Indianapolis, Indiana: A prototype of Midland convergence

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Abstract
Conventional wisdom suggests that the dialects of American English are converging due to the influence of mass media and improved communication. Yet in fact, American regional dialects appear to be diverging from one another and these diverging regional dialects are expanding at the expense of smaller, distinctive speech islands within each region. One major, apparent exception to this pattern seems to be the American Midland, a region whose three largest urban centers ? St. Louis, Pittsburgh and Cincinnati ? have been shown to exhibit unique dialect patterns which distinguish them from the more general pattern of the surrounding region. But another major Midland center, Indianapolis, Indiana, has been largely ignored by previous research. This paper examines the state of Indianapolis English with regards to three key Midland identifiers: the fronting of back vowels /ow/, /uw/ and /aw/; the transitional merger of the low-back vowels /o/ and /oh/; and the monophthongization of /ay/ before resonants. The results of this study suggest that Indianapolis does indeed follow the Midland regional pattern. First, the Indianapolis speakers all show back vowel fronting. Second, while Indianapolis does not have an unconditioned low-back merger, all of the youngest speakers showed a merger in some environment (before /l/, before /n/ or both) and only half of the oldest speakers did. Finally, while there is no overall /ay/ monophthongization in any environment in Indianapolis, /ay/ glides show significant reduction before resonants as compared to non-resonants across all age groups. Thus, Indianapolis is a Midland speech prototype representing the target of convergence for the larger urban centers.

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1 Introduction

Conventional wisdom believes that the dialects of American English are converging, a reaction to the homogenizing pressures of the mass media and an ever more mobile and well-educated population. But a major finding of Labov, Ash and Boberg in their recently published *Atlas of North American English* (2006; hereafter LAB) flies in the face of this folk belief: "the diversity of regional dialects in North America is not diminishing, but is increasing over time" (304). Yet this increased diversity comes at the expense of small, distinct speech islands within larger regions, which are disappearing as they assimilate to the regional norms.

One apparent exception to this pattern of regional convergence is the American Midland. Frazer (1986) suggested that distinctly Northern speech areas could be found throughout the rural areas of the Midland and he believed that as small communities remained largely isolated from each other, the dialect of these Northern speech islands would remain distinct from the general Midland. Further, the three largest urban centers of the Midland—Pittsburgh, St. Louis and Cincinnati—have all been shown to exhibit unique dialect patterns which distinguish them from the more general pattern of the surrounding region. Despite this documented diversity within the Midland dialect region, recent observation suggests that even these historic speech islands now seem to be disappearing in favor of a general Midland dialect that closely follows the Southeastern superlect (Labov 2006).

Further exploration of divergence and convergence in the Midland is warranted, and one key area where such an exploration should be directed is Indianapolis, Indiana, the capital of Indiana and the fifth largest metropolitan area in the Midland dialect region. While the larger Midland urban centers have been thoroughly examined by both LAB and scholars looking at each city individually (for example, Pittsburgh in Johnstone, Bhasin and Wittkofski (2002) and McElhinney (1999); Cincinnati in Boberg and Strassel (1995) and (2000); St. Louis in Murray (2002); and Columbus, OH in Thomas (1989)), Indianapolis has been largely ignored by previous research and receives only a passing mention by LAB.

Furthermore, Indianapolis shows great potential for dialectal divergence from a non-linguistic perspective. First, the settlement history of Indianapolis includes a stronger Southern influence than other Midland cities. The set-

tlement of Indianapolis was deliberate, as the previously uninhabited site was chosen by Indiana government officials in 1820 to become the new state capital, at which point northward migration from the southern part of the state began. The majority of initial settlers in Indiana came from the Carolinas, Kentucky and Tennessee, and accordingly, the majority of the city's initial residents did too. This pattern contrasts with the early populations of other urban centers across the Midland, which were influenced more heavily by westward migration from New England and the Mid-Atlantic.

In addition, present day Indianapolis appreciates a direct connection with Chicago provided by the interstate I-65, a similar connection to that created by I-55 between Chicago and St. Louis. This connection could, as it has in St. Louis, serve as a pipeline through which Northern speech is adopted in the Midland.

