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A shift of allegiance: The case of Erie and the North / Midland boundary

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Abstract
The city of Erie, Pennsylvania represents an anomalous case in the dialect geography of North America. According to all available historical records, it was linguistically aligned with the North in the early part of the 20 th century: the lexical data presented in Kurath (1949) and Carver (1987) locate Erie within most of the Northern isoglosses, and the phonological data presented in Kurath and McDavid (1961) show that Erie shared nearly all of its phonological features with the North and only a few with the Midland. However, recent research for the Atlas of North American English (Labov et al. 2006) shows that Erie is now a Midland city, and the two ANAE speakers from Erie show no traces of the Northern Cities Shift. Crucially, the two pivot points in the vowel system, as defined by Labov (1991), show clear Midland characteristics: short-a exhibits raising before all nasals, but not the general raising of the NCS, and both speakers have a complete merger of the vowels in cot and caught.

Erie's shift from being a Northern city to a Midland city is surprising given that the North/Midland boundary is the most clearly defined dialect boundary in North America today (Labov et al. 2006). Furthermore, it would not be predicted by dialect diffusion models that only take population and distance into account, such as Trudgill's (1974) Gravity Model: Buffalo and Cleveland, the large Northern Cities along Lake Erie on either side of Erie are more populous and closer to Erie than Pittsburgh, the nearest large Midland city.

The current study provides a more detailed characterization of Erie, and presents vowel measurements from seven Erieites, ranging in age from 25 to 60. I n general, the results confirm ANAE's finding that Erie is aligned with the Midland. H owever, the vowels systems of the Erie speakers are different from the neighboring Midland speakers in two respects. First of all, /ow/ does not participate in the strong fronting that is characteristic of Pittsburgh/Western PA: only the youngest speaker (a 25-year-old female) shows an F2 value for /ow/ that is higher than would be expected for a Northern speaker. Furthermore, while all speakers clearly have the low-back merger, the phonetic realization of the resulting phoneme is unrounded and lower than the distinctly rounded and raised open-o of the Pittsburgh area. Thus, while Erie is clearly phonologically aligned with Pittsburgh, the two regions are not phonetically identical.

This realignment with the Midland suggests that Pittsburgh has had a stronger influence on Erie since the middle of the 20 th century than either of the two large nearby Northern cities. Qualitative evidence from sociolinguistic interviews will be presented to confirm this and to show that Erieites have more contact with speakers from Pittsburgh than either Buffalo or Cleveland. Much of this contact stems from the popularity of Erie as a summer vacation destination for residents of Pittsburgh, evidenced by the fact that some Erieites refer to these summer vacationers from Pittsburgh as "mups" (from "come up"). It will be argued that this higher density of communication caused Erie to shift its phonological allegiance from the North to the Midland, and, consequently, that any model of dialect diffusion must take communication patterns into account in order to be fully explanatory.

A shift of allegiance: The case of Erie and the North / Midland boundary

Keelan Evanini

1 Introduction

Erie holds a unique place in the dialectology of North America, since it is the only city to have switched its regional affiliation from the North to the Midland. The earliest dialectological records of the region (Kurath 1949, Kurath and McDavid 1961) show Erie to pattern together with the North with respect to nearly all lexical and phonological isoglosses. However, the recently completed *Atlas of North American English*, henceforth ANAE, shows that the phonology of Erie is clearly no longer Northern, and shares two crucial phonological traits with the Midland: the merger of /o/ (as in *cot*) and /oh/ (as in *caught*) and a pattern of raising /æ/ before nasals (Labov et al. 2006:205). This shift of allegiance from the North to the Midland is surprising, since the North is perhaps the most cohesive dialect region in North America, as evidenced by the high rate of homogeneity and consistency of its defining isoglosses (Labov et al. 2006:151), and the boundary between the North and the Midland regions is the sharpest boundary in North America.

