Nasal Short-a Systems vs. the Northern Cities Shift

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Abstract
Labov et al. (2006) discuss a taxonomy of configurations of short-a in American English, including the nasal system (in which the prenasal allophone of short-a is relatively high and discretely different from the low non-prenasal allophone), the continuous system (in which short-a is spread out over a continuous area of phonetic space, from higher prenasal tokens to lower non-prenasal tokens), and the raised system associated with the Northern Cities Shift (NCS), in which all tokens of short-a are high. This paper uses this taxonomy as a starting point for an analysis of the status of short-a in the different dialect regions of Upstate New York (Dinkin 2009). The data show that a fourth pattern needs to be added to the three listed above: a raised nasal short-a system, in which there is a sharp phonetic difference between prenasal and non-prenasal allophones, but even the non-prenasal allophone is located quite high in the vowel space. The raised nasal system is most frequent in the Inland North Fringe, the dialect region where some but not most speakers exhibit advanced NCS. In the Hudson Valley region, where nasal short-a patterns are extremely prevalent, NCS features are present at high degrees of advancement except the raising of short-a. An analysis based on the “life cycle of phonological patterns” (Bermudez-Otero 2007) suggests that the nasal system itself may be responsible for blocking the general raising of the non-prenasal allophone here.
Nasal Short-\(a\) Systems vs. the Northern Cities Shift

Aaron J. Dinkin

1 Short-\(a\) Systems

The vowel /æ/, as in *trap*, shows a great diversity of allophonic behavior across the dialects of North American English: the *Atlas of North American English* (ANAE: Labov, Ash, and Boberg 2006) lists at least seven configurations that /æ/ takes on in various regions. And since /æ/ is involved as well in many ongoing major regional chain shifts, exploring the relationships between the /æ/ systems of different regions can shed light on the relationships between the larger patterns of change as well.

Perhaps the most widespread of the /æ/ systems discussed in *ANAE* is the so-called nasal system. In this configuration, there is a regular and discrete allophonic alternation between two allophones of /æ/: a raised and tensed allophone that appears before nasal consonants, and a low allophone that appears in all other environments. The two allophones are separated by some distance in phonological space. Figure 1 displays a very clear example of a nasal /æ/ system.

![Figure 1: The nasal /æ/ system of Sarah L. from Cooperstown, N.Y. Prenasal tokens of /æ/ are marked with a bold outline.](image)

The second principal type of /æ/ system is the so-called continuous system, exemplified in Figure 2. This resembles the nasal system in that prenasal tokens of /æ/ generally tend to be higher and fronter than non-prenasal tokens, but unlike the nasal system there is no sharp phonetic gap between the two allophones, and indeed prenasal and non-prenasal tokens of /æ/ may overlap in phonetic space: on Figure 2, note a relatively high token of *actually* and a relatively low token of *hand*. So in this case, prenasal /æ/ occupies the high end of a single /æ/ cluster in phonetic space, rather than a distinctly separate cluster as it does in the nasal system; the presence of a following

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1 For vowel phonemes I use the notation of Labov et al. (2006).

2 In this paper, a speaker is judged as meeting this description if all prenasal tokens of /æ/ but at most one are higher and/or fronter than pre-oral tokens, or if a wide gap between allophones exists in phonetic space with at most three exceptional tokens not before /r/ or /ŋ/.
nasal may be merely one of many factors that influence the position of a token within this cluster.

Figure 2: The continuous /æ/ system of Pete G. from Sidney, N.Y.

Figure 3. The raised NCS /æ/ system of Dianne S. from Gloversville, N.Y.

In addition to the nasal and continuous systems, ANAE discusses a variety of more exotic /æ/ configurations that are restricted to particular regions. The one of these that will be relevant to the current paper is what ANAE calls the raised /æ/ system of the Northern Cities Shift (NCS). The NCS is a major chain shift that has taken or is taking place in most of the urban areas just south of
the Great Lakes, reaching from central New York State as far west as Wisconsin, and it involves
the general raising of /æ/, the fronting of /o/ as in lot, the backing of /e/ as in dress and /ʌ/ as in
strut, and other vowel movements. Thus, in the NCS /æ/ system, all tokens of /æ/ are raised\(^3\); the
entire phoneme occupies roughly the same area of phonetic space as the prenasal allophone alone
in the nasal system, as shown in Figure 3.

