

The PIN~PEN Vowel Merger in Southern Illinois English

Douglas S. Bigham

Capn002@aol.com

University of Texas – Austin

NWAV 33 - Ann Arbor

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 this /æ/-raising has never been explicitly linked to the PIN~PEN merger.

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 “flatter” than the vowel space for oral vowels.

Phonetic Background

- Beddor (1993, etc.): this "flattening" effect 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 purely CONTEXTUAL nasalization had no effect on perceived vowel height.
 - Only PHONEMICALLY nasal vowels were perceived with a height shift.

Phonetic Background of the PIN~PEN Merger

- Thomas (2001): /ɛ/, being higher in the South, is more susceptible to the influence from the nasal formant trough
- This allows /ɛ/ to undergo categorical raising in pre-Nasal contexts.
- So far, this has been one of the only acoustic explanations of 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 South¹.

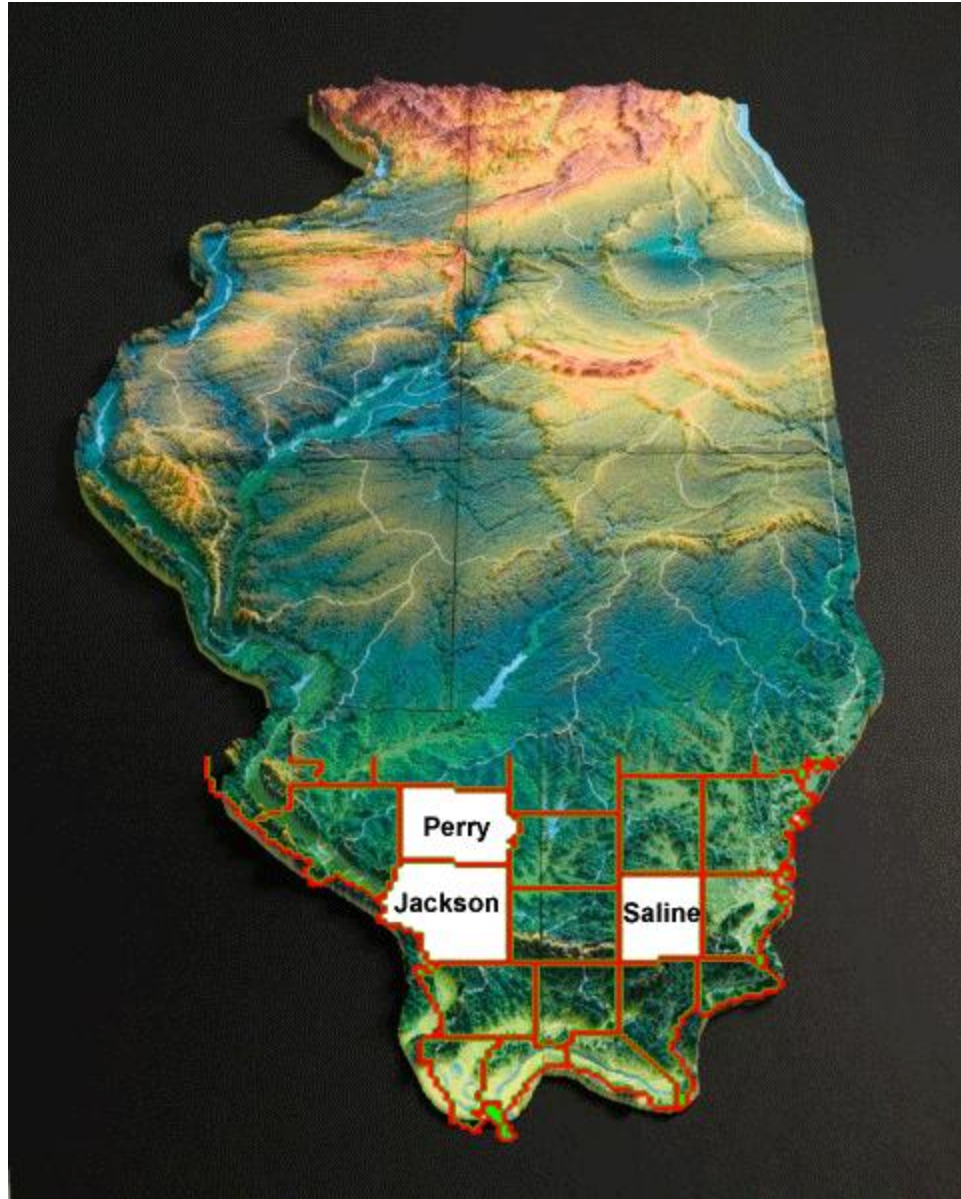
General PIN~PEN

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.
- My work, then, is a move toward filling that gap.

Social/Regional Background

- Southern Illinois (SoIL) consists of the lower 16 counties of Illinois; roughly Illinois below I-64.
 - The area is economically depressed.
 - Generally middle to lower-working class.
- The speakers in my study come from three different counties in Southern Illinois.



Social/Regional Background

- The dialect of Southern Illinois is understudied.
- Its status as part of the North, Midland(s), South, or a “Mountain” dialect has been debated. (see, e.g.: Carver 1987; Dakin 1966; Davis & Houck 1995; Dickson 2000; Frazer 1996, Kretzschmar 2003, Labov 1996).
- It has snow in the winter; but it also has kudzu

Social/Regional Background

- Labov's TELSUR/Phonological Atlas of N. America project included SoIL in the "merger in perception & production" side of the $ɪn \sim \varepsilon n$ merger map.
 - But no speakers from Southern Illinois appear to have been sampled.
- Speakers in SoIL have real and frequent access to both fully merged and fully distinct dialects.

Methods

- 20 speakers from Southern Illinois were analyzed.
 - 11 males, 9 females
 - Age range: 15 – 65 years old
 - All were native Southern Illinoisans
 - All 20 speakers were raised lower working class, and all are currently somewhere between working and lower middle class
 - All 20 speakers are related in a complex network; mixing family, work, and friendship spheres, often across generational divides.

Methods

- 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 /ɪ/
 - 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

- 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, ear, eye, now, when, then, next, laid, sat, **did**, Dawn, Shawn, **Ted**, thin, **ban**, mad. . .
 - (**Bold/Italics** were NOT part of the original)

Methods

- 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...
 - (again, *bold/italics* NOT in original)

Methods

- 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, then two short stories, and finally read List Two.