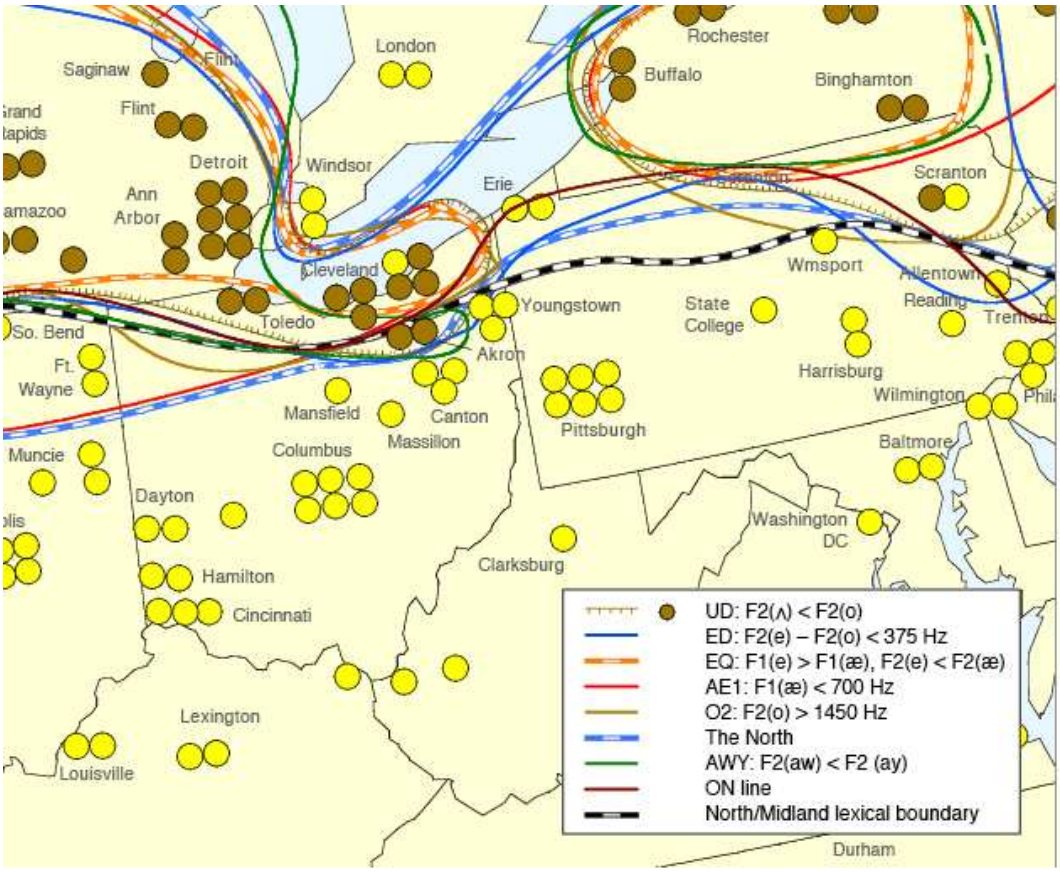

Figure 1: Erie and the surrounding region (Map 14.11 from ANAE)

Figure 1 shows how Erie is located outside of most of the 8 isoglosses for the North in ANAE, thus creating a Midland wedge between the otherwise continuous North stretching from Albany to Minneapolis. This paper will expand on the findings of ANAE by presenting new apparent time data about the merger of /o/ and /oh/ in Erie in an attempt to pinpoint when the switch to the Midland occurred.

2 Erie's original status as a Northern city

All of the earliest dialectological studies indicate that Erie was aligned with the North for at least the early part of the 20th century. The evidence for this based on lexical items is quite strong, and comes primarily from *A Word Geography of the Eastern United States* (Kurath 1949), henceforth WG, as well as the data collected for the *Dictionary of American Regional English*, henceforth DARE, as presented in Carver (1987). The sources for the phonological evidence are *The Pronunciation of English in the Atlantic States*, henceforth PEAS, (Kurath and McDavid 1961) and Wetmore (1959), both based on the fieldwork done for the *Linguistic Atlas of the Middle and South Atlantic States*, or LAMSAS.

2.1 Lexical

WG provides two types of evidence for Erie's position within the North. First of all, Erie is located within 10 of the 11 defining isoglosses of the North (Maps 5–8 in WG) and all 6 isoglosses that are characteristic of both the North and the Midland (Maps 39 and 40). Table 1 lists these words along with their non-Northern counterparts, showing the Northern version used in Erie in italics.

Northern form	non-Northern form	map in WG
whiffletree, whippletree	swingletree	5a
pail	bucket	5a
darning needle	dragonfly	5a
teeter, teeterboard	seesaw	5b
stone boat	vehicle for dragging field stones	5b
spider	frying pan	6
skaffle	scaffold (in a barn)	6
buttry	pantry	6
stoop	porch	7
dutch cheese	cottage cheese	8
stone wall	fence built of loose stone	39
hay mow	hay loft	39
grist of corn	turn of corn	39
whinny	nicker / whicker	40
corn husks	corn shucks	40
string beans	snap beans	40

Table 1: Northern isoglosses in WG that contain Erie (italicized variant used in Erie)

Table 2 shows that *belly-gut* is the only one of the 11 Northern lexical items that does not contain Erie.

