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Abstract factors in English Diphthong Raising in a Mississippi dialect

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1 Preview: English Diphthong Raising

(1) American Raising is one version of English Diphthong Raising (Moreton and Thomas, 2007), the phonological syndrome of higher diphthongs before voiceless consonants which reappears in many times and places around the English-speaking world. Some examples ("*T*" = before voiceless; "*D*" = before voiced):

[ʌɪ]/[ɐɪ]	[aɪ]	[ae]	[aɛ]	[a^{ɛ}]/[aː]	Dialects
T	*D*				*Canada*: Ontario (Joos, 1942; Chambers, 1973), Labrador and Newfoundland (Clarke, 2010), Cape Breton (Kiefte and Kay-Raining Bird, 2010), Manitoba (Onosson, 2010), B.C. (Rosenfelder, 2005). *North-central U.S.* (Dailey-O'Cain, 1997; Thomas, 2000) *U.S. East Coast*: Martha's Vineyard MA (Labov, 1963; Blake and Josey, 2003), Philadelphia (Fruehwald, 2016), E. VA (Shewmake, 1925), SC and GA Low Country (Kurath and McDavid, 1961). *Honduras* (Graham, 2010). *English Fens* (Britain, 1997), *Hawaii* (Vance, 1987, 208), *Cape Town* (Finn, 2008).
T		*D*			*Bahamian Creole, 'working-class'* (Kraus, 2015)
T			*D*		*SE U.S.* (Greet, 1931; Kurath and McDavid, 1961). *Tristan da Cunha* (Schreier and Trudgill, 2006)
T				*D*	*Eastern Va., NE N.C.* (Kurath and McDavid, 1961). *Liverpool* (Cardoso, 2015).
	T		*D*		*SE U.S. white speakers* (Edgerton, 1935; Hall, 1942; Sledd, 1966; Pederson et al., 1992). *Bahamian Creole, 'higher-class'* (Kraus, 2015)
	T			*D*	*AAE, widespread in U.S.* (Thomas and Bailey, 1998; Thomas, 2001; Anderson, 2002; Knight and Herd, 2016). *SE U.S. white speakers* (Evans, 1935; Sledd, 1966; Bailey et al., 1991; Bernstein, 1993; Hazen, 2000; Knight and Herd, 2016). *Afro-Bahamian* (Childs et al., 2003; Reaser, 2010). *Devonshire, England* (Orton et al., 1978; Anderson, 1987). *Hull, England* (Trudgill, 1999, 72)
			T	*D*	*AAE in Texas* (Bailey and Thomas, 1998)

(2) Repeated independent re-innovations: *English Fens* (Britain, 1997; Britain and Trudgill, 2008); *Liverpool* (Cardoso, 2015); *Cleveland, Ohio* (Moreton and Thomas 2007, **Thomas, this session**); *Philadelphia* (Fruehwald, 2013, 2016); *Fort Wayne, Indiana* (Berkson et al. 2017, **Davis et al., this session**); Upper Peninsula of Michigan **Rankinen, this session**; Raleigh, **Dodsworth, Kohn, and Forrest, this session**.

⇒ opportunity to see how a concrete phonetic precursor spawns an abstract phonological pattern.

(3) Research on the transition from concrete to abstract in English Diphthong Raising has focused on *lexical* abstractness — specifically, whether raising is conditioned by (concrete) surface voicing or (abstract) underlying voicing of flapped /t/ (e.g., Fruehwald 2013, 2016; Berkson et al. 2017; Davis et al. 2019; **Davis et al., this session**).

[0]Handout from a talk presented at NWAV 48, held at the University of Oregon, in a special session on "American Raising" organized by Kelly Berkson and Stuart Davis. Thanks to Stuart Davis, Jennifer Smith, and the UNC-Chapel Hill P-Side Caucus for helpful comments. Address for correspondence about this talk: moreton@unc.edu.

(4) Main objectives of this talk:

a. Show that *other abstract factors are also involved*: prosody, morphological boundary type and location, and free/bound status of stems.
b. Show that their effects can *vary* from one EDR variety to another.
c. Suggest ways *that this variation could be used* to test hypotheses about how and when abstractness enters into phonology (interesting to linguists across a range of subfields and theoretical approaches).

(5) Illustrated with a small-scale study (4 archival and 1 live speaker) of an under-studied dialect with fully phonologized Raising, using a novel fully-crossed design (prosody × morphological boundary type × morphological boundary location × free/bound).

2 How does phonology become abstract?

(6) Mature phonological patterns (not just EDR) are often conditioned by factors other than the surface phonetics of the utterance.

E.g., underlying representation (i.e., opacity, Kiparsky 1971, 1973), prosodic affiliation (Kahn, 1976), morphology (Casali, 1996; Beckman, 1998), paradigm membership (Benua, 1997), syntactic category (Smith, 2001, 2011), lexical stratum (Itô and Mester, 1995), etc.

(7) ***Big Question*: How and when do abstract factors come to condition a phonological pattern?** Possibilities include:

The Late Abstractness Hypothesis: A freshly-phonologized pattern is conditioned by phonetics alone. The abstractness of a phonological pattern increases with its age (Janda and Joseph, 2003; Bermúdez-Otero, 2007; Hyman, 2013; Bermúdez-Otero, 2015).

The Early Abstractness Hypothesis: Abstract conditioning is present from the moment of phonologization, and is imposed by the pre-existing phonology (Fruehwald, 2013, 2016).

The Abstract Phonetics Hypothesis: Abstract conditioning is already present in the phonetic precursor, and is phonologized along with it. E.g.,

a. *Influence of morpheme boundary*: Longer vowel in *band* than in *banned* (e.g., Frazier 2006; Sugahara and Turk 2009).
b. *Influence of UR before flap*: Longer vowel in *puh-PAD-ing* than *puh-PAT-ing* (Braver, 2014). Possible precursor for faithfulness to base (Braver, 2013; Kaplan, 2017).

(8) *Relevance of English Diphthong Raising*: Flapped /t/ triggers Raising; i.e., Raising is sensitive to underlying (abstract) voicelessness rather than surface (concrete) voicing (Chambers 1973; Vance 1987; Kaye 1990; Dailey-O'Cain 1997; Fruehwald 2013, 2016, ...) — as predicted by Early Abstractness.

