

# 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 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 South<sup>1</sup>.

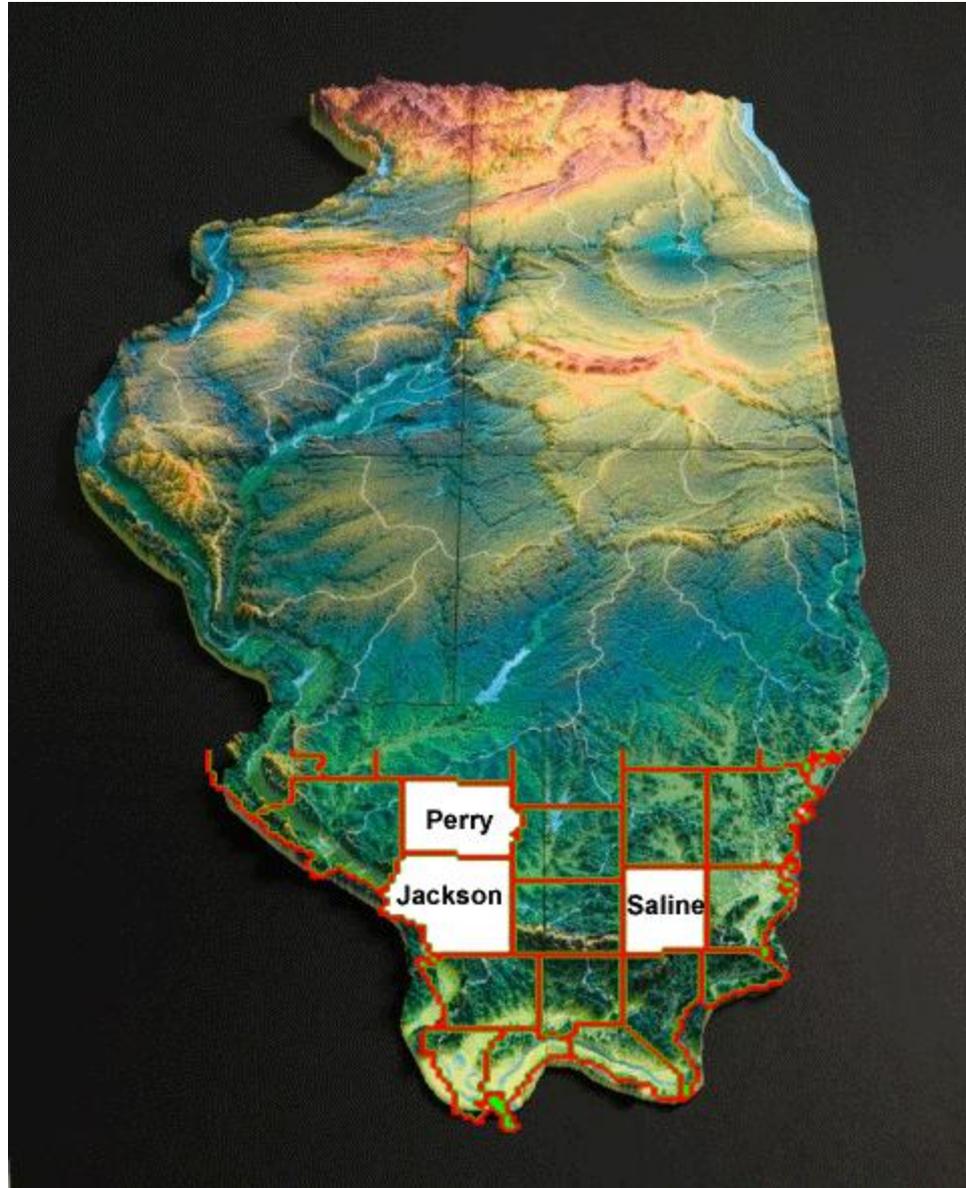
# General PIN~PEN

## 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 ATRAC<sup>2</sup> 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 graph<sup>3</sup> 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/.