The Midland dialect region is difficult to classify. Labov (1991) initially considered the Midland to be part of the Third Dialect of American English and defined it based on the fact that it clearly demonstrates neither Northern nor Southern characteristics. Further work has, however, moved towards describing this dialect through the features it does demonstrate and LAB offer such a template, albeit a complicated one:

(1) The back upgliding vowels /uw/ *do*, /ow/ *coat* and /aw/ *loud* show marked fronting to a front or central position.[1]
(2) The diphthong /ay/ is intact before obstruents, but may be reduced before resonants such that words like *time* are pronounced as 'tahm'.
(3) The low-back vowels /oh/ *caught* and /o/ *cot* are neither the same nor different, demonstrating a transitional merger.

The three features named above represent both major elements of sound change: chain shifts and mergers. In order to classify Indianapolis as prototypically Midland, all three should be present in the speech of Indianapolis natives.

In addition to these three features, a fourth is important to an examination of Indianapolis speech: the conditioned merger of /in/ *pin* and /en/ *pen*. This merger is typically a marker of Southern speech, but Ash (2006) observes that "Indianapolis stands out as a city where almost all speakers have been affected by the merger" (39). While it will not be discussed here, this study did find the *pin-pen* merger in working class Indianapolis speech, which follows Habick (1980), who found a correlation between Southern features and working class speech in the Midland.

[1]Phonemic transcriptions follow LAB.

2 Methodology

2.1 Subjects

In order to explore the features of Indianapolis English, this study examined the speech of 21 Indianapolis natives. The sample was balanced for age and sex, with speakers ranging in age from 19 to 76. The distribution is shown in Table 1.

	18-23	29-56	63+	Total
Male	4	4	3	11
Female	4	5	1	10

Table 1: Participant distribution by age and gender

Nineteen subjects were born in Indianapolis and the remaining two moved to the city before the age of 4. Four attended or were currently enrolled in universities outside of Indiana. All had at least one parent from the Indianapolis metropolitan area and thirteen had both.

All subjects were of European descent and reported a variety of ethnic backgrounds, including Irish, Swedish, German and Italian. They came from a variety of Indianapolis neighborhoods with a variety of socioeconomic profiles in all parts of the city. Four subjects had only a high school education and five had advanced degrees (MBA, JD or PhD). The rest had either completed or were in the process of completing four-year university degrees.

2.2 Interview

All subjects participated in a sociolinguistic interview conducted between February 2005 and November 2006. Interviews took place either in person or over the phone and all were conducted by the author, an Indianapolis native. During the course of the interview, participants were asked to give demographic information about themselves and their parents, to read a list of 175 common English words consisting of tokens of all of the stressed vowels of English in a variety of different phonological and allophonic environments, and in order to elicit spontaneous, casual speech, to discuss a variety of topics such as their feelings about Indianapolis, their opinions about local politics, their favorite childhood memories, etc.

2.3 Data Analysis

All interviews were digitized and analyzed using the Windows-based pro-

gram Computerized Speech Lab (CSL) Model 4400 manufactured by Kay Elemetrics. Spectrograms were created for all 175 words and a linear predictive coding (LPC) analysis was performed allowing for the recording of single point, synchronous F1-F2 measurements at each vowel's nucleus, following the guidelines in LAB (36-40). For /ay/ tokens, a measurement was also taken at the end of the vowel to measure glide presence and strength. In addition, tokens of the low-back vowels and /ay/ were extracted from spontaneous speech for all speakers and measured in the same way. All data were normalized following Nearey (1977) in order to minimize interspeaker variation due to the physical differences in vocal tract length between men and women and thus to allow direct comparison between speakers.

Mean F1 and F2 measurements were determined for each class of vowels for each speaker individually and for the sample as a whole. For the variable of age and to examine changes in apparent time, t-tests were used to compare measurements for ternary age groups (young/middle/old) and Pearson coefficients were determined using birth year as a continuous variable. For the variables of sex and socioeconomic class, measurements were analyzed using t-tests.

