The PIN~PEN Vowel Merger in Southern Illinois English

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General Information

• This study looks at the merger of the /ɪ/ and /ɛ/ vowels before nasals.

• This is commonly called the PIN~PEN merger (Bailey 1997, Labov 1996).

• The presence of this merger is considered a hallmark of Southern speech (Bailey 1997, Pederson 1983).
General Information

• In the PIN~PEN merger, the high and mid lax front vowels merge before nasals, but remain distinct before oral stops.
  – bin [bɪn]  ben [bɪn]
  – bid [bɪd]  bed [bɛd]

• Likewise, it has been noted (Labov 1994, Thomas 2001) that pre-nasal /æ/ will often be raised. . .

• ...and when raised often shows something like merger with either /ɪ/ or /ɛ/ (Clarke 1995, Thomas 2001, etc.).

• Yet the ramifications of /æ/-raising have never been explicitly linked to the PIN~PEN merger.
General PIN~PEN Background

• Brown (1990, 1991) is the only study to look at the PIN~PEN merger specifically.

  – These are historical accounts of the merger in Tennessee and North Carolina.

  – Brown used orthographic evidence and impressionistic transcriptions from Dialect Atlas projects.
General PIN~PEN Background

• Brown found that:
  – The PIN~PEN merger began around 1875 and could be considered “complete” by around 1930.
  – Neither sex nor education nor class plays a role in the merger after its completion.
  – This is not a particularly stigmatized feature, at least not in the South.
Phonetic Background

• Nasalization of vowels has the general effect of lowering a high F1 and raising a low F1 (Stevens 1999).

  – F1 is inversely related to vowel height (see Ladefoged 2000).
  
  – Nasalized /æ/ will sound “higher”; nasalized /i/ will sound “lower”.

• So, the vowel space of nasalized vowels is generally more contracted than the vowel space for oral vowels.
Phonetic Background

• Beddor (1993, etc.): this contraction of the vowel space is likely due to the combination of the nasal formant trough with a vowel's F1.
  – This interaction causes a shift in the vowel's "center of gravity".

• However, Beddor also found that recoverable CONTEXTUAL nasalization had no effect on perceived vowel height.
  – [bænd] ~ [bãn] ~ [bãd]
  – [bænd] ~ [bæn] ~ [bɛd]
General PIN~PEN Background

- No dedicated *acoustical* study of the PIN~PEN merger has been published.

- When mentioned in existing acoustical studies, the PIN~PEN merger is not the focus.

  - For example, while Thomas's 2001 study of vowel variation was acoustically-based, when it came to the PIN~PEN merger, he chose to conduct an impressionistic analysis.
Phonetic Background of the PIN~PEN Merger

• So far, Thomas (2001) has been one of the only acoustic explanations of the PIN~PEN merger.
  – /ɛ/, being higher in the South, is more susceptible to the influence from the nasal formant trough...
  – ...which allows /ɛ/ to undergo categorical raising in pre-nasal contexts.
Primary Research Goals

• What is the phonetic picture for the PIN~PEN merger?
  – Beddor’s word predicts that pre-nasal /ɪ/ should lower.
  – Thomas’s account predicts that pre-nasal /ɛ/ should raise.
  – Problem One: Thomas’s account goes against Beddor’s findings.
  – Problem Two: Beddor’s findings regarding contextual nasalization predict no effect of perceived vowel height.
Southern Illinois (SoIL)

- Lower-most 16 counties of Illinois ("Egypt" in Frazer, 1987)
  - Part of The Ohio River Valley (Dakin, 1966)
- An understudied dialect
- Labov’s TELSUR/Phonological Atlas of N. America project included SoIL in the “merger in perception & production” side of the $\text{in} \sim \varepsilon \text{n}$ merger map.
  - But no speakers from Southern Illinois appear to have been sampled.
- A Rural Transition Zone
  - Roughly equidistant from NCS and SS urban anchors
    - NCS = St. Louis / SS = Memphis
- Speakers in SoIL have real and frequent access to both fully merged and fully distinct dialects.
Southern Illinois
Secondary Research Goals

• How does the PIN~PEN merger fit into a larger account of Southern Illinois English?