Northern form	non-Northern form	map in WG
belly-gut	*face-down on a sled*	7

Table 2: Only Northern isogloss in WG that does not contain Erie

Secondly, evidence for Erie's original status as a Northern City is provided by the Midland isoglosses in WG. Erie falls outside of 8 isoglosses that define the Midland (Maps 15-18) and 5 isoglosses that are characteristic of both the South and the Midland, all of which reach northward past Pittsburgh (Maps 41 and 42) . In Table 3 I refer to these two types of isoglosses as the *non-Northern isoglosses*, in contrast to the isoglosses in Table 1 that were either distinctly Northern or shared by the North and Midland.

non-Northern form	Northern form	map in WG
I want off	*I want to get off*	15
Sook!	*call to cows*	15
snake feeder	*dragonfly*	15
blinds	*roller shades*	16
bawl	*noise a calf makes*	16
poke	*paper bag*	17
sugar tree	*maple tree*	17
worm fence	*a rail fence laid zigzag*	18
corn pone, pone	*cornbread*	41
paling fence, pale fence	*picket fence*	41
roasting ears	*sweet-corn*	41
pole cat	*skunk*	42
Christmas gift!	*Merry Christmas!*	42

Table 3: Non-Northern isoglosses in WG that do not contain Erie (italicized variant used in Erie)

Conversely, Erie shares only two of the lexical items characteristic of the Midland: *run* and *smear case* (used to define the North Midland in Map 18), and one of the items common to both the Midland and South: *spicket*. These three lexical items that Erie shares with the Midland are shown in Table 4. Thus, Erie behaves like a Northern city for 88% (29 out of 33) of the relevant lexical items from WG.

non-Northern form	Northern form	map in WG
run	a small stream	18
smear case, smear cheese	cottage cheese	18
spicket	faucet	42

Table 4: Only non-Northern isoglosses in WG that contain Erie

Finally, Erie is also situated outside of the three isoglosses that Kurath provides for Western Pennsylvania (Figure 25 in WG). These three extend northward from Pittsburgh into northwestern PA, but none of them quite reach Erie. This suggests that Pittsburgh's influence in Erie was not yet strong at that time. These three lexical items are show in Table 5.

The evidence from DARE is available only indirectly through Carver (1987), who trolled through the DARE fieldwork data to compile maps that capture the regional patterning of some of the lexical items used in the survey. Instead of the more traditional concept of dialect region, Carver prefers to use dialect *layers* as his descriptive apparatus. He defines a dialect layer as "the composite of a unique set of areal isoglosses, the geographical spread of its lexicon" Carver (1987:16).

Western PA form	non-Western Pa form	map in WG
hap	*quilt*	25
doodle, hay doodle	*haycock*	25
drooth	*drought*	25

Table 5: Three Western Pennsylvania isoglosses that do not contain Erie

The evidence from the maps relevant to Erie is presented in Table 6. The first column in the table represents the name of the dialect layer, as defined by Carver. The next two columns represent the number of DARE isogloss terms for the layer that occur in Erie, and the total number of DARE isoglosses used to define the layer, respectively. Unfortunately, even though Carver does provide lists of all of the isogloss terms he used to define the layers, there is no way to know, without

consulting the original fieldwork data, which of them occur in any given geographical point—due to space limitations on the maps, Carver only depicts the number of terms, not the specific terms themselves. So, a direct comparison with the distribution of the words from WG in Tables 1–5 is not possible. The fourth column in Table 6 shows the strength of the boundary within which Erie is situated for each of the dialect layers. The possible types of boundaries are *primary*, *secondary*, *tertiary*, and *quaternary*, with a primary boundary containing the area where the highest percentage of terms for the layer are found.