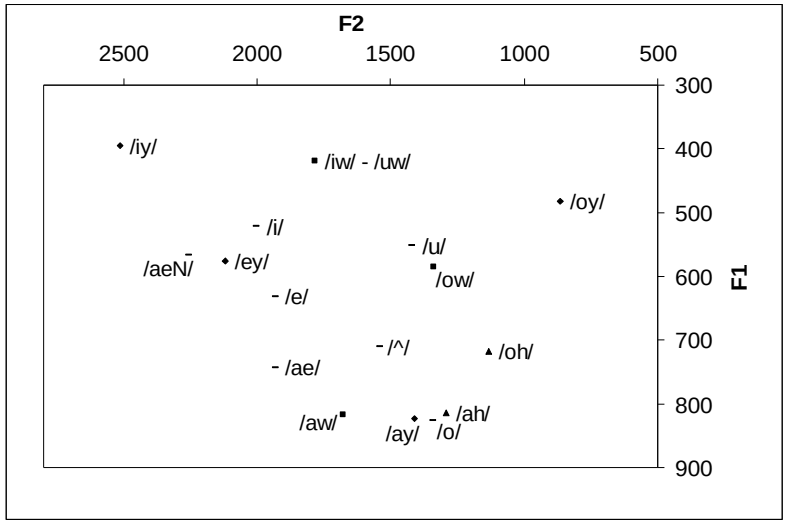
3 A Profile of Indianapolis English

Figure 1 shows the Indianapolis vowel space. As expected following Labov (1991) and LAB, Indianapolis is clearly neither Northern nor Southern.

Neither of the first two stages of the Northern Cities Shift (NCS) is present in the Indianapolis data. First, there is no general raising of /æ/, which is instead a low vowel (well below /e/) that is only raised and tensed before nasals—the average measurements for F1 and F2 of /æ/ are 743 Hz, 1931 Hz, while the averages for /æN/ are 567 Hz, 2257 Hz. In a system affected by the NCS, /æ/ would be raised and tensed in all environments.

Second, there is comparatively little fronting of /o/. The average F2 measurement for this vowel is 1342 Hz, over 100 Hz less than the threshold of 1450 Hz for fronted /o/ set by LAB (196). Thus, unlike St. Louis, where the I-55 corridor acts as a pipeline of Northern features diffusing southward from Chicago, Indianapolis has not been similarly affected by I-65, despite the geographical and industrial similarities of its situation.

There is also no indication of the Southern Shift in Indianapolis. While the behavior of /ay/, the trigger of the Southern Shift, will be discussed below, the second and third steps, the tensing and raising of /i/ and /e/ and the subsequent laxing and retraction of /iy/ and /ey/, are clearly not in effect in Indianapolis. Each of the tense vowels /iy/ and /ey/ is clearly higher and more peripheral than its lax counterpart.



Front upgliding	Back upgliding	Long	Short	
/iy/ - see	/ow/ - go	/ah/ - spa	/i/ - sit	/o/ - hot
/ey/ - day	/uw/ - do	/oh/ - paw	/e/ - bet	/^/ - cut
/ay/ - tie	/iw/ - due		/ae/ - cat	/u/ - put
/oy/ - boy	/aw/ - cow			

Figure 1: Mean F1/F2 values for all vowels across speakers

3.1 Fronting of Back Upgliding Vowels

In order to characterize Indianapolis as a Midland community, the back upgliding vowels /aw/, /uw/ and /ow/ must all show significant fronting, resulting in their realization as central or even front vowels. The data used to examine back vowels in this study was taken exclusively from wordlists. The wordlist separated the occurrences of each vowel into a variety of environments.[2] This analysis, however, will set aside data from pre-liquid/nasal environments for all three vowels because the vowels in these environments show different patterns.

In this study, the back upgliding vowels all demonstrated advanced

[2]The vowels /uw/ and /ow/: before /l/, before /r/ and other (open syllables and before obstruents) environments. The vowel /aw/: before /n/, before voiceless obstruents and other (open syllables and before voiced consonants) environments.

fronting. The mean F2 for /aw/ was 1680 Hz. For /uw/, it was 1672 Hz (1962 Hz for post-coronal /uw/), and for /ow/, 1345 Hz. In each case, the measured Indianapolis vowels fall within LAB's expected threshold for Midland fronting (Ch. 10), though all three back upgliding vowels show different stages of change in progress.