Methods: Recording

- Recordings were made in subjects' homes; 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 ATRAC² files were then recorded into Macquiner as *.wav files for analysis.

Methods: Analysis

- 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.)

Methods: Measurements

- For Monophthongs:
 - Measurement at midpoint of the F1/F2 steady state.
 - If F2 was parabolic with clear a maximum/minimum, the max/min point was used.
- Diphthongs:
 - When there was one distinct steady state for F1; measurement was taken at the F1 midpoint.
 - When there were two distinct steady states for F1; measurement was taken at the first F1 midpoint.
 - There were no tokens *without* an F1 steady state.

Results: Non-merging

- Following is a graph³ 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 “flattening” in the vowel space.
- Notice also that List Type does not affect the relationship of the heights of /æ/ - /ɛ/ - /ɪ/.

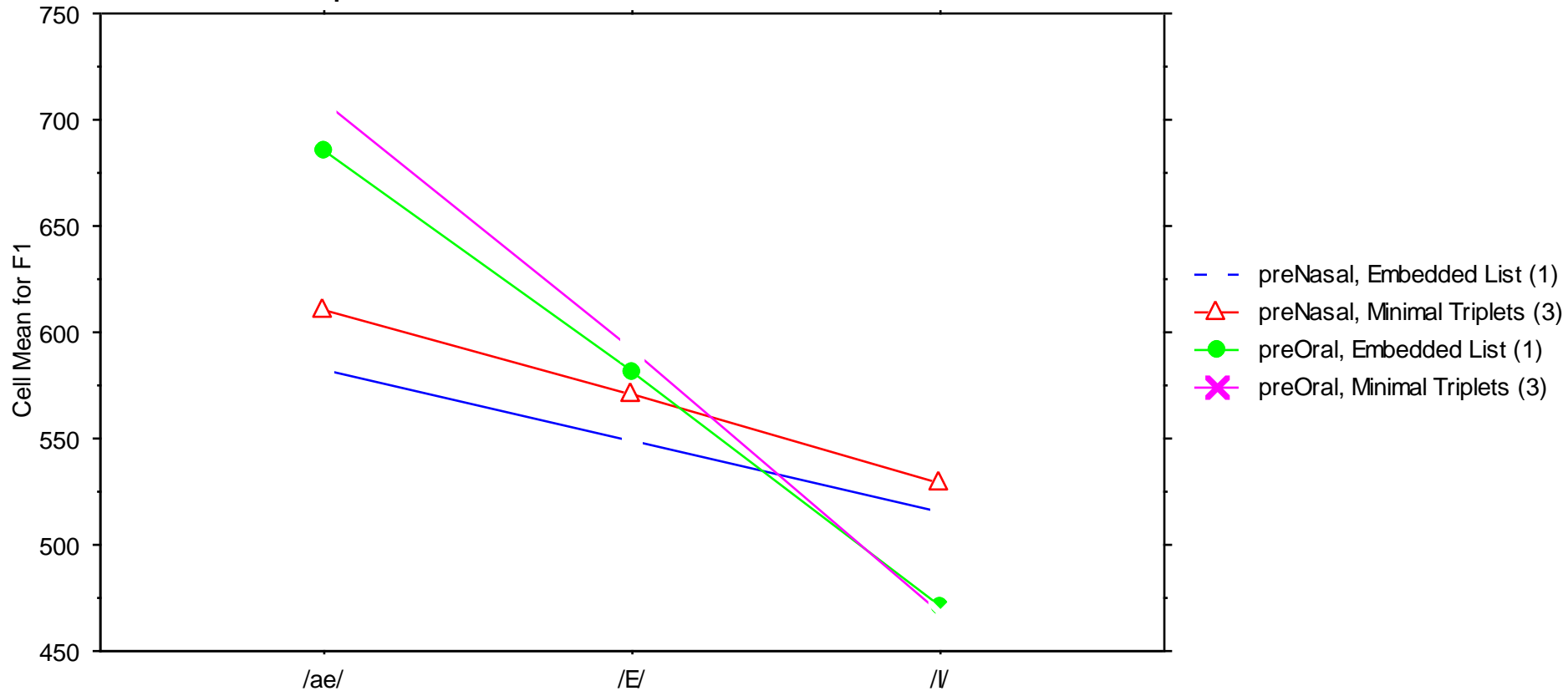
Speaker P, male, 16 years, no merger

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 /ɪ/ 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.

Older SoIL Vowels

- Following next 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 (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.