Raising conditioned by underlying /t/	*wr*$\overset{1}{\underset{\wedge}{\text{ɪ}}}$*te*	*wr*$\overset{1}{\underset{\wedge}{\text{ɪ}}}$*ter*	*b*$\overset{1}{\underset{\wedge}{\text{aɪ}}}$*son*	Ontario (Chambers, 1973), Inland North (Vance, 1987; Dailey-O'Cain, 1997), focal Miss. (Moreton, 2016), etc.
Raising conditioned by surface [t] vs. [ɾ]	*wr*$\overset{1}{\underset{\wedge}{\text{ɪ}}}$*te*	*wr*$\overset{1}{\underset{\smile}{\text{ɪ}}}$*ter*	*b*$\overset{1}{\underset{\wedge}{\text{aɪ}}}$*son*	Missing? (Joos, 1942)

(9) The "missing" pattern has now been reported from speakers of a variety whose EDR is very recent (Davis et al. 2019; **Davis et al., this session**), contradicting the Early Abstractness Hypothesis.

This finding will likely lead to further research into abstractness in the early stages of English Diphthong Raising.

3 The focal Mississippi variety: a mature EDR pattern

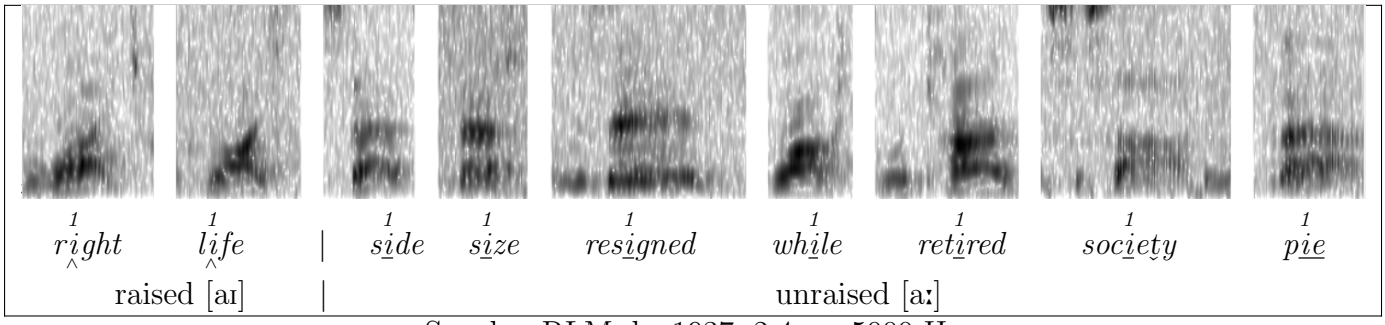
(10) An under-studied variety of Diphthong Raising in 20th-Century educated white speakers from Jackson and Oxford, Mississippi:

Code	yob	gen	place	race	class	occ	data
LAGS-546	1894	M	Oxford	white	middle	lawyer	1974 interview
LAGS-592	1902	F	Jackson	white	middle	unknown	1972 interview
AM	1934	M	Oxford	white	middle	lawyer	1990 interview
RLM	1937	F	Oxford	white	middle	linguist	1990 interview
EM	1968	M	Oxford	white	middle	linguist	2016 judgements

Previous phonetic studies of this variety include Shands (1893); Knight and Herd (2016); Moreton (2016).

(11) In the focal dialect, EDR is "mature", i.e., fully phonologized. Main evidence:

a. The allophones are *phonetically very distinct* (raised [aɪ], unraised monophthongal [aː]):



Speaker RLM, b. 1937, 2.4s × 5000 Hz

b. The allophones are *phonetically stable* across three generations, except that the two oldest speakers occasionally have a slight offglide where the others have a monophthong ([aː] ∼ [aᵋ]).

c. Speakers have *definite judgements*, i.e., the difference is enough for them to be conscious of.

d. Fully *productive*; applies to loan words (e.g. *Hokk²¹aido* vs. *Neustadt an der Aisch*), nonce words, acronyms, etc.

e. Lexical exceptions create a *marginal contrast*; e.g., *t¹iger*, *T¹igris* (exceptional) vs. *G¹eiger*, *N¹eiger*, *St¹eiger*, *m¹igrant*, *¹IGERT* (regular).

f. The allophones contrast before flap; e.g., *wr¹iter* vs. *r¹ider*

4 How do prosody and morphology affect Raising?

(12) *Research question*: What prosodic and morphological factors affect Raising in this dialect, and how? (Purely descriptive venture.)

(13) *Study design*: Four prosodic environments were crossed with three morpheme-boundary locations and with free vs. bound status. ("$\overset{1/2}{\text{aɪ}}$" = "$\overset{1}{\text{aɪ}}$ or $\overset{2}{\text{aɪ}}$"; $\underset{\circ}{C}$ = "voiceless consonant")[1]

Prosody		Boundary location		Free/bound status		Boundary strength
$\overset{1/2}{\text{aɪ}}\underset{\circ}{C}$ $\overset{1/2}{\text{aɪ}}\underset{\circ}{C}\,\overset{0}{V}$ $\overset{1}{\text{aɪ}}\underset{\circ}{C}\,\overset{2}{V}$ $\overset{2}{\text{aɪ}}\underset{\circ}{C}\,\overset{1}{V}$	×	Monomorphemic: aɪ$\underset{\circ}{C}(V)$ Tautomorphemic: aɪ$\underset{\circ}{C}$-V Heteromorphemic: aɪ-$C\underset{\circ}{V}$	×	At least one free morpheme No free morphemes	×	Compound Stress-neutral Stress-affecting

The last factor, compound vs. stress-neutral affix vs. stress-affecting affix (Chambers, 1973; Siegel, 1974; Kiparsky, 1979; McCarthy, 1982; Vance, 1987) turned out not to matter in this dialect.