3.1.1 /aw/

In Indianapolis, /aw/ is fronted with average F1/F2 measurements of 817 Hz, 1680 Hz across all speakers in unmarked environments. The mean F2 for the Indianapolis vowel system as a whole is 1602 Hz, suggesting that /aw/ is indeed in the low-front quadrant of the vowel space.

While the averages for each age group do point to a slight numerical advantage for younger speakers (average F2 of 1694 Hz, compared to 1671 Hz for middle aged speakers and 1674 Hz for older speakers), t-tests comparing the groups all returned insignificant results. Further, Pearson coefficients using birth year as a continuous variable returned $r = 0.06$, confirming no correlation between birth year and the fronting of /aw/: this vowel is not shifting its articulation over time.

Sex also proved to be unrelated to the position of /aw/ in Indianapolis. Women do have a slight numerical advantage, with an average F2 of 1690 Hz compared to 1671 Hz for men, but a t-test comparing the two sexes did not return significant results. Thus, as expected by LAB, /aw/ is stable in Indianapolis.

3.1.2 /uw/

As was the case with /aw/, Indianapolis English shows advanced fronting of /uw/, again following the expected Midland behavior.

For /uw/ across pre-vocalic environments, the average F2 measurement was 1679 Hz and t-tests comparing /uw/ measurements between different age groups all returned insignificant results. Accordingly, there was no correlation between birth year and /uw/ fronting ($r = 0.05$). Thus, any correlation between age and the fronting of /uw/ is weak, suggesting that /uw/ has reached the limit of its advancement and any observed variation should be social in nature.

In Indianapolis, men had an average F2 for /uw/ of 1619 Hz and women had an average F2 of 1735 Hz, a difference significant at $p < .005$. Thus, women are leading men in the fronting of /uw/ by more than 100 Hz.

Correlation coefficients comparing birth year and /uw/ fronting for men returned a value of $r = 0.35$, while the same for women returned $r = -0.18$. These results suggest that birth year is weakly correlated with /uw/ fronting

for men and that there is limited movement in apparent time towards men catching up with women (Figure 2). Thus, overall, Indianapolis shows relatively stable sex stratification in the fronting of /uw/.

LAB suggest that /uw/ fronting is a fairly old shift in American English (160). So, the stability along the age stratum is not surprising, nor, following Eckert (1989) and Labov (1990), is the persistence of sex stratification, despite the apparent early movement towards stabilization as men do show a weak trend towards fronting in younger speakers.

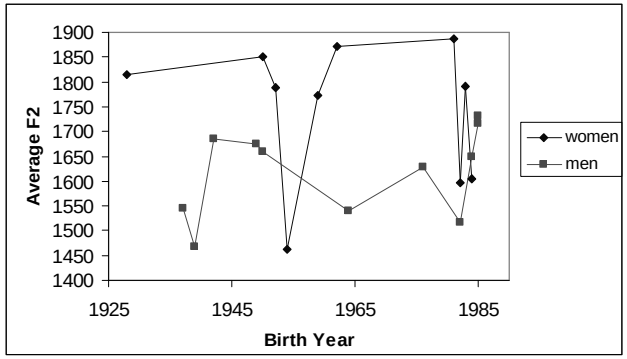


Figure 2: Average F2 value for /uw/ and birth year for men and for women

3.1.3 /ow/

As expected within the Midland prototype, Indianapolis shows advanced /ow/ fronting with an average F2 measurement of 1345 Hz across speakers, well ahead of the 1200 Hz threshold set by LAB (135). In looking at the variable of age, average F2 measurements and corresponding t-tests are shown in Tables 2 and 3 respectively.

Age	F2
young	1384 Hz
middle	1327 Hz
old	1307 Hz

Table 2: Average /ow/ F2 by age group

Age	F2
y/m	p = .03
m/o	n.s.
y/o	p < .01
y/m-o	p < .01

Table 3: T-tests: F2 between age groups

The youngest speakers have the most advanced /ow/ fronting. The difference between the middle and older age groups is not significant, but the youngest group is significantly more fronted than each other group individu-

ally and the two combined. Pearson coefficients returned r = 0.33, which would suggest, at best, a weak positive correlation and a slight advance of centralization in apparent time.

