



The Phonological Aspect of Phonetic Change

Josef Fruehwald

University of Pennsylvania

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Outline

Introduction

What is Phonetic Change?

- The Unit of Phonetic Change
- The Process of Phonetic Change
- The Role of Phonology
- Proposal

Application of the Proposal

- The Unity Principle
- /eyC/ in Philadelphia

Conclusion



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What is the unit of phonetic change?

- I'll be assuming, following Labov (1981) that “sound change” is not monolithic.
- I'll be focusing on neogrammarian sound change, rather than other kinds of sound change.
- “Phonemes Change”



What is the unit of phonetic change?

/æ/



What is the unit of phonetic change?

/æ/

[-hi
+low
-back
-peripheral]



What is the unit of phonetic change?

/æ/

[
-hi
+low
- back
-peripheral
]



What is changing in a phonetic change?

- hi → large F1
- +low → larger F1
- back → large F2
- peripheral → close to center



What is changing in a phonetic change?

- hi → large F1
- +low → larger F1
- back → large F2
- peripheral → close to center



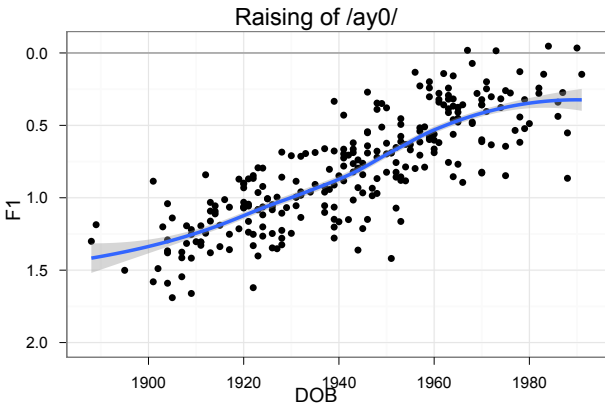
What is changing in a phonetic change?

- hi → large F1
- +low → larger F1
- back → large F2
- peripheral → close to center



What is changing in a phonetic change?

You're not going to get anywhere messing with the phonological representation.





What is changing in a phonetic change?

- hi → large F1
- +low → larger F1
- back → large F2
- peripheral → close to center



Is it worth talking about phonology?

/æ/

$$\left[\begin{array}{c} -\text{hi} \\ +\text{low} \\ -\text{back} \\ -\text{peripheral} \end{array} \right]$$



Is it worth talking about phonology?

// ε
æ //

[-hi
-back
-peripheral]



Is it worth talking about phonology?

/ i
ε
æ /

[-back
-peripheral]



Is it worth talking about phonology?

/ɛ/

[-back
-peripheral] →

less large F2
close to center

Boberg (2005)

Durian (2009)

Durian & Joseph (approx 15 minutes ago)



Is it worth talking about phonology?

Is there a robust relationship between phonetic variation and change and phonological representation?

Correlation Analysis

- Utilized the Philadelphia Neighborhood Corpus.
 - 272 speakers.
 - 654,820 vowel measurements.
 - 7730 vowel means
- For each pairwise comparison of vowels, I calculated the correlation of those vowel means across speakers



Is it worth talking about phonology?

Speaker	F1	
	æ	ɛ
JStevens	0.65	0.37
NJulian	0.97	0.44
GSalvi	0.89	0.39
BDAddario	1.03	0.39
...		

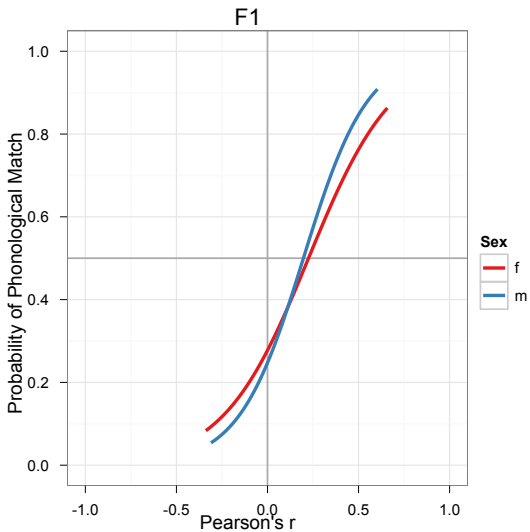


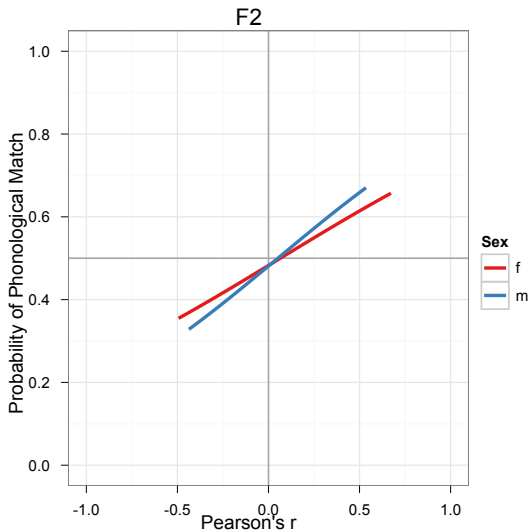
Vowel 1	F1		cor
	Vowel 2		
æ	ɛ		0.45
æ	a		0.18
	...		