According to ANAE, within a raised /æ/ system prenasal tokens are still usually the very
highest and frontest, but “pre-nasal allophones are not distinctly separated from the rest of the
class. The raised /æ/ system contrasts with the nasal system in that the effect of following nasals is
not a simple categorical constraint, but rather one of many independent influences on the raising
and fronting of the vowel.” This description sounds exactly the same as the key fact about the
continuous system; the only difference between the continuous and raised systems, as ANAE
describes them, is how low in the vowel space the single /æ/ cluster reaches. With this in mind, it
makes sense to consider this raised system as merely a subtype of the continuous system, rather
than a completely distinct category of /æ/ configuration; we can refer to it as a raised continuous
system, and the configuration shown in Figure 2 above as a low continuous system.

2 Upstate New York

The data presented in this paper are derived from a series of 120 short sociolinguistic interviews
following the methodologies of Ash (2002) and ANAE with native speakers from Upstate New
York, in communities chosen chiefly with the goal of locating the eastern boundary of the region
subject to the NCS. Details on the interview methodology and selection of communities can be
found in Dinkin (2009); vowel measurements and normalization were carried out according to the
methodology of ANAE. These 120 interviews are supplemented with data from the ten interviews
in Upstate New York conducted for ANAE.

Map 4: The dialect regions of New York (Dinkin 2009).

Based on Dinkin (2009), Upstate New York can be divided into four major dialect regions

\(^3\)Speakers are judged as meeting this description if they have at most one token of /æ/ lower than mean
/o/, or mean /æ/ two standard deviations or more higher than mean /o/.
according to degree of participation in the NCS. A speaker’s NCS participation can be rated on a five-point scale according to how many they satisfy of a set of five phonetic criteria defined by Labov (2007); this rating is referred to as the speaker’s “NCS score.” The four regions, shown on Map 4, are the following:

- the **Inland North core**, in the western and central part of the state, where nearly all speakers sampled have NCS scores of 4 or 5;
- the **Inland North fringe**, east of the Inland North core, where some speakers have scores as high as 4, but scores of 2 and 3 constitute the majority;
- the **Hudson Valley**, southeast of the Inland North fringe, where NCS scores of 2 predominate and none are as high as 4;
- and the **North Country**, in the northeastern corner of the state, where NCS scores are all below 2 and the caught-cot merger is advanced.

Since the raised continuous /æ/ system is characteristic of the NCS, it is unsurprising to find that it is exhibited by the majority of speakers in Inland North core communities, a minority in Inland North fringe communities, and none in the Hudson Valley or North Country.

### 3 The Raised Nasal System

Above, it was argued that what *ANAE* calls the raised /æ/ system is merely a subtype of the continuous system that happens to be situated high in the vowel space. This argument implicitly treats raised vs. low and continuous vs. discrete (“nasal system”) as orthogonal parameters that /æ/ systems might exhibit, rather than parallel classifications. That opens the possibility of a type of /æ/ system not described in *ANAE*: a **raised nasal system**, with a sharp distinction between prenasal and non-prenasal allophones, but the non-prenasal allophone substantially raised out of the low region of the vowel space. As shown in Figure 5, this /æ/ system does in fact exist: Pamela H. from Walton exhibits a sharp separation between prenasal and non-prenasal tokens of /æ/, with only two exceptions; and yet even her non-prenasal /æ/ allophone is close to the F1 midline of the vowel space, much higher than low vowels such as /o/. In other words, it is possible for NCS raising of /æ/ and sharp nasal allophony to coexist in a single speaker, and all four combinations of the raised vs. low and discrete vs. continuous parameters are attested in Upstate New York.

![Figure 5: The raised nasal system of Pamela H. from Walton, N.Y. The low vowel /o/ is shown in magenta for comparison with the raised /æ/.](image-url)
22 speakers in the data exhibit the raised nasal system. Map 6 shows their geographical distribution, represented by stars: the raised nasal system is most frequent in the Inland North fringe, with some spillover into the Inland North core and the border communities of the Hudson Valley. In other words, while the raised continuous system is most concentrated in the Inland North core, where the NCS is most advanced, the raised nasal system is most frequent in the region where the NCS is present, but not the majority pattern.

Map 6: Distribution of the raised nasal system.