In examining sex as the relevant variable, men had an average F2 measurement of 1315 Hz, while the average for women was 1378 Hz, a difference significant at $p < .01$, indicating that women are leading men in the fronting of /ow/.

Correlation coefficients for birth year within each sex were also determined. For men, birth year was very strongly correlated with /ow/ fronting (r = 0.68). The oldest male, born in 1937, had the least centralized /ow/ with an F2 of 1217 Hz, a measurement that more closely aligns with the conservative Northern pattern. The two youngest males, both born in 1985, had the two most fronted and most prototypically Midland average /ow/ measurements with F2s of 1436 Hz and 1481 Hz. Yet for women, there was no correlation with birth year (r = -0.14). Indeed, the women with the most and least centralized /ow/ (mean F2 of 1508 Hz and 1256 Hz) were born within 5 years of each other, in 1959 and 1954. Figure 3 shows the fronting trend across time for both men and women. While the women do show variation in mean value, it cannot be related to age. For the men, however, there is a general trend wherein younger speakers have a more fronted vowel. While younger men do appear to be overtaking younger women, t-tests comparing their values of /ow/ did not return significant results.

Overall, the three back upgliding vowels, /ow/, /uw/ and /aw/ all show behavior that strongly matches the expectations of a Midland vowel system and none have changes in progress indicating the emergence of a diverging pattern. Thus, the back upgliding vowels of Indianapolis support the description of the city as a Midland prototype.

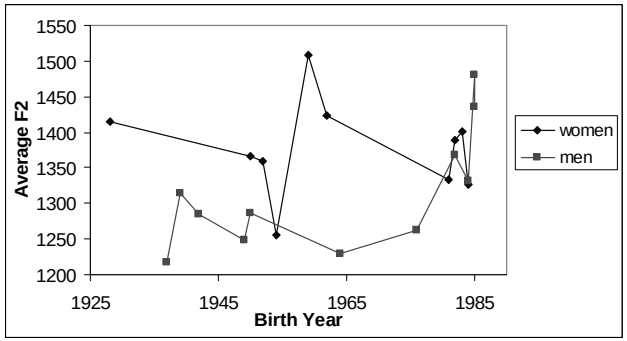


Figure 3: Average F2 value for /ow/ and birth year for men and for women

3.2 /ay/ Monophthongization

For Indianapolis to follow the Midland pattern there must be no evidence of /ay/ monophthongization or glide reduction before obstruents or in open syllables. Reduction or monophthongization before resonants, however, would fit the Midland pattern, or more specifically, the South/Midland pattern, described by LAB. In order to examine this feature, this analysis looked at /ay/ tokens from both wordlist and spontaneous speech for all speakers. The wordlist data captured /ay/ in three different environments: open syllables, before voiced obstruents and before voiceless obstruents.[3] Tokens from these environments as well as before /l/, before nasals, before /r/ and before vowel environments were extracted from spontaneous speech.

Overall, Indianapolis English follows the expected Midland pattern. T-test results support this observation: all t-tests comparing nucleus and glide values for F1 and F2 in each environment were significant at $p < .0001$.

A closer look at the mean Cartesian distances between the vowel nucleus and glide across environments does, however, show a degree of glide reduction in Indianapolis, ranging from fully diphthongized /ay/ in open syllables (Cart. dist. = 798 Hz) to the near-monophthongized /ay/ before /l/ (Cart. dist. = 251 Hz) as seen in Figure 4.

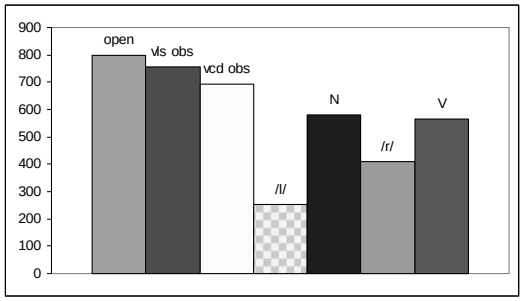


Figure 4: Mean difference: Glide and nucleus Cartesian distances in all environments across all speakers

Here, the word-final and obstruent categories (before voiceless and voiced obstruents) show strong, intact glides with Cartesian distances of 798 Hz, 754 Hz and 693 Hz respectively. The resonant categories (before /l/, before nasals, before /r/ and before vowels), on the other hand, show weaker

[3]A later version of the wordlist includes the tokens *tire* and *tile*, which adds "before /l/" and "before /r/" to the wordlist environments, but only one speaker in this sample read that wordlist.

glides with measurements of 251 Hz, 581 Hz, 408 Hz and 566 Hz respectively. T-tests confirm a distinction in glide reduction for /ay/ before resonants as compared to /ay/ before non-resonants, significant at $p < .0001$. These results follow the Midland pattern reported by LAB.