(14) Cells were populated from several sources:

a. Previous publications on Dialect Raising, esp. Chambers (1973); Vance (1987); Idsardi (2006)
b. Dictionaries: Headwords from Webster's Second New International Dictionary in Unix `/usr/share/dict/` and the on-line *OED*
c. Lexical databases: CELEX, Baayen et al. 1995; CMU Pronouncing Dictionary, Weide 1998
d. Conjecture confirmed by Web search with Duck Duck Go or Google

(15) Words were chosen to minimize prosodic and morphological ambiguity. Example exclusions: *psychology* (not clear which morpheme the *o* belongs to synchronically), *micrometer* (unclear free/bound status of *micro*), *taiko* (unclear whether final vowel is stressless).

(16) ⇒ Speaker base is quite small, but the range of morphological and phonological conditions is unusually large.

(17) Representative examples with my own pronunciations (Speaker EM) are shown in the table below. A fuller list can be found in Moreton (2016). Speakers agreed in all design cells where data from more than one was available (which was considerably less than all cells).

[1]The UR would be /aː/ (the elsewhere allophone), but I'll write /aɪ/ to facilitate comparison across dialects. "Allophone" is a misnomer since there is a marginal contrast, but I'll keep using it for convenience.

Morphology	Prosody	Free stem? Yes	No
*Mono*morphemic: [aɪ], $\overset{\circ}{C}$, and following nucleus (if any) all in one morpheme	$\overset{1/2}{aɪ}\overset{\circ}{C}$	*l*$\overset{1}{\wedge}$*ife*, *Chr*$\overset{1}{\wedge}$*ist*, *ind*$\overset{1}{\wedge}$*ict* (a, c)	*met*$\overset{1}{\wedge}$*abol*$\overset{2}{\wedge}$*ite*, *sat*$\overset{1}{\wedge}$*isf*$\overset{2}{\wedge}$*ice* (a)
	$\overset{1/2}{aɪ}\overset{\circ}{C}\overset{0}{V}$	*cr*$\overset{1}{\wedge}$*isis*, *l*$\overset{1}{\wedge}$*icense*, *cy*$\overset{1}{\wedge}$*press*, *T*$\overset{1}{\wedge}$*itan* (a)	*hy*$\overset{1}{\wedge}$*pocaust*, *psy*$\overset{1}{\wedge}$*chrophyte* (a)
	$\overset{1}{aɪ}\overset{\circ}{C}\overset{2}{V}$	*i*$\overset{1}{\underline{\ }}$*con*, *B*$\overset{1}{\underline{a}}$*ikal*, *L*$\overset{1}{\underline{y}}$*sol*, *P*$\overset{1}{\underline{i}}$*sces*	(no examples found)
	$\overset{2}{aɪ}\overset{\circ}{C}\overset{1}{V}$	*T*$\overset{2}{\underline{ai}}$*pei*, *t*$\overset{2}{\underline{y}}$*phoon*, *S*$\overset{2}{\underline{ai}}$*pan*, $\overset{2}{\underline{I}}\overset{1}{\underline{\ }}$*kea*, *Tch*$\overset{2}{\underline{ai}}$*k*$\overset{1}{\underline{\ }}$*ovsky*	*h*$\overset{2}{\underline{y}}\overset{1}{\underline{\ }}$*potenuse*, *cr*$\overset{2}{\underline{i}}\overset{1}{\underline{\ }}$*terion*, $\overset{2}{\underline{i}}\overset{1}{\underline{\ }}$*tinerant*
*Tauto*morphemic: [aɪ] and $\overset{\circ}{C}$ are in one morpheme	$\overset{1/2}{aɪ}\overset{\circ}{C}$-$\overset{0}{V}$	*w*$\overset{1}{\wedge}$*iper*, $\overset{2}{\underline{\ }}$*archet*$\overset{1}{\wedge}$*ypal*, *i*$\overset{1}{\wedge}$*cy*, *wr*$\overset{1}{\wedge}$*it*$\overset{1}{\smile}$*er*, *br*$\overset{1}{\wedge}$*ight*$\overset{1}{\smile}$*est*, *W*$\overset{2}{\underline{\ }}$*ainwr*$\overset{1}{\wedge}$*ight*$\overset{1}{\smile}$*ian*, *kn*$\overset{1}{\wedge}$*ight*$\overset{1}{\smile}$*ish* (a, c)	*Eut*$\overset{1}{\wedge}$*ychian*, *sp*$\overset{1}{\wedge}$*icous*, *l*$\overset{1}{\wedge}$*ycanthr*$\overset{2}{\underline{o}}$*pe* (a)
	$\overset{1}{aɪ}\overset{\circ}{C}$-$\overset{2}{V}$	*a*$\overset{2}{\underline{c}}$*on*$\overset{1}{\wedge}$*it*$^{h}\overset{2}{\underline{i}}$*ine*, *ammon*$\overset{1}{\wedge}$*it*$^{h}\overset{2}{\underline{o}}$*id* (b)	*l*$\overset{1}{\wedge}$*ip*$\overset{2}{\underline{a}}$*se*, *n*$\overset{1}{\wedge}$*itr*$\overset{2}{\underline{a}}$*te* (b)
	$\overset{2}{aɪ}\overset{\circ}{C}$-$\overset{1}{V}$	*c*$\overset{2}{\wedge}$*it*$^{h}\overset{1}{\underline{e}}$*e*, *p*$\overset{2}{\underline{a}}$*ras*$\overset{2}{\wedge}$*it*$^{h}\overset{1}{\underline{o}}$*logy*, *str*$\overset{2}{\wedge}$*ip*$\overset{1}{\underline{a}}$*tion*, *Dw*$\overset{2}{\wedge}$*ight*$^{h}\overset{1}{\underline{e}}$*sque*, *sp*$\overset{2}{\wedge}$*ic*$\overset{1}{\underline{e}}$*tte*, *L*$\overset{2}{\wedge}$*ight*$^{h}\overset{1}{\underline{e}}$*ria*, *N*$\overset{2}{\wedge}$*ight*$^{h}\overset{1}{\underline{a}}$*rium*, *b*$\overset{2}{\wedge}$*ik*$\overset{1}{\underline{e}}$*itis*, (c)	*ph*$\overset{2}{\underline{y}}$*t*$^{h}\overset{1}{\underline{o}}$*logy*, *c*$\overset{2}{\underline{y}}$*t*$^{h}\overset{1}{\underline{o}}$*logy*, *l*$\overset{2}{\underline{i}}$*t*$^{h}\overset{1}{\underline{a}}$*tion*, *r*$\overset{2}{\underline{i}}\overset{1}{\underline{s}}$*orial*, *m*$\overset{2}{\underline{i}}\overset{1}{\underline{c}}$*ation*, *m*$\overset{2}{\underline{i}}$*t*$^{h}\overset{1}{\underline{o}}$*sis*, *l*$\overset{2}{\underline{y}}\overset{1}{\underline{c}}$*anthropy*
*Hetero*morphemic: [aɪ] and $\overset{\circ}{C}$ are in different morphemes.	$\overset{1/2}{aɪ}$-$\overset{\circ}{C}$	*dr*$\overset{1}{\underline{y}}$*th*, $\overset{1}{\underline{\text{i}}}$-*th*	(no examples found)
	$\overset{1/2}{aɪ}$-$\overset{\circ}{C}\overset{0}{V}$	*s*$\overset{1}{\underline{i}}$*ghful*, *tr*$\overset{1}{\underline{i}}\overset{2}{\underline{c}}$*olon*	*b*$\overset{1}{\underline{i}}$*furc*$\overset{2}{\underline{a}}$*te*, *tr*$\overset{1}{\underline{i}}$*somy*
	$\overset{1}{aɪ}$-$\overset{\circ}{C}\overset{2}{V}$	$\overset{1}{\underline{e}}$*ye*$\overset{2}{\underline{s}}$*ore*, *b*$\overset{1}{\underline{y}}$*p*$\overset{2}{\underline{a}}$*ss*, *tr*$\overset{1}{\underline{i}}$*t*$^{h}\overset{2}{\underline{o}}$*ne*, *b*$\overset{1}{\underline{i}}$*pl*$\overset{2}{\underline{a}}$*ne*	*b*$\overset{1}{\underline{i}}\overset{2}{\underline{c}}$*eps*, *d*$\overset{1}{\underline{i}}$*pl*$\overset{2}{\underline{e}}$*x*
	$\overset{2}{aɪ}$-$\overset{\circ}{C}\overset{1}{V}$	*h*$\overset{2}{\underline{i}}$*gh-c*$\overset{1}{\underline{o}}$*ncept*, *b*$\overset{2}{\underline{i}}\overset{1}{\underline{s}}$*exual*, *d*$\overset{2}{\underline{i}}$*chl*$\overset{1}{\underline{o}}\overset{2}{\underline{r}}$*ide*	*b*$\overset{2}{\underline{i}}\overset{1}{\underline{c}}$*uspid*, *Tr*$\overset{2}{\underline{i}}\overset{1}{\underline{c}}$*eratops*,

