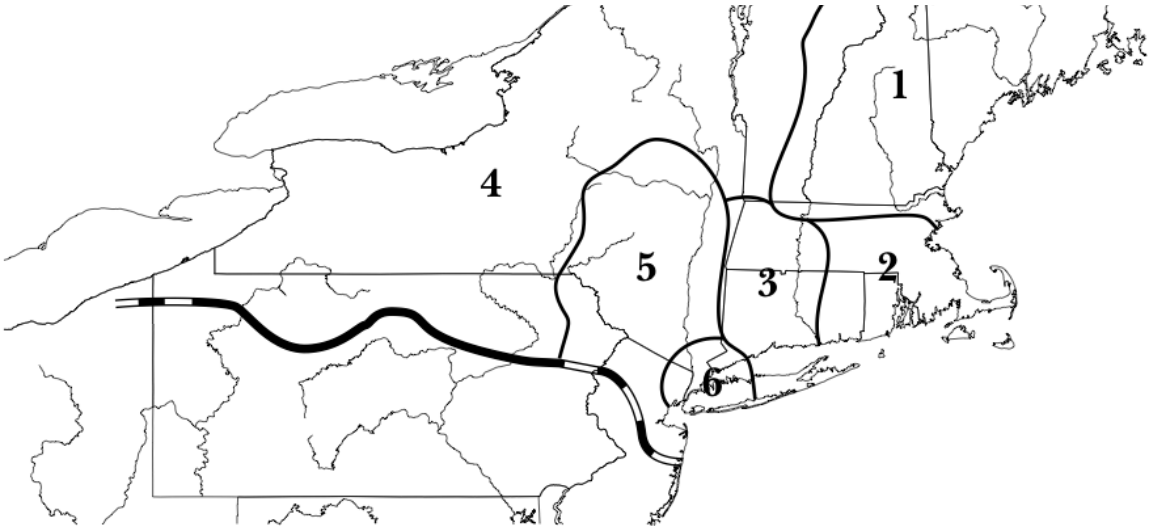
Evanini's overall finding is that the area of northwestern Pennsylvania around the city of Erie, although historically part of the Northern dialect region, never underwent the NCS, and has in many (though not all) respects moved in

[17] In Chapter 5, on the other hand, it was hypothesized that the *caught-cot* merger had spread into the Plattsburgh area from Vermont; if true, that means that Lake Champlain cannot be a *total* barrier to the spread of linguistic change. However, mergers are the most easily diffused of all linguistic changes; moreover, the apparent-time data seems to indicate that the merger is substantially newer to Plattsburgh than to Burlington, meaning the lake may have impeded the merger's advance somewhat in any case.

the direction of features associated with the rest of Western Pennsylvania rather than the North. Ripley, although on the New York side of the border, is grouped with northwestern Pennsylvania in this respect, although in apparent time it lags behind the communities in Pennsylvania proper in its adoption of Western Pennsylvania features such as the *caught-cot* merger. Now, the presence of two elderly speakers in Erie County, Penna. who produced stressed-penult tokens of *elementary* in Evanini's interview data may indicate that the stressed penult was formerly more prevalent in the northwestern corner of Pennsylvania than it is now. In this case, the stressed penult in *-mentary* may be regarded as just another one of the "Northern" features that northwestern Pennsylvania has abandoned in its move towards more Western Pennsylvania–associated features. In that case, the reason the *-mentary* isogloss is so close to the state line here is that Ripley lags behind the communities on the Pennsylvania side of the border in retreating from Northern features.

Further evidence for considering the stressed penult in *-mentary* to be a Northern feature, rather than strictly speaking a New York State feature, can be had by looking further eastward along the New York–Pennsylvania border. Mid–20th century dialectological research grouped the Northern Tier of Pennsylvania counties with New York State as part of the Northern dialect region on both phonetic and lexical criteria (Kurath 1949; Kurath & McDavid 1961); I am not aware of any recent detailed research along this line to see how the mid–20th century isoglosses have held up with respect to present-day features such as the NCS. The *-mentary* isogloss on Map 6.12, however, seems to reflect this pattern: the northernmost communities in Pennsylvania are relatively

consistently grouped with New York State in showing the stressed penult in the school-district data, while communities farther south into Pennsylvania differ.



Map 6.13. Figure 2 from Boberg (2001), based upon Figure 3 from Kurath (1949). The North-Midland lexical boundary is the heavy black-and-white line.

Map 6.13 is another reproduction of Boberg (2001)'s map, showing some of the lexical dialect regions of Kurath (1949). Kurath's North-Midland lexical isogloss seems to extend somewhat farther south into Pennsylvania than the red isogloss on Map 6.12 does; however, as discussed above, the distribution of the stressed penult in the school-district study is expected to fall somewhat short of the actual extent of its presence in the speech community. As argued by Dinkin & Evanini (2009), the motivation of the maintenance of the North-Midland boundary in Pennsylvania as a lexical isogloss seems likely to be related to regional communication patterns: Labov (1974) shows that there has always been a relatively low amount of traffic and communication between the Northern Tier of Pennsylvania counties and the rest of the state. Figure 6.14 reproduces Labov's chart of the average daily north-south traffic flow across various lines of latitude in Pennsylvania, showing that the point of minimum traffic flow corresponds to

(or is even slightly north of) the North-Midland isogloss. On the other hand, Evanini (2009) finds that there has always been a relatively high degree of communication between northwestern and southwestern Pennsylvania. Thus the *-mentary* isogloss appears to match Pennsylvania's regional communication patterns in grouping most of the Northern Tier with New York State, but grouping the northwestern corner of Pennsylvania with the region south of it.

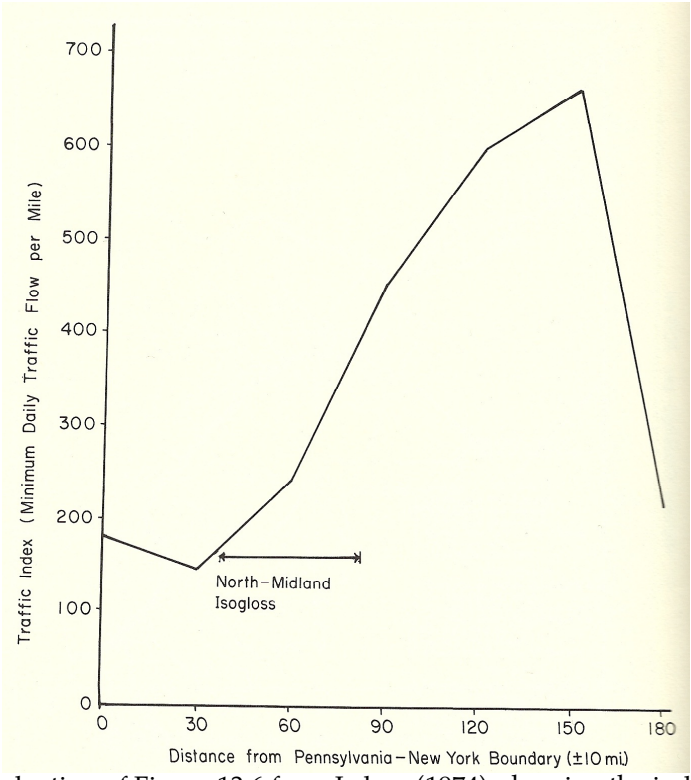


Figure 6.14. A reproduction of Figure 12.6 from Labov (1974), showing the index of traffic density across each of seven east-west lines across Pennsylvania.

The largest discrepancy between the Kurath lexical isogloss and the school-district *-mentary* isogloss is in the area of Scranton, Penna.: as Map 6.12 shows, the school-district study collected data from 14 communities surrounding and including Scranton (in Lycoming, Wyoming, and Luzerne Counties) and found not a single token of stressed-penult *elementary*. Kurath's North-Midland

isogloss, however, as seen on Map 6.13, easily reaches far enough south to include the entire vicinity of Scranton[18] as part of the North, and even *ANAE* includes Scranton as part of the Inland North in some maps. Despite Scranton's inclusion in the North, however, neither of the two Telsur speakers in Scranton has an NCS score of 4 or more—they score 1 and 3, which would not be sufficient to include Scranton in even the Inland North fringe by the standards of the present work, let alone the Inland North core. Moreover, Herold (1990) reports the presence of the *caught-cot* merger in Scranton, further distinguishing it from the Inland North. So notwithstanding the fact that Scranton is historically part of the linguistic North, it does not appear to be sufficiently closely tied to the Inland North to be subject to the NCS. Scranton's nonparticipation in the NCS is mirrored by the absence in the Scranton area of the nearby Northern stressed penult in *-mentary*, although not enough research has been done on the Scranton area to explain what the cause of its separation from the rest of the North is, or whether the north-south traffic minimum in the eastern part of Pennsylvania specifically runs to the north or south of Scranton.

So far it looks as if the stressed penult in *-mentary* originated in the Inland North core of New York State (and northern Pennsylvania), and either failed to spread into or retreated from some historically Northern areas in which the NCS never took place. But it appears to be still in the process of spreading into and through the eastern part of the state—into the regions described in this dissertation as the Inland North fringe, Hudson Valley, and North Country. The eastward expansion of stressed-penult *-mentary* is in some respects reminiscent

[18] Scranton is located near the sharp bend in the Susquehanna River in northeastern Pennsylvania, which is visible on Map 6.13 as being just north of the North-Midland boundary.

of the pattern of diffusion of the NCS, as discussed in previous chapters: NCS features appear to have spread eastward from the Inland North core to the Inland North fringe; and the backing of /e/ spread into the Hudson Valley as well although substantial raising of /æ/ did not. Indeed, just as the NCS appears to have continued spreading eastward from the Glens Falls area to the point that it occurs in one Telsur speaker in Rutland, Vt., the easternmost extent of the stressed penult in *elementary* in the school-district study is two towns in Vermont along the New York border, not too far from Glens Falls.[19] However, the stress pattern of *-mentary* words is essentially a lexical feature that does not depend on the structure of the vowel system, and for that reason the stressed penult spreads eastward irrespective of the phonological status of the communities it spreads into: the area in which the stressed penult is most frequent and the area in which is it least frequent both include Inland North, Hudson Valley, and North Country communities. Thus, while the path of advancement of the NCS is constrained by the differing phonologies of the communities it might spread into, the path of the stressed penult might in some sense be taken to be the most natural path for the west-to-east advance of linguistic innovations in New York State—i.e., the route along which dialect features diffuse if there are no *linguistic* constraints interfering with the course of diffusion.

Identifying the location of the southeastern boundary of the stressed penult is a bit of a challenge. As Map 6.12 shows, the southeasternmost extent of the stressed penult in the school-district study is an arc roughly 80–100 miles north of New York City; if the east-west component of New York–Pennsylvania

[19] Rutland itself was not sampled in the school-district survey because the city does not appear to contain any schools with *elementary* in their names.

boundary were projected eastward, or the Massachusetts-Connecticut boundary projected westward[20], it would roughly coincide with the red isogloss. Poughkeepsie is south of this line, however, and it is known from interview data that the stressed penult occurs in *elementary* and other *-mentary* words in wordlist style in Poughkeepsie. So the actual southeastern limit of the stressed penult must be 40 miles or more south of where the red isogloss appears on Map 6.12. However, the fact that there are *no* tokens of the stressed penult attested in the southeastern part of New York State in the school-district study seems to indicate that the southeastern boundary of the stressed penult must not be too far beyond Poughkeepsie in any case.

Recall that, as shown above, the two large regions' *-mentary* scores from interview data seem to correspond fairly well to the frequencies of the stressed penult in them from school-district data. In the area bounded by the red and green isoglosses on Map 6.12, 64% of school districts produced at least one stressed-penult token of *elementary*, and the average individual *-mentary* score among the interviewed speakers in this area is 0.6. In the area bounded by the red and blue isoglosses, 90% of school districts produced at least one stressed-penult token, and the average individual *-mentary* score is about 0.88.[21] So in the area southeast of the red isogloss, where no school district produced a single stressed-penult token, the best hypothesis seems to be that the stressed penult in *-mentary* vanishes fairly rapidly any further south than Poughkeepsie.

[20] The result of this geometric operation will be referred to below as the "projected line".
[21] It remains approximately 0.88, in fact, regardless of whether only interviews conduced by me are considered or whether Evanini's and Sinhababu's speakers are included in calculating the average.