3.3 Low-back Merger

LAB expect a Midland community to show low-back vowels that are neither clearly the same nor clearly different, suggesting a transitional stage of the low-back merger. In order to examine the state of the low-back vowels in Indianapolis English, this study used wordlist and spontaneous speech data in three environments: the vowels /oh/ and /o/ before /l/, before /n/ and in unmarked environments.[4]

Across all speakers, Indianapolis English appears to maintain a clear distinction between /oh/ and /o/ in all environments, as seen in Figure 5. The average measurements across speakers for F1 and F2 of /oh/ were 724 Hz, 1138 Hz and for /o/, 817 Hz, 1341 Hz. For /ohl/, average measurements were 697 Hz, 1103 Hz and for /ol/, 793 Hz and 1240 Hz. Finally, for /ohn/, average measurements were 724 Hz, 1113 Hz and for /on/, 794 Hz, 1297 Hz.

All t-tests for both F1 and F2 measurements in all environments (comparing /oh/ and /o/, /ohl/ and /ol/, and /ohn/ and /on/) across speakers returned results significant at $p < .0001$.

While Indianapolis does not appear to have any indication of the low-back merger in the aggregate, the vowels of individual speakers do tell a slightly different story, with some speakers showing merger in certain environments, as shown in Table 4. Here, merger was determined by t-test when enough tokens were available and by auditory impression when they were not.[5]

Accordingly, the values for correlation coefficients calculated for birth year and /oh/-/o/ differences across environments and within each specific environment suggest an overall trend towards decreased differences in measurements, and as such, towards merger. These results are reported in Table 5.

One correlation coefficient seems to stand out – that for the F1 of /ohn/-

[4]Here, the unmarked environment contains tokens with post-vocalic obstruents (voiced and voiceless, stop and fricative) for both vowels and in open syllables for /oh/. Wordlist data also includes /oh/ and /o/ before /r/, but because the vowels in this environment exhibit independent developments, they will not be considered here.

[5]Numerical comparison was also used to determine merger among a small number of tokens. If measurements were within 50 Hz or less of each other in F1 and 100 Hz or less of each other in F2, the class was considered merged.

/on/. This apparent lack of correlation is likely due to the fact that two of the oldest speakers demonstrate advanced merger in this dimension.

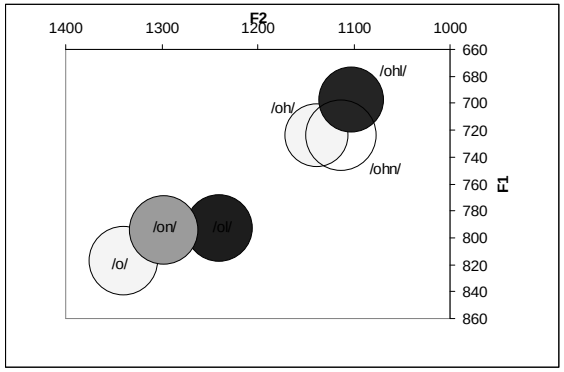


Figure 5: Average position of low-back vowels in Indianapolis English, wordlist and spontaneous speech[6]

Age	N	No merger	Merger only before /n/	Merger only before /l/	Merger before /l/ and before /n/
Younger	8	0	1	2	5
Middle	9	6	1	2	0
Older	4	2	1	1	0
Sex					
Male	11	3	2	3	3
Female	10	5	1	2	2

Table 4: Occurrence of merger by environment, distribution by speakers' age and sex

Figure 6 shows the vowel space of Patty, 76, who maintains a clear distinction in all environments, while Figure 7 shows the vowel space of Dave, 20, for whom the distinction is less clear.