Dialect Layer	# of terms in Erie	total # of terms for layer	boundary strength	Map from Carver
North	33	82	primary	3.3
Upper North	20	62	secondary	3.7
Inland North	18	51	primary	3.9
Midland	1	40	N / A	6.5
Lower North	4	53	N / A	6.15

Table 6: Erie's position with regard to dialect layers in Carver (1987)

The three boundaries for the layers of the North provide good evidence for Erie's status as a Northern City at the time of the DARE fieldwork. Erie is located within primary boundaries for the North and Inland North layers; furthermore, Erie falls just outside of the primary boundary for the Upper North, which extends westward to Lake Erie, stopping just at the Pennsylvania-New York state line. On the other hand, the data provide very little evidence for associating Erie with the Midland. Map 6.15 situates Erie outside of the tertiary boundary for the Midland layer (which extends northward to around Youngstown, OH). Similarly, Erie falls outside of the two boundaries provided for the Lower North layer (traditionally referred to as the North Midland region), although the secondary boundary does stretch northward almost to Erie.

2.2 Phonological

Table 7 presents the features mapped in PEAS that are evidence for Erie's original affiliation with the North.

For all of these features, the isogloss falls just south of Erie, indicating that Erie was always just on the edge of the boundary between the North and the Midland. The first column in Table 7 describes the feature that Erie shares with the North, and lists the lexical items that PEAS uses to illustrate this. The second column describes the contrasting feature that is found just south of Erie. In some cases, this feature is widely distributed throughout the Midland region (e.g., /uw/ in *due*, Map 163), whereas in others the contrasting feature is more characteristic of Western Pennsylvania in particular (e.g., [druθ] for *draught*, Map 142). In either case, there is a clear boundary between Erie to the north and the area of Western Pennsylvania surrounding Pittsburgh to the south. The speakers from two counties immediately south of Erie appear to be transitional for many of these features, with Crawford County aligning more frequently with Western PA, and Warren County aligning more frequently with the North.

The large number of features that Erie shares with the North can be contrasted with the features in Table 8. These are the only three listed in PEAS that have Erie aligned with the Midland or Western Pennsylvania in opposition to the North.

Even more probative of Erie's original phonological alignment with the North is the status of the low-back vowels. This (along with the status of /æ/) is one of the two main structural features that determine the status of a dialect of present-day North American English (Labov 1991, Labov et al. 2006:122). The fact that /o/ and /oh/ are kept distinct by the two speakers from Erie proves the regions's original alignment with the North as opposed to Western Pennsylvania, where the two phonemes are merged as a low, back rounded vowel ([ɒ] in the PEAS notation).

Table 9 presents the /o/ and /oh/ words that are mapped in PEAS. First of all, the merger in

Erie feature (shared with the North)	contrasting Midland / Western PA feature	PEAS Map #
/i/ monophthongal in *crib*	ingliding diphthong [iᵊ]	4
/e/ monophthongal in *bed*	ingliding diphthong [eᵊ]	4
/ey/ more close (i.e. [eɪ]) in *day*, *bracelet*	[ɛɪ]	18, 19
non-fronted /ow/ in *ago*, *coat*	fronted to [ɜʊ]	20, 21
raised nucleus for /ay/ in *nine*	not raised	26
fronted [ɛʊ] in *mountain*, *(worn) out*	[aʊ ∼ ɑʊ]	28, 29
unrounded [a] in *father*	rounded [ɒ]	32
/iw/ in *dues* and *tube*	/uw/	33
vowel in *four* and *forty* distinct	merged	44
[e] before /r/ in *married*	[æ]	51
[ʊ] in *root*	[u]	113
[ʌ ∼ ɵ] in won't	[o]	125
[drauθ] for *draught*	[druθ]	142
/iw/ in *blue*, *chew*, and *suit*	/uw/	147
[ɪ] in final unstressed syllable of *careless*, *houses*, *haunted*, and *bucket*	[ə]	148
/iw/ in *due*, *new*, and *Tuesday*	/uw/	163, 164, 165
yeast pronounced as [jist]	[ist]	166
/ð/ in *without*	/θ/	170
/s/ in *greasy*	/z/	171

Table 7: Northern phonological isoglosses that contain Erie in PEAS

vowel quality is shown clearly for the Western PA speakers: they have a rounded low-back vowel for all tokens. The Northern speakers and the Erie speakers, on the other hand, maintain a clear distinction in quality between the two types. The /o/ words have an unrounded low-central vowel, possibly slightly fronted in *oxen*, whereas the /oh/ words all have a low-back rounded vowel.