While the outer limit of the stressed penult along the New York–Pennsylvania border corresponds roughly to the location of the Kurath (1949) North-Midland lexical boundary, the hypothesized location of the southeastern limit of the stressed penult does not clearly correspond to any known isogloss. While the immediate area around New York City is excluded from the stressed penult, the area of exclusion seems larger than the immediate New York City dialect area (labeled "6" on Map 6.13). At the same time, it is certainly smaller than Kurath's Hudson Valley dialect area (labeled "5"). This dissertation's "Hudson Valley core" region, defined as the region subject to the diffusion of characteristic features of the New York City dialect, includes Poughkeepsie and extends some distance north from there, so the area of absence of the stressed penult doesn't correspond to the Hudson Valley core, either.

While it does not correspond to any known *linguistic* boundary, the southeastern limit of the stressed penult does appear to correspond to a well-known *cultural* boundary: the boundary between Upstate and Downstate New York. While the exact location of the boundary between "Upstate" and "Downstate" is notoriously hard to formalize, Upstate can be loosely characterized as that part of New York State that is far enough north to be beyond the immediate influence of New York City in some sense—for example, outside the New York City media market, or far enough away that few locals commute to New York City for work. For example, Empire State Development, a state-run agency for promoting economic development, defines "Downstate" as

including Long Island, New York City, and the five closest counties north of New York City, and "Upstate" as the rest of the state[22].

The saliency of "Upstate" versus "Downstate" as a boundary between two distinct parts of New York State is supported by a map-drawing task I asked most of my in-person interview subjects in the summer of 2008 to perform. Subjects were given a mostly-blank outline map of New York State, labeled only with the caption "New York - The Empire State" and the locations of a few cities (New York City, Albany, Syracuse, Binghamton, Buffalo, Plattsburgh, and either Watertown and Ogdensburg or Oneonta) and asked to draw lines on the map in order to divide the state into its major subregions. A total of 20 individuals in Oneonta[23], Sidney, and Cooperstown performed this task, as well as 14 in Ogdensburg and Canton. The amount of detail in these hand-drawn maps varied widely: a few respondents divided the state into a large number of relatively small regions, giving them labels like "Capital District", "Hudson Valley", "Central New York", "Southern Tier", and so on; a few others divided the state broadly into quarters and labeled them merely, for instance, "north", "east", "south", and "west". But all but three of the 20 subjects in the Oneonta area[24] separated off New York City and the area immediately north of it from the rest of the state, using a boundary line at least 35 or so miles north of New York City

[22] These definitions are found in a document available at *http://www.empire.state.ny.us/UpstateDownstateFund/Guidelines051109.pdf*, viewed 23 August 2009.
[23] These are the Oneonta speakers interviewed in 2008, whose interviews were not phonetically analyzed.
[24] Interestingly, the subjects from Ogdensburg and Canton did not consistently separate a "Downstate" or New York City area from the area north of the projected line—only five of fourteen did so, suggesting that individuals substantially farther north than the conventional Upstate-Downstate boundary are less cognizant of it. Those in Ogdensburg and Canton who labeled some area as "Upstate" gave that name to the North Country or part of it; a few labeled as "Downstate" a region including both New York City and Albany.

and no farther north than approximating the projected line of the east-west Pennsylvania border; many labeled the area south of this line with some such moniker as "Downstate" or "The City".[25] These seventeen Upstate/Downstate boundaries are shown superimposed on Map 6.15.

The second most salient subregion of New York State, based on this task, is Western New York: 16 out of the 20 maps drawn by Oneonta-area residents included some kind of boundary separating Buffalo and the western extremity of the state from Syracuse and locations further east (Rochester was not marked on the blank map), usually with the label "Western NY"; these lines are also shown on Map 6.15. Now, despite the fact that Western New York and much of Central New York are within the Inland North core and share the NCS, the salient regional division between Western and Central New York is reflected in linguistic reality: to a good approximation, Western New York is the only part of the state where *pop* is used rather than *soda* to mean 'soft drink' (*ANAE*; Campbell 2003). So the salient regional division is reflected not in the patterns of sound change, but in the distribution of a lexical variable. By the same token, then, although the salient division between Upstate and Downstate New York does not appear to correspond neatly to any major phonological dialect boundaries, it does seem to approximately represent the southeastern boundary of the stressed penult in *-mentary*. In other words, while the geographical advance of sound change is constrained by the phonological systems of the surrounding regions, which are not easily changed through diffusion, the spread of relatively recent lexical variants appears to more or less reflect the general folk

[25] Several had more than one labeled region south of such a line—distinguishing Long Island from New York City, for example, and a larger labeled "Downstate" region from both of them.

understanding of boundaries between regions. Thus, the stressed-penult *-mentary* seems to be a unifying linguistic trait of the region commonly understood as Upstate New York.

Map 6.15. Composite of Downstate and Western New York boundaries drawn by 20 subjects in Oneonta, Sidney, and Cooperstown. 17 out of 20 subjects identified one or more regional boundaries separating New York City from Albany, Oneonta, and Binghamton, and 16 out of 20 identified a boundary between Buffalo and Syracuse; this map shows the locations of those 33 boundary lines. When a subject marked two or more regions in the southeastern part of the state, the line used here is the one identified as the southern boundary of the region labeled "Upstate" or the northern boundary of the region labeled "Downstate".

6.6. Conclusion

The chief empirical finding of this chapter is merely the unexpected (and previously undescribed) fact that stressed-penult pronunciations of *-mentary* words are very frequent across all of Upstate New York. In greater detail:

- The stressed penult appears to be increasing in apparent time; the word *elementary* lags the change.
- A region along the eastern edge of New York State has a lower frequency of the stressed penult than the rest of the state; the boundaries of this region do not resemble the dialect regions defined in previous chapters.
- The stressed penult extends out of New York State into the Northern Tier of counties in Pennsylvania, but it is not found in northwestern Pennsylvania or any further south in New York than Poughkeepsie.

These findings are interpreted as confirming that the stressed penult is the result of an analogical change in the morpheme *-ary*, even in the eastern region where the stressed penult is less prevalent; this suggests that an analogical change in a morpheme can be the object of dialect diffusion. The locations of the *-mentary* isoglosses suggest that, in the absence of interaction with systematic phonological structure, the geographical distribution of lexically-specific (or morpheme-specific) features will be shaped by communication patterns and perhaps by boundaries between overtly recognizable regions.

The final chapter will draw some general comparisons and conclusions about the structure of dialect boundaries and diffusion, based on the discussion in this and the preceding three chapters.

Chapter 7

Conclusions

7.1. Defining dialect boundaries

One of the core goals of this dissertation was to locate the boundaries between the dialect regions of New York State, in order to determine the nature of the boundaries and the linguistic behavior of speakers in the communities located closest to them. Several sets of communities have been identified as dialect regions by analyzing the data from the Upstate New York sample, and referred to by such names as "Inland North fringe", "Hudson Valley core", and "North Country". However, the ontological status of such collections of communities as dialect regions is not immediately obvious. There are, after all, both differences and similarities among these supposed regions, and it is not a priori necessary that the differences between the sets of communities that have been referred to up to this point as dialect regions should be allowed to outweigh the differences *within* the notional regions, or the similarities between them. For example, on the one hand the Inland North core exhibits raised /æ/, a feature of the NCS, and the Hudson Valley essentially does not. On the other hand, the backing of /e/ is another feature of the NCS, and the Hudson Valley exhibits even more backing of /e/ than the western component of the Inland North does (Michigan, northern Illinois, etc.), though less than the Inland North communities in Upstate New York. To simplify the question, is it justified to

exclude the Hudson Valley from the Inland North on the basis of /æ/, rather than including it on the basis of /e/?

In fact, of the features studied in this dissertation, relatively few seem to respect the boundaries between the notional dialect regions. The isoglosses for stressed penult in *-mentary*, of course, show no relationship whatsoever with any of the boundaries between the notional dialect regions discussed in earlier chapters. But even the phonetic and phonological features, though they may differ in advancement between the different regions, nevertheless show clear indications of diffusion across the boundaries between regions. While the NCS raising of /æ/ stops relatively abruptly at the edge of the Inland North, and is mostly absent in the Hudson Valley and entirely absent in the North Country, the backing of /e/ (as mentioned above) extends into them both. Both the fronting of /o/ (relative to non–Northern dialect regions) and the backing of /o/ (in apparent time) are shared by both the Inland North and the Hudson Valley fringe, although both features are less extreme in the Hudson Valley than in the Inland North core or fringe. This same backing of /o/ is an indication that the influence of the *caught-cot* merger is not confined to the North Country, even though only in the North Country (and Cooperstown) is the merger relatively advanced in perception; the transfer of (olC) words such as *revolve* from /o/ to /oh/ is also found throughout the Inland North and Hudson Valley fringes. The nasal /æ/ system predominates in the Hudson Valley fringe but is found frequently in the Inland North fringe as well. So it now begins to seem as if the *only* feature that reliably correlates with the major regional boundary posited in this dissertation is the raising of /æ/. So in order to identify the eastern

boundary of the Inland North, we have seemingly drawn a line based on a single feature, while other features are shared on both sides of the boundary. Is this really a good method?

An alternative approach would be to forgo the aim of having relatively clearly identified linear boundaries, in favor of defining dialect regions with both high internal homogeneity and distinctly different features from one another. Under that system, regions with clearly-defined distinctive linguistic innovations might be separated from each other by very large intermediate or transitional regions that are not assigned full membership in either. Thus, for example, we might define the Inland North as the region with full participation in the NCS, including raised continuous /æ/, backed /e/, and fronted /o/, with (at least in New York State) the stressed penult in *-mentary* and the beginnings of a long-term trend toward *caught-cot* merger; and define the New York City dialect region as the area with the characteristic New York City split /æ/ system, raised /oh/, and no stressed penult in *-mentary*. From that point of view, most of the regions defined and communities sampled in the southeastern and central part of New York State in this project would constitute merely a broad transitional area between the Inland North and New York City, with varying degrees of the features of one or the other of the regions. So the Inland North fringe has less advanced and less consistent participation in the NCS changes than the Inland North core does, with a higher frequency of phonologically discrete /æ/ allophony (i.e., the nasal /æ/ system). The Hudson Valley fringe shows some but not all NCS features, with the nasal /æ/ system fully dominant. In the Hudson Valley core, NCS features are further reduced, /oh/ is raised, and the

diffused /æ/ system begins to be found—still a phonologically discrete pattern of allophony, but with a greater resemblance to the phonemic split of New York City. Meanwhile, across all of these regions, the frequency of the stressed penult in *-mentary* declines from northwest to southeast. So the areas in between the Inland North core and New York City have no particular distinctive linguistic features of their own, at least as far as the variables examined in this dissertation are concerned; the closest they get to having distinctive features are the nasal /æ/ system in the Hudson Valley fringe and the diffused system in the Hudson Valley core, which are phonologically intermediate between the continuous distribution and the New York City system. The Inland North fringe and Hudson Valley are, from this point of view, merely the manifestation of the gradual boundary between the Inland North and New York City. By the same token, the North Country and the northern part of the Inland North fringe can be regarded as the gradual boundary between the Inland North core and Canada.

However, the approach of identifying just a few key dialect regions with major features and regarding everything else as merely a transitional or intermediate region between the dialects is not very satisfying. It fails to take into account, for example, the internal structural relationships between the changes involved in the NCS, so that a region which is subject to all the NCS features to a reduced degree and a region which is subject to only some of them are given more or less equal status as possessing "intermediate" degrees of the NCS, with one merely closer to the Inland North than the other. Similarly, it is not capable of explaining the irregular distribution of linguistic features within the broad transitional areas; for instance, regarding the northern part of the Inland North

fringe and the North Country as just a transitional region between the Inland North and Canada misses the fact that Ogdensburg has a higher degree of Inland North features than Canton does despite being closer to Canada. Such an approach would likewise ignore the striking correlation between high NCS scores and early settlement from southwestern New England. Finally, it simply seems inelegant to describe a fairly large geographical area, the Hudson Valley fringe, as merely part of a transitional zone between two regions with neither of which it shares many of the most distinctive features—or as part of no dialect region at all.