• Can the particulars of the PIN~PEN merger in Southern Illinois tell us anything about dialect attitudes and the outcomes of dialect contact?
Methods - Speakers

- All speakers were native Southern Illinoisans
- All speakers were raised working class
- Primary Analysis (Speaker Group A):
  - 20 Speakers
  - 11 males, 9 females
  - Age range: 15 – 65 years old
- Secondary Analysis (Speaker Group B):
  - 15 Speakers
  - 6 males, 7 females
  - Age: 18 (high school seniors)
  - Used as a comparison group only.
Methods: Recording

• Recordings were made in subjects' homes and/or quite local diners; there was no attempt to control microphone distance.

• Recordings were made on a Sony Minidisc MZ-707 recorder, with a Sony ECM-ms907 microphone.

• Minidisc ATRAC files were then recorded into Macquiro as *.wav files for analysis.
Methods – Data Collection: Group A

• 6 tokens, of 3 vowels, in 2 environments, in 2 tasks were measured for 20 speakers.
  • This yields 1440 tokens total; actual number = 1324
  – All tokens were monosyllabic
  – The vowels measured were /æ/, /ɛ/, and /ɨ/
  – Following environments were either oral (/b/ and /d/) or nasal (/m/ and /n/)
    • Initial context was not kept constant.
    • Equal number of labials and alveolars were used in final position.
Methods – Data Collection: Group A

• Tokens were samples from two different reading tasks.

• Task One: Embedded List
  – Reading list where token words were jumbled in a larger list of words NOT of the phonological type under consideration.
    • EXAMPLE: . . .tiny, get, cram, chick, hen, farm, plough, hog, ham, head, body, now, laid, sat, did, Dawn, Shawn, Ted, thin, ban, mad. . .

• Task Two: Minimal Triplets
  – Reading list where tokens words were presented in minimal triplets only.
    • EXAMPLE: . . .din, Dan, den, did, dad, dead, Ken, can, kin...
Methods – Data Collection: Group A

- Reading lists allowed for a large sample of controlled data.

- It was thought that these two List Types would represent both a lower and a higher "attention to speech" level.

- Subjects read List One (Embedded), then two short stories, and finally read List Two (Minimal Triplets).
Methods – Data Collection: Group B

- Group B is a comparison group.
- 75 speakers (in progress... ~40 done so far)
- 8 tokens each of /æ/, /ɛ/, and /ɪ/ in pre-oral environments
- 3 tokens each of /æ/, /ɛ/, and /ɪ/ in pre-nasal environments
- Word list reading task (Embedded List)
- 360 pre-oral tokens, 135 pre-nasal tokens
- All tokens were monosyllabic
Methods: Measurements

- F1 was the primary consideration for this analysis.
- Measurement at midpoint of the F1 steady state.
Methods: Measurement & Analysis

• Measurement of F1 and F2 was taken at the midpoint of the F1 steady state.

• F1 was the primary consideration for this analysis.
  – F1 is generally accepted to represent vowel height (Ladefoged 2000).
  – The PIN~PEN merger is generally considered a merger of height (Thomas 2001, etc.)

• F2 was not considered.
Results: Overview

• Group A Speakers show a variety of different patterns of merger.
• Most older speakers show a PIN~PEN merger in their speech.
  – The phonetics of the merger show two distinct patterns for older speakers
• Younger speakers show more variability.
  – Phonetic merger seems to be adding to and conflicting with a learned neutralization / dialect feature
• Group B confirm the patterns found in younger Group A speakers.
Results: Non-merging

- Following is a graph of a speaker whose system is without merger.
- This speaker is a 16-year-old male.
- Note that both the pre-oral and pre-nasal vowels are distinct, at three different heights, but the nasality has caused a “contraction” of the vowel space.
- Notice also that Task type does not have a great influence on the vowels.
Speaker P, male, 16 years, no merger

Cell Line Chart
Grouping Variable(s): Vowel
Split By: Context, Task Type
Inclusion criteria: Speaker P from MA_3set_9-16c.svd
Results: Merging: Older Speakers

- Generally, the pre-nasal merger of /l/ and /ɛ/ occurs for older speakers.