Wetmore (1959) reaches the same conclusion, based on a larger body of evidence from the LAMSAS fieldnotes. In addition to the data presented in PEAS, he examined the lexical items *pot*, *fought*, *shock*, *god*, *off*, *cloth*, *sauce*, *costs*, *frost*, *all*, *John*, *gone*, *launch*, *strong*, *saw*, *swamp*, and *wasp* (Wetmore 1959:109) for speakers from Western Pennsylvania (although it is unclear exactly which of these had data from the two Erie speakers). Based on this evidence he lists both Erie informants as having a distinction between /ɑ/ and /ɔ/ (Wetmore 1959:113).

Thus, it is clear from the earliest survey data available that Erie's linguistic original linguistic affiliation was with the North. Both the lexical data from WG and DARE as well as the phonological data from PEAS and further LAMSAS field records show that Erie was located inside of most of the Northern isoglosses and outside of most of the Midland/Western PA isoglosses.

3 The merger of /o/ and /oh/ in Erie

As Section 2 showed, Erie patterned like a Northern city with respect to most lexical and phonological isoglosses investigated by the early linguistic atlas projects. However, more recent data show that Erie has lost its original Northern affiliation. The clearest diagnostic of this shift is the merger of /o/ and /oh/. The earliest study to document the merger of /o/ and /oh/ in Erie is Herold (1990). She conducted a telephone survey of all of the counties in Pennsylvania that were reported as distinct in PEAS and Wetmore (1959) in order to track the progress of the merger in the state. She interviewed a 63-year-old female from the city of Erie and a 59-year-old male from the town of Warren (in War-

Erie feature (shared with the Midland / Western PA)	contrasting Northern feature	PEAS Map #
/i/ is ingliding [ɪ^{ə}] in *whip*	[ɪ]	5
/e/ is ingliding [ɛ^{ə}] in *fence*	[ɛ]	9
trisyllabic pronunciation of *mushroom* ending in /n/	disyllabic ending in /n/	177

Table 8: Midland / Western PA phonological isoglosses that contain Erie in PEAS

Lexical Item	Erie	North	Western PA	Map #
oxen	[ɑ ∼ ɑ̰ ∼ a̰]	[ɑ ∼ ɑ̰ ∼ a̰]	[ɒ ∼ ɔ]	15
wash	[ɑ]	[ɑ]	[ɒ ∼ ɔ]	135
fog	[ɑ]	[ɑ]	[ɒ ∼ ɔ]	136
on	[ɑ]	[ɑ]	[ɒ ∼ ɔ]	138
law	[ɒˑ ∼ ɒˑ^{ə}]	[ɔˑ ∼ ɔˑ^{ə}]	[ɒˑ ∼ ɒˑ^{ə}]	22
salt	[ɒˑ ∼ ɒˑ^{ə}]	[ɔˑ ∼ ɔˑ^{ə}]	[ɒˑ ∼ ɒˑ^{ə}]	23
dog	[ɒˑ ∼ ɒˑ^{ə}]	[ɔˑ ∼ ɔˑ^{ə}]	[ɒˑ ∼ ɒˑ^{ə}]	24

Table 9: /o/ and /oh/ words in PEAS in Erie, the North, and Western PA

ren County). Through a series of elicitations and minimal pair tests she concluded that both of these speakers had the merger of /o/ and /oh/. Subsequently, two female Erieites were interviewed in 1995 for the ANAE survey. At the time, they were 31 and 39 years old, and both had a solid merger of /o/ and /oh/ in production and perception. Finally, my own research includes over 20 residents of Erie County, all with a solid merger of /o/ and /oh/.

As a typical example of an Erie speaker, Figure 2 shows the merger of /o/ and /oh/ system for Tom L., a 53-year-old Erie resident, along with the nasal /æ/ system (the other main phonological feature that differentiates the Midland from the North).

3.1 The unmerged LAMSAS informants

Since research for the early atlases shows that Erie originally patterned with the North while contemporary research shows it to be Midland, it should be possible, through real time and apparent time data, to determine more precisely when this shift occurred. In order to examine this chronology more closely, Table 10 presents the demographic information for the two LAMSAS speakers from Erie County. Based on this data alone, the fact that the younger of the two LAMSAS informants from Erie County was born in 1903 would seem to indicate a time around 1910 as the *terminus post quem* for the merger of /o/ and /oh/ in Erie.