Now, it is certainly true that most of the features studied in this dissertation show signs of having diffused across the boundaries between the posited dialect regions; and there does seem to be something questionable about defining a dialect "boundary" that dialect features can move across relatively freely. However, this concern leads directly to a criterion for defining dialect boundaries in a meaningful way. If it's not appropriate to separate communities into different dialect regions when linguistic features can diffuse freely between them, then we can define a boundary between dialect regions to be located where there is an *obstacle* to diffusion—a line that some feature or set of features which is relatively prevalent on one side of the line is *prevented* from diffusing across. *ANAE* hints in this direction by not using mergers as principal criteria for defining dialect regions—for instance, despite their completed *caught-cot* merger, *ANAE* includes southern West Virginia and eastern Kentucky in the South rather than in the Western Pennsylvania dialect area. This is because of Herzog's Principle that mergers expand at the expense of distinctions: if mergers have

such an expansive tendency, then presumably they should be able to expand across the boundaries between dialect regions, and therefore shouldn't be used to define boundaries themselves. The principle I introduce here—that dialect boundaries are defined by obstacles to diffusion—is simply an extension of that idea.

Obstacles to diffusion may be socially motivated. For instance, Labov (to appear: ch.10) suggests that the reason the NCS has (mostly) not diffused into the Midland may in part be attributable to Midland resistance to "Yankee cultural imperialism". The North-Midland boundary, under this account, corresponds to a boundary in settlement history between communities originally settled from Western New England and New York State and communities originally settled from Pennsylvania; the settlers brought with them distinct cultural traditions and ideologies, and the Midland resists the sound changes of the North because of their association with the ideology of the North. The only geographically Midland city to which the NCS has diffused is St. Louis, Mo., where Murray (2002) suggests that the Inland North dialect is perceived as having a high standard of correctness that influences the community as a result of "St. Louisans' strong aversion to sounding like a 'hoosier' [i.e., a hick or hillbilly] when they speak". Under this account, there is an *ideological* barrier to the diffusion of *linguistic* features, and that obstacle to diffusion constitutes the boundary between the North and Midland dialect boundaries.

The more usual sort of obstacle to the diffusion of a linguistic feature, of course, will be a linguistic obstacle. I argue in Chapter 4 of this dissertation that the reason that the NCS raising of /æ/ has not diffused effectively into

Amsterdam and Oneonta, even while other elements of the NCS have, is because the nasal /æ/ system is an effective phonological block to the diffusion of a continuous pattern of /æ/-raising, and the nasal system cannot be reverted into a continuous system to allow this diffusion to proceed. Thus the raising of /æ/ is blocked from diffusing into the Hudson Valley by a phonological incompatibility. This justifies regarding the Inland North and the Hudson Valley fringes as distinct dialect regions. The Hudson Valley is not merely an extension of the greater Inland North with even less advancement of the NCS than the Inland North fringe has, or part of a gradual fading-out of NCS features in the approach toward New York City—it is a qualitatively different dialect region, in which at least one aspect of the Inland North phonology is actually inaccessible, not merely absent. Thus it is coherent from a dialectological point of view to say that certain Inland North phonological features, such as the backing of /e/, have diffused into a region which nevertheless maintains its status as not part of the Inland North.

An obstacle to diffusion is not necessarily an obstacle in both directions: although the phonology of the nasal system stops raising from diffusing across the Inland North–Hudson Valley border, the nasal system itself does not appear to be prevented from developing in the Inland North (whether as a result of diffusion or as an independent innovation). Moreover, the fact that diffusion is only blocked in one direction implies also that the location of the boundary is not permanent. Recall, for example, that Sidney appears to be retreating in apparent time from /æ/-raising, perhaps as a result of diffusion of the non–Inland North pattern from Oneonta. If this is the case, the Inland North–Hudson Valley

boundary is in the process of moving from one side of Sidney to the other. If the lowering of /æ/ in Sidney goes to completion to match Oneonta's /æ/ and the nasal system comes to predominate[1], Sidney will be a Hudson Valley fringe community, and the boundary will be between it and Binghamton. If continuous distributions of /æ/ were to somehow remain frequent in Sidney even after /æ/ has fully lowered, however, this approach implies that it would still be appropriate to describe Sidney as part of the Inland North fringe—there would be no obstacle to the diffusion of /æ/ back into it.

According to this definition, then, the eastern edge of the Inland North as established in this dissertation is an authentic dialect boundary—perhaps not as robust a boundary as the one between the North and Midland, but one that represents a legitimate and relatively stable linguistic difference between the communities on either side of it. Since the boundary between the Inland North and Hudson Valley fringe is defined by only one feature that fails to diffuse, it may make sense to think of it as a lower-order or secondary dialect boundary, defining dialectological sub-regions of a broader major region. So while the North-Midland boundary is one of the principal dialect boundaries of North American English, the Inland North and the Hudson Valley are just closely related sub-regions of the broad Northern region.

While the boundary between the Inland North and the Hudson Valley is defined by only one feature that fails to diffuse, the boundary between the Inland North and North Country is defined by two. One is the raising of /æ/ again, of course: the nasal /æ/ system is if anything even more prevalent in the North

[1] In the current sample, three out of eight speakers in Sidney have nasal systems.

Country than the Hudson Valley fringe. Now, the Inland North fringe and North Country are sharply distinguished by the advancement of the *caught-cot* merger, in that all but the two oldest North Country speakers have /o/ and /oh/ merged or transitional in perception, while only a few younger Inland North fringe speakers are transitional and none are merged. But this difference in merger status alone does not demonstrate an obstacle to diffusion; the apparent-time backing of /o/ in the Inland North and the completed phonological transfer of (olC) from /o/ to /oh/ indicate that the *caught-cot* merger is indeed in the process of diffusing to the Inland North fringe, although it is not very advanced yet.

However, the near-completion of the low back merger in North Country does appear to block the diffusion of the triangular vowel phonology from the Inland North fringe. Recall that Preston (2008) argues that the reason that triangular vowel systems are a likely result of diffusion is their structural symmetry: each front vowel is matched with a back vowel of the same height and peripherality. In this model, /æ/ and /oh/ are a corresponding front-back pair, with /o/ as the lone low central vowel at the bottom vertex of the triangle. But in a community with the *caught-cot* merger, that symmetrical triangular structure is unavailable: if the merged /oh/~/o/ phoneme is used as the back counterpart of /æ/, there is no low vertex vowel and thus the system is not triangular; while if /oh/~/o/ were used as the low vertex, /æ/ would lack a back counterpart and thus the triangular system would not be symmetrical. Since the main rationale for the triangular system as a result of diffusion is its symmetry, there is therefore no motivation for the North Country to develop a

triangular system through diffusion. And indeed, while some speakers in Amsterdam and Oneonta in the Hudson Valley fringe show triangular vowel distributions, no speakers in Canton or Plattsburgh have a distinctively triangular system[2], despite (in particular) Canton's proximity to the Inland North fringe. At the same time, other features do appear to have spread from the Inland North to the North Country: the North Country resembles the Hudson Valley fringe in having /e/ backed to about 1700 Hz, seemingly a diffused NCS component[3]; and of course the stressed penult in *-mentary*, which I conjecture to have diffused from farther west, is very advanced in the North Country as well. So the failure of clearly triangular vowel distributions to appear in the North Country the way they do in the Hudson Valley fringe may be taken to be a result of the *caught-cot* merger preventing (or at least, eliminating the motivation for) the diffusion of triangular patterns. From this point of view, the dialect boundary between the Inland North and the North Country may be taken to be of a higher order than the boundary between the Inland North and Hudson Valley fringe.

The Hudson Valley core and fringe are separated by an obstacle to diffusion that justifies regarding them as distinct dialect regions also. In Chapter 5, it was argued that the raised /oh/ found in the Hudson Valley core confers

[2] A couple of speakers in Canton and Plattsburgh have vowel systems that are ambiguous and could be interpreted as either triangular or quadrilateral. However, the *mean* vowel distributions over all nine Canton speakers and all seven Plattsburgh speakers are clearly quadrilateral; those of Amsterdam and Oneonta are intermediate between triangular and quadrilateral, indicating that both patterns are found in those cities relatively frequently.

[3] Here we cannot strictly rule out the possibility that the backing of /e/ diffused into the North Country from Canada, where /e/-backing is part of the Canadian Shift, rather than from the Inland North. However, in the Telsur sample the four closest Canadian speakers to the North Country (two from Montreal, Que., and one each from Ottawa and Arnprior, Ont.) have collectively a mean /e/ F2 of 1830 Hz, apparently substantially fronter than the North Country mean of 1708 Hz. That's not enough *ANAE* data on the nearby part of Canada to reach the level of statistical significance, of course ($p \approx 0.1$); but it does seem to suggest that the backing of /e/ is more likely to have spread from the Inland North fringe (whose /e/ is backer than the North Country's) than from Canada.

stable resistance to the *caught-cot* merger (in a way that the NCS does not). Although the merger itself is not robustly present in the Hudson Valley fringe, I have argued that the phonological transfer of words of the (olC) type from /o/ to /oh/ is an early stage of the merger in progress—and indeed, this transfer is present in the Hudson Valley fringe but completely absent in the Hudson Valley core community of Poughkeepsie. Thus there does appear to be an obstacle to diffusion of the phonological transfer of (olC)—and therefore a dialect boundary—between the Hudson Valley fringe and core. In the other direction, the dialect boundary between the Hudson Valley core and New York City can be defined by the New York City split /æ/ system: as we have seen, the split /æ/ is blocked from diffusing effectively out of New York City by the mere fact that it is a phonemic split, and ends up as the monophonemic diffused /æ/ system in the Hudson Valley core. In this case diffusion has taken place, but the fact that structural constraints prevent the result of diffusion from having the same systematic properties as the source of the diffusion justifies describing the Hudson Valley core and New York City as distinct dialect regions.

Whether the boundary of the stressed penultimate in *-mentary* can be interpreted as a dialect boundary is a somewhat tougher question. Since the stressed penult is basically a lexical feature and does not interact in an obvious manner with other components of the linguistic system, it is unlikely that there are any *linguistically* motivated obstacles to its diffusion. Obviously the area along the eastern border of New York State where the stressed penult is present with slightly lower frequency does not count as a separate dialect region from the remainder of Upstate New York, where the stressed penult is more

dominant: the stressed penult has clearly diffused eastward across this line. In northern Pennsylvania, the southernmost extent of the stressed penult appears to be the traditional North-Midland dialect boundary, which has been shown to correspond fairly closely to a natural break in patterns of travel and communication—thus the very lack of traffic between the Northern Tier of Pennsylvania counties and locations further south can be interpreted as an obstacle to linguistic diffusion, motivating this dialect boundary.

But what about the southeastern limit of the stressed penult, separating Upstate from Downstate New York? Here it is harder to say whether there is a legitimate obstacle to diffusion of lexical changes from Upstate to Downstate New York, because of cultural or communication issues, or whether diffusion is not impeded and merely has not had enough time to take place yet, especially inasmuch as the adjacent portion of Upstate New York is the eastern region where the stressed penult is less advanced. Certainly there are *phonological* features that have evidently diffused across this line, in the opposite direction: the raised /oh/ and diffused /æ/ system, reaching Poughkeepsie and all the way up to Albany. But in order to decide whether the Upstate-Downstate line constitutes an actual obstacle to the diffusion of lexical change, it would be necessary to hunt for other lexical innovations in Upstate New York and see how far south towards Downstate they have diffused. As mentioned in the previous chapter, the location of the *soda-pop* isogloss, between Western and Central New York, does give some evidence for supposing that boundaries between popularly-understood regions might be able to act as obstacles to diffusion—though, again, no other lexical isogloss has been shown to correspond to the *soda-*

pop isogloss. Even if such lines do act as obstacles to diffusion, and thus can be meaningfully described as boundaries between dialect regions, if they only correspond to one lexical feature each they must be considered boundaries of a very low order.