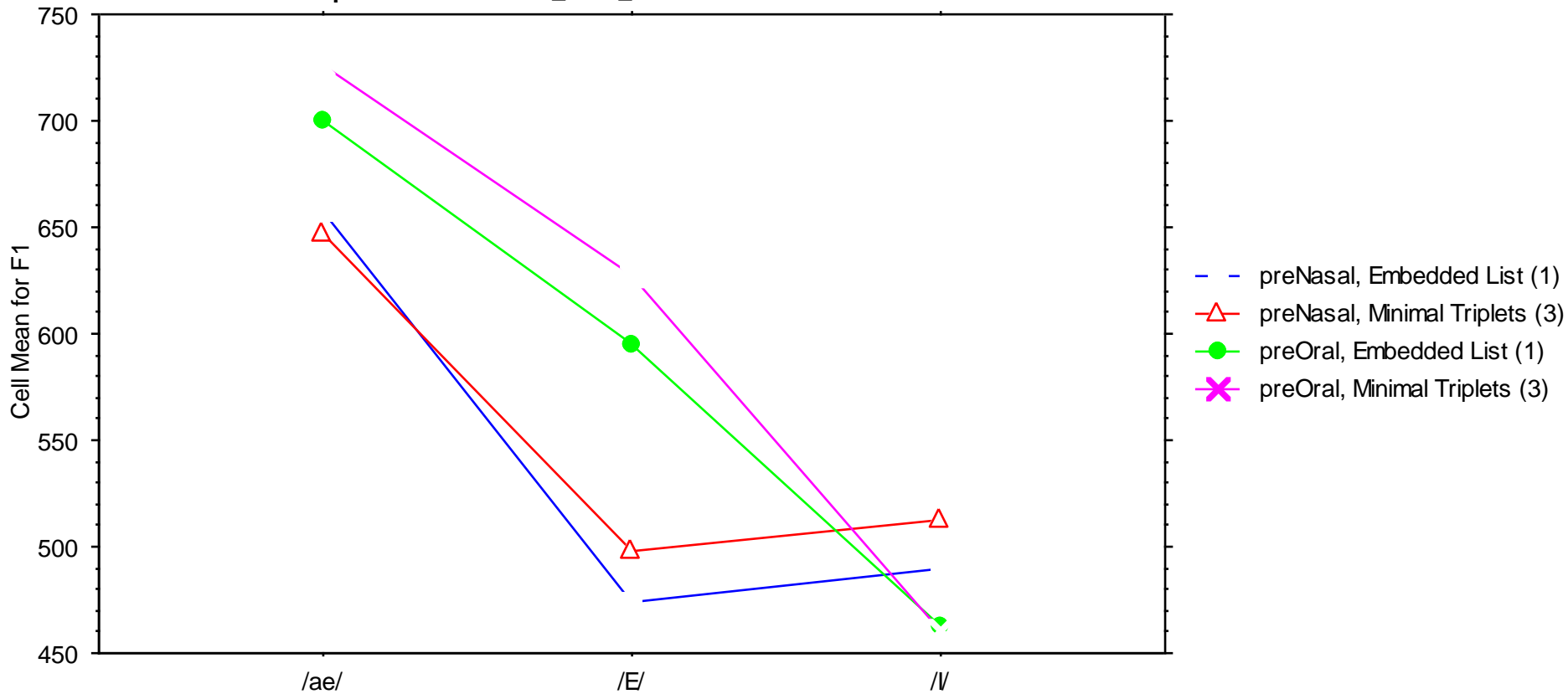
Speaker 3, female, 55 years

Cell Line Chart

Grouping Variable(s): Vowel

Split By: Context, Task Type

Inclusion criteria: Speaker 3 from MA_3set_9-16c.svd



Older SoIL Vowels

- 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.