(18) Upshot: Multiple abstract factors are involved:

/aɪ/ is raised if and only if it is immediately followed in the *same morpheme* by an *underlyingly* voiceless consonant $\overset{\circ}{C}$ of which at least one of the following is true:

a. $\overset{\circ}{C}$ does not precede a *stressed* nucleus, or
b. $\overset{\circ}{C}$ precedes a *less-stressed* nucleus in the *next morpheme*, or
c. $\overset{\circ}{C}$ ends a *free base*.

5 Variation in abstract conditioning, and how we might use it

(19) The pattern in (18) seems so complex, it would be surprising if it *didn't* vary across dialects. Goals of this section:

a. Confirm that it does vary, identifying three relevant word types (i-*th* cases, *icon* cases, and *invitee* cases)
b. Consider how that variation could be used to test the hypotheses about abstractness (Point 7, above),

5.1 i-th cases: Heteromorphemic codas and Late Abstractness

(20) $\overset{1/2}{\text{aɪ}}\text{-}\underset{\circ}{C}$ ($\overset{1}{\text{i}}th$): In some mature EDR dialects, Raising is triggered by a voiceless coda that is a subsyllabic affix (Idsardi, 2006). There are not many of them, but they are productive (ordinal i*th,* y*th,* phi*th,* chi*th*, etc; deadjectival *dryth, highth*). The focal Mississippi dialect is different.

	Ordinal *-th*	Deadjectival *-th*	
Voiceless coda but no Raising	$\overset{1}{\underline{\text{i}}}th$	$dr\overset{1}{\underline{y}}th$	Focal Miss. (Moreton, 2016)
Raising before voiceless coda	$\overset{1}{\underset{\wedge}{\text{i}}}th$	(no data)	Ontario (Idsardi, 2006)

(21) $\overset{1/2}{\text{aɪ}}\text{-}\underset{\circ}{C}\overset{0}{\text{V}}$ ($\overset{1}{s}ighful$): In the focal Mississippi dialect, Raising is also blocked when the voiceless coda is part of a longer morpheme with a stressless vowel.[2]

Voiceless coda but no Raising	$\overset{1}{\underline{s}}ighful$	$dr\overset{1}{\underline{y}}ster$	$tr\overset{1}{\underline{i}}col\overset{2}{o}n$	$b\overset{1}{\underline{i}}furc\overset{2}{a}te$	Focal Miss. (Moreton, 2016)
Raising before voiceless coda	$\overset{1}{\underset{\wedge}{s}}ighful$	$dr\overset{1}{\underset{\wedge}{y}}ster$	$tr\overset{1}{\underset{\wedge}{i}}col\overset{2}{o}n$	$b\overset{1}{\underset{\wedge}{i}}furc\overset{2}{a}te$	Does this happen?

(22) The *Late Abstractness Hypothesis* predicts that

a. the earliest observable stages of EDR should be purely phonetically conditioned
b. mature EDR varieties which differ in age will differ correspondingly in degree of abstract conditioning. (Already seen with incipient vs. mature, Davis et al. 2019, **Davis et al., this session**).

⇒ Freshly-phonologized Raising *should* apply to $dr\overset{1}{y}th$, $\overset{1}{\text{i}}$*-th*, $\overset{1}{s}ighful$, while long-established Raising may leave them unraised. What actually happens?