The apparent northern boundary of the stressed penult, between the North Country and Canada, seems much sharper: in Canton and Plattsburgh the stressed penult is extremely high-frequency, unlike in the part of Upstate New York adjacent to Downstate. The North Country and Canada also differ sharply in their treatment of /æ/: three of the four closest Canadian speakers to the North Country have /æ/ systems unlike anything seen in New York State, with prenasal tokens of /æ/ not appreciably higher than pre-oral tokens. Based on Boberg (2000)'s argument that the U.S.–Canada boundary might act as an impediment to diffusion, and the sharpness of these differences between North Country phonology and that of the nearby part of Canada, it seems reasonable to assume that there is a dialect boundary between the North Country and Canada as well (notwithstanding the *caught-cot* merger in progress in the North Country and complete in Canada).

This dissertation began with a naive definition of dialect boundaries as merely what obtains in any situation where two communities that are relatively near each other differ in linguistic features. The definition introduced in this section, however, of dialect boundaries as obstacles to diffusion, give dialect boundaries a more well-grounded ontological and theoretical status. Under the naive definition, the existence of a dialect boundary is merely a descriptive fact about linguistic differences between two regions. Under the definition of this

section, on the other hand, a dialect boundary becomes, rather than a mere *description* of dialect diversity, an *explanation* of dialect diversity: a dialect boundary is what *causes* two regions to continue to exhibit linguistic differences.

Labov (2007) delves into the theory of diffusion in order to untangle the relationship between the family-tree model and the wave model of linguistic change: under the family-tree model, individual dialects diverge from each other as a result of the transmission and incrementation of their individual innovations, while under the wave model dialects converge as changes are diffused from one community to another. Dialect boundaries, under the definition introduced in this section, are then where the two models of linguistic change interface: a change may diffuse as a wave until it reaches the dialect boundary, which preserves the distinctiveness of the two dialect regions and allows them to continue diverging in accordance with the family-tree model.

7.2. Western New England

One of the aims of this dissertation was to explore the dialectological relationship between Western New England and the Inland North; and defining boundaries as obstacles to diffusion can give us a way of looking at this issue, although any attempt to look deeply at Western New England is hampered by the lack of available data. Boberg (2001) describes a gradual transition from full *caught-cot* merger in Northwestern New England to full distinction with some evidence of NCS participation in Southwestern New England, with "little phonological reason" for separating Southwestern New England from the Inland

North. By the standards defined in Chapter 4, however, six of the seven Telsur speakers in Western Massachusetts and Connecticut exhibit nasal /æ/ systems, grouping Southwestern New England from this point of view with the Hudson Valley (a region which had not been acoustically studied as of Boberg's paper, and is located in between the Inland North proper and Southwestern New England) rather than with the Inland North, inasmuch as the nasal system is taken to be the feature that prevents diffusion of the full NCS.

That said, two of the Southwestern New England Telsur speakers have higher EQ1 indices than any speaker sampled in the Hudson Valley fringe: Jesse M. from New Britain, Conn. (born 1939, EQ1 –20) and Elena D. from Springfield, Mass. (born 1925, EQ1 –29); Elena D. is also the only Western New England Telsur speaker to have a continuous rather than nasal /æ/ system. Inasmuch as Elena D. is the oldest of the seven Southwestern New England speakers, it may be that she predates the development of the nasal system in that region; we know, after all, that the continuous system must have existed in Southwestern New England at one point because it was the source for the settlement of the Inland North, where the continuous system dominates, and the restructuring of a continuous system into a nasal system appears to be a unidirectional phonological change. It is conceivable, then, that at one point Southwestern New England, like the Inland North region whose settlement was derived from it, was beginning to trend in the direction of the NCS, but the rise of the nasal system stemmed that trend and prevented the general raising of /æ/ from continuing.

Boberg defines the chief internal dialect boundary of Western New England in terms of the distribution of the *caught-cot* merger: thus Northwestern

New England consists of Vermont, where the merger is complete, while Southwestern New England includes Connecticut and Western Massachusetts. Defining boundaries in terms of obstacles to diffusion, however, places the key internal dialect boundary of Western New England in a very different location. The three southernmost speakers in the Telsur sample of Western New England—all in Connecticut—have raised /oh/, with mean F1 less than 700 Hz: Jesse M. from New Britain (687 Hz), Tyler K. from Middletown (689 Hz), and especially Amy N. from New Haven, on the southern edge of the state (610 Hz). This is sufficient to include them in *ANAE*'s "Eastern Corridor" zone of raised /oh/, which is described as resisting diffusion of the *caught-cot* merger (a description which is supported by the status of Poughkeepsie in this dissertation).[4]

This suggests that somewhere within Connecticut a dialect boundary can be defined as separating an area to the south, where /oh/ is sufficiently raised to resist the diffusion of merger, from an area to the north where /oh/ is not so raised. In other words, while Boberg groups Western Massachusetts with Connecticut because of the absence of completed *caught-cot* merger, the approach to defining dialect boundaries taken in this chapter would group Western Massachusetts (and probably part of Connecticut) with fully-merged Vermont, on the grounds that there is no indication that there is any *obstacle* to the advance of full merger into Western Massachusetts, even though the merger is not complete there—indeed, two of the three Western Massachusetts speakers in the

[4] It is not necessarily clear that 700 Hz is the exact right value for the cutoff; I use 700 Hz for convenience and because it is the cutoff used by *ANAE*. The mean F1 of /oh/ in Poughkeepsie is 617 Hz.

Telsur corpus have transitional, rather than fully distinct, minimal-pair judgments, presumably indicating some degree of merger in progress. Further research in Western New England, however, would be necessary to determine to what extent and by what mechanism the *caught-cot* merger is in progress in Western Massachusetts[5], whether the raised /oh/ in southern Connecticut actually resists the influence of the merger as predicted, and how far north such resistance extends.

Amy N. from New Haven, in addition to having the highest /oh/ among Telsur speakers in Western New England, also has the lowest EQ1 index—lower, in fact, than any speaker in the Hudson Valley core or fringe[6], at –187. The second lowest is Tyler K. from Middletown, at –110. This seems to justify the approach being taken in this chapter of using obstacles to diffusion as the definition of dialect boundaries: although identifying southern Connecticut as a separate dialect region from the rest of Western New England was motivated by the behavior of /oh/, we find that the behavior of /æ/ in that region might be distinct also. In other words, a boundary drawn on the basis of one feature may correlate with another feature. This is a lot to hang on one or two speakers from an undersampled region, of course, but it is striking that the raising of /oh/ seems to correlate with the non-raising of /æ/. By the same token, Amy N. and Tyler K. have fairly clearly rectangular vowel systems, while most of the rest of the Connecticut and Western Massachusetts speakers have triangular systems—

[5] For example, is /o/ backing in apparent time? Have (olC) words jumped from /o/ to /oh/?
[6] Actually, lower than any speaker in the current sample; however, Winter H. from Lake Placid comes quite close at –185, and there are several other speakers from the North Country and Poughkeepsie in the –150-to-–185 range.

unsurprising, since once of the most noticeable features of a triangular system is the symmetry of /æ/ and /oh/ as a front-back pair.

So the southern-Connecticut raised-/oh/ area is looking less and less like the Inland North, and can probably be categorized as a dialect region closely related to the Hudson Valley core. The status of the rest of Southwestern New England is more ambiguous, resembling a weak form of the Inland North in some ways but more similar to the Hudson Valley fringe in other ways. However, it seemingly must be considered a dialect region of its own in any case: the Hudson Valley core intervenes between Southwestern New England and the Hudson Valley fringe[7], isolating western Massachusetts and Connecticut (the part of Connecticut without raised /oh/, anyhow) as a separate dialect region. The data is not sufficient to show, however, to what extent linguistic features can diffuse between non-contiguous regions: does the interposition of the Hudson Valley core between the Hudson Valley fringe and Western New England constitute a barrier to diffusion between the two regions? But on the other hand, even if there is no obstacle to direct diffusion between the Hudson Valley fringe and Western New England, it seems inappropriate to identify two noncontiguous areas as a single "dialect region" (notwithstanding the fact that *ANAE* did exactly that for the Inland North).

[7] The Hudson Valley core is really defined only by two communities, Albany and Poughkeepsie. It may be, however, that Hudson Valley core features do not cover the entire region *between* Albany and Poughkeepsie; the diffusion from New York of the raised /oh/ and the /æ/ system might (as predicted by the cascade model of diffusion) have reached Albany earlier than the smaller communities south of Albany. If that is the case, it may be that the Hudson Valley fringe does reach all the way to Western New England.

7.3. The objects of diffusion

7.3.1. Is diffusion taking place?

Several linguistic features have been loosely described in this dissertation as having undergone diffusion from one community or region to another: elements of the NCS, including /e/-backing, /o/-fronting, and /æ/-raising; the *caught-cot* merger; a triangular layout of vowel phonemes; the New York City /æ/ system (being reduced in the process into the "diffused" allophonic pattern of the Hudson Valley core); and the stressed penult in *-mentary*. Diffusion is defined specifically, however, as the spread of linguistic variants from community to community by means of contact between adults; and so in order to discuss the implications of the results of this dissertation for the theory of diffusion it is necessary to be reasonably confident that it is contact between adults that is responsible for the propagation of the changes in question.

Several of the changes studied here are taken to be the result of diffusion because they show patterns already argued by Labov (2007) or Preston (2008) to be caused by diffusion, namely the NCS in the Inland North fringe, which exhibits a symmetrical triangular vowel system with no correlation between age and score, and the diffused /æ/ system in the Hudson Valley core. Other features are inferred to have been propagated by diffusion because of their gradual geographic profiles. For example, as discussed in Chapter 5, the *caught-cot* merger is taken to be undergoing diffusion (rather than, say, originating independently in each community) because the incipient merger is more advanced in regions closer to those where it is complete or nearly complete. Thus

if the merger had originated independently in the Hudson Valley fringe and Inland North fringe, we would be surprised to find that it is more advanced in the Inland North fringe, where the phonetic space between /o/ and /oh/ is larger to begin with. However, if we accept diffusion as a possibility, the fact that the Inland North fringe is adjacent to the North Country (and, in parts, Canada and Vermont) explains the *caught-cot* merger's unexpected relative advancement there.

It is not impossible that diffusion might coexist with incrementation through transmission, of course. An incipient sound change that may be occurring for internally-motivated reasons among children in a community could be reinforced and accelerated by diffusion of the same or a similar sound change among the community's adults. Moreover, diffusion could at least in principle *lead* to incrementation through transmission: an innovation acquired by adults in a community is transmitted to their children through the ordinary means of language acquisition, and then augmented over time by the children. In this case, of course, the system that is incremented through transmission will be the diffused system itself, showing the characteristic structural features of diffusion.

Of course, diffusion is not the only possible explanation for a linguistic change propagating from one region to an adjacent region. Johnson (2007) discusses the propagation of the *caught-cot* merger from eastern Massachusetts toward Rhode Island, and attributes its advance not to diffusion but to contact between children whose parents have moved from the merged region into the historically unmerged region. In many cases it is not strictly speaking possible to

be certain from the current data that "transfusion" of that sort is not responsible for the propagation of some of the changes studied in this dissertation; but there is at least reason to doubt it. To begin with, almost every region of Upstate New York, and nearly all of the cities in the current sample, have undergone substantial population decline in the last 30–50 years (Population Trends 2004); this suggests that it is unlikely that many of the communities sampled in this dissertation have seen substantial enough recent in-migration for an incoming population of children to change the dialectological status of the community.

However, population decline is not entirely incompatible with a high rate of in-migration; the village of Cooperstown has lost population over the past 30 years, and yet in Chapter 5 it was argued that heavy migration is responsible for the rapid dialect change there. This argument was made on the basis of the actual migration in the history of the speakers sampled in the community: none of the younger speakers sampled in Cooperstown, and only one third of the entire sample of the village, had a parent who grew up in Cooperstown. Most of the other communities in which seven or more interviews were conducted contrast with Cooperstown in this respect: in all but Plattsburgh[8], at least half of the speakers sampled had a parent raised in the same community, and many others had parents raised in the immediate vicinity. The combination of sharp population declines throughout almost all of Upstate New York with the relatively small percentage of speakers in the sample with parents from different dialect regions suggests that (outside of Cooperstown) diffusion is the most

[8] Plattsburgh is also the only one of these communities to have experienced population growth in the past 30 or 50 years.

likely explanation for the apparent regional propagation of linguistic change, rather than dialect contact within children's peer groups.

