from the Coast in a storm in order to deliver her eulogy. People who knew her as an effervescent, self-effacing, consistent force for good in a small town and a turbulent time eased our grief with an outpouring of memories and a very public honoring of two irreplaceable people. We are grateful to Felice Coles, Don Dyer, the *SJL,* and all the generous contributors for providing this forum in which she can be remembered as a scholar by her own community of fellow linguists. It is an honor that she would never have expected, but one I know would gratify her as much as it does her grateful family of Beth, Elliott, Pamela, Jennifer, and baby Arachne Rebecca.

NOTES

[1] Open Doors oral history interview with Rebecca Larche Moreton, February, 2003, Open Doors Collection, Archives and Special Collections, J.D. Williams Library, the University of Mississippi. Thank you to Jennifer Ford for her help accessing this recording. For additional context see James W. Silver, *Mississippi: The Closed Society* (New York: Harcourt, Brace & World, 1966); Joseph Crespino, *In Search of Another Country: Mississippi and the Conservative Counterrevolution* (Princeton: Princeton University Press, 2007); and William Doyle, *An American Insurrection: James Meredith and the Battle of Oxford, Mississippi, 1962* (New York: Anchor, 2001). My mother would want me to note, however, that Doyle mistakenly asserts that no one was ever prosecuted for the riots. In fact, Al Moreton was among those who mounted a federal case against them.

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Prosody-Morphology Interaction in English Diphthong Raising in a Mississippi Dialect

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Allophony in vocoid height conditioned by consonant voicing recur in geographically dispersed English dialects. Cross-dialectal consistency in the phonetic details of the patterns is due to their being recent or ongoing phonologizations of the same phonetic precursor. This paper asks whether a shared phonetic precursor can cause uniformity in the effects of more abstract factors. Diphthong Raising is described in a Mississippi dialect across three generations of speakers, systematically and orthogonally varying the morphological and prosodic context. Results are compared with published accounts of dialects in Virginia, Ontario, and the Inland North. Diphthong Raising is found to interact with stress, morphological structure, and the free vs. bound status of stems, and to do so in different ways across dialects.

1. Introduction: English Diphthong Raising

Around the English-speaking world, synchronic phonological alternations are found in which the height of a vocoid differs depending on whether it precedes a voiced or voiceless coda obstruent. The best-known case is Canadian Raising, in which [aɪ] and [aʊ] are raised to [ʌɪ] and [ʌʊ] before a voiceless coda consonant; e.g. tight [tʌɪt] vs. tide [taɪd]; lout [lʌʊt] vs. loud [laʊd] (Joos 1942, Chambers 1973, Paradis 1980). However, patterns meeting this criterion—"English Diphthong Raising"—recur in multiple geographically and historically separated varieties of English, as shown in Table 1. The scattered geographic distribution, the rarity of English Diphthong Raising in the British Isles, the phonetic diversity of the vocoids from one dialect to

another, and the relative recency of Diphthong Raising in some dialects indicate that at least some of the instances are independent innovations (Labov 1963, Chambers 1989, Britain 1997, Moreton and Thomas 2007, Fruehwald 2016).

All patterns meeting the criterion share a number of properties in addition to the criterion itself: the higher and lower vocoids are always found before voiceless and voiced obstruents, respectively; never the other way around. Before sonorant codas, and in open syllables, the lower vocoid is found, never the higher. The affected vocoids always include at least one of historical /ai/ and /au/. What creates this consistency across independent innovations, and maintains it in the face of historical change, seems to be that Diphthong Raising arises from the phonologization (Hyman 1976) of a consistent phonetic precursor—a phonetic ʹpre-voiceless peripheralization process that involves all English vocoids, and that affects diphthongs more the bigger the articulatory difference between their nucleus and offglide (Thomas 2000, Moreton 2004, Moreton and Thomas 2007). Diphthong Raising thus provides a clear, well-documented, and historically on-going illustration of how the interaction between a phonetic precursor and cognitive mechanisms of generalization can skew phonological typology by steering language change.

A few dialects have been studied in more detail, with the result that two other main factors have been found to affect Diphthong Raising: the prosodic environment of the segmental trigger and the morphological structure of the word (Shewmake 1925, Chambers 1973, Paradis 1980, Vance 1987, Fruehwald 2016). These properties are much more abstract than the phonetics of the diphthongs or of the segmental trigger, and far less is known about how their effects vary between speakers or change over historical time.

This paper describes an underknown instance of Diphthong Raising in the English of 20th century educated European-American speakers from Mississippi.