  - Task type, while it shows an effect, does not usually affect degree or direction of merger in older speakers.
Results: Canonical Merging: Older Speakers

- Following is a graph that shows the canonical PIN~PEN merger.
- See how, in pre-oral environments, all three vowels are distinct and match what we would expect of the traditional (inverted) vowel triangle.
- In pre-nasal environments, however, we see that /ɪ/ and /ɛ/ have merged; that is, they are at the same height on the Y-axis.
- Task Type does not have an effect on the merger of Speaker 3, i.e. the merger pattern is the same for both tasks.
Cell Line Chart
Grouping Variable(s): Vowel
Split By: Context, Task Type
Inclusion criteria: Speaker 3 from MA_3set_9-16c.svd
Results: Phonetic Merging: Older Speakers

- However, this pattern of "canonical" /ɪ/~/ɛ/ merger is not what we find for the majority of our older speakers.
- Instead, we find the kinds of examples that, when based on impressionistic data, might be misleading.
- In the majority of cases for older speakers, we see that it is the /ɪ/ which has lowered to meet the /ɛ/, and not /ɛ/ raising.
  - This follows the phonetic effects of nasalization predicted in Beddor’s work.
Speaker A, male, 62 years

Cell Line Chart
Grouping Variable(s): Vowel
Split By: Context, Task Type
Inclusion criteria: Speaker A from MA_3set_9-16c.svd
Speaker L, male, 56 years

Cell Line Chart
Grouping Variable(s): Vowel
Split By: Context, Task Type
Inclusion criteria: Speaker L from MA_3set_9-16c.svd
Results: Phonetic Merging: Older Speakers

• In the two previous examples, we still see PIN~PEN merger, but it is in the opposite direction from what the dialect literature would predict.
  – Pre-nasal /ɛ/ has remained, more or less, at the same F1 height as its pre-oral counterpart.
  – Pre-nasal /ɪ/, however, has shifted down in F1.

• This is, however, the direction of merger we would expect from the phonetics literature!

• Again, Task Type, while it has an effect on the vowels, is not affecting the pattern of merger.
Results: Merging: Younger Speakers

• If this merger is complete in SoIL, we could expect to find the same pattern in our younger speakers (see also Thomas 1996).

• Younger speakers, however, show much more variable vowel patterns.
Younger Speaker Vowels

• When List Type is also considered, there is even less consistency among younger speakers.

• Pre-oral vowels continue to behave as expected—without much change from speaker to speaker or generation to generation.

• Pre-nasal vowels are more complicated.

• There are, however, four basic patterns for pre-nasal vowels among younger speakers.
Results: Merging: Pattern A

- Complete pre-nasal neutralization
- All three pre-nasal vowels have merged
- All three pre-oral vowels remain distinct
- Context plays no role in merger
- This pattern appears to be most common for males.
Speaker 7, male, 26 years

Cell Line Chart
Grouping Variable(s): Vowel
Split By: Context, Task Type
Inclusion criteria: Speaker 7 from MA_3set_9-16c.svd
Results: Merging: Pattern B

- a PEN~PAN merger...
- /ɛ/ and /æ/ have merged, while /ɪ/ is distinct
- This is seen both in cases where /ɛ/ lowers and in cases where /æ/ raises.
- With regard to Task Type, this pattern is highly variable, and therefore, Task Type is not considered here.
Speaker 5, female, 24 years

Cell Line Chart
Grouping Variable(s): Vowel
Split By: Context, Task Type
Inclusion criteria: Speaker 5 from MA_3set_9-16c.svd
Cell Line Chart
Grouping Variable(s): Vowel
Split By: Context, Task Type
Inclusion criteria: Speaker E from MA_3set_9-16c.svd
Results: Merging: Pattern C

- Task-dependant merger
- Pre-nasal vowels show different patterns of merger depending on Task Type.
  - In the Embedded List Task, we see either /ɪ/~/ɛ/ merger or no merger.
  - In the Minimal Triplets Task, we see either full merger or /æ/~/ɛ/ merger.
Speaker D, male, 20 years