5.2 icon cases: $\overset{1}{\text{aɪ}}\underset{\circ}{C}\overset{2}{\text{V}}$ and Early Abstractness

(23) Monomorphemic words with this stress pattern are unraised in the focal Mississippi dialect, but they are reported to be raised in Ontario (Chambers, 1973, 126–127) and implied to be so in the Inland North (Vance, 1987, 200):

No Raising before stressed syllable	$\overset{1}{\underline{i}}c\overset{2}{o}n$	$L\overset{1}{\underline{y}}s\overset{2}{o}l$	Focal Miss. (Moreton, 2016)
Raising between main- and secondary-stressed syllable	$\overset{1}{\underset{\wedge}{i}}c\overset{2}{o}n$	(no data)	Ontario (Chambers, 1973, 125–127)

[2]The example $\overset{1}{\underline{e}}yeful$ 'a quantity sufficient to fill an eye' is sometimes cited for Canadian and Inland North varieties, but denominal *-ful* in that word is not stressless (Bermúdez-Otero, 2003; Idsardi, 2006; Bermúdez-Otero, 2019).

(24) The *Early Abstractness Hypothesis* predicts that the earliest stages of EDR should already show abstract conditioning.

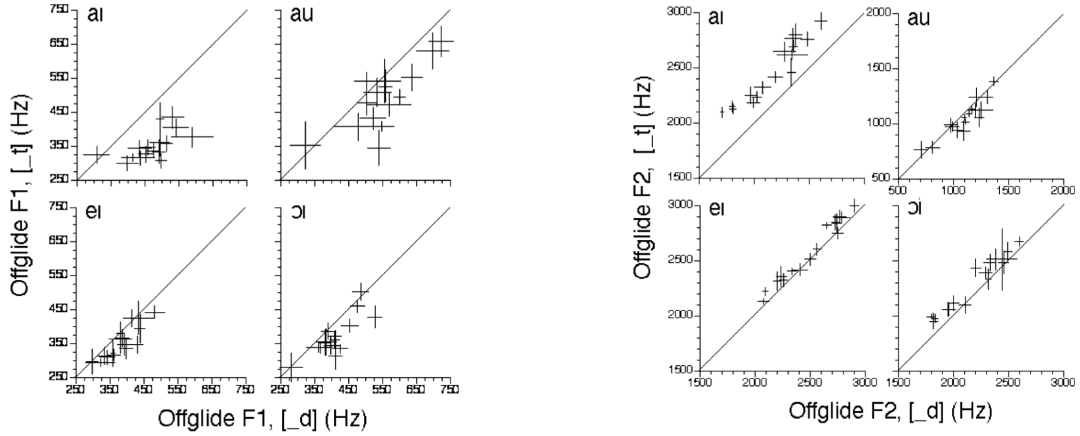
a. Conditioning was already present in the pre-EDR phonology (Fruehwald, 2016, 404–405)
b. ⇒ if Raising has different conditioning in Dialects A and B, then that is because the phonology of A and B *already* differed in ways that automatically extend to the new pattern
c. A likely candidate here: Different prosodification of $\overset{1}{V}C\overset{2}{V}$

(25) ⇒ Early Abstractness predicts that as $\overset{1}{i}\underline{con}\overset{2}{}$ goes, so go other patterns that depend on the same environmental trigger, such as flapping, /l/ velarization(Sproat and Fujimura, 1993), nasalization (Durvasula and Huang, 2017), or æ-tensing (Ferguson, 1975).

Raising		Flapping	/l/	Nasalization	æ-tensing	
$\overset{1}{\underline{i}}con\overset{2}{}$	⇒ C acts like an onset	$pro\overset{1}{t}^{h}\overset{2}{e}in$	$\overset{1}{a}ll\overset{2}{o}y$	$\overset{1}{g}am\overset{2}{e}te$	$\overset{1}{c}ath\overset{2}{o}de$	Do these co-occur?
$\overset{1}{i}con\overset{2}{}$	⇒ C acts like a coda	$pro\overset{1}{t}\overset{2}{e}in$, $pro\overset{1}{t}\overset{2}{?}ein$	$a\overset{1}{ɬ}\overset{2}{ɬ}oy$	$g\tilde{a}m\overset{1}{e}\overset{2}{}te$	$c\overset{1}{A}th\overset{2}{o}de$	Do these co-occur?

5.3 icon and Abstract Phonetics

(26) The phonetic precursor to EDR is pre-voiceless offglide peripheralization in diphthongs generally, not just [aɪ] (Thomas 2000; Moreton 2004; Moreton and Thomas 2007; see also **Thomas and Mielke, this session**; for a review of alternative hypotheses, see Cardoso 2015, §4.2).



Figures 2 and 3 of Moreton (2004); plotting symbols show 95% CIs for each participant.

(27) When the /aɪ/ pattern has been phonologized, the precursor itself is still there, still peripheralizing pre-voiceless offglides in other diphthongs at the expense of the nucleus.

(28) The *Abstract Phonetics Hypothesis* says that abstract conditioning of a phonological pattern is inherited from abstract conditioning of its phonetic precursor. Hence between-dialect differences in the phonologized pattern should be mirrored in the unphonologized residue of the precursor.

⇒ $\overset{1}{i}con\overset{2}{}$-like words with /eɪ/ and /oʊ/ should follow, phonetically, the same pattern that $\overset{1}{i}\underline{con}\overset{2}{}$ itself follows phonologically in the Mississippi and Ontario dialects. Do they?

		focal Miss.			Ontario		
		voiceless		voiced	voiceless		voiced
/aɪ/	phonologized	$\underline{i}^{1}con^{2}$	=	$rh\underline{i}^{1}z^{2}ome$	$\underset{\wedge}{i}^{1}con^{2}$	≠	$rh\underline{i}^{1}z^{2}ome$
/oʊ/	unphonologized	$pr\underline{o}^{1}file^{2}$	$\overset{?}{=}$	$\underline{o}^{1}zone^{2}$	$pr\underset{\wedge}{o}^{1}file^{2}$	$\overset{?}{\neq}$	$\underline{o}^{1}zone^{2}$

5.4 invitee cases: $\underset{\circ}{aɪC}$-V and all three hypotheses

(29) For Ontario and Inland North dialects, Raising happens only when /aɪ/ and the triggering consonant are in the same syllable (Paradis, 1980; Chambers, 1989; Moreton and Thomas, 2007; Idsardi, 2006; Pater, 2014) or foot (Kiparsky 1979, 440; McCarthy 1982, 586; Jensen 2000, 212f.; Bermúdez-Otero 2003).