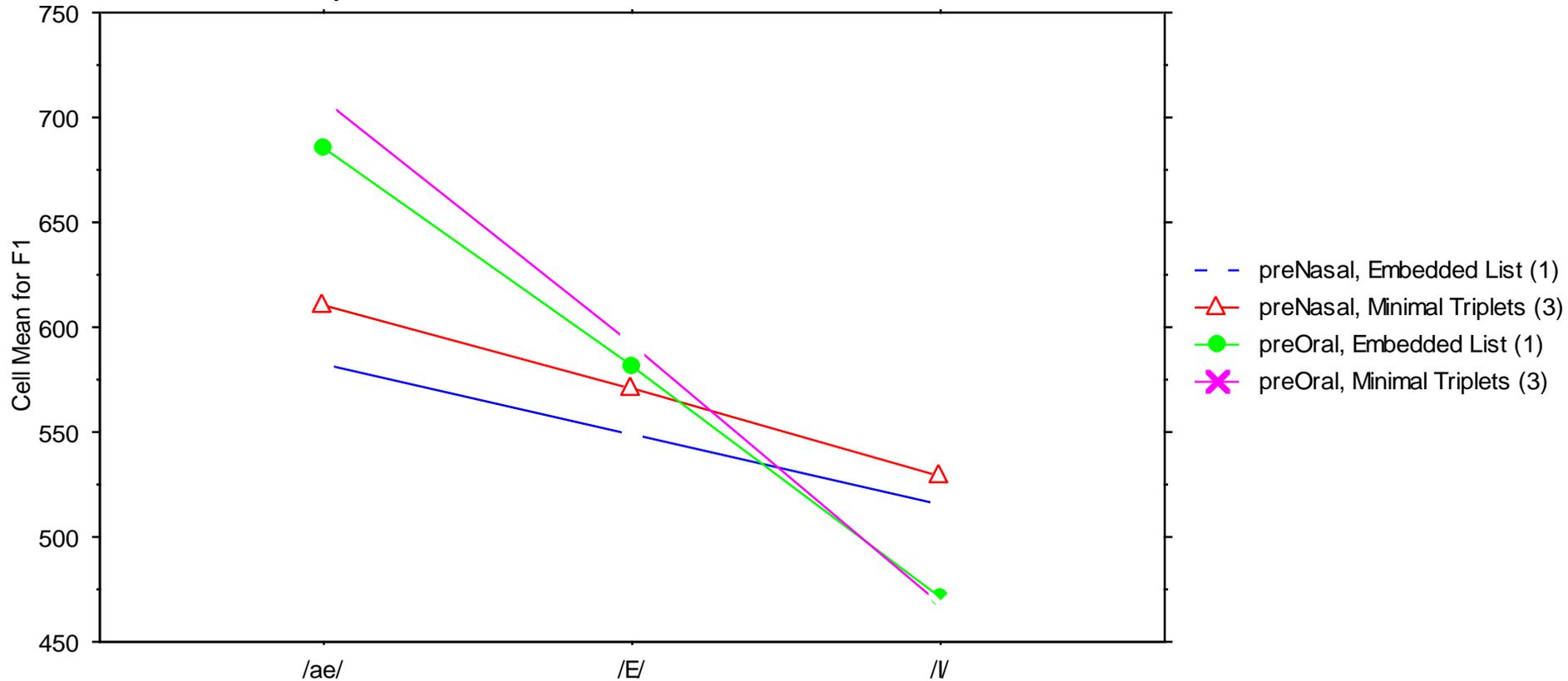
# Speaker P, male, 16 years, no merger

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.