Table 1. Height Alternation in Historical /ai/ Conditioned By Voiceless (−) versus Voiced (+) Coda Obstruents

ʌɪ	aɪ	aɛ	aɛ´, aː	Dialects
−	+			Canada (Joos 1942, Chambers 1973, Paradis 1980) North-central U.S. (Dailey-O'Cain 1997, Thomas 2000) East coast of U.S. (Labov 1963, 2001; Blake and Josey 2003; Fruehwald 2016) Eastern Virgina (Shewmake 1925) Low Country of South Carolina and Georgia (Kurath and McDavid 1961) South Atlantic islands (Trudgill 1986) Hawai'i (Vance 1987: 208) English Fens (Britain 1997)
−		+		Southeastern U.S. (Greet 1931, Kurath and McDavid 1961)
−			+	Eastern Virginia, northeastern North Carolina (Kurath and McDavid 1961)
	−	+		Southeastern U.S. white (Edgerton 1935; J. S. Hall 1942; Sledd 1966; Pederson et al. 1986–1992)
−			+	African-American English, many varieties (Thomas and Bailey 1998; Thomas 2001; B. Anderson 2002; Knight and Herd 2015) Southeastern U.S. white speakers (Evans 1935; Sledd 1966; Bailey et al. 1991; Bernstein 1993; Hazen 2000; Knight and Herd 2015) Devonshire (Orton et al. 1978; P. Anderson 1987) Humberside (Trudgill 1999: 72)
	−	+		Texas African-American English (Bailey and Thomas 1998)

(Other environments, such as nasal and zero codas, were not reported by all sources.) Enlarged from Moreton and Thomas (2007: Table 1).

It investigates the prosodic and morphological conditioning of the process and compares them with those reported from dialects in Virginia (Shewmake 1925, 1943, 1945), Ontario (Chambers 1973, 1989, Paradis 1980), and the U.S. Inland North (Vance 1987, Dailey O'Cain 1996). The present study goes beyond the Virginia, Ontario, and Inland North studies in systematically and

orthogonally varying prosody and morphology across a wider range of contexts, revealing interactions between stress environment, morphological environment, and free vs. bound status.

Section 2 of this paper gives basic information about the dialect and the speakers whose data is used in this study. Section 3 uses the author's judgments of words in each observable cell of the prosody-morphology matrix to describe the productive Diphthong Raising alternation in this dialect. Section 4 compares the conclusions of Section 3 with recorded productions of two speakers in the previous generation and of two speakers in the generation before that, confirming the stability of the pattern over time. Section 5 presents a formal analysis in the framework of Harmonic Grammar (Legendre, Miyata and Smolensky 1990), and discusses problems posed by overapplication of Diphthong Raising to affixed free roots like Hittitology. Section 6 discusses lexical exceptions and apparent exceptions in the four dialects. Section 7 compares the regular Diphthong Raising pattern in focal Mississippi dialect with the focal Virginia, Ontario, and Inland North dialects. Section 8 lays out what is known about the historical development of Diphthong Raising in the focal Mississippi dialect. The main findings and their significance are discussed in Section 9.

2. Dialect and Speakers

The focal dialect for this study is that of educated white speakers in Mississippi born in the 20th century. I will distinguish it from other Mississippi dialects by calling the "the focal Mississippi dialect," since it is the focus of this study. The other three dialects will be likewise referred to as the "focal Ontario" (Chambers 1973 et seqq.), "focal Virginia" (Shewmake 1925 et seqq.), and "focal Inland North" (Vance 1987, Dailey-O'Cain 1996) dialects.

Data comes from five speakers. Speaker RLM was born in Jackson, Mississippi, in 1937 and raised in a middle-class monolingual English-speaking white family in that city. Her father, who had some college, was an engineer for a gas company. Her mother had completed college and was a housewife. Speaker AM,

spouse of RLM, was born in New Orleans in 1934 and raised in a working-class monolingual English-speaking white family in different places on the Gulf Coast. Neither of his parents attended college. He served in the U.S. Navy from 1952 to 1956, stationed in Norfolk, Virginia. Both RLM and AM attended white-only public schools. Both matriculated at Millsaps College in Jackson, then completed undergraduate and graduate or professional degrees at the University of Mississippi, in Oxford. They lived in Oxford, where AM practiced law, continually thereafter except for one year in New Haven, Connecticut, one year in Cambridge, England, and four years in Washington, D.C. Speaker EM, son of RLM and AM (and author of this article) was born in 1968 near Washington, D.C., and was raised from the age of 1 in Oxford in their middle-class monolingual English-speaking white family. EM attended integrated public schools.

Judgment data is entirely from EM, drawn partly from an unpublished 1999 manuscript (E. Moreton 1999). Recordings of RLM and AM come from a two-hour oral-history interview recorded in January 1990 by EM, in which he interviewed them about the integration of the University of Mississippi in 1962. The recording was made on audiotape, which was digitized in 2015.

Two archival speakers from the Linguistic Atlas of the Gulf States (Pedersen, McDaniel, Bailey and Bassett 1986) were chosen based on geographical and social similarity to RLM and AM. Both were a bit over one generation older, and both were white. Speaker LAGS-592 was born in the town of Madison, near Jackson, and at the age of three moved to that city, where she later taught school. She was 70 years old when interviewed in 1972. Her own schooling went through college, and would have been in white-only schools. The recording was made on audiotape and later digitized in MP3 format. Speaker LAGS-546 was born in Burgess, Mississippi, which is about 12 km from Oxford, and was 80 years old when interviewed in 1974. He attended Oxford High School and the University of Mississippi (both white-only at that time), practiced law in Oxford, and served as a circuit court judge in Oxford and as a State Supreme Court judge in Jackson. He was a familiar neighbor of RLM, AM, and EM until shortly before the interview, when the M family moved to a different part of Oxford.

The recording was made on audiotape and later digitized in MP3 format.

AM and EM's speech is consistently rhotic. RLM's dialect is variably non-rhotic in unstressed final syllables; e.g. *prior*, sometimes end in [ɚ], sometimes in [ə]. LAGS-592 grammar consistently has [ə] in place of syllabic [ɚ] and also in place of syllable-final [ɹ]; e.g. *fire* is [fɑə], but *andiron*, where the [ɹ] is not syllable-final, is [ændɑɹn].

For all of these speakers, the unraised /ai/ is a low monophthong, back of [æ] but considerably less back than [ɑ]. It is near, but slightly less back than, the [a] of Boston *car*. Here it will be written [ɑ], following R. L. Moreton (pers. comm., 1999). The raised allophone is [ai]. For typographical simplicity, and to facilitate comparison across Diphthong Raising dialects, examples will be written in English orthography, with primary and non-primary stress marked on the vowels, and raised (^) or unraised (‿) /ai/ marked at the end: bàlaláika^, Hokkáidò‿, éyesìght‿^. Variable judgments are indicated with a slash: hỳpánthium^/‿. Different dialects are, where necessary, disambiguated with abbreviations: tíger^ms‿va means that *tiger* is raised in the focal Mississippi dialect, but unraised in the focal Virginia dialect (it is pronounced [taɪgɚ] in both dialects). Flapped /t/ or /d/ is underlined: líghter^.

3. Speaker Judgments

Speakers of the focal Mississippi dialect, like those of other Diphthong Raising dialects, have definite and stable judgments about whether the raised or unraised vocoid occurs in a given word (Vance 1987: 197, 203–204; Idsardi 2006). This section of the paper describes the judgments of a single speaker (the author, Speaker EM). Although doubts have been raised about the productivity of Diphthong Raising in Ontario (Mielke et al. 2003: 132), Diphthong Raising in the focal Mississippi dialect is fully productive for this speaker. Names, loan words, and other new lexical items with surface [ai] in the source language are lexicalized with the context-appropriate alternant. Thus Shánghài‿, Hokkáidò‿, dáikòn‿, káitèn‿, Kai‿, Kléiber‿, (Karl) May‿,

(Frankfurt am) Main‿, Báikàl‿ all have [ɑ], while Aisch^, Méissen^, Réissner^, Reith^, Leith^, bàlaláika^, Reince^ (Príebus) have [ai]. The pattern has lexical exceptions and apparent exceptions, which are discussed in Section 6.

Two main factors were investigated: the local morphological structure and the stress environment. Following previous work on Diphthong Raising (Chambers 1973, Kiparsky 1979, McCarthy 1982, Vance 1987), we distinguish two classes of affix, "stress-neutral" and "non-stress-neutral." The classification used here follows Siegel (1974), where they are called "Class I," or "stress-determining," and "Class II," or "non-stress-determining." An affix is classified as stress-neutral if it does not perturb the stress of the base word except possibly by usurping main stress; e.g. *anti-* as in ántipàrticle‿ (cf. párticle) or *-er* as in móonlìghter^ (cf. móonlìght^). An affix is classified as non-stress-neutral otherwise; e.g. *bí-* as in bítheìsm‿ (cf. théìsm) or *-ee* as in ìnvitée^ (cf. ìnvíte^). I write "+" for a non-stress-neutral boundary, "#" for a stress-neutral or compound boundary, and "|" for any kind of boundary. Example words were chosen to minimize ambiguity as to the existence and