(30) But in the focal Mississippi dialect, Raising occurs before a *syllable-* and *foot-initial* voiceless consonant if it ends a free base:

Free base: Raising	$inv\underset{\wedge}{i}^{2}t^{h}{}^{1}ee$	$str\underset{\wedge}{i}^{2}p^{1}ation$	$F\underset{\wedge}{i}^{2}ght^{h}{}^{1}ology$	$Dw\underset{\wedge}{i}^{2}ght^{h}{}^{1}esque$	Focal Miss.
Bound base: No Raising	$m\underline{i}^{2}t^{h}{}^{1}osis$,	$l\underline{i}^{2}t^{h}{}^{1}ation$,	$ph\underline{y}^{2}t^{h}{}^{1}ology$,	$l\underline{y}^{2}canthropy$	

a. The pattern is highly productive, occurring before a wide range of main-stressed formatives (*-ee*, *-esque*, *-ation*, *-ology*, *-ography*, *-itis*, *-osis*, *-eria*, *-ality*, etc.) and with bases from many lexical strata. It is not limited to jocular or playful words (witness $inv\underset{\wedge}{i}^{2}t^{h}{}^{1}ee$, $ind\underset{\wedge}{i}^{2}ct^{h}{}^{1}ee$, $paras\underset{\wedge}{i}^{2}t^{h}{}^{1}ology$, $str\underset{\wedge}{i}^{2}p^{1}ation$). The oft-discussed $c\underline{i}^{2}t^{h}{}^{1}ation$ is an irregular exception.

b. It also applies when an affixed word is restressed for contrastive segmental focus:

Plain:	The menu is chosen by the	$inv\underset{\wedge}{i}^{1}t\breve{}er$,	not the	$inv\underset{\wedge}{i}^{1}t\breve{}ed$
Focused:	The menu is chosen by the	$inv\underset{\wedge}{i}^{2}t^{h}{}^{1}er$,	not the	$inv\underset{\wedge}{i}^{2}t^{h}{}^{1}ed$

(31) These examples have not been reported in any other dialect. Is there variation? (If so, what is it? If not, why not?)

(32) Contrasting predictions:

a. *Late Abstractness Hypothesis*: Freshly-phonologized Raising has $inv\underline{i}^{2}t^{h}{}^{1}ee$.

b. *Early Abstractness Hypothesis*: Freshly-phonologized Raising may have $inv\underset{\wedge}{i}^{2}t^{h}{}^{1}ee$.

c. *Abstract Phonetics Hypothesis*: Phonetic raising should match phonological Raising.

$$inv\underset{\wedge}{i}^{2}t^{h}{}^{1}ee \Rightarrow esc\underset{\wedge}{a}^{2}p^{1}ee$$
$$inv\underline{i}^{2}t^{h}{}^{1}ee \Rightarrow esc\underline{a}^{2}p^{1}ee$$

6 Conclusions and future directions

(33) English Diphthong Raising is ideal for testing hypotheses about how abstractness enters phonology:

a. Repeated independent innovations from the same phonetic precursor
b. Wide range of pattern ages
c. Multiple abstract conditioning factors
d. Variation between dialects in effects of abstract factors
e. Potential incompatibility with Late Abstractness, Early Abstractness, Abstract Phonetics

. . . but very little is yet known about the situation in any given dialect.

(34) That may be about to change as we enter a golden age of research on American Raising and other English Diphthong Raising patterns. Opportunities beckon:

a. *Variation in mature EDR*: How do prosodic and morphological effects on Raising vary across dialects? Do older EDR patterns tend to have more of them?
b. *Variation in phonetic precursor*: Is phonetic raising affected by prosody and morphology? Do between-dialect differences in phonetic raising match differences in phonologized Raising?
c. *Patterned variation*: Do between-dialect differences in Raising correlate with other phonological differences?
   (Or other social differences, e.g., whether Raising was phonologized in place vs. arose through contact-induced reallocation.)
d. *Phonological theory*: Of what general phenomena is English Diphthong Raising a special case? Opacity (Farris-Trimble and Tessier, 2019), cyclicity (Bermúdez-Otero, 2019), output-output faithfulness (Moreton, 2016), ...

References

Anderson, B. L. (2002). Dialect leveling and /ai/ monophthongization among African American Detroiters. *Journal of Sociolinguistics 6*, 86–98.

Anderson, P. M. (1987). *A structural analysis of the English dialects*. London: Croom Helm.

Baayen, R. H., R. Piepenbrock, and L. Gulikers (1995). The CELEX lexical database. CD–ROM, Linguistic Data Consortium, University of Pennsylvania, Philadelphia, Pennsylvania.

Bailey, G. and E. Thomas (1998). Some aspects of AAVE phonology. In S. S. Mufwene, J. Rickford, G. Bailey, and J. Baugh (Eds.), *African-American English: structure, history, and use*, pp. 85–109. London: Routledge.

Bailey, G., T. Wikle, J. Tillery, and L. Sand (1991). The apparent time construct. *Language Variation and Change 3*(241–264).

Beckman, J. (1998). *Positional faithfulness*. Ph. D. thesis, University of Massachusetts, Amherst.

Benua, L. (1997). *Transderivational identity: phonological relations between words*. Ph. D. thesis, University of Massachusetts, Amherst, Mass.

Berkson, K., S. Davis, and A. Strickler (2017). What does incipient /ay/-raising look like? a response to Josef Fruehwald. *Language 93*(3), e181–e191.

Bermúdez-Otero, R. (2003). The acquisition of phonological opacity. In *Variation within Optimality Theory: Proceedings of the Stockholm Workshop, April 26–27, 2003*, pp. 25–36.

Bermúdez-Otero, R. (2007). Diachronic phonology. In P. de Lacy (Ed.), *The Cambridge handbook of phonology*, pp. 497–518. Cambridge, England: Cambridge University Press.

Bermúdez-Otero, R. (2015). Amphichronic explanation and the life cycle of phonological processes. In P. Honeybone and J. C. Salmons (Eds.), *The Oxford handbook of historical phonology*, pp. 374–399. Oxford, England: Oxford University Press.