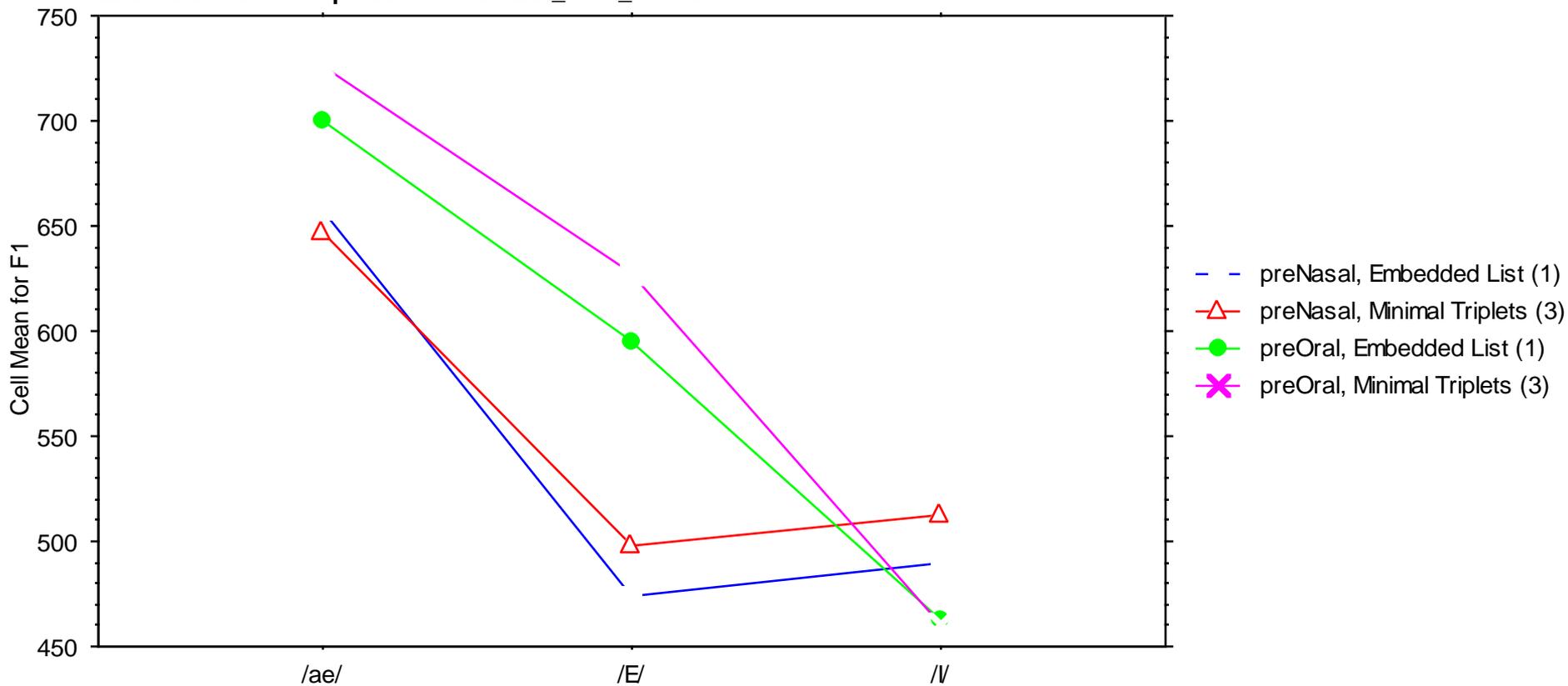
# Speaker 3, female, 55 years

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.