7.3.2. What is an observable element of language?

Since diffusion is defined as the result of dialect contact between adults, whose grammatical systems are less malleable than children's or adolescents', it can affect only relatively surface-level linguistic features. Thus, a feature cannot undergo exact diffusion if such diffusion would require speakers in the recipient community to learn a new underlying category, or take note in detail of the structural makeup of the lexical items they affect; and complex rules that undergo diffusion will be simplified because adult speakers in the recipient community will not have been able to correctly learn all of the relevant complexities. So, as Labov (2007) observes, the lexical exceptions to the New York City /æ/ system are eliminated in the diffused system because speakers in the recipient communities are not going to acquire a novel underlying contrast between /æ/ and /æh/; the syllable-boundary constraint is eliminated because recipient speakers do not take note of the fact that the phonological pattern interacts with morphological structure but just take it as a surface-level phonological rule. Chapter 4 of this dissertation adds to that the finding that tensing before /g/ is eliminated because recipient speakers learn a simpler rule, in which place and manner of articulation do not interact.

Labov (2007) characterizes the set of types of features which can undergo diffusion as follows:

> More precisely, adults borrow observable elements of language, the same elements that can be socially evaluated. The objects of social evaluation are at a level one step more abstract than words or sounds. The adult community assigns prestige or stigma to the word stem, irrespective of its appearance in a word with various inflections.

The stressed penult in *-mentary* is an example of a feature "one step more abstract than words" undergoing diffusion. As argued in Chapter 6, it appears that it is the innovative analogical behavior of the morpheme *-ary* itself that is undergoing diffusion, rather than individual lexical items. Thus, a derivational morpheme such as *-ary* is not too abstract to be the object of diffusion. This means that the failure of the morphophonological constraints on New York City /æ/-tensing to diffuse to the Hudson Valley core cannot be put down merely to adult speakers' failure to take note of the morphological structure of words that are affected by a diffused change; in the case of *-mentary* they apparently do so. So it seems that it is the interaction between morphological and phonological structure that is at too abstract a level to be subject to diffusion, rather than the mere existence of morpheme boundaries themselves.

It is well known that phonemic mergers are very easily diffused, but they do not seem to fit the description of "observable elements of language"; a merger is a relatively abstract structural fact about the set of available phonemic contrasts, and is "almost invisible to social evaluation" (Labov 2001:27). But Labov also (1994:324) provides the mechanism by which mergers appear to diffuse even in the absence of "observability", following upon the work of Herold (1990)—being in contact with merged speakers causes unmerged speakers to depend less upon the phonemic contrast for the purposes of communication. Thus, in the recipient community, the contrast is weakened

enough for other phonetic and phonological changes that can lead to merger over the long term to be set into motion; this is exactly what we saw in Chapter 5 with the backing of /o/ and the transfer of (olC) from /o/ to /oh/ in the Inland North and Hudson Valley fringe. So the effect of contact with merged speakers is not (necessarily) immediate merger, but rather merely a sufficient weakening of the barriers between phonemes for merger to take place eventually. The "observable elements of language" that actually undergo diffusion in this case, then, are phonetic and phonological changes that lead to merger, not merger itself; while at the same time the phonemic distinction is "weakened" enough that these phonetic and phonological movements in the direction of merger are not prevented.

The fact that the Hudson Valley core apparently continues to resist diffusion of the merger because of its raised /oh/ is further evidence for the hypothesis that what is being diffused is not merger per se but rather sound changes in the direction of merger. It was argued in Chapter 5 that the reason raised /oh/ is better able to resist the diffusion of merger than fronted /o/ is because the raising of /oh/ is a unidirectional sound change, while fronting a low vowel is reversible—in other words, lowering /oh/ back toward /o/ would be a marked sound change, while backing /o/ towards /oh/ in the Inland North. But this difference between the Inland North and the Hudson Valley fringe only makes sense if it what is being resisted in the Hudson Valley fringe is

the sound change itself, rather than the diffusion of the abstract relationship between the phonemes.[9]

7.3.3. Phonemic mergers vs. allophonic mergers

As mentioned in Chapter 4, however, the weakening of phonological barriers between *phonemes* that can take place as a result of diffusion does not appear to apply to the phonological barriers between allophones of a single phoneme. Formally, the difference between a discrete allophonic alternation (a sound pattern of Phase II in the terminology of Bermúdez-Otero 2007) and a gradient phonetic implementation rule (Phase I) seems fairly similar to the difference between a pair of distinct phonemes and a merger between those phonemes[10]: in both pairs, there are in the former case two distinct phonological segments, where in the latter case there is only a single segment. However, although mergers, as described above, diffuse easily into previously unmerged communities through the weakening of the phonemic contrast, we see from the distribution of nasal and continuous /æ/ systems that a Phase I pattern does not seem to diffuse easily into a Phase II community. Indeed, I hypothesize in Chapter 4 that in nasal systems the raised allophone actually *blocks* the unraised allophone of /æ/ from moving into its space as a result of diffusion; this is the

[9] This also explains why the merger does not diffuse to the Hudson Valley fringe by means of the raising of /o/ to /oh/, which after all would not require a marked sound change to take place and would satisfy Herzog's Principle. The reason for this, by this analysis, is because the merger is not the first-order target of diffusion—the sound change itself is the feature being diffused, and since no dialect has /o/ raised as high as the Hudson Valley core's /oh/, there's no *source* of diffusion that might cause the Hudson Valley core to develop the *caught-cot* merger that way.
[10] In fact, the later phases beyond Phase II of the "life cycle" are themselves phases of phonemic split.

exact opposite of what happens in the diffusion of mergers. Why, despite the apparent structural similarity, can the barrier between phonological segments be weakened through diffusion if the segments are distinct phonemes but not if they are allophones of the same phoneme?

The reason for this, I argue, is merely because a discrete allophonic alternation is synchronically a phonologically predictable rule. If diffusion directly affects only more or less surface-level elements of linguistic structure, and not the systematic relationships between them, then such a phonologically regular rule (being merely a type of systematic relationship between phonological segments) is not directly eliminated as a result of dialect contact.[11] This means that, even if some speaker with (for example) a nasal /æ/ system is in contact with a continuous-/æ/ community, the allophonic rule nevertheless remains active as part of that speaker's grammar, and still determines which allophone appears in which words.

By contrast, if two segments represent different phonemes, there is in some sense *no* systematic relationship between them at an abstract level in the synchronic grammar. In the case of diffusion of a phonemic merger, once a speaker or community is no longer depending on the contrast to distinguish between words there is no other synchronic element of the grammar maintaining the distinction, and sound changes in the direction of merger can go to completion. In other words, if a phonemic contrast becomes redundant through

[11] In the case of the partial diffusion of the New York City /æ/ system to the Hudson Valley core, this same argument holds in the other direction if we suppose the nasal system to have existed in the Hudson Valley prior to this diffusion. Diffusion doesn't eliminate the fact that there's a synchronic allophonic relationship between the tense and lax allophones, although it does seem to be able to change what the conditioning environments of that allophony are.

dialect contact, it might cease to be maintained; but an allophonic alternation is *already* redundant, so dialect contact doesn't weaken it. Thus, somewhat counterintuitively, this argument entails that the phonological boundaries between allophones of the same phoneme are stronger than those between different phonemes with respect to tendency toward merger.

This hypothesis is perhaps a lot of analytical weight to place upon the behavior of /æ/ among a few speakers in Amsterdam and Oneonta, but it is consistent with the behavior that would be predicted by Bermúdez-Otero's categorization of sound patterns. Indeed, the fact that the categorization of sound patterns can be portrayed as a "life cycle"—i.e., that Phase I gradient rules tend to be restructured into Phase II discrete allophonic rules, but not vice versa—suggests that the involvement of diffusion is not essential for this argument. That is to say, the synchronic presence of a discrete allophonic rule relating two segments may be sufficient to prevent those segments from moving back into overlapping areas of phonetic space through internally-generated sound change, as well as through diffusion.

Moreover, the hypothesis that potentially allophonic segments, rather than entire phonemes, act as the key units of vowel shifting, could explain the striking absence of so-called allophonic chain shifting, as discussed in detail by Labov (to appear: ch.14). In brief, the problem of allophonic chain shifting is the following: if (for example) the general raising of /æ/ under the NCS can trigger the fronting of /o/ towards the space formerly occupied by /æ/, why doesn't the raising of prenasal /æ/ only in the nasal system trigger the fronting of prenasal /o/? According to the hypothesis advanced here, the reason for the

absence of allophonic chain shifting is that the units of chain shifting are neither the phonemes themselves nor allophones in general, but only *phonologically discrete* allophones. Thus, in a nasal /æ/ system, the absence of prenasal tokens among the low front /æ/ cluster is not sufficient to constitute a gap in phonetic space for the purposes of chain shifting; since chain shifting is a Phase I operation, the phonological entities it is sensitive to need not be entire phonemes as long as they are discretely specified as sets of phonological features. Thus the presence of the pre-oral allophone of /æ/ is sufficient to avoid triggering a chain shift of any tokens of /o/, even the prenasal ones, despite the fact that the low allophone of /æ/ includes no prenasal tokens.

Another factor that might be expected to contribute to the resistance of a Phase II allophonic alternation from collapsing into a Phase I gradient phonetic rule through diffusion is the tendency for the outcomes of diffusion to be structurally simple and unmarked. As argued in Chapter 4, an allophonic alternation is simpler as an element of the speaker's grammatical knowledge than a gradient allophonic tendency, since it can be represented as a single regular rule, without needing to control the fine-grained detail of the phonetic realizations of phonological features.

7.3.4. The two principles of diffusion

The symmetric triangular vowel system has been loosely described in this dissertation as a feature of the NCS that is diffused to the Inland North fringe and other communities. The symmetric triangular vowel system, however, is

obviously an abstract fact about the structure of the vowel system and the relationships between the phonemes in it—not the type of surface-level feature which would be expected to easily undergo diffusion. If as Labov (2007) argues only "observable elements" of language and not the structured relationships between them are subject to diffusion (i.e., interdialectal borrowing as a result of contact between adults), the triangular shape of the vowel system should not be diffusible. How then is it, as Preston (2008) argues, diffused?

In fact, the role that the triangular distribution must play in Preston's discussion is not that of the feature undergoing diffusion, being imitated by speakers from other communities who come into contact with it, but rather that of the symmetry imposed in the recipient community on an asymmetric feature. What speakers are doing when they acquire a symmetrical triangular vowel system through diffusion of the NCS, then, is merely acquiring some degree of raising of /æ/, fronting of /o/, and so on, but imposing a symmetrical and thus relatively unmarked structure upon it.

The triangular vowel system thus plays the same role in diffusion of the NCS as the elimination of lexical exceptions, of the syllable-structure constraint, and of tensing before /g/ plays in diffusion of the New York City /æ/ system the Hudson Valley core, rather than being the target feature that speakers imitate as a result of dialect contact. In the Hudson Valley core the feature speakers borrow is the tensing of /æ/ before voiced stops and voiceless fricatives, but they simplify the constraints on the tensing system into a more symmetrical and unmarked pattern. So likewise, in diffusion of the NCS, the features speakers borrow are the individual changes in /æ/, /e/, /o/, and other vowels; the

symmetrical layout in phonetic space of the overall vowel system is the simplification of structure and reduction of markedness imposed upon the system by adult learners. Under this analysis, then, the fact that the NCS in Inland North core communities often has a triangular structure becomes only indirectly relevant to the fact that the result of diffusion of the NCS is a triangular system, rather than the immediate cause.[12] Instead, it's just that having a generally triangular layout is a direct consequence of acquiring a moderate degree of /æ/-raising (since /o/ is left behind as the only low monophthong), and as a result of the nature of diffusion the triangular system becomes one with a symmetrical distribution of front and back vowels.

This analysis serves as a reminder that the two key principles of diffusion identified by Labov (2007)—that it acts directly only on "observable elements", rather than on the structural relationships between them, and that the outcome of diffusion is likely to be structurally simple or unmarked—play distinct roles in the process of diffusion, and considering both of them is necessary in order to understand why diffusion takes the shape it does. Indeed, the second principle, simplicity of the outcome, can help to explain why abstract-seeming structural features might seem to undergo diffusion when the first principle would seem to imply that they should not. Here I have argued that this is the case with respect to the triangular vowel system that is the result of diffusion of the NCS; it can also account for the diffusion of merger, as I have alluded to earlier in this section. While merger is a structural fact about the relationship between surface

[12] Indeed, some extreme Inland North core speakers have quadrilateral vowel systems, with /o/ and /oh/ respectively as the front and back low vowels instead of /æ/ and /o/, but this is not apparently what is imitated as a result of diffusion.

elements and not overtly noticeable, and therefore should not be directly susceptible to diffusion by the first principle, the first principle can account for phonetic and phonological changes that move in the direction of merger. It is the second principle that accounts for the fact that the changes eventually lead to a phonemic merger—i.e., a relatively unmarked system.