Bermúdez-Otero, R. (2019). English /aI-raising: new insights into an old problem. Handout from a talk presented at the IGRA (Interaction of Grammatical Building Blocks) Research Training Group, University of Leipzig, July 19.

Bernstein, C. (1993). Measuring social causes of variation in Texas. *American Speech 68*, 227–240.

Blake, R. and M. Josey (2003). The /ay/ diphthong in a Martha's Vineyard community: what can we say 40 years after Labov? *Language in Society 32*, 451–485.

Braver, A. (2013). *Degrees of incompleteness in neutralization: paradigm uniformity in a phonetics with weighted constraints*. Ph. D. thesis, Rutgers University, New Brunswick, New Jersey.

Braver, A. (2014). Imperceptible incomplete neutralization: production, non-identifiability, and non-discriminability in American English flapping. *Lingua 152*, 24–44.

Britain, D. (1997). Dialect contact and phonological reallocation: "Canadian Raising" in the English Fens. *Language in Society 26*, 15–46.

Britain, D. and P. Trudgill (2008). New dialect formation and contact-induced reallocation: three case studies from the English Fens. *International Journal of English Studies 5*(1), 183–209.

Cardoso, A. B. (2015). *Dialectology, phonology, diachrony: Liverpool English realisations of* PRICE *and* MOUTH. Ph. D. thesis, University of Edinburgh.

Casali, R. (1996). *Resolving hiatus*. Ph. D. thesis, University of California, Los Angeles.

Chambers, J. K. (1973). Canadian Raising. *Canadian Journal of Linguistics 18*, 113–135.

Chambers, J. K. (1989). Canadian Raising: blocking, fronting, etc. *American Speech 64*(1), 75–88.

Childs, B., J. Reaser, and W. Wolfram (2003). Defining ethnic varieties in the Bahamas: phonological accomodation in black and white enclave communities. In M. Aceto and J. P. Williams (Eds.), *Contact Englishes of the Eastern Caribbean*, Varieties of English around the world, pp. 1–28. Philadelphia: John Benjamins Publishing Company.

Clarke, S. (2010). Newfoundland and Labrador English. In D. Schreier, P. Trudgill, E. W. Schneider, and J. P. Williams (Eds.), *The lesser-known varieties of English: an introduction*, Chapter 5, pp. 72 – 91. Cambridge, England: Cambridge University Press.

Dailey-O'Cain, J. (1997). Canadian raising in a midwestern U.S. city. *Language Variation and Change 9*, 107–120.

Davis, S., K. Berkson, and A. Strickler (2019). Unlocking the mystery of Dialect B: a note on incipient /ai/-raising in Fort Wayne. *American Speech ??*(??), 1–29.

Durvasula, K. and H. Huang (2017). Word-internal "ambisyllabic" consonants are not multiply-linked in American English. *Language Sciences 62*, 17–36.

Edgerton, W. B. (1935). Another note on the Southern pronunciation of 'long i'. *American Speech 10*(3), 190.

Evans, M. (1935). Southern 'Long I'. *American Speech 10*(3), 188–190.

Farris-Trimble, A. and A. Tessier (2019). The effect of allophonic processes on word recognition: eye-tracking evidence from Canadian raising. *Language 95*(1), e136–e160.

Ferguson, C. A. (1975). 'short a' in Philadelphia English. In M. E. Smith (Ed.), *Studies in linguistics in honor of George L. Trager*, pp. 259–274. The Hague: Mouton.

Finn, P. (2008). Cape Flats English: phonology. In R. Mesthrie (Ed.), *Varieties of English 4: Africa, South and Southeast Asia*, pp. 200–222. Berlin and New York: Mouton de Gruyter.

Frazier, M. (2006). Output-output faithfulness to moraic structure: evidence from American English. In C. Davis, A. R. Deal, and Y. Zabbal (Eds.), *Proceedings of the 36th Meeting of the Northeast Linguistics Society (NELS 36)*, Amherst, Massachusetts. Linguistics Graduate Students' Association: University of Massachusetts, Amherst.

Fruehwald, J. (2013). *The phonological influence on phonetic change*. Ph. D. thesis, University of Penn-