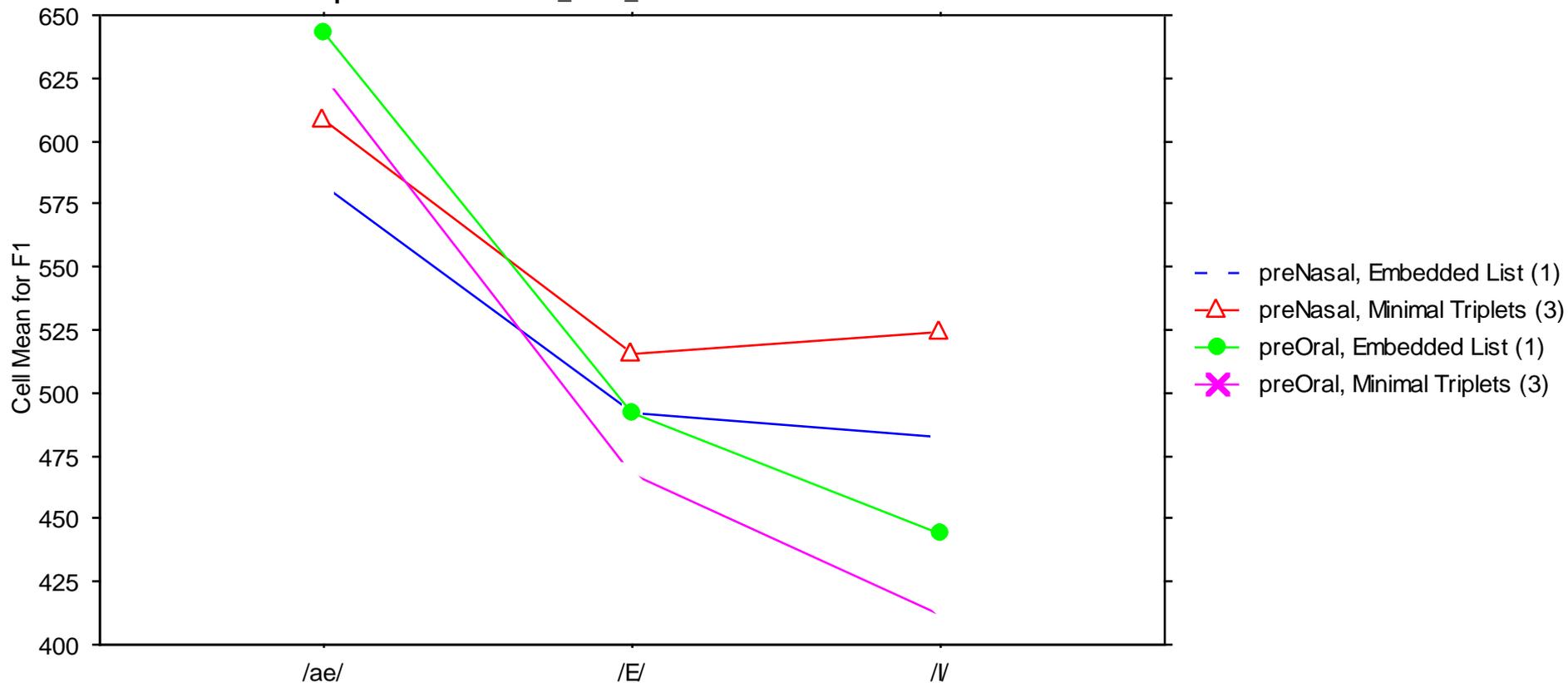
# Speaker A, male, 62 years

Cell Line Chart

Grouping Variable(s): Vowel

Split By: Context, Task Type

Inclusion criteria: Speaker A from MA\_3set\_9-16c.svd



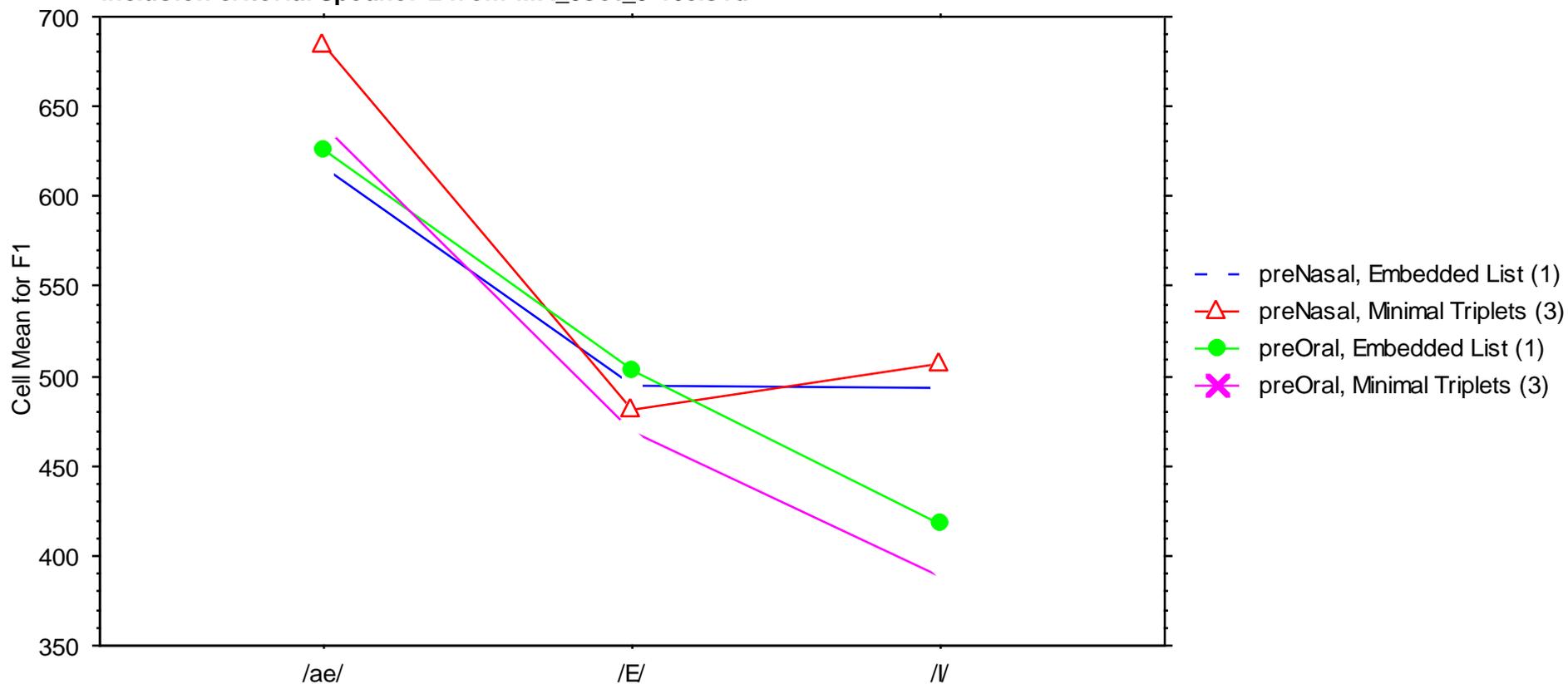
# Speaker L, male, 56 years

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.