In general, the raised continuous system is closely associated with more advanced NCS, while the raised nasal system is associated with intermediate degrees of NCS. For example, the 26 raised continuous speakers (including those from the ANAE sample) have a mean NCS score of 4.2 out of 5, whereas the 22 raised nasal speakers have a mean score of 2.8. Similarly, recall that the NCS involves the fronting of /o/ and backing of /e/; so a speaker with advanced NCS will have a relatively small difference in F2 between /o/ and /e/; the mean F2 difference between these two phonemes for raised continuous speakers is 133 Hz, whereas the mean for raised continuous speakers is 288 Hz. In other words, although raised continuous and (discrete) nasal /æ/ distributions are both found among NCS speakers and NCS regions, the continuous distribution is in a number of respects more characteristic of advanced NCS speakers and the core dialect region, while the nasal distribution is more characteristic of less advanced speakers and the fringe area.

4 Nasal vs. Continuous Overall

Indeed, the closer association of advanced NCS with continuous /æ/ than with nasal /æ/ is not restricted only to speakers with overall raised /æ/; a similar pattern can be found when comparing all continuous and nasal systems, or even only unraised ones. For example, although we have seen above that continuous and nasal distributions are both compatible with both raised and unraised /æ/, it is not the case that whether a speaker’s /æ/ is continuous or nasal is independent of whether or not it is raised. Table 7 shows the number of speakers in each cell of the 2×2 matrix of /æ/ systems considered here; it demonstrates that low-/æ/ speakers are much less likely to have a continuous distribution than are raised speakers.\footnote{A chi-squared test gives $p \approx 0.001$.} So—at least in Upstate New York—a continuous...
/æ/ system appears to be much more at home with NCS raised /æ/ than with low /æ/.

Table 7. Frequency of the four combinations of raised/low and nasal/continuous /æ/.

<table>
<thead>
<tr>
<th></th>
<th>raised</th>
<th>low</th>
</tr>
</thead>
<tbody>
<tr>
<td>nasal</td>
<td>22</td>
<td>56</td>
</tr>
<tr>
<td>continuous</td>
<td>26</td>
<td>19</td>
</tr>
</tbody>
</table>

In fact, even if we entirely ignore speakers with NCS raising we find that the continuous distribution is more associated with the NCS than the nasal distribution. Table 8 includes only speakers with low non-prenasal /æ/, and demonstrates that even among non-raised speakers, continuous /æ/ systems are more common in the Inland North regions, where the NCS exists.

Table 8. The total number of sampled speakers with low continuous or low nasal /æ/.

<table>
<thead>
<tr>
<th></th>
<th>continuous</th>
<th>nasal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inland North (core or fringe)</td>
<td>11</td>
<td>13</td>
</tr>
<tr>
<td>elsewhere</td>
<td>8</td>
<td>43</td>
</tr>
</tbody>
</table>

Map 9: The distribution of nasal vs. continuous and raised vs. low /æ/ systems.

We can see this same pattern fairly clearly on Map 9, which shows the overall distribution of raised/unraised and nasal/continuous systems throughout the sampled region. The communities marked in red are those where more than 85% of the speakers interviewed have a nasal system, and these communities are almost all outside the Inland North. So it’s not just /æ/-raising that’s a feature of the Inland North in this data set; continuous /æ/ is also an Inland North feature. This result is somewhat unexpected: /æ/-raising is one of the defining features of the NCS, and therefore of the Inland North as well, and as we have seen raising is compatible with the nasal system. But apparently despite that compatibility, the continuous system is still a more characteristic feature of the Inland North. To explore why this is, let us focus on the regions with

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5This table adds up to 123, not 130 (the number of speakers in the study), because seven speakers with a more exotic /æ/ system—the diffused New York City system (see Dinkin 2009, Labov 2007)—are excluded.

6Fisher’s exact test gives $p < 0.01$. 

mostly nasal systems—the Hudson Valley and North Country.

5 NCS Features Outside the Inland North

The Hudson Valley and North Country are excluded from the Inland North because of their low degree of participation in the NCS; as noted above, every community in the Inland North contains speakers with Inland North scores of 4 or 5, while nearly all speakers in the Hudson Valley and North Country have scores of 2 or lower. However, the Hudson Valley in particular is far from a typical non–Inland North region. Although it exhibits less participation in NCS features than the Inland North core or fringe, the Hudson Valley has substantially more NCS participation than typical communities outside the Inland North. Table 10 shows how the Hudson Valley compares to ANAE data from inside and outside the Inland North with respect to the five criteria from Labov (2007) that define the NCS score; these five criteria are broadly satisfied in the Inland North, and only infrequently satisfied elsewhere. It turns out that the Hudson Valley resembles the Inland North with respect to two of these criteria, but resembles non–Inland North regions with respect to the other three. So although the Hudson Valley is not considered part of the Inland North, it exhibits some of the features that are distinctively associated with the Inland North.