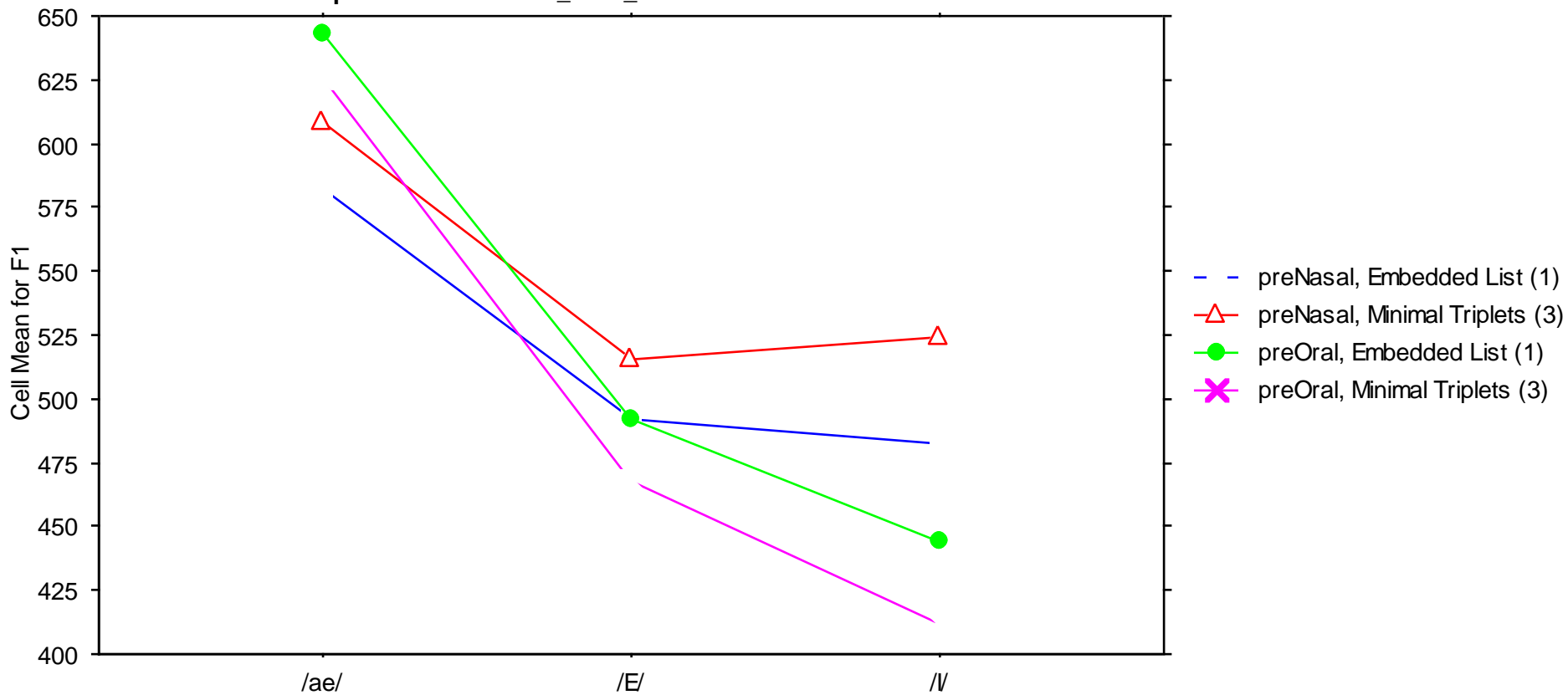
Speaker A, male, 62 years

Cell Line Chart

Grouping Variable(s): Vowel

Split By: Context, Task Type

Inclusion criteria: Speaker A from MA_3set_9-16c.svd



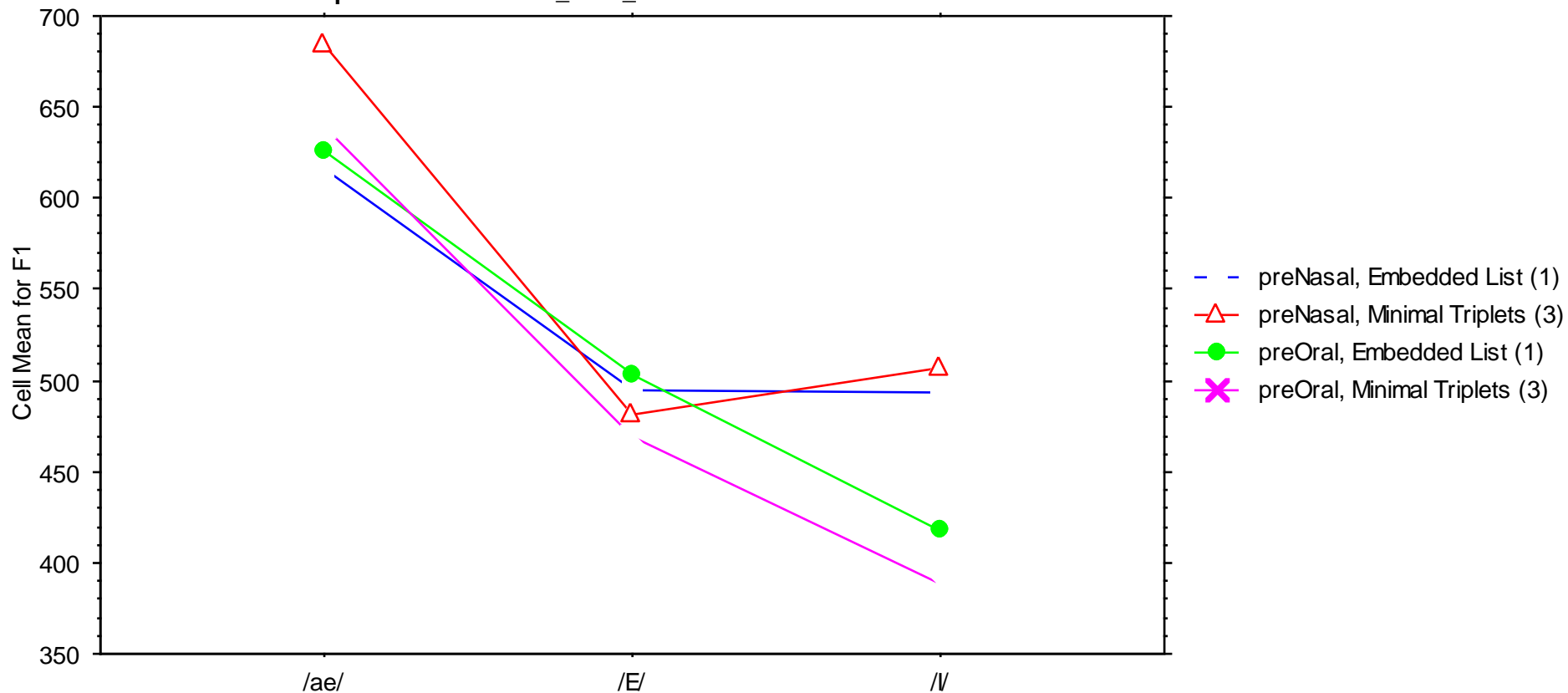
Speaker L, male, 56 years

Cell Line Chart

Grouping Variable(s): Vowel

Split By: Context, Task Type

Inclusion criteria: Speaker L from MA_3set_9-16c.svd



Older SoIL Vowels

- In these two examples, we still see PIN~PEN merger, but it is in the opposite direction from what the 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.
- 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 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: Patterns

- Pattern A
 - 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.

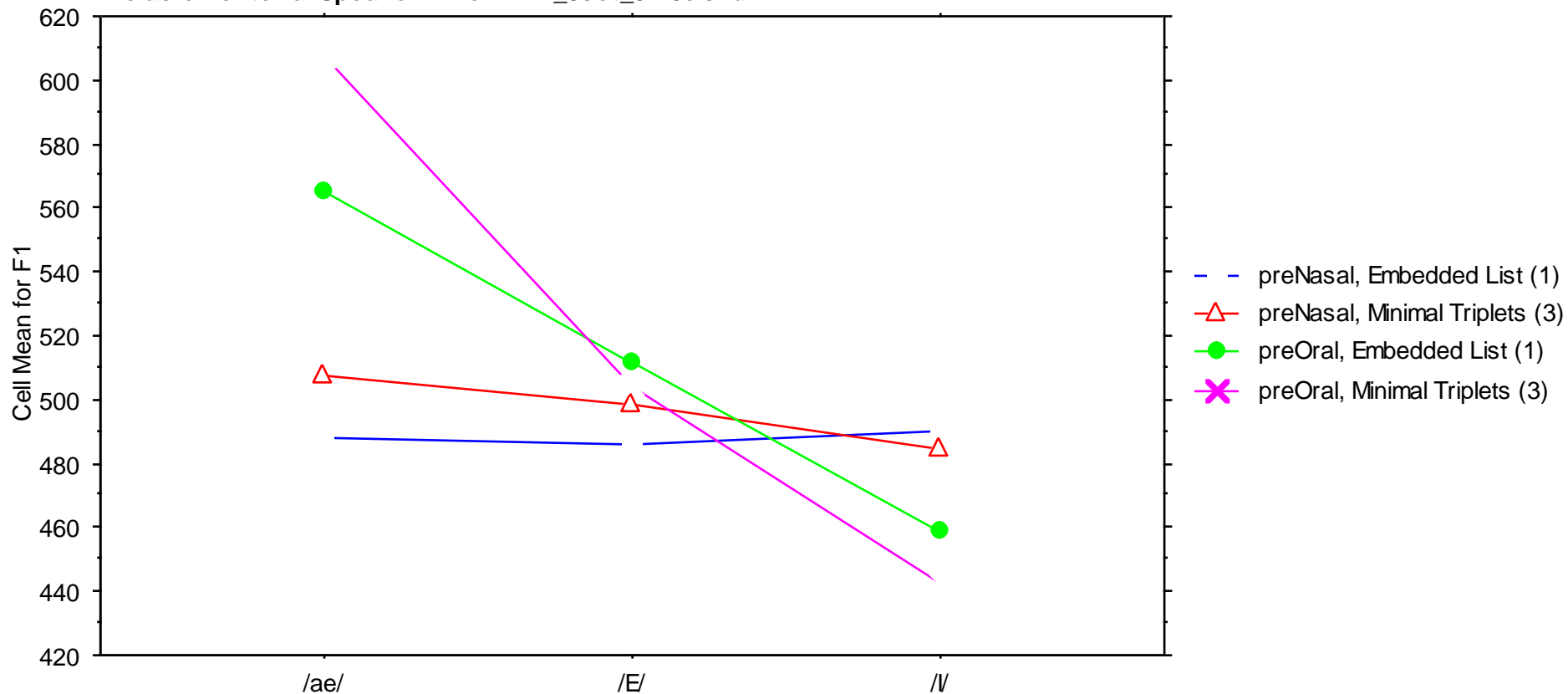
Speaker 7, male, 26 years

Cell Line Chart

Grouping Variable(s): Vowel

Split By: Context, Task Type

Inclusion criteria: Speaker 7 from MA_3set_9-16c.svd



Results: Merging: Patterns

- Pattern B
 - /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.