At the same time, the second principle may play a role in preventing a Phase II allophonic rule from being diffused back into Phase I; a Phase II rule is arguably structurally simpler than a Phase I context-dependent phonetic implementation.

7.4. Unanswered dialectological questions

7.4.1. Gaps in the sample

The sampling technique of the dissertation was designed to collect a large amount of data from a wide region of Upstate New York in a relatively short period of time, and zero in on communities near the boundary. However, the broad geographic scope of the study meant that it was not possible to obtain detailed samples for most communities, or to return to collect more data in regions that turned out to be of greater interest after the third phase of in-person interviews. This means that there are several locations or areas in which the data that was collected leave unanswered questions that can only be satisfactorily answered with future studies.

Obviously there is much that could be learned from collecting additional data from any of the communities sampled in this dissertation, or from new

communities bridging some of the geographic gaps left between the sampled locations. If there is new-dialect formation in progress in Cooperstown, how is it situated demographically in the village? Is there change in progress in Oneonta towards less NCS influence; and if so, did Oneonta at one time have a greater degree of NCS than it does now? What is the status of Saratoga Springs? Is the Hudson Valley core actually a continuous dialect region extending up the Hudson from Poughkeepsie to Albany, or does it disappear at some point north of Poughkeepsie and only reappear in Albany because of the state capital's closer connection with New York City? Is there Canadian influence on the North Country?

All of these questions deal with important issues in the dialectology of New York State that would benefit from additional research to test my hypotheses or go beyond the scope of the issues I intended to deal with in this dissertation. In the next two subsections, however, I will focus on two of the most vexing questions raised by this dissertation's data and left, in my opinion, without satisfactory explanation by my analysis.

7.4.2. Glens Falls and vicinity

The greatest dialectological quandary in the sample is the difference between the city of Glens Falls and the communities adjacent to it. During the course of fieldwork in Glens Falls, three speakers were interviewed from the adjacent village of South Glens Falls and two from the adjacent town of Queensbury; they were not excluded from analysis because it seemed plausible

to suppose that these immediately adjacent communities would be part of the same general speech community as Glens Falls and therefore show the same dialectological features. Phonetic analysis, however, revealed sharp and unexplained differences between the city and the adjacent towns.

Glens Falls is a clear example of an Inland North fringe city: three out of seven speakers have NCS scores of four; the mean EQ1 index is –19, and two speakers have positive indices. Moreover, Glens Falls has the highest rate of continuous /æ/ systems of any of the twelve well-sampled communities: only one of seven speakers shows a nasal system, and her Cartesian distance between prenasal and pre-oral /æ/ is only 386 Hz, not much greater than that of the continuous-/æ/ speakers in the city. Of the total of five speakers sampled from South Glens Falls and Queensbury, four have NCS scores of two and EQ1 indices below –80; the fifth does score four, but his EQ1 index of –60 is the lowest of all speakers in the sample whose NCS score is four. So even if South Glens Falls and Queensbury can collectively be assigned to the Inland North fringe[13], they have much less advanced NCS than Glens Falls proper does. Meanwhile, four out of the five speakers from South Glens Falls and Queensbury have nasal /æ/ systems; the three from South Glens Falls in particular all have Cartesian differences between prenasal and pre-oral allophones of 550 Hz or more. The South Glens Falls speaker with the NCS score of four (Carl T., born in 1940) actually has the second-highest Cartesian distance in the entire sample, at 728 Hz.

[13] Obviously, by the methodology employed in Chapter 3, only South Glens Falls, which has the speaker who scores four, is considered part of the Inland North fringe; Queensbury, whose sampled speakers both score two, is ineligible.

So Glens Falls's /æ/ differs sharply from that of the communities directly adjacent to it, in terms of EQ1 index and in terms of allophonic pattern. In addition, Glens Falls differs from the adjacent towns with respect to the stress pattern of *-mentary* words: the only reduced token of any *-mentary* word produced in South Glens Falls or Queensbury was a single token of *elementary* in spontaneous speech; all elicited *-mentary* tokens from those two communities had the stressed penult. Glens Falls, on the other hand, has one of the lowest frequencies of stressed penult in the entire sample; it is only of only three communities in the sample (with Poughkeepsie and Schenectady) where the stressed penult appeared in less than half of all *-mentary* tokens produced. So the difference between Glens Falls and the communities adjacent to it is not only in the behavior of /æ/ but also in the behavior of *-mentary*.

These two linguistic differences between Glens Falls and the other communities is not even geographically consistent: with respect to /æ/, Glens Falls is part of the Inland North while South Glens Falls and Queensbury behave more like the nearby Hudson Valley, while with respect to *-mentary* the exact opposite is the case. So it cannot merely be the case that Glens Falls is in general more open to diffusion from some regions, while the adjacent towns are more open to diffusion from others, given the inconsistency just noted. However, the two features (/æ/-raising and *-mentary*) do display the general population-pattern features expected of them: Chapter 6 showed that *-mentary* may be somewhat disfavored in more densely populated cities, such as (in the current example) Glens Falls in comparison to the adjacent towns; while Labov (2001) attributes to Callary (1975) the claim that /æ/-raising is most favored in larger

cities. So it may be that the NCS and *-mentary* are just showing the exact behavior expected of each of them at the edge of their distributions, one focusing in the local city and the other in the less dense communities abutting it. The status of Glens Falls, Queensbury, and South Glens Falls as constituting a single community in the eyes of the locals (at least to the extent that people from Queensbury and South Glens Falls who had never lived in Glens Falls were willing to tell me they were lifelong residents of Glens Falls before beginning the interviews) makes the fact that the city and the adjacent towns behave as distinct speech communities at all a conundrum.

Glens Falls was part of the town of Queensbury until 1908, so it is unlikely that there is any difference in settlement history between them. It is conceivable that these differences may be merely a sampling fluke, although almost all of the differences discussed here between Glens Falls and the adjacent towns are statistically significant at the $p < 0.05$ level; if they are a fluke, a more detailed study of Glens Falls and its environs could clarify the local dialectology. And finally, the sampling process in this dissertation focused on collecting data from cities and from villages that play the role of cities in being the most densely populated locations in their immediate environs. It was observed in Chapter 3 that villages (such as Sidney) that depend on a nearby city for commerce appear to be more dialectologically unstable than communities that have their own commercial development; the difference between Glens Falls and the adjacent towns may represent a similar phenomenon, although with a different apparent manifestation. This hypothesis, and the hypothesis above that *-mentary* and NCS

follow different density-dependent patterns, could be tested by examining in more detail the villages and towns adjacent to other Inland North fringe cities.

7.4.3. St. Lawrence County

The sharpest dialect boundary between nearby communities in this dissertation's sample is that between Ogdensburg and Canton—Ogdensburg exhibits a relatively high degree of NCS (though perhaps still in progress), with some signs of incipient *caught-cot* merger, while Canton has the lowest NCS scores of all the well-sampled communities and a *caught-cot* merger nearing completion. There is no room for a gradual boundary between them, made to look sharp merely because locations between them were unsampled; Ogdensburg and Canton are only 20 miles apart with no substantial populated places between them. The analysis of the boundary of the Inland North as the edge of Southwestern New England settlement is complicated here by the fact that the only information I was able to find on the settlement history of Ogdensburg (Merriam 1907) was somewhat vague. But in any event, it is clear that Canton was settled from Northwestern New England. And inasmuch as Northwestern New England itself was settled from Southwestern New England, then even if Ogdensburg was settled from Southwestern New England it is surprising to find a sharper linguistic boundary between regions Northwestern and Southwestern New England settlement than between regions of Northwestern New England and Hudson Valley settlement, which do not share a common origin.

In Chapter 3 I conjectured that the sharp difference between Ogdensburg and Canton is because Ogdensburg is located on the St. Lawrence River, and therefore more directly open to trade from the Erie Canal area and Inland North core earlier in its history than Canton was. However, I have no idea if other communities located on the St. Lawrence show the same Inland North behavior as Ogdensburg does; the analysis is hampered here by the fact that Canton and Ogdensburg are the only towns near the Inland North–North Country border from which I collected data. The original chief research goal of this dissertation was to identify the boundary between the Inland North and Southwestern New England (or what turned out to be the Hudson Valley); collecting a detailed geographical sample near the northern edge of Upstate New York was a lower priority. Future research, then, might focus on additional villages in St. Lawrence County, attempting to determine the status of the dialect boundary in that area more exactly: Massena, on the shores of the St. Lawrence like Ogdensburg, but further west, like Canton; Potsdam, a village northwest of Canton whose population is closer to that of Ogdensburg and toward which Canton shows some regional orientation; Gouverneur, away from the river but halfway between Canton and the NCS city of Watertown. These communities have different combinations of some of the features that have been conjectured to play a role in locating the dialect boundary between Ogdensburg and Canton—population size, closeness to Canada and the river, closeness to Vermont, and conceivably settlement history—and thus collecting data from them could test various hypotheses on the motivation for the location of the boundary.

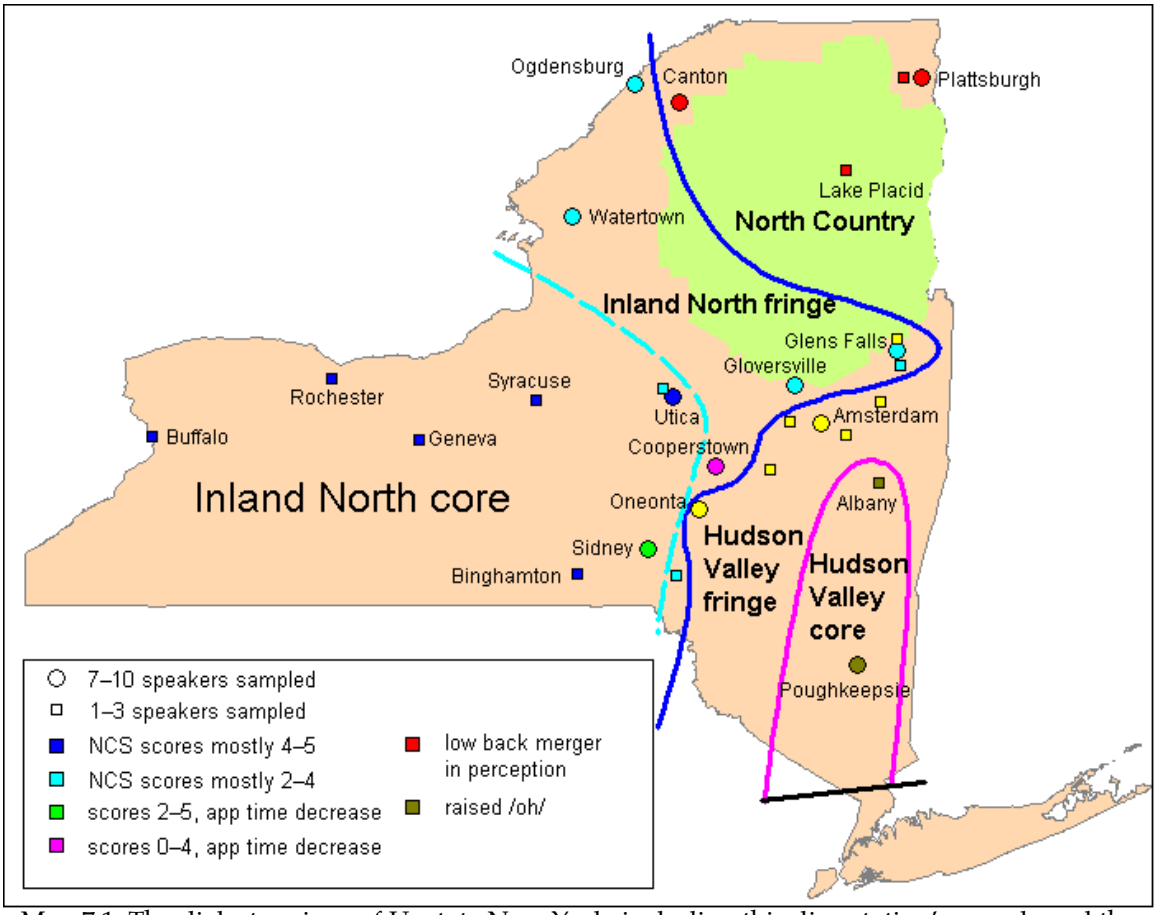
However, the *sharpness* of the boundary would still not be explained by any of these hypotheses even if they were correct. Why should not Canton at least show as much /æ/-raising as is found in Oneonta or Amsterdam, cities where nasal systems are just as dominant? It is conceivable that the *caught-cot* merger plays a role here, in that (as argued earlier in this chapter) the presence of the merger makes a symmetrical triangular system unlikely, and it may be that without an available symmetrical structure to serve, by the second principle, as the *result* of diffusion, the diffusion of the single sound change of /æ/-raising is not permitted to take place. However, this analysis does not account for Phyllis P., the Telsur speaker from Rutland, Vt. with both raised /æ/ and full *caught-cot* merger.