Is it worth talking about phonology?

		F1		
Vowel 1	Vowel 2	cor	Same Height	
æ	ɛ	0.45	0	
æ	a	0.18	1	
		...		







It is worth talking about phonology

Patterns in both parallel shifts and in phonetic variation across speakers appears to be relatable to phonological natural classes.



Phonology-Phonetic Interface

Phonology

$uw \rightarrow [+back]/_l$

Language Specific Implementation

$[+back] \rightarrow \text{small F2}$

Kingston & Diehl, 1994; Boersma & Hamann, 2008

Phonetic Alignment

$t\tilde{u}:n$

Cohn, 1993; Zsiga, 2000



Proposal

- At least at their outset, phonetic change is a change in the implementation of surface phonological representations.
- The units of phonetic change are the same as the units the Phonology-Phonetics interface can see.
 - Natural class (i.e. parallel shifts) = features
 - Single vowel shift = holistic surface representation



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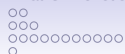
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Unity Principle

- Diachronic Phonological Unity → Diachronic Phonetic Unity



Unity Principle

- Diachronic Phonological Unity → Diachronic Phonetic Unity
- Diachronic Phonetic Disunity → Diachronic Phonological Disunity



/eyC/ in Philadelphia

Background

Description

- The raising and peripheralization of /ey/ in non-word final position
 - *snake* sound similar to *sneak*.
- Identified as a new and vigorous change in Philadelphia (Labov, 2001).

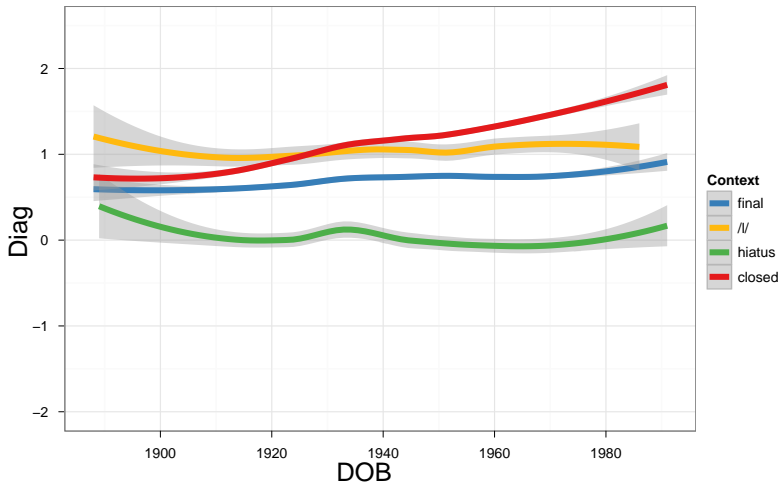
PNC

This is the second most vigorous change in the corpus following the raising of /ay0/.



/eyC/ in Philadelphia

Contexts





/eyC/ in Philadelphia

Phonological analysis

Unity Principle

- Pre-C \neq Final
- Pre-C \neq Pre-Hiatus
- Pre-C \neq Pre-//



/eyC/ in Philadelphia

Phonological analysis

Unity Principle

- Pre-C \neq Final
- Pre-C \neq Pre-Hiatus
- Pre-C \neq Pre-//

Phonological Analysis

- ey \rightarrow +peripheral / ___C/#

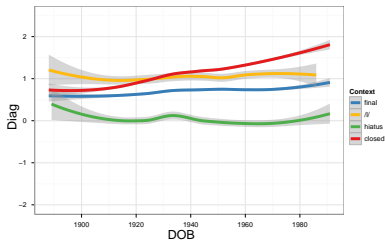


/eyC/ in Philadelphia

Change Analysis

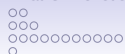
The Change

- $ey_{+periph}$ becomes more phonetically peripheral.
- $ey_{-periph}$ remains stable.



Future Extension

If one of the non-participating environments were to become participating in the future, it would necessarily be a phonological change.



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- Phonetic change and phonetic variation can be related to phonological natural class behavior.
- It provides an explanatory account for parallel shifts.
- This also allows for a clear way to leverage diachronic phonetic data to phonological investigation.



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