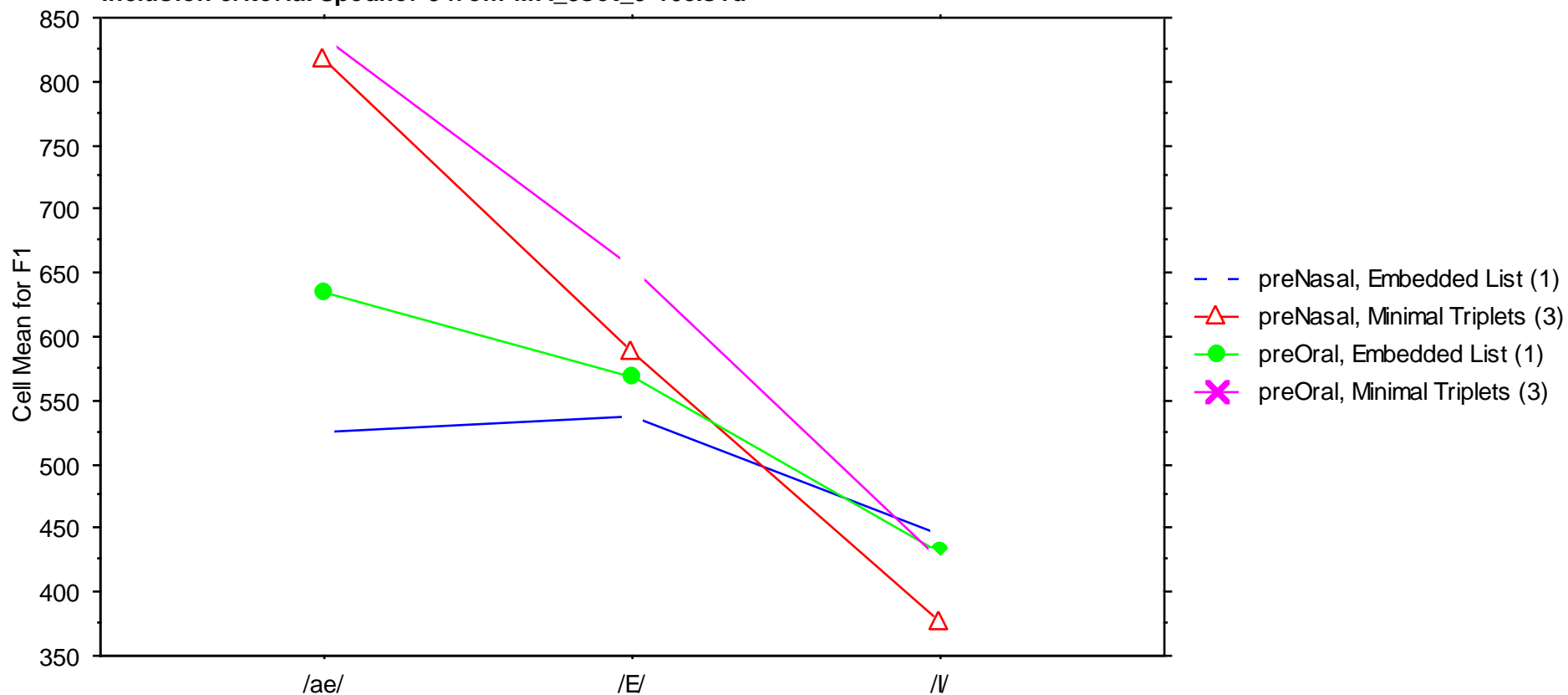
Speaker 5, female, 24 years

Cell Line Chart

Grouping Variable(s): Vowel

Split By: Context, Task Type

Inclusion criteria: Speaker 5 from MA_3set_9-16c.svd



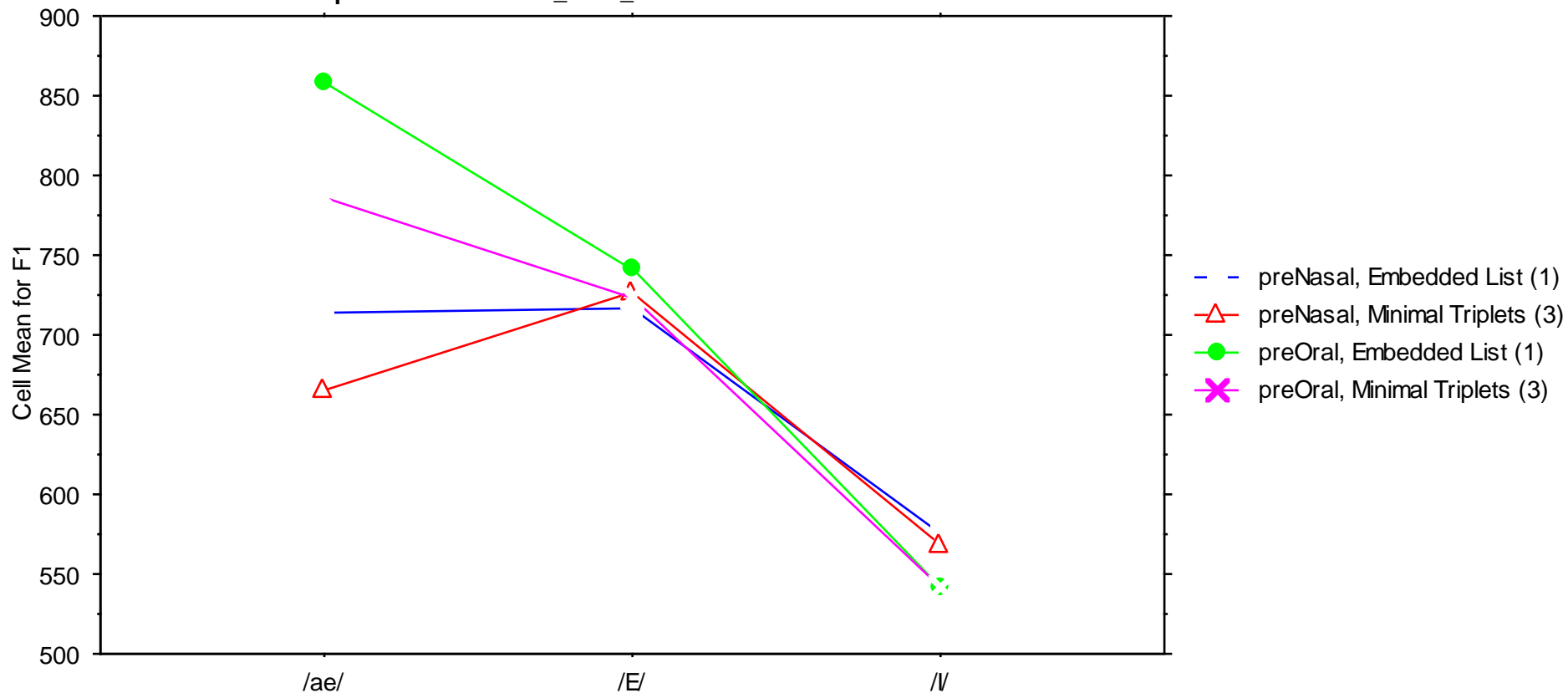
Speaker E, female, 24 years

Cell Line Chart

Grouping Variable(s): Vowel

Split By: Context, Task Type

Inclusion criteria: Speaker E from MA_3set_9-16c.svd



Results: Merging: Patterns

- Pattern C
 - Pre-Nasal vowels show different patterns of merger depending on Task Type.
 - In the Embedded List Task, we see either /ɪ/~/ ϵ / merger or no merger.
 - In the Minimal Triplets Task, we see either full merger or /æ/~/ ϵ / merger.