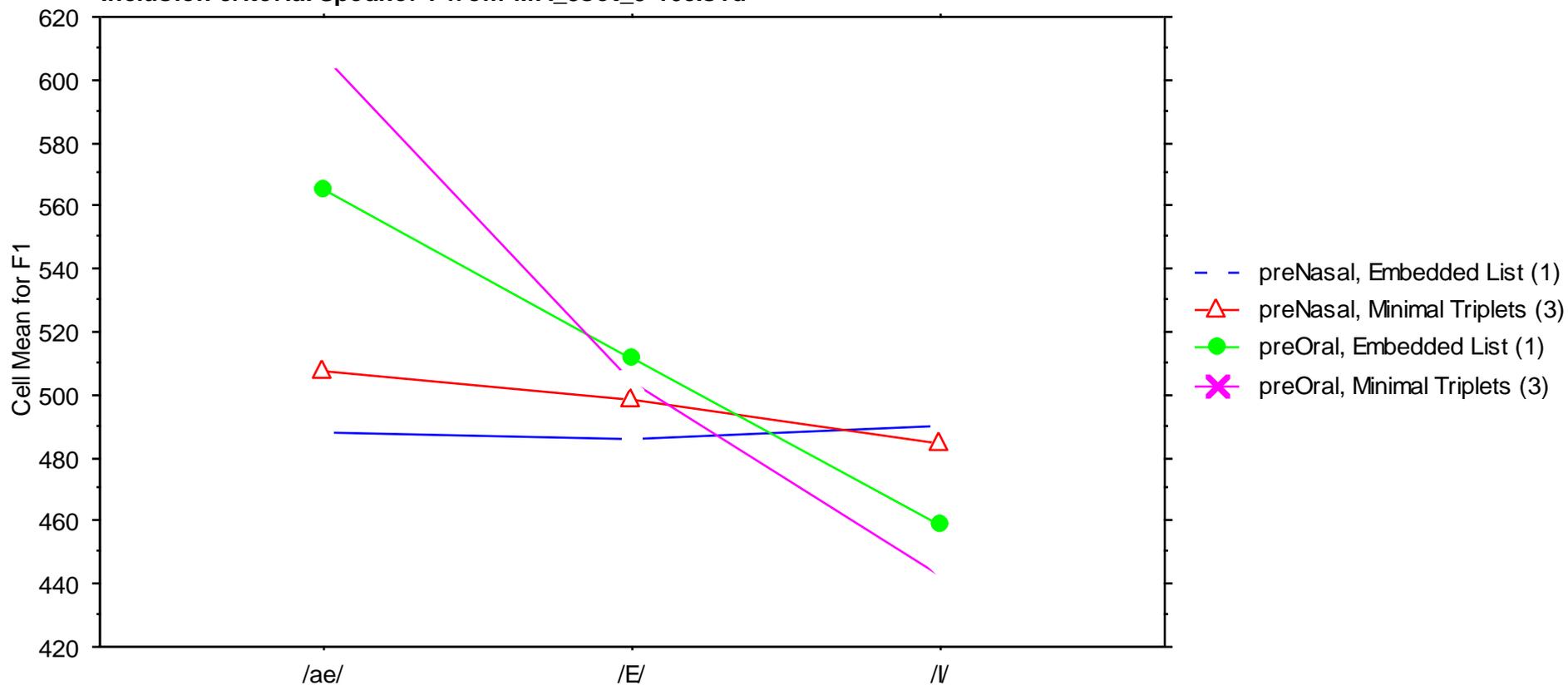
# Speaker 7, male, 26 years

## 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.

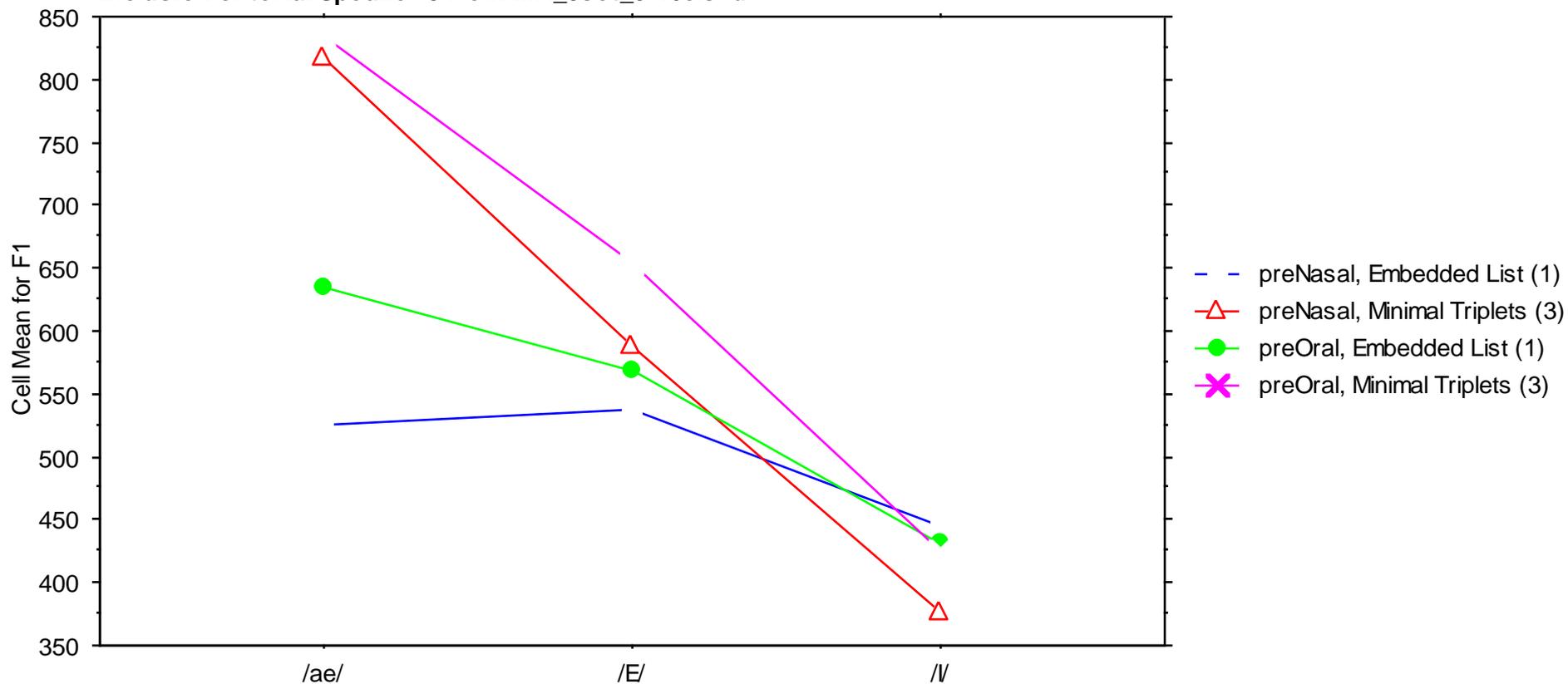
# Speaker 5, female, 24 years

## Cell Line Chart

Grouping Variable(s): Vowel

Split By: Context, Task Type