<table>
<thead>
<tr>
<th>% satisfying criteria</th>
<th>ANAE Inland North (n = 61)</th>
<th>Hudson Valley (n = 33)</th>
<th>ANAE elsewhere (n = 385)</th>
</tr>
</thead>
<tbody>
<tr>
<td>/ʌ/ F2 &lt; /o/ F2</td>
<td>93%</td>
<td>87%</td>
<td>15%</td>
</tr>
<tr>
<td>/e/ F2 – /o/ F2 &lt; 375 Hz</td>
<td>84%</td>
<td>81%</td>
<td>13%</td>
</tr>
<tr>
<td>/æ/ F1 &lt; /æ/ F1</td>
<td>66%</td>
<td>0%</td>
<td>3%</td>
</tr>
<tr>
<td>/æ/ F1 &lt; 700 Hz</td>
<td>84%</td>
<td>9%</td>
<td>17%</td>
</tr>
<tr>
<td>/o/ F1 &lt; 1500 Hz</td>
<td>46%</td>
<td>9%</td>
<td>5%</td>
</tr>
<tr>
<td>mean NCS score</td>
<td>3.7</td>
<td>1.9</td>
<td>0.6</td>
</tr>
<tr>
<td>mode NCS score</td>
<td>5</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 10: Comparison of the Hudson Valley’s NCS criteria to those of ANAE speakers in and out of the Inland North.

Let us look a bit more closely at how the Hudson Valley and North Country are situated with respect to the Inland North by looking at the individual vowels involved in the NCS. Table 11 shows the mean F1 and F2 values for several of the relevant phonemes in these two regions, comparing them again with ANAE data from inside and outside the Inland North.

<table>
<thead>
<tr>
<th>vowel means</th>
<th>ANAE Inland North (n = 61)</th>
<th>Hudson Valley (n = 33)</th>
<th>North Country (n = 19)</th>
<th>ANAE elsewhere (n = 385)</th>
</tr>
</thead>
<tbody>
<tr>
<td>/o/ F2</td>
<td>1498 Hz</td>
<td>1421 Hz</td>
<td>1334 Hz</td>
<td>1310 Hz†</td>
</tr>
<tr>
<td>/e/ F2</td>
<td>1740 Hz</td>
<td>1724 Hz</td>
<td>1708 Hz</td>
<td>1847 Hz</td>
</tr>
<tr>
<td>/ʌ/ F2</td>
<td>1353 Hz</td>
<td>1324 Hz</td>
<td>1343 Hz</td>
<td>1470 Hz</td>
</tr>
<tr>
<td>/æ/ F1</td>
<td>653 Hz</td>
<td>766 Hz</td>
<td>792 Hz</td>
<td>767 Hz</td>
</tr>
</tbody>
</table>

Table 11: NCS vowels in the Hudson Valley and North Country, compared to Inland North and non–Inland North ANAE data.

As Table 11 demonstrates, the Hudson Valley and North Country’s degree of participation in NCS vowel features differs greatly for different phonemes. With respect to /o/, the Hudson Valley is situated approximately midway between the Inland North and non–Inland North varieties; this is perhaps what we might naively expect to find in a region that is not part of the Inland North itself but shows some influence from it. The North Country, where the caught–cot merger is nearing completion, unsurprisingly has /o/ backer than it is in the Hudson Valley.

Although with /o/ we find that the Hudson Valley is situated midway between Inland North

7If caught–cot–merged regions are excluded, the mean ANAE non–Inland North /o/ F2 is 1339 Hz.
and non–Inland North regions, with /e/ and /ʌ/ the picture seems quite different. Here the NCS movement is toward backing of these two vowels, and the Hudson Valley and North Country both have the two phonemes apparently even backer than the average ANAE Inland North speaker! In other words, these two regions participate in the backing of /e/ and /ʌ/ at least enough to be indistinguishable from parts of the Inland North, if not more so.