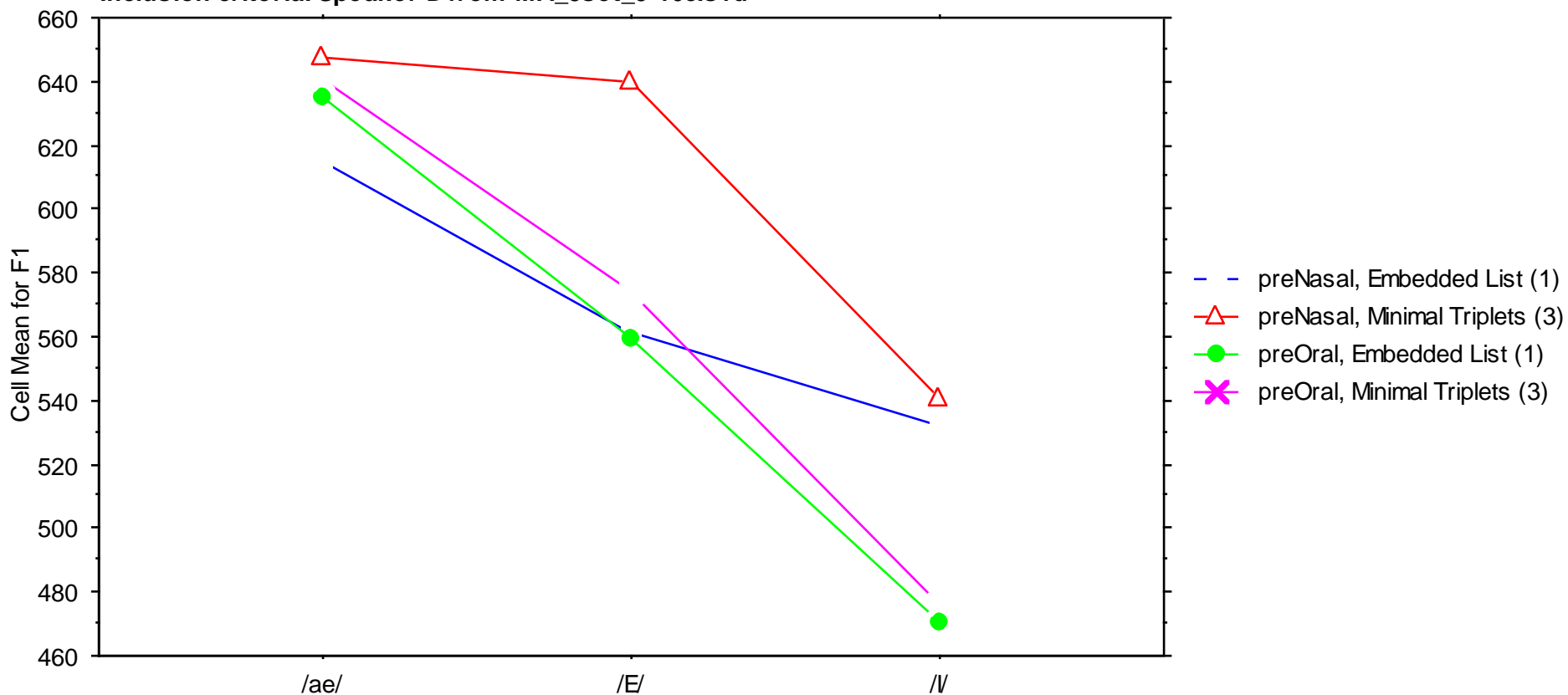
Speaker D, male, 20 years

Cell Line Chart

Grouping Variable(s): Vowel

Split By: Context, Task Type

Inclusion criteria: Speaker D from MA_3set_9-16c.svd



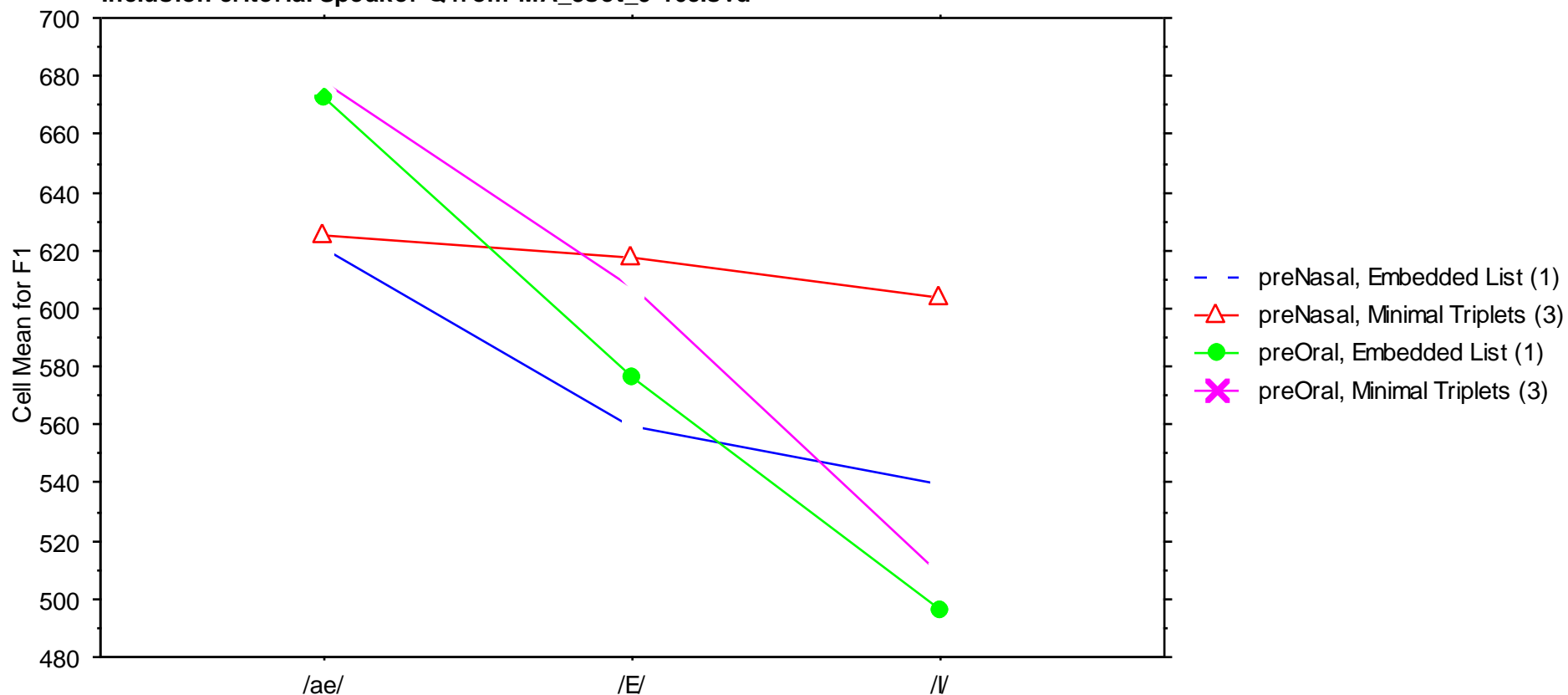
Speaker Q, male, 15 years

Cell Line Chart

Grouping Variable(s): Vowel

Split By: Context, Task Type

Inclusion criteria: Speaker Q from MA_3set_9-16c.svd



Results: Merging: Patterns

- Pattern D
 - /ɪ/ 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.

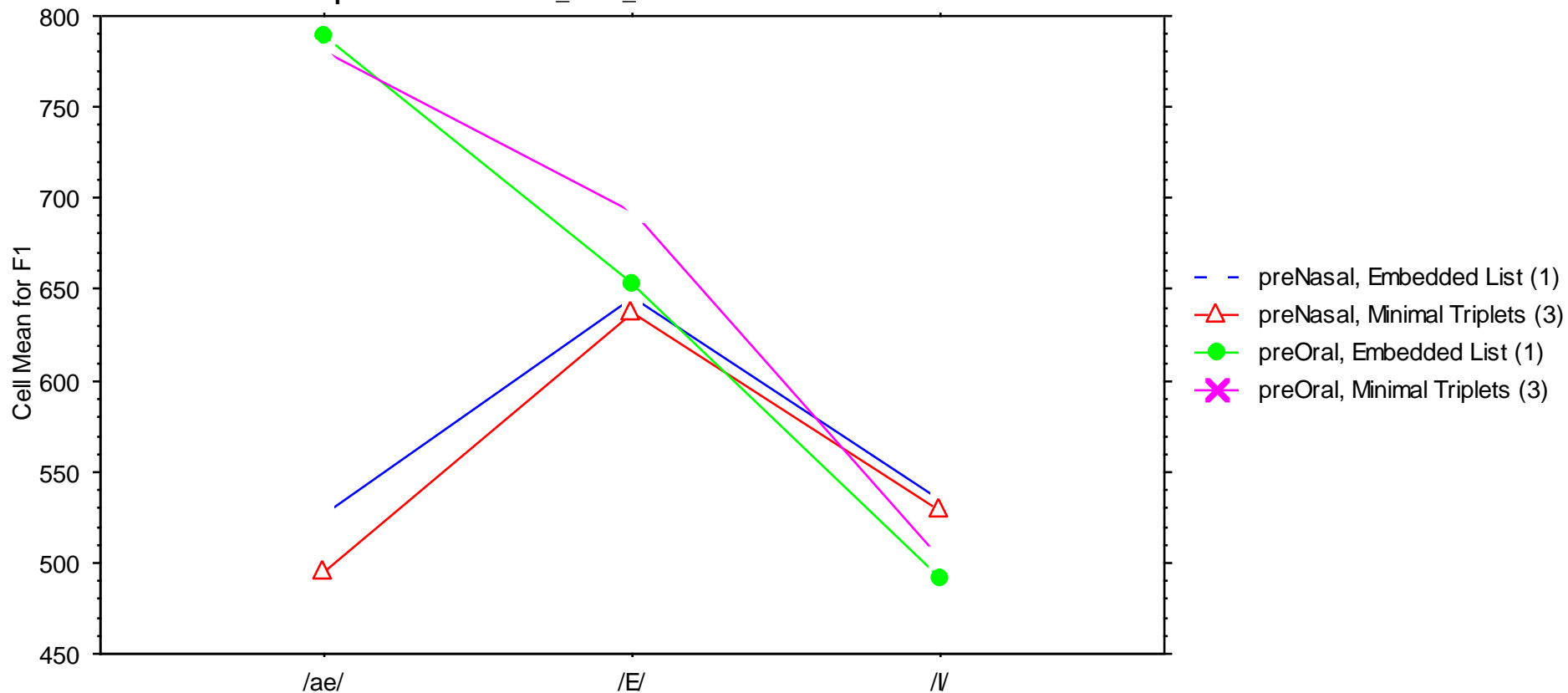
Speaker H, female, 51 years

Cell Line Chart

Grouping Variable(s): Vowel

Split By: Context, Task Type

Inclusion criteria: Speaker H from MA_3set_9-16c.svd



Conclusions

- A case of language change in progress
 - 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

- Nearly all reports of the PIN~PEN merger have considered it an /ε/-raising phenomenon.
- However, these reports have focused on impressionistic rather than acoustic data.
- The difference between /ε/ raising and /ɪ/ lowering might not be indicated in impressionistic work.