Inclusion criteria: Speaker 5 from MA\_3set\_9-16c.svd



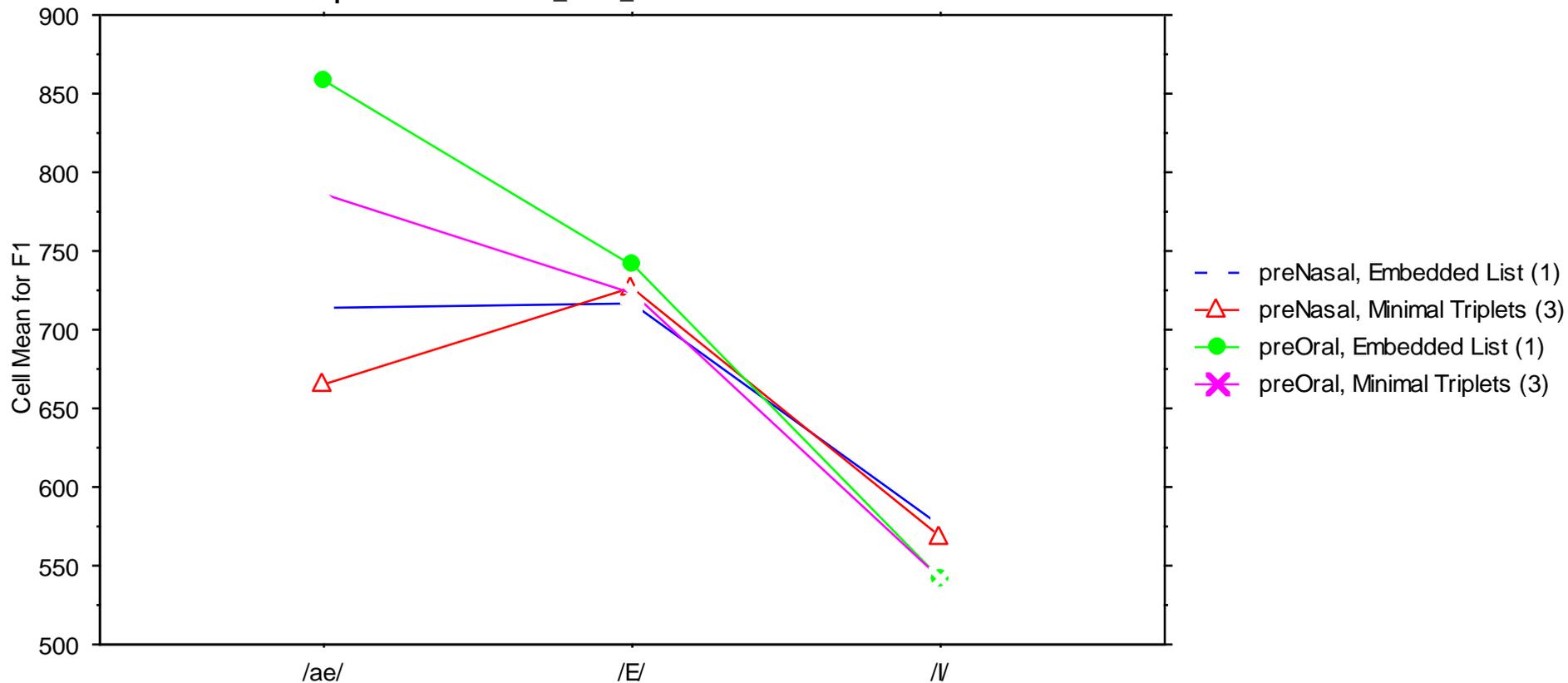
# Speaker E, female, 24 years

## 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/~/ $\epsilon$ / merger or no merger.
  - In the Minimal Triplets Task, we see either full merger or /æ/~/ $\epsilon$ / merger.