[6]The circles in this chart have at their center the mean vowel measurement, while the size of the circle represents the average Cartesian distance of any given token from the mean.

Vowel category	F1	F2
only /oh/ - /o/	-0.44	-0.23
only /ohl/ - /ol/	-0.48	-0.34
only /ohn/ - /on/	-0.05	-0.39
all environments	-0.41	-0.31

Table 5: Correlation coefficients for birth year and F1/F2 differences

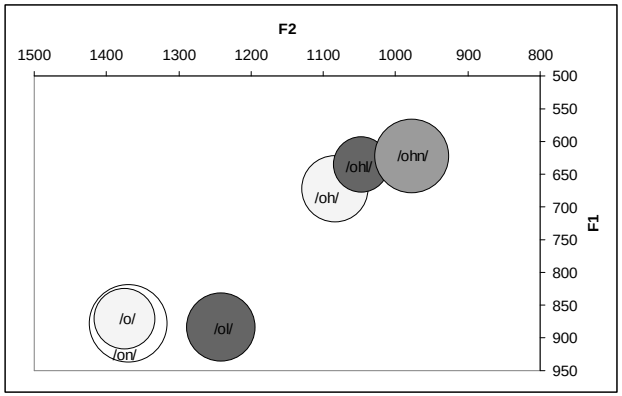


Figure 6: Low-back vowels of Patty, 76, wordlist and spontaneous speech

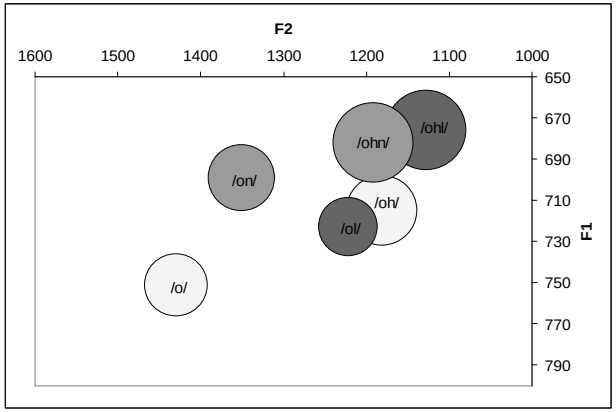


Figure 7: Low-back vowels of Dave, 20, wordlist and spontaneous speech

The heterogeneity displayed among individual speakers as well as the appearance of merger in some environments does suggest that Indianapolis has a merger in progress of the low-back vowels.

Sex as the independent variable has little effect on the state of the low-back merger in Indianapolis, with no systematic differences emerging between men and women.

Overall, Indianapolis English has a transitional merger of the low-back vowels, demonstrating clear movement towards complete merger being led by younger speakers. Thus, with regards to the low-back merger, Indianapolis does follow the Midland pattern and the observed change in progress does not indicate any divergence from this pattern, suggesting that Indianapolis can be considered prototypical in this regard.

4 Conclusion

An examination of Midland features in Indianapolis suggests that the city is indeed largely prototypical of the Midland region. As expected, Indianapolis English has marked fronting of the back vowels /ow/, /uw/ and /aw/, no glide reduction of /ay/ before obstruents but some glide reduction before resonants, and a low-back merger clearly in a transitional stage. Further, changes in progress suggest continued convergence with the Midland pattern. The only caveat to an otherwise categorical description of Indianapolis as a representative of Midland speech is the socially conditioned *pin-pen* merger.

Indianapolis has two key non-linguistic factors that might facilitate divergence from the Midland: the heavily Southern historical influences and the I-65 corridor connecting it to Chicago. But despite these undoubtedly influential forces, Indianapolis is clearly a part of the Midland dialect region, and Indianapolis residents are confident about the way they speak. When asked, none of the speakers interviewed for this study could offer characteristics, correct or erroneous, of an ‘Indianapolis accent’, yet most were able to offer specific characteristics of other regional dialects. Overall, this confidence can be summed up by the following comments from Eleanor, 22: “I’ve always felt like the Midwest and Indiana in particular doesn’t have an accent. We are the baseline and the rest of the country deviates from us.”

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