In the next (and final) section, I offer a general synopsis of my principal empirical findings and theoretical inferences in this dissertation.

7.5. Overall wrapup and synopsis

The chief empirical result of this dissertation is a more detailed dialectological picture of Upstate New York than had been possible based on any other recent research. The dialect regions into which Upstate New York is divisible, shown on Map 7.1, are the following:

- the Inland North core, which was already known from existing research to be the area of advanced NCS, focused in central and western New York;



Map 7.1. The dialect regions of Upstate New York, including this dissertation's sample and the Telsur data.

- the Inland North fringe, located to the northeast of the core, defined by the presence of the NCS to a less advanced or less pervasive degree than in the core[14];
- the North Country, occupying most of the northern extremity of the state, defined by absence of the NCS and advanced *caught-cot* merger;
- the Hudson Valley core, apparently reaching north along the Hudson River beyond the New York City dialect area, and exhibiting the diffused /æ/ system and raised /oh/;

[14] By the definition of dialect boundaries advanced in this chapter, there is no dialect boundary between the Inland North core and fringe. However, it is still useful for descriptive and perhaps historical purposes to treat them as two sets of communities.

- the Hudson Valley fringe, region between the Hudson Valley core and the Inland North with few particularly marked features, showing some influence of NCS vowels but little raising of /æ/.

The Inland North fringe and core are also distinguished by a relatively high rate of continuous /æ/ systems, which are almost absent in the Hudson Valley and North Country. The nasal system exists in the Inland North as well, however, even among speakers with distinctly raised pre-oral /æ/, and the phonetic distance between prenasal and pre-oral /æ/ is increasing in apparent time.

Apparent-time trends toward the *caught-cot* merger are found in all of these regions except the Hudson Valley core, contrary to the hypothesis that the NCS should confer stable resistance to the merger. Meanwhile, the stressed-penult pronunciation of -*mentary* words is present at a high rate throughout the entirety of Upstate New York, even bleeding over into the Northern Tier of Pennsylvania counties; it is less frequent along most of the eastern border of New York State, but not in a way that resembles the boundaries any of the principal dialect regions listed above.

The Inland North–Hudson Valley boundary seems to be correlated with the settlement history of the communities in question: the early settlers of communities that today exhibit the NCS were for the most part from Southwestern New England, while the Hudson Valley communities, where the NCS is absent, for the most part were founded by the descendants of New Netherland Dutch colonists. I hypothesize that the Inland North core represents the region in which the NCS originated, while the Inland North fringe consists of

those communities to which, due to their shared settlement history, the NCS was able to diffuse relatively unimpeded. However, villages along the Inland North–Hudson Valley boundary seem to display less stability or classifiability than the cities with their own commercial development. The clearest example of this is Sidney, which is visibly retreating from the NCS in apparent time; most of the other villages sampled along the border have data from only two speakers, but appear to be intermediate or ambiguous in status in a way that even the small cities along the border are not. Cooperstown is a special case, apparently undergoing new-dialect formation as a result of having a high percentage of children of natives of other dialect regions among its population; it is abandoning the NCS and entirely in favor of a less marked *caught-cot* merged system.

The foregoing paragraphs outline the major empirical findings of this dissertation. Based on these, I have formulated several hypotheses about the structure of phonological change, and diffusion of phonological change in particular. I describe these theoretical inferences for the most part as hypotheses, rather than conclusions. This is because in many cases they are abstracted from relatively small amounts of data, in which exceptions and unexplained phenomena are still to be found, or which could be subject to more than one possible interpretation. Serious testing of some of these hypotheses will have to wait for studies directly targeted at answering the questions they pose, rather than such a broad exploratory study as this dissertation fundamentally is; but they are all founded directly on my (interpretation of my) empirical results and the theoretical background of diffusion, dialectology, and phonological change.

Some of these hypotheses deal with the geographical distribution of linguistic change: that small towns may be more subject to the linguistic influence of the regional hubs on which they economically depend than are small cities that have some commercial development of their own, perhaps because a smaller absolute amount of dialect contact can have a greater proportional effect on the population of a village; and that the geographic boundaries of an innovative linguistic feature that does not interact with other structures in the grammar may be more likely to be more directly shaped by regional patterns of communication and overt cultural boundaries than to other linguistic boundaries. A fairly abstract phonological hypothesis, suggested by the pilot experiment I carried out in Ogdensburg and Canton, is that American English does not distinguish phonemic length among low monophthongs.

The theoretical hypotheses about diffusion largely boil down to elaborations of what I call have called the two principles of diffusion, taken from Labov (2007) and defined earlier in this chapter: that diffusion of linguistic change does not immediately change the structured relationships between linguistic entities in the recipient community, but rather only affects surface-level features; and that speakers in the recipient community are likely to reorganize the result of diffusion into a more structurally symmetric or unmarked pattern. These hypotheses include the following:

- The result of diffusion of a phonemic merger is not immediately merger itself in the recipient community, but rather sound changes in the direction of merger.

- Diffusion of a marked or unnatural sound change, such as the lowering of a tense peripheral vowel, may be resisted.
- A bound derivational morpheme, such as *-ary*, is sufficiently superficial as a linguistic entity to be able to be the subject of diffusion per se.
- Diffusion should not be able to cause the "merger" of two phonologically discrete allophones of a single phoneme back into the same place in phonetic space.

This last hypothesis, I argue, is the reason why the NCS raising of /æ/ does not appear to have effectively spread into regions where the nasal /æ/ system is sufficiently dominant; the prenasal allophone blocks the pre-oral allophone from raising. This hypothesis also depends on the principle, implicit in Bermúdez-Otero (2007) but not explicitly stated, that the basic units of chain shifting are not phonemes but rather potentially allophonic segments. This means that the Inland North and Hudson Valley remain linguistically distinct because the full raising of /æ/ is blocked from diffusing into the Hudson Valley, while the Inland North fringe appears to have developed the NCS as a result of diffusion of all the NCS features. Inspired by this, I propose defining the borders between dialect regions as lying wherever a (social or structural) obstacle to the diffusion of linguistic change exists.

This dissertation has only scratched the surface of New York State's great dialectological diversity, and much more work remains to be done, in both geographical and linguistic ground to cover. However, even this relatively restricted picture, the first detailed phonological portrait of the state, has

suggested answers to some questions about the structure of dialect diversity and linguistic change, and beyond them pointed the way to deeper questions still.

Appendix

Index of sampled speakers

The following pages list all 119 of the speakers whose vowel systems were phonetically analyzed. For each speaker, the following data is listed:

- pseudonym;
- home community;
- type of interview, in person (IP) or telephone (T);
- data of interview;
- year of birth, determined as discussed in Chapter 2;
- sex;
- mean formant values for the NCS vowels /æ/, /e/, /o/, /oh/, and /ʌ/, although F1 of /ʌ/ has been omitted in order to save space and because it does not play a part in the analyses in this dissertation;
- *caught-cot* minimal-pair judgments: merged (M), transitional (T), or distinct (D).

A 120th speaker, Linda K. from Schenectady, whose vowel system was not fully analyzed is not listed in the following table; her word-list /æ/ tokens were analyzed, but none of her other vowel. She was interviewed by telephone on August 29, 2006; her year of birth is 1926.

The actual recordings of the interviews and the individual vowel-token measurement data will be archived at the Linguistics Lab at the University of Pennsylvania.

Pseudonym	Community	Type	Date	YOB	Sex	æF1	æF2	eF1	eF2	oF1	oF2	ohF1	ohF2	ʌF2	Jgmts
Amy B.	Amsterdam	IP	6/13/07	1977	F	763	1663	685	1656	855	1385	763	1168	1333	D
Fred B.	Amsterdam	T	8/22/06	1945	M	766	1774	641	1724	802	1480	719	1205	1388	D
Laurence C.	Amsterdam	T	8/18/06	1993	M	694	1907	619	1957	773	1380	792	1241	1429	M
Marilyn R.	Amsterdam	IP	6/13/07	1951	F	839	1701	720	1726	872	1405	758	1129	1259	D
Melissa C.	Amsterdam	IP	6/13/07	1986	F	826	1718	714	1657	866	1371	702	1065	1243	D
Pat S.	Amsterdam	IP	6/13/07	1955	M	748	1856	644	1779	850	1500	745	1198	1372	D
Rebecca H.	Amsterdam	IP	6/13/07	1980	F	793	1724	683	1604	835	1343	798	1111	1296	D
Amanda H.	Canton	T	2/25/08	1970	F	783	1729	689	1771	835	1352	804	1177	1466	T
Ben S.	Canton	IP	8/19/08	1987	M	724	1657	657	1679	771	1475	760	1330	1341	T
Bob L.	Canton	IP	8/19/08	1951	M	789	1818	637	1792	830	1406	791	1233	1385	T
Cody T.	Canton	IP	8/19/08	1976	M	804	1690	681	1778	812	1381	824	1302	1280	M
Elizabeth P.	Canton	T	2/25/08	1991	F	804	1643	686	1757	831	1311	855	1159	1425	T
Ida C.	Canton	IP	8/19/08	1962	F	800	1543	686	1529	800	1346	800	1200	1293	M
Monica M.	Canton	IP	8/19/08	1938	F	775	1733	695	1718	805	1328	721	1086	1266	D
Myke U.	Canton	IP	8/19/08	1992	M	760	1589	668	1625	765	1248	745	1170	1324	M
Sarah M.	Canton	IP	8/19/08	1989	F	819	1530	695	1633	817	1185	766	1128	1228	T
Mary R.	Cobleskill	T	3/31/08	1970	F	789	1658	681	1689	877	1415	803	1166	1293	D
Ronald B.	Cobleskill	T	3/31/08	1924	M	765	1655	728	1583	828	1355	754	1052	1316	D
Buck B.	Cooperstown	IP	7/16/08	1926	M	689	1930	651	1808	788	1639	699	1186	1423	D
Emily R.	Cooperstown	T	3/4/08	1987	F	829	1540	681	1637	853	1262	800	1077	1357	T
Janet H.	Cooperstown	IP	7/16/08	1950	F	748	1773	649	1716	802	1489	733	1117	1400	D
Kelly R.	Cooperstown	IP	7/16/08	1991	F	854	1571	716	1639	842	1295	739	1137	1330	T
Nellie M.	Cooperstown	T	8/15/08	1963	F	816	1793	688	1707	907	1415	761	1044	1291	D
Peg W.	Cooperstown	IP	7/16/08	1957	F	708	1759	783	1561	812	1355	723	1026	1190	D
Sally B.	Cooperstown	T	9/15/08	1957	F	820	1670	703	1579	942	1372	823	1072	1325	D
Sarah L.	Cooperstown	T	3/4/08	1983	F	868	1567	718	1654	840	1315	830	1168	1335	M