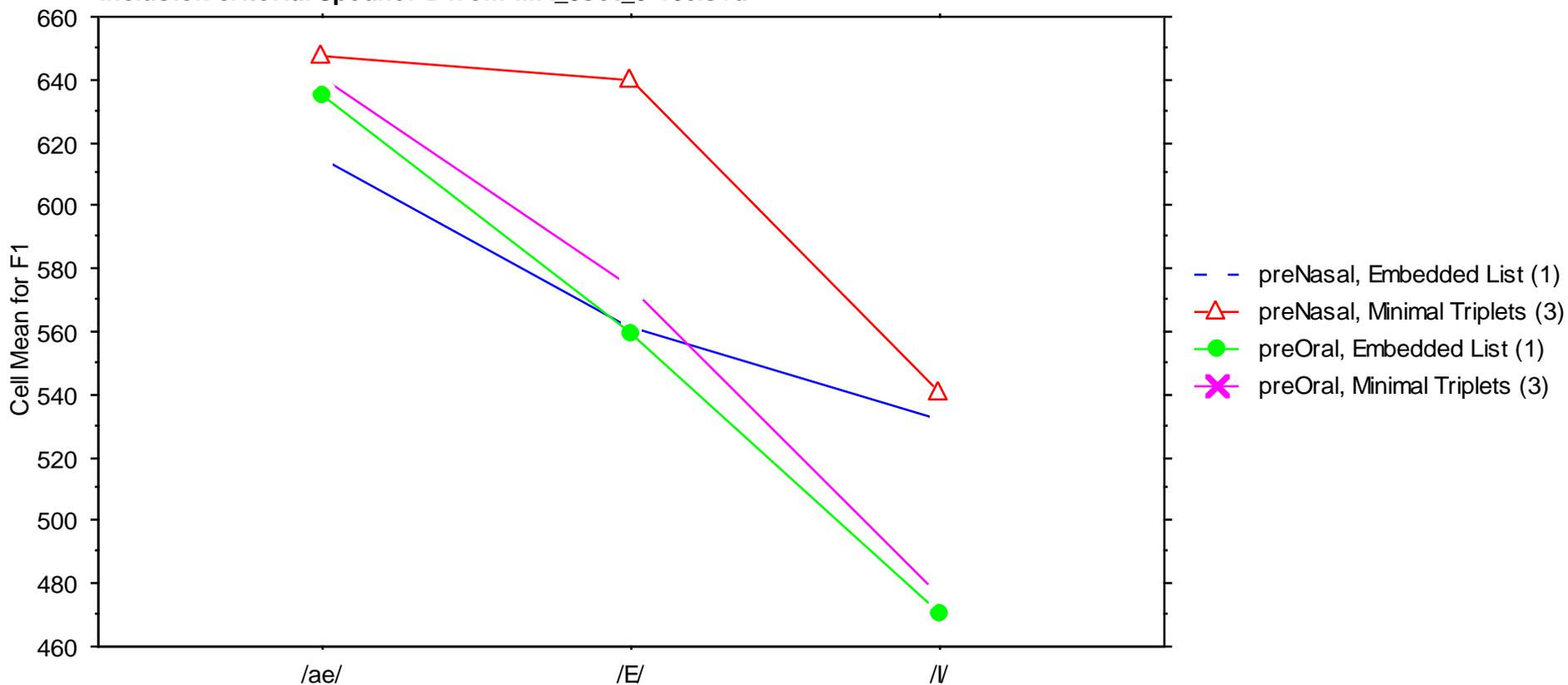
# Speaker D, male, 20 years

Cell Line Chart

Grouping Variable(s): Vowel

Split By: Context, Task Type

Inclusion criteria: Speaker D from MA\_3set\_9-16c.svd



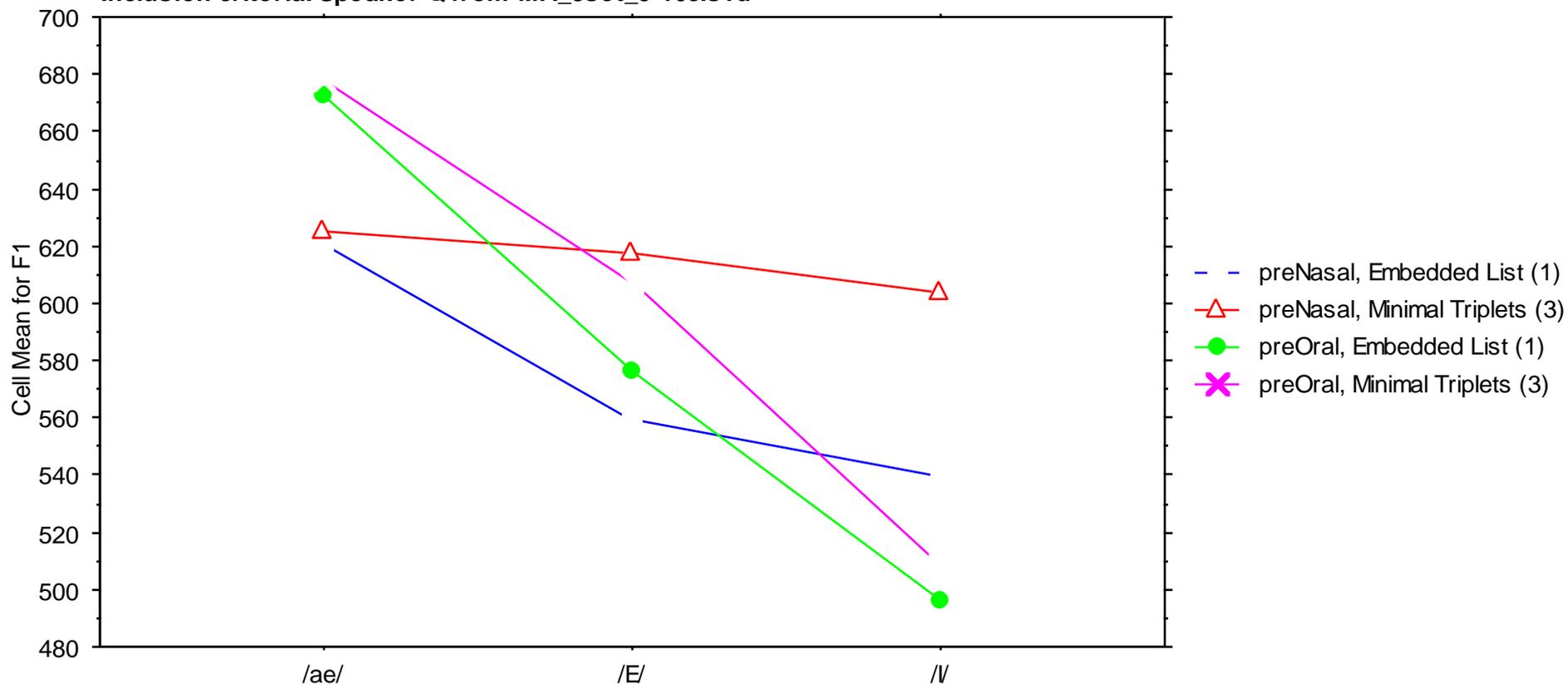