Conclusions

- 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.
- Is this also true of the speech of the South-South? Or is this characteristic of South Midland (or Midland, etc.) pronunciation only?

Further Research

- Data should span all 16 counties of Southern Illinois to see if dispersion patterns are noticeable.
- Education, gender, and class should also be considered
 - For these subjects, class was not a factor.
 - Education and gender in my data were biased. Nearly all female speakers were more educated than their male counterparts.

Further Research

- Other contexts
 - Natural speech
 - multisyllabic words
- Is there a difference between Pre-LABIAL and Pre-ALVEOLAR vowel regarding this merger?
- Perception studies
 - How do speakers with different patterns of merger understand or interpret one another?

References

- --Bailey, Guy. 1997. "When did Southern American English begin?". in *Englishes Around the World*, vol. 1. Schneider, Edgar W. (ed.). Amsterdam: John Benjamins. pp. 255-275
- --Beddor, Patrice Speeter; Rena Arens Krakow; Louis M. Goldstein. 1986. "Perceptual constraints and phonological change: a study of nasal vowel height". *Phonology Yearbook*. 5. pp. 197-217.
- --Beddor, Patrice Speeter. 1993. "The perception of nasal vowels". *Phonetics & Phonology 5: Nasals, Nasalization, and the Velum*. pp. 171-196.
- --Brown, Vivian. 1990. "Phonetic constraints on the merger of /ɪ/ and /ɛ/ before nasals in North Carolina and Tennessee". *The SECOL Review*. Fall 1990. pp. 87-100.
- --Brown, Vivian. 1991. "Evolution of the Merger of /ɪ/ and /ɛ/ before nasals in Tennessee". *American Speech*. 66.3. pp. 303-315.
- --Campbell, Nick. 2002. "Recording and storing of speech data". Presentation given at LREC-2002, Las Palmas.
- --Carver, Craig M. 1987. *American Regional Dialects: A Word Geography*. Ann Arbor: University of Michigan Press.
- --Dakin, Robert Ford. 1966. *The Dialect Vocabulary of the Ohio River Valley*. 3 vols. Ph.D. Dissertation, University of Michigan.
- --Davis, Lawrence M. & Charles L. Houck. 1995. "The Comparability of Linguistic Atlas Records". in *Focus on the USA (Varieties of English Around the World: G16.)*. Edgar W. Schneider (ed.). pp. 51-62.
- --Dickson, Amanda Jo. 2000. *The View from Little Egypt: A Look into the Linguistic Identity of Southern Illinoisans Through Their Perceptions of US English*. Masters Thesis, Southern Illinois University – Carbondale.
- --Di Paolo, Mariana & Alice Faber. 1990. "Phonation differences and the phonetic content of the tense-lax contrast in Utah English". *Language Variation and Change*. 2. pp. 155-204.
- --Faber, Alice & Mariana Di Paolo. 1995. "The discriminability of nearly merged sounds". *Language Variation and Change*. 7. pp. 35-78.
- --Frazer, Timothy C. 1996. "The dialects of the Middle West". in *Focus on the USA (Varieties of English Around the World: G16.)*. Edgar W. Schneider (ed.). pp. 81- 102.
- --Gonzalez, Julio & Teresa Cervera. 2001. "The effect of MPEG audio compression on multidimensional set of voice parameters". *Logopedics Phoniatrics Vocology (Log Phon Vocol)*. 26. pp. 124-138.
- --Kretzschmar, William A. 2003. "Mapping Southern English". *American Speech*. 78.2. pp. 130-149.
- --Labov, William; Mark Karen; & Corey Miller. 1991. "Near-mergers and the suspension of phonemic contrast". *Language Variation and Change*. 3. pp. 33-74.
- --Labov, William. 1996. "The organization of dialect diversity in North America". Paper given at the *Fourth International Conference on Spoken Language Processing at Philadelphia, October 6, 1996*. (Revised version available on the internet at: http://www.ling.upenn.edu/phono_atlas/ICSLP4.html)
- --Labov, William. 2001. *Principles of Linguistic Change: Volume 2, Social Factors*. Oxford: Blackwell.
- --Ladefoged, Peter. 1993. *A Course in Phonetics*. 3rd ed. Fort Worth: Harcourt Brace.
- --Ladefoged, Peter. 2003. *Phonetic Data Analysis*. Oxford: Blackwell.
- --Maeda, Shinji. 1993. "Acoustics of vowel nasalization and articulatory shifts in French nasal vowels". *Phonetics & Phonology 5: Nasals, Nasalization, and the Velum*. pp. 147-167.
- --Pederson, Lee. 1983. *East Tennessee Folk Speech*.
- --Stevens, Kenneth N. 1999. *Acoustic Phonetics*. Cambridge, MA: MIT Press.
- --Thomas, Eric R. 1996. "A comparison of variation patterns of variables among sixth-graders in an Ohio community". in *Focus on the USA (Varieties of English Around the World: G16.)*. Edgar W. Schneider (ed.). pp. 149-168.
- --Thomas, Eric R. 2001. *An Acoustical Analysis of Vowel Variation in New World English*. Publication of the American Dialect Society (PADS: 85). Duke UP.
- --von Son, R.J.J.H. 2002. "Can standard analysis tools be used on decompressed speech?" Paper presented at COCOSDA 2002, Denver. Available online through the GNU Free Documents Project: <http://www.cocosda.org/meet/denver/COCOSDA2002-Rob.pdf>.
- --Wolfram, Walt & Natalie Schilling-Estes. 1998. *American English: Dialects and Variation*. Oxford: Blackwell.