Informant #	Township	Sex	Age at Interview	Year of Birth	Year Interviewed
PA67a	Venango	M	76	1864	1940
PA67b	Amity	M	37	1903	1940

Table 10: Demographic information for the two LAMSAS informants from Erie County

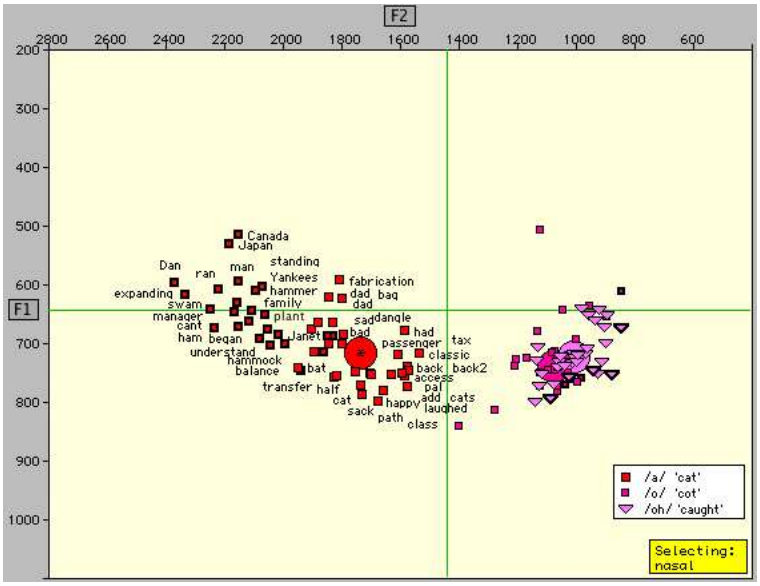

Figure 2: Merger of /o/ and /oh/ and nasal /æ/ system for Tom L., 53 [2006], from Erie, PA; word list and interview tokens

3.2 Sun Valley residents

In order to test the hypothesis that the merger of /o/ and /oh/ occurred in Erie sometime after 1910, an effort was made to record elderly Erieites with the hope of finding some who were born before the merger took place. If present-day speakers with the /o/ $\sim$ /oh/ distinction could be found, it would enable us to pinpoint the date of the merger with a high degree of certainty.

I established contact with the director of an upscale retirement community in Erie, which I will call Sun Valley. She invited me into the community, and arranged one-on-one interviews with several of the residents (ranging from 66 to 95 in age). The oldest was born in 1912, and would thus be a good candidate for maintaining the distinction, assuming the chronology in Section 3.1 is correct.

However, it is clear from minimal pair tests and word list data that all of the native Erieites interviewed at Sun Valley have a complete merger between /o/ and /oh/. None of them had a difference in production of perception for any of the minimal pairs, and the wordlist data show almost total overlap between the two classes.

Table 11 displays the F1 and F2 differences for /o/ and /oh/ from 25 word list tokens, as well as the Euclidean distances between the two vowels, for all of the Sun Valley residents from Erie. The means are all quite close as no speaker has a difference greater than 50 Hz in both F1 and F2, and no speaker has a difference greater than 100 Hz in either domain.

As a comparison point, Table 12 shows the same values for the one non-merged Sun Valley resident, who is from Buffalo. The Euclidean distance between his /o/ and /oh/ means is more than 6 times larger than the average distance for the 9 merged Sun Valley residents, and more than 3 times larger than the individual merged speaker with the largest distance.

The clear evidence for the merger of /o/ and /oh/ among several Sun Valley residents aged 80 and above indicates a time around 1920 as the *terminus ante quem* for the merger of these two vowels in Erie. This evidence along with the LAMSAS data presented in Section 2.2 would seem to indicate a short window in the second decade of the 20th century for its occurrence. In order to shed more light on this chronology, I attempted to find real time data from older recordings of Erieites

Name	Year of Birth	Age	F1(/o/) – F1(/oh/)	F2(/o/) – F2(/oh/)	Dist(o, oh)
Dana W.	1941	66	9	17	19.2
Sally W.	1928	79	13	54	55.5
Dottie A.	1926	81	35	72	80.1
Eloise B.	1925	82	25	71	75.3
Charles B.	1925	82	98	-4	98.1
Mary D.	1919	88	40	21	45.2
Flora R.	1919	88	49	39	62.6
Robert E.	1916	91	-7	39	39.6
Dan R.	1912	95	-14	21	25.2
		Averages	28	36	55.6

Table 11: /o/ and /oh/ for 9 Sun Valley residents from Erie

Name	Year of Birth	Age	F1(/o/) – F1(/oh/)	F2(/o/) – F2(/oh/)	Dist(o, oh)
Walkter K.	1927	80	187	326	375.8

Table 12: /o/ and /oh/ from the wordlist for a Sun Valley resident from Buffalo

who were born before the Sun Valley residents.