Cell Line Chart
Grouping Variable(s): Vowel
Split By: Context, Task Type
Inclusion criteria: Speaker D from MA_3set_9-16c.svd
Speaker Q, male, 15 years

Cell Line Chart
Grouping Variable(s): Vowel
Split By: Context, Task Type
Inclusion criteria: Speaker Q from MA_3set_9-16c.svd
Results: Merging: Pattern D

• /æ/-Raising (a PIN~PAN merger?)
• /I/ and /æ/ have merged in pre-nasal contexts.
• Again, this pattern is highly variable by list type.
• This is the only pattern found among both younger and older speakers.
• This resembles the /æ/-raising characteristic of Northern Cities Speech...
Speaker H, female, 51 years

Cell Line Chart
Grouping Variable(s): Vowel
Split By: Context, Task Type
Inclusion criteria: Speaker H from MA_3set_9-16c.svd
Conclusions: Primary Goals

• Is the PIN~PEN Merger present in Southern Illinois English?
• Yes... mostly.
  – My data indicate that the PIN~PEN merger in SoIL appears to have been a stable phenomenon, but has since become variable.
  – This apparent-time change could be either real change in progress or age-graded, we cannot know until future studies are done in Southern Illinois.
Conclusions: Primary Goals

• What is the phonetic picture for the PIN~PEN merger?
• Nearly all reports of the PIN~PEN merger have considered it an /ɛ/-raising phenomenon.
• My data, however, show that /ɪ/ lowering is actually more common than /ɛ/ raising
  – Acoustically, this lowering of /ɪ/ is exactly what we would expect based on the work by Beddor.
• Since all previous reports have focused on impressionistic rather than acoustic data the difference between /ɛ/ raising and /ɪ/ lowering could have been elusive.
Conclusions: Primary Goals

- The /ɛ/~/æ/ merger: Hypercorrection
- I had noticed that when speakers of this region were forced to make a phonetic distinction between *ink PIN* and *stick PEN*, the second would sound much closer to *PAN* than a standard English *PEN*.
- The data occasionally show exactly this. We saw this in Speaker D, for example, who would lower his /ɛ/ down to the F1 value of his pre-nasal /æ/ in the minimal triplet list.
Conclusions: Secondary Goals

- Can the particulars of the PIN~PEN merger in Southern Illinois tell us anything about dialect attitudes and the outcomes of dialect contact?
- Two patterns were found in older speakers
  - Phonetics-based merger (/ı/ lowering)
  - Dialect-based merger (/ɛ/ raising)
- Which pattern is true of the speech of the South-South?
- Is the phonetics-based pattern characteristic of South Midland (or Midland, etc.) pronunciation only?
  - i.e., Is this the result of Southern Illinois’s status as a Dialect Transition Zone?
Conclusions: Secondary Goals

- Younger speakers show more variability
- Younger speakers also have greater access to speakers from outside their “native” dialect region
- It appears that contact destabilizes the traditional merger pattern
- More frequent out-of-area contact leads to a wider range of variation
  - More work is needed in this area...
Conclusions: Secondary Goals

- How does the PIN~PEN merger fit into a larger account of Southern Illinois English?
- I’m currently working on this...
- Data from Group B are being taken into account.
Additional Data: Group B

• Data from Group B speakers (and then some) show three distinct dialect patterns.
  – A “native” Southern Illinois pattern
  – A Northern Cities Shift influenced pattern
  – A Southern Shift influenced pattern

• Do these different overall vowel patterns correspond to different patterns of merger?
  – Yes, more or less.
Group B: Patterns & Correspondences

- “Native” Southern Illinois Dialect pattern
  - Merger pattern C
    - Either PIN~PEN merger or none at all

- NCS-influence pattern
  - /æ/-raising
  - Merger patterns B & D (depends on degree of /æ/-raising
    - PEN~PAN merger
    - PIN~PAN merger

- SS-influenced pattern:
  - Merger pattern A
    - Complete pre-nasal neutralization
References