Pseudonym	Community	Type	Date	YOB	Sex	æF1	æF2	eF1	eF2	oF1	oF2	ohF1	ohF2	ʌF2	Jgmts
Zara F.	Cooperstown	IP	7/16/08	1990	F	830	1526	705	1537	784	1356	751	1267	1441	M
Madeline R.	Fonda	T	2/19/08	1981	F	746	1834	678	1755	800	1494	799	1228	1386	D
Samantha H.	Fonda	T	2/19/08	1955	F	762	1813	729	1752	948	1459	801	1051	1187	D
Alexandra R.	Geneva	T	2/7/08	1982	F	640	1901	630	1740	787	1526	760	1248	1463	D
Tom S.	Geneva	T	2/5/08	1931	M	658	1958	645	1665	861	1536	787	1210	1349	D
Annie F.	Glens Falls	IP	8/14/07	1992	F	737	1628	664	1632	752	1383	750	1215	1338	T
Bill B.	Glens Falls	IP	8/14/07	1936	M	655	1954	616	1760	763	1651	721	1407	1432	D
Brian L.	Glens Falls	IP	8/14/07	1989	M	690	1797	683	1732	830	1427	752	1226	1349	D
Connie D.	Glens Falls	IP	8/14/07	1974	F	724	1729	704	1601	803	1341	780	1152	1265	D
Mike W.	Glens Falls	IP	8/14/07	1986	M	655	1855	680	1613	790	1482	705	1175	1314	D
Steve B.	Glens Falls	IP	8/14/07	1982	M	686	1715	692	1575	779	1474	745	1236	1356	D
Ted J.	Glens Falls	IP	8/14/07	1968	M	770	1829	743	1768	844	1521	830	1278	1351	D
Betty S.	Gloversville	T	8/10/06	1954	F	712	1917	737	1680	907	1435	829	1111	1357	D
Buddy G.	Gloversville	IP	6/12/07	1993	M	727	1919	712	1616	822	1454	703	1102	1255	D
Butch S.	Gloversville	IP	6/12/07	1962	M	739	1758	678	1638	782	1454	722	1155	1400	D
Christopher P.	Gloversville	IP	6/12/07	1993	M	669	2061	705	1685	811	1451	734	1248	1399	D
Dianne S.	Gloversville	IP	6/11/07	1953	F	642	2105	738	1542	828	1422	754	1087	1172	D
Jake V.	Gloversville	IP	6/12/07	1938	M	654	2081	627	1779	766	1689	705	1257	1500	D
Julie M.	Gloversville	T	8/15/06	1990	F	632	2000	694	1669	815	1498	756	1250	1309	D
Robert O.	Gloversville	IP	6/12/07	1943	M	720	1846	677	1687	811	1479	725	1214	1412	D
Vincent B.	Gloversville	IP	6/12/07	1925	M	691	1873	654	1643	810	1601	659	1148	1393	D
Paul R.	Lake Placid	T	3/18/08	1986	M	726	1819	623	1786	803	1385	737	1197	1450	T
Winter H.	Lake Placid	T	3/18/08	1989	F	826	1683	641	1780	805	1282	780	1131	1444	T
Kerri B.	Morrisonville	IP	8/12/07	1990	F	819	1571	680	1614	801	1252	775	1164	1283	T
Dan L.	Ogdensburg	IP	8/20/08	1959	F	721	1831	664	1721	767	1566	705	1266	1423	D
Jackie E.	Ogdensburg	IP	8/20/08	1966	F	751	1809	664	1601	885	1403	772	1129	1332	D

Pseudonym	Community	Type	Date	YOB	Sex	æF1	æF2	eF1	eF2	oF1	oF2	ohF1	ohF2	ʌF2	Jgmts
Jess M.	Ogdensburg	IP	8/20/08	1986	F	710	1871	714	1566	854	1450	824	1122	1213	T
Jessica J.	Ogdensburg	T	2/14/08	1988	F	664	1850	685	1643	759	1425	748	1193	1348	D
Mike P.	Ogdensburg	IP	8/20/08	1977	M	699	1764	641	1744	841	1439	805	1357	1373	D
Noreen H.	Ogdensburg	IP	8/18/08	1982	F	682	1851	734	1582	810	1435	792	1196	1276	T
Shelley L.	Ogdensburg	IP	8/20/08	1989	F	705	1692	713	1464	838	1313	768	1120	1253	T
Stacy B.	Ogdensburg	IP	8/20/08	1983	F	766	1676	731	1493	824	1349	776	1152	1271	D
Wanda R.	Ogdensburg	T	2/14/08	1922	F	707	2074	631	1968	828	1437	710	1144	1427	D
Carol C.	Oneonta	IP	6/21/07	1958	F	714	1815	659	1705	794	1509	742	1179	1316	D
Carol G.	Oneonta	IP	6/22/07	1952	F	818	1752	678	1775	885	1461	798	1223	1289	D
Jack K.	Oneonta	IP	6/22/07	1960	M	731	1812	692	1673	790	1465	735	1146	1308	D
Jess L.	Oneonta	IP	6/22/07	1982	F	793	1618	655	1695	775	1322	719	1165	1402	D
Larry R.	Oneonta	IP	6/22/07	1961	M	710	1922	647	1684	839	1541	772	1242	1353	D
Lisa W.	Oneonta	IP	6/21/07	1989	F	786	1730	679	1694	770	1334	743	1206	1312	T
Max S.	Oneonta	IP	6/21/07	1982	M	762	1755	687	1663	800	1385	734	1197	1309	D
Sean B.	Oneonta	IP	6/21/07	1988	M	738	1878	634	1880	774	1451	704	1109	1348	D
Stephanie G.	Oneonta	IP	6/21/07	1990	F	748	1587	679	1530	769	1424	754	1205	1368	D
Amanda N.	Plattsburgh	IP	8/13/07	1972	F	784	1615	639	1704	775	1377	751	1226	1443	M
Ben S.	Plattsburgh	IP	8/13/07	1991	M	791	1567	683	1670	767	1208	758	1184	1299	T
Colin D.	Plattsburgh	IP	8/12/07	1941	M	806	1761	654	1733	828	1433	741	1144	1299	D
Eric P.	Plattsburgh	IP	8/13/07	1991	M	772	1641	654	1671	769	1288	745	1286	1309	M
Justin C.	Plattsburgh	IP	8/13/07	1976	M	820	1752	665	1782	815	1352	773	1207	1312	M
Marc F.	Plattsburgh	IP	8/13/07	1955	M	797	1664	613	1697	844	1421	834	1319	1281	M
Wendy H.	Plattsburgh	IP	8/13/07	1981	F	847	1585	669	1683	837	1322	826	1266	1391	M
Allison S.	Poughkeepsie	IP	8/1/07	1984	F	849	1549	742	1624	853	1305	663	1048	1337	D
Fred M.	Poughkeepsie	IP	8/1/07	1970	M	838	1931	671	1824	899	1412	618	921	1243	D
Jeannette H.	Poughkeepsie	IP	8/1/07	1955	F	756	1634	610	1683	801	1346	583	1022	1326	D

Pseudonym	Community	Type	Date	YOB	Sex	æF1	æF2	eF1	eF2	oF1	oF2	ohF1	ohF2	ʌF2	Jgmts
Louie R.	Poughkeepsie	IP	7/31/07	1954	M	695	1932	652	1793	753	1470	547	986	1291	D
Mehmet T.	Poughkeepsie	IP	8/1/07	1972	M	763	1686	627	1715	802	1453	580	931	1438	D
Natalie I.	Poughkeepsie	IP	8/1/07	1993	F	786	1775	618	1790	840	1369	671	1051	1466	D
Vic R.	Poughkeepsie	IP	8/1/07	1932	M	764	1688	688	1661	815	1351	657	1005	1259	D
Jeremy G.	Queensbury	IP	8/14/07	1989	M	706	1845	620	1791	748	1465	719	1217	1436	D
Nate P.	Queensbury	IP	8/14/07	1990	M	781	1658	651	1644	822	1325	719	1066	1311	D
Charlie P.	Saratoga Springs	T	2/11/08	1982	M	720	1796	696	1663	809	1478	716	1132	1290	D
Sharon F.	Saratoga Springs	T	2/11/08	1945	F	810	1729	694	1736	875	1443	737	991	1270	D
Benjamin W.	Schenectady	T	8/30/06	1938	M	736	1921	617	1839	818	1549	721	1231	1444	D
Elaine B.	Schenectady	T	8/24/06	1929	F	783	1709	688	1657	866	1445	769	1160	1357	D
Allison L.	Sidney	IP	7/14/08	1990	F	808	1651	728	1576	796	1359	731	1124	1300	D
Amanda F.	Sidney	T	2/28/08	1950	F	665	1966	739	1645	914	1527	799	1130	1264	D
George S.	Sidney	IP	7/14/08	1947	M	729	1796	672	1661	806	1510	755	1182	1354	D
Jennifer B.	Sidney	IP	7/14/08	1987	F	748	1792	716	1664	838	1388	851	1160	1271	D
Keith M.	Sidney	IP	7/14/08	1958	M	685	1992	648	1718	846	1641	812	1336	1346	D
Lisa S.	Sidney	IP	7/14/08	1949	F	746	1622	753	1443	792	1362	735	1158	1271	D
Pete G.	Sidney	IP	7/14/08	1974	M	799	1784	739	1642	844	1394	771	1124	1201	D
Terri M.	Sidney	T	2/28/08	1958	F	558	2173	692	1591	909	1575	821	1126	1271	D
Betty C.	South Glens Falls	IP	8/15/07	1959	F	852	1554	708	1531	839	1325	806	1152	1181	D
Candie S.	South Glens Falls	IP	8/14/07	1983	F	745	1761	661	1611	752	1407	726	1174	1315	D
Carl T.	South Glens Falls	IP	8/15/07	1940	M	686	1928	626	1897	708	1531	705	1188	1369	D
Alex S.	Utica	IP	7/18/06	1989	M	673	1865	667	1666	791	1417	742	1150	1331	D
Brian L.	Utica	IP	7/19/06	1983	M	725	1873	690	1706	841	1515	701	1112	1379	D
Christie L.	Utica	IP	7/18/06	1988	F	655	1958	725	1723	837	1452	799	1052	1255	M
Chuck O.	Utica	IP	7/18/06	1979	M	675	1884	713	1681	801	1518	768	1192	1318	D
Janet B.	Utica	IP	7/19/06	1942	F	510	2300	790	1608	887	1647	842	1151	1289	D

Pseudonym	Community	Type	Date	YOB	Sex	æF1	æF2	eF1	eF2	oF1	oF2	ohF1	ohF2	ʌF2	Jgmts
Kelly W.	Utica	IP	7/19/06	1986	F	693	1766	723	1558	841	1437	779	1175	1359	D
Susan S.	Utica	IP	7/19/06	1989	F	652	1854	761	1530	896	1473	792	1233	1238	D
Daniel H.	Walton	T	3/7/08	1985	M	726	1771	636	1646	874	1421	740	1103	1329	D
Pamela H.	Walton	T	3/7/08	1957	F	669	1991	620	1824	839	1541	755	1160	1457	T
Allie E.	Watertown	IP	7/17/07	1982	F	700	1796	683	1614	807	1431	786	1285	1388	T
Bill P.	Watertown	IP	7/16/07	1969	M	724	1963	660	1747	851	1475	754	1117	1339	D
Brandi F.	Watertown	IP	7/16/07	1986	F	737	1797	703	1579	862	1415	786	1145	1241	T
Carrie S.	Watertown	IP	7/17/07	1989	F	678	1767	729	1520	867	1344	753	1110	1242	D
Dennis C.	Watertown	IP	7/17/07	1952	M	701	1862	697	1682	773	1585	724	1222	1387	D
Jeff C.	Watertown	IP	7/17/07	1963	M	736	1671	650	1612	800	1414	753	1077	1259	D
Jess K.	Watertown	IP	7/17/07	1978	F	713	1711	671	1604	792	1461	773	1263	1369	D
Matt F.	Watertown	IP	7/17/07	1971	F	699	1873	723	1610	832	1459	704	1006	1251	D
Mike D.	Watertown	IP	7/16/07	1961	M	730	1716	707	1570	847	1484	766	1235	1230	D
Rhoda B.	Watertown	IP	7/16/07	1964	F	691	1882	717	1573	879	1493	821	1211	1246	D
James C.	Yorkville	IP	7/19/06	1931	M	713	1795	647	1605	823	1583	725	1251	1424	D

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