3.3 The Seasonal Workers in Viticulture Corpus

The Seasonal Workers in Viticulture (SWV) corpus was compiled as part of an oral history project conducted in 1988 to document the local grape growing and picking industry around North East, PA. The town of North East is located in the northeastern corner of Erie County, about 20 miles from downtown Erie, and directly across the state line from New York. The SWV project attempted to interview older native residents of North East who had owned vineyards or who had worked as grape pickers, although a few younger people and a few in-migrants were also interviewed.

The two oldest, native North East residents from the corpus were selected for analysis, since they were considered to be the most likely ones to still maintain a distinction between /o/ and /oh/. Both of these informants grew up on farms in North East and lived in the town their entire lives. Their families owned grape farms, and they sold their grapes at local markets, and, later, to nearby plants for the production of grape juice.

Name	Year of Birth	Age	F1(/o/) – F1(/oh/)	F2(/o/) – F2(/oh/)	Dist(o, oh)
Richard O.	1906	82	56	154	163.9
Benjamin S.	1907	81	36	40	53.8

Table 13: /o/ and /oh/ from interviews for two SWV informants from North East, PA

Figure 3 shows a plot of all tokens of the vowels /o/ and /oh/ for Richard O., and Table 13 displays the differences between the vowels in the F1 and F2 dimensions for both speakers. Richard O. has a small amount of overlap between the two classes, with *a lot*, *operator*, and *Concord* clearly falling in the /oh/ cloud and *thought*, *Catawbas*, and *crossroads* approaching the /o/ cloud. This distribution suggests that Richard O. maintained a distinction between /o/ and /oh/; however, the two phonemes are quite close, and are close to merging. The F2 difference between /o/ and /oh/ for Richard O. is only 154 Hz, compared to 326 Hz for the clearly unmerged Walter K. from Buffalo.

This is the type of distribution that exists for many of the Midland ANAE speakers who are labeled as "transitional" with regard to the /o/ ∼ /oh/ merger.

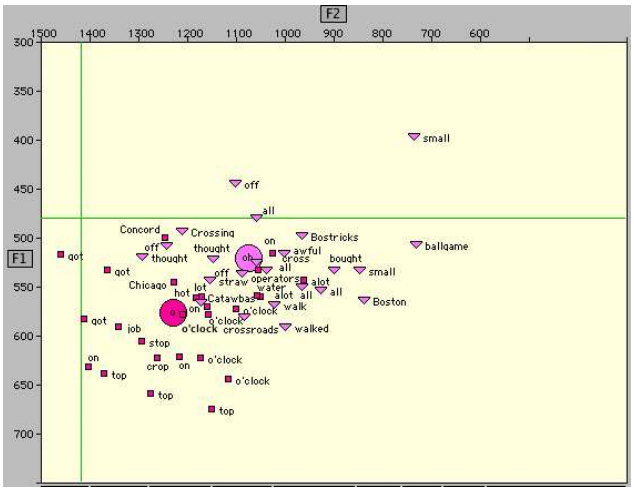

Figure 3: /o/ and /oh/ from Richard O., born 1906 in North East, from the SWV corpus

Benjamin S., on the other hand, shows a much greater degree of overlap between the two classes, with several tokens from each class falling clearly within the cloud of the other class. Furthermore, the F2 distance between the means of the two classes is only 40 Hz. All of this evidence suggests that the merger of /o/ and /oh/ is quite advanced for Benjamin S., and has probably already reached completion.

3.4 H. O. Hirt

The oldest real time data that I have been able to discover so far comes H.O. Hirt, the founder of Erie Insurance Exchange. He was born in 1887, founded the company in 1925, and served as its CEO until 1976. An interview was conducted with him in 1977 and a 20-minute VHS version of this interview was released as a publicity tape by the Erie Insurance Group.

Figure 4 shows a plot of all tokens with /o/ and /oh/. As the figure shows, there is some degree of overlap between /o/ and /oh/, although the two clouds do not overlap as much as they do for the Sun Valley residents. Two tokens of *thought* and one of *office* are clearly within the /o/ distribution, and several /o/ words fall within the /oh/ cloud: *policy*, *dollars*, *modest*, *profit*, *pocket*, *top*, and *not*. Furthermore, several tokens from the /o/ class sound quite rounded, especially *top*, *policy*, *pocket*, and *dollars*.