So the Hudson Valley is participating in NCS changes to some extent in all three of /o/, /e/, and /ʌ/—in some cases less than the Inland North, in some cases as much or more, but at any rate substantially more than the average non–Inland North speaker. The North Country participates in two of the three. The picture is quite different for /æ/, however. The Hudson Valley is identical to non–Inland North regions in its height of /æ/, and the North Country’s /æ/ is even lower. In other words, the difference between the Inland North and the Hudson Valley seems to be specifically that the Hudson Valley can acquire all the features of the NCS except the raising of /æ/; the dark blue line on Map 4, described as the eastern boundary of the NCS, is really just the eastern boundary of /æ/-raising; other NCS features exist on both sides of that line. What, then, stops /æ/-raising specifically from crossing that boundary, while other NCS components are able to do so?

6 Phonological Structure and Diffusion

We shall examine the special status of /æ/-raising in terms of the phonological structure of the different /æ/ systems. We approach this question from the perspective of the life cycle of phonological change, as formulated by Bermúdez-Otero (2007). According to this model, phonological rules, or “sound patterns,” evolve through a series of phases, situating the same rule in different parts of the grammar with different phonological consequences.

The first phase in a sound pattern’s life cycle 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.” Structurally, such a rule maps abstract phonological segments to their physical articulatory realizations. Bermúdez-Otero cites the raised continuous distribution as an example of a Phase 1 rule, in 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.” 8 From this description it is clear that nasal /æ/ systems fall within this phase.

According to this analysis, in Phase 2 patterns such as the nasal systems, the two allophones of /æ/ represent different phonological entities with different sets of phonological features, whereas in Phase 1 patterns such as the continuous systems, prenasal and non-prenasal /æ/ are merely different phonetic implementations of the same phonetic features. Why does this matter? Because vowel shifting, of the type that happens in chain shifts, is itself a Phase 1 phonological operation: a vowel moves gradually through phonetic space. According to this model, then, what is moving in the case of a chain shift is not a phoneme per se, but rather a discrete bundle of phonological features, which may be an entire phoneme or may simply be one of several Phase 2 allophones of a phoneme. In other words, in a nasal system, the prenasal and non-prenasal allophones of /æ/ will act independently of each other for purposes of gradient sound change, while in a continuous system the entire phoneme will act as a unit.

8The component of the Inland North within Upstate New York, including both Dinkin (2009) and ANAE data, is more advanced in backing of /e/ and /ʌ/ than the remainder of the Inland North; the Hudson Valley and North Country fall in between the two subregions of the Inland North with respect to these vowels.

9This quotation is from Bermúdez-Otero’s description of the third phase of the life cycle, not the second; however, Phase 3 is also phonetically “abrupt” in the sense used here, and this description will serve for the purpose of defining phonetic abruptness.
Dialect diffusion should not change these facts. According to Labov (2007), diffusion mainly affects the superficial elements of language, not the underlying abstract relationships between linguistic structures. So if two sounds are allophones of a single phoneme, this is a fact about underlying linguistic structure which is unlikely to be changed as a result of diffusion.

This gives us a possible explanation for why the raising of /æ/ is blocked from diffusing beyond the Inland North while other components of the NCS are not so blocked. Suppose the raising of /æ/ were to diffuse from the Inland North to a community with a nasal /æ/ system. Since diffusion operates at a linguistically superficial level, this diffusion would affect the phonetic implementation of /æ/ in the target community. The two allophones of /æ/ have two different phonetic implementations there: The prenasal allophone doesn’t need to move anywhere under the influence of diffusion, since it’s already in the raised position that the entire /æ/ phoneme occupies in the source community, so any nontrivial effect of diffusion will have to be felt by the non-prenasal allophone.

Diffusion only affects surface-level features, not the underlying structure of phonological entities. In other words, speakers of the recipient dialect maintain the grammatical knowledge that the prenasal and non-prenasal allophones have distinct phonological features. If we make the reasonable assumption that there is a synchronic constraint against two distinct phonological entities with different features having the same phonetic implementation, this implies that the non-prenasal allophone cannot (as a result of diffusion) raise into the phonetic space occupied by the prenasal allophone. In other words, the non-prenasal allophone blocks the prenasal allophone from raising fully, as long as the difference in their phonological representations remains in the grammar. As noted above, the Hudson Valley and North Country have almost exclusively nasal /æ/ systems. Therefore the argument in this section explains why the raising of /æ/ fails to effectively diffuse into these regions while other elements of the NCS appear to do so freely: the sharp allophony of the nasal system causes these regions to resist diffusion of /æ/-raising.