sylvania.
Fruehwald, J. (2016). The early influence of phonology on a phonetic change. *Language 92*(2), 376–410.
Graham, R. (2010). Hondurals/Bay Islands English. In D. Schreier, P. Trudgill, E. W. Schneider, and J. P. Williams (Eds.), *The lesser-known varieties of English: an introduction*, Chapter 6, pp. 92–135. Cambridge, England: Cambridge University Press.
Greet, W. C. (1931). A phonographic expedition to Williamsburg, Virginia. *American Speech 6*(3), 161–172.
Hall, J. S. (1942). The phonetics of Great Smoky Mountain speech. *American Speech 17*(2, Part 2), 1–110.
Hazen, K. (2000). A methodological suggestion on /aj/ ungliding. *American Speech 75*(2), 221–224.
Hyman, L. M. (2013). Enlarging the scope of phonologization. *Origins of sound change: Approaches to phonologization*, 3–28.
Idsardi, W. (2006). Canadian Raising, opacity, and rephonemicization. *Canadian Journal of Linguistics/Revue canadienne de linguistique 51*(2/3), 119–126.
Itô, J. and R. A. Mester (1995). Japanese phonology. In J. Goldsmith (Ed.), *The handbook of phonological theory*, Chapter 29, pp. 817–838. Cambridge, Massachusetts: Blackwell.
Janda, R. D. and B. D. Joseph (2003). Reconsidering canons of sound-change: towards a "Big Bang" theory. In B. Blake and K. Burridge (Eds.), *Historical Linguistics 2001. Selected papers from the 15th International Conference on Historical Linguistics, Melbourne, 13–17 August 2001*, Amsterdam, pp. 205–219. John Benjamins.
Jensen, J. T. (2000). Against ambisyllabicity. *Phonology 17*(2), 187–235.
Joos, M. (1942). A phonological dilemma in Canadian English. *Language 18*, 141–144.
Kahn, D. (1976). Syllable-based generalizations in English phonology. Bloomington, Indiana: Indiana University Linguistics Club.
Kaplan, A. (2017). Incomplete neutralization and the (a)symmetry of paradigm uniformity. In A. K. et al. (Ed.), *Proceedings of the 34th West Coast Conference on Formal Linguistics*, Somerville, Massachusetts, pp. 319–328. Cascadilla Proceedings Project.
Kaye, J. (1990). Whatever happened to Dialect B? In J. Mascaro and M. Nespor (Eds.), *Grammar in progress: GLOW essays for Henk van Riemsdijk*, pp. 259–263. Dordrecht: Foris.
Kiefte, M. and E. Kay-Raining Bird (2010). Canadian Maritime English. In D. Schreier, P. Trudgill, E. W. Schneider, and J. P. Williams (Eds.), *The lesser-known varieties of English: an introduction*, Chapter 4, pp. 59–71. Cambridge, England: Cambridge University Press.
Kiparsky, P. (1971). Historical linguistics. In W. Dingwall (Ed.), *A survey of linguistic science*, pp. 576–653. College Park: University of Maryland.
Kiparsky, P. (1973). Phonological representations. In O. Fujimura (Ed.), *Three diminsions of linguistic theory*, pp. 3–136. Tokyo: TEC.
Kiparsky, P. (1979). Metrical structure assignment is cyclic. *Linguistic Inquiry 10*(3), 421–441.
Knight, W. L. and W. J. Herd (2016). The Southern Vowel Shift in women from Mississippi. In *Proceedings of Meetings on Acoustics*, Volume 23, pp. 060008. Acoustical Society of America.
Kraus, J. (2015). Voice-conditioned allophones of MOUTH and PRICE in Bahamian Creole. In *Proceedings of INTERSPEECH 2015*, pp. 1705–1709.
Kurath, H. and R. I. McDavid (1961). *Pronunciation of English in the Atlantic States*. Ann Arbor, Michigan: University of Michigan Press.
Labov, W. (1963). The social motivation of a sound change. *Word 19*, 273–309.
McCarthy, J. J. (1982). Prosodic structure and expletive infixation. *Language 58*, 574–590.
Moreton, E. (2004). Realization of the English postvocalic [voice] contrast in F1 and F2. *Journal of Phonetics 32*(1), 1–33.
Moreton, E. (2016). Prosody-morphology interaction in English Diphthong Raising in a Mississippi dialect. *Southern Journal of Linguistics 40*(2), 15–58.
Moreton, E. and E. R. Thomas (2007). Origins of Canadian Raising in voiceless-coda effects: a case study in phonologization. In J. S. Cole and J. I. Hualde (Eds.), *Papers in Laboratory Phonology 9*, Berlin, pp. 37–64. Mouton.
Onosson, D. S. (2010). Canadian raising in Manitoba: acoustic effects of articulatory phasing and lexical frequency. Master's thesis, University of Manitoba.

Orton, H., S. Sanderson, and J. Widdowson (1978). *The linguistic atlas of England*. London: Croom Helm.

Paradis, C. (1980). La règle de Canadian raising et l'analyse en structure syllabique. *Canadian Journal of Linguistics 25*(1), 35–45.

Pater, J. (2014). Canadian Raising with language-specific weighted constraints. *Language 90*(1), 230–240.

Pederson, L. A., S. L. McDaniel G. Bailey, M. H. Basset, C. M. Adams, C. Liao, and M. Montgomery (Eds.) (1986–1992). *The linguistic atlas of the Gulf States*. Athens, Georgia: University of Georgia Press.

Reaser, J. (2010). Bahamian English. In D. Schreier, P. Trudgill, E. W. Schneider, and J. P. Williams (Eds.), *The lesser-known varieties of English: an introduction*, Chapter 8, pp. 158–170. Cambridge, England: Cambridge University Press.

Rosenfelder, I. (2005). Canadian Raising in Victoria, B.C.: an acoustic analysis. Master's thesis, Ruprecht-Karls-Universität Heidelberg.

Schreier, D. and P. Trudgill (2006). The segmental phonology of nineteenth-century Tristan da Cunha English: convergence and local innovation. *English Language and Linguistics 10*(1), 119–141.

Shands, H. A. (1893). *Some peculiarities of speech in Mississippi*. Boston: Norwood Press.

Shewmake, E. F. (1925). Laws of pronunciation in eastern Virginia. *Modern Language Notes 40*(8), 489–492.

Siegel, D. C. (1974). *Topics in English morphology*. Ph. D. thesis, Massachusetts Institute of Technology, Cambridge, Massachusetts.

Sledd, J. D. (1966). Breaking, umlaut, and the Southern drawl. *Language 42*(1), 18–41.

Smith, J. L. (2001). Lexical category and phonological contrast. In R. Kirchner, J. Pater, and W. Wikely (Eds.), *PETL 6: Proceedings of the Workshop on the Lexicon in Phonetics and Phonology*, Edmonton, Alberta, pp. 61–72. University of Alberta.

Smith, J. L. (2011). Category-specific effects. In M. van Oostendorp, C. Ewen, B. Hume, and K. Rice (Eds.), *The Blackwell Companion to Phonology*, pp. 2439–2463. Malden, Mass.: Wiley-Blackwell.

Sproat, R. and O. Fujimura (1993). Allophonic variation in English /l/ and its implications for phonetic implementation. *Journal of Phonetics 21*, 291–311.

Sugahara, M. and A. Turk (2009). Durational correlates of english sublexical constituent structure. *Phonology 26*(3), 477–524.

Thomas, E. R. (2000). Spectral differences in /ai/ offsets conditioned by voicing of the following consonant. *Journal of Phonetics 28*(1), 1–25.

Thomas, E. R. (2001). *An acoustic analysis of vowel variation in New World English*. Number 85 in Publications of the American Dialect Society. Durham: Duke University Press.

Thomas, E. R. and G. Bailey (1998). Parallels between vowel subsystems of African American Vernacular English and Caribbean Anglophone Creoles. *Journal of Pidgin and Creole Languages 13*, 267–296.

Trudgill, P. (1999). *The dialects of England* (2nd ed.). Oxford, England: Blackwell.

Vance, T. J. (1987). *An introduction to Japanese phonology*. Albany, New York: State University of New York Press.

Weide, R. L. (1998). Carnegie-Mellon pronouncing dictionary, release 6.0. http://www.speech.cs/cmu.edu.