Table 14 shows the differences between the means for the two vowel classes. Again, the difference in F1 is quite small (30 Hz); however, the difference in F2 is somewhat larger than for all of the Sun Valley residents, but much smaller than for a completely unmerged speaker. It thus appears that the merger of /o/ and /oh/ was nearing completion in Erie slightly before the turn of the 20th century, when H.O. Hirt was growing up.

Name	Year of Birth	Age	F1(/o/) – F1(/oh/)	F2(/o/) – F2(/oh/)	Dist(o, oh)
H. O. Hirt	1887	90	30	114	117.9

Table 14: /o/ and /oh/ from interview with H.O. Hirt, born 1887 in Erie

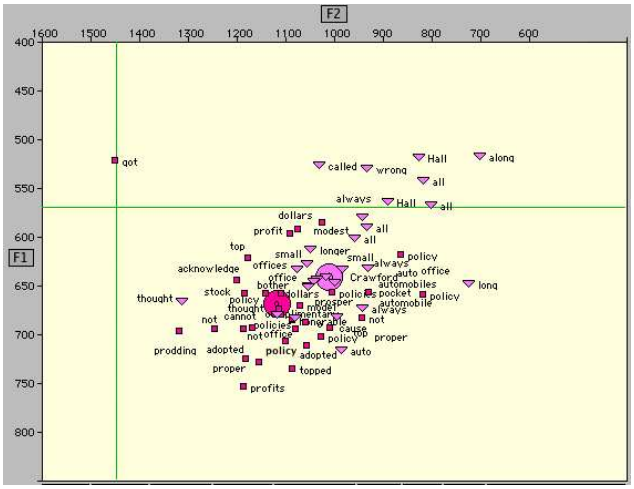

Figure 4: /o/ and /oh/ from H. O. Hirt, born 1887 in Erie

3.5 Explaining the LAMSAS data

The pieces of evidence presented above about the chronology of the merger of /o/ and /oh/ do not form a coherent picture; specifically, the LAMSAS data seems to suggest that the merger must have taken place later in Erie County than it clearly did based on both the apparent time and real time evidence. However, so far the discussion has focused primarily on the temporal dimension of the merger, but has disregarded the geographic dimension. If we consider how the merger must have progressed through both time *and* space, the picture becomes clearer.

The younger non-merged LAMSAS speaker who seems to provide evidence for a later date for the merger, PA 67b, was born in 1903. However, he was not from the city of Erie itself; rather he was born and raised in Amity township, a small farming community in the southeastern part of Erie County. On the other hand, the speakers who provide evidence for an earlier date for the merger are much more connected to the city than PA 67b: H.O. Hirt and the Sun Valley residents are all from the city of Erie itself, and the two SWV speakers are from North East. North East is only slightly closer to Erie than Amity in terms of distance, but is much more closely connected with Erie, since it is a larger community and a major road passes between Erie and North East.

So, if all of the temporal and geographic evidence is taken at face value, then it indicates that the merger first occurred in the city of Erie, and then spread gradually to the nearby townships in Erie County, first to the more populous ones, then, finally, to the smaller, more isolated ones, similar to the progression in a Cascade Model of change (Labov 2003). H.O. Hirt's data indicates that the merger probably took place in Erie already before the turn of the 20th century. The two SWV speakers indicate that it had spread to North East by around 1910. Finally LAMSAS speaker PA67b indicates that the merger had not yet reached Amity township by 1910.

4 Conclusion

In this paper I have documented Erie's shift from the North to the Midland, and the diachronic status of the vowels /o/ and /oh/. If the chronology of the merger of /o/ and /oh/ presented in Section 3.5 is correct, then it might still be possible to find non-merged speakers in the rural areas of the county that the merger spread to last. Such apparent time data as well as more real time data from around the time of H. O. Hirt or earlier would help to confirm the chronology presented here.

Furthermore, more research in this dialect boundary region is necessary in order to determine the dynamics of Erie's shift. On the one hand, real time evidence from small towns near Erie, such as Ripley, NY, show that the merger of /o/ and /oh/ is continuing to spread into the North. On the other hand, Erie's phonology still maintains vestiges of its original Northern status (e.g., /ow/ is not fronted at all, contrasting Erie sharply with Pittsburgh to the south). Further research will be necessary to completely characterize all aspects of the dialect boundary.

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