7 Objections

It may seem odd to argue that diffusion does not allow one allophone to move into the phonetic space of another on the grounds that distinct phonological entities must be distinct phonetically—after all, phonemic merger surely undergoes diffusion very frequently, and is nothing if not one phonological entity moving into the phonetic space of another. Why should it be possible for a merger of two phonemes to diffuse from community to community, but not a “merger” of two allophones of the same phoneme?

This may be because allophones of a single phoneme are related by a productive phonological rule in speakers’ grammars, and distinct phonemes are not. Labov (1994) argues that one of the causes of the diffusion of phonemic merger is that being in contact with merged speakers makes unmerged speakers less likely to depend on the contrast between the two phonemes in order to distinguish words. But this doesn’t apply in cases of allophonic alternations: it’s already unnecessary to depend on the contrast between two allophones in order to distinguish words, since the allophones are in complementary distribution. The relationship between the two phonemes is a rule of grammar, which perhaps can’t be suspended as easily as simply disregarding which of two phonemes happens to occur in which words; and thus the contrast between two phonemes might be easier to overwhelm through diffusion than a productive allophonic relationship.

Finally, if the nasal system blocks the development of /æ/-raising, then how do raising and sharp nasal allophony coexist in the raised nasal system discussed above? To answer this, keep in mind that the raised nasal system is most frequent not in the Hudson Valley but rather in the Inland North fringe—i.e., not in the regions where nasal systems overall are most dominant. The Inland North fringe shares its origins with rest of the Inland North in migration from western New England beginning around the 1790s (Dinkin 2009), and the Inland North as a whole has a fairly high percentage of continuous systems. Given that the natural direction of phonological change, according to Bermúdez-Otero (2007), is from Phase 1 (continuous) to Phase 2 (discrete allophony), and that the Inland North fringe shares its immediate dialectological ancestry with the Inland North core, it seems more likely that the raised nasal system in the Inland North fringe is the result of already-raised /æ/ systems evolving from Phase 1 to Phase 2 and developing sharp nasal allophony, rather than of already-discrete Phase 2 systems becoming raised.
The apparent-time pattern of change gives some evidence for this account. In Inland North fringe communities in which the raised nasal system exists, the phonetic distance in F1/F2 space between prenasal and non-prenasal /æ/ is increasing in apparent time ($r^2 \approx 0.14$, $p < 0.05$). This is exactly what we would expect in communities where a gradient phonetic differentiation between prenasal and non-prenasal /æ/ is in the process of being replaced by a categorical and discrete allophony. Meanwhile, in those communities in the Hudson Valley and North Country where there is enough data to check, the distance between prenasal and non-prenasal allophones of /æ/ is not increasing in apparent time. Thus it seems as if the nasal system might be a newer development in the Inland North fringe than in the Hudson Valley. So perhaps the nasal system can develop on top of a raised continuous /æ/, creating the raised nasal system, but a nasal system can’t develop raising, thus creating the blue boundary seen on Maps 4, 6 and 9.

8 Conclusion

The main empirical findings of this paper are thus the existence of the raised nasal system and the fact that continuous /æ/ systems are rare in the same parts of New York where raised /æ/ is rare, even though the parameters are in principle independent. To explain the latter finding, I hypothesize that the nasal system blocks the development of raising, and that in general one discrete allophone of a phoneme can block another allophone from moving into its phonetic space through dialect diffusion. This analysis seems theoretically well-founded, but it could do with more empirical support in the form of further studies of dialect diffusion between Phase 1 and Phase 2 systems.

I conclude by noting the potential applicability of this analysis to the conundrum of “allophonic chain shifting” explored by Labov (2010): for instance, if in a dialect with general raising of /æ/ we see /o/ fronting in response to it, why do dialects with raised prenasal /æ/ not exhibit concomitant fronting of prenasal /o/, in a chain shift restricted to prenasal allophones? Analysis in terms of the life cycle of sound patterns can provide an answer to this question: chain shifting is a Phase 1 phenomenon, and whether a given feature cluster is an independent phoneme or not is immaterial to a chain shift’s progress. Thus it does not matter whether a certain allophone of /æ/ is raised out of the low front phonetic position as long as another phonological entity remains there; the presence of the non-prenasal allophone means there is no gap in phonetic space that might trigger the beginning of a chain shift.

References