# Speaker Q, male, 15 years

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.

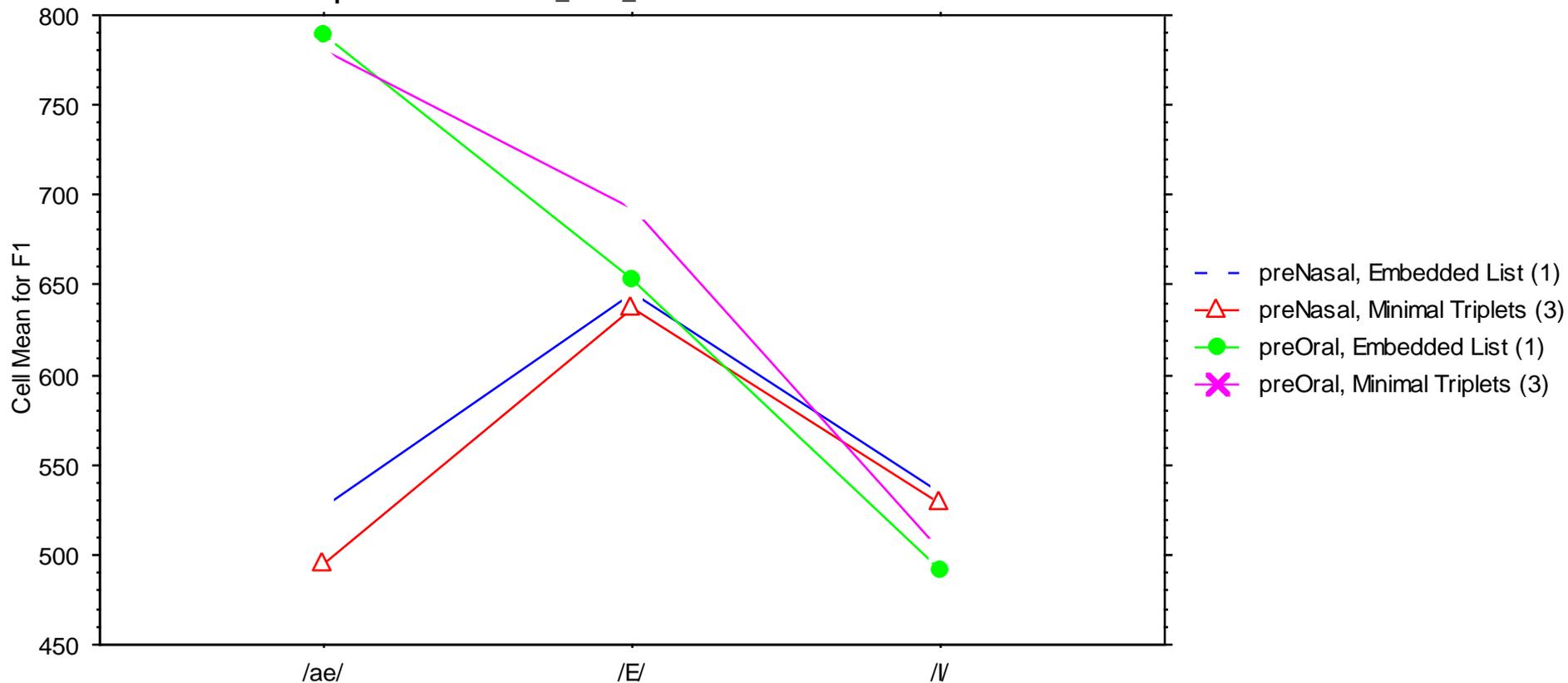
# Speaker H, female, 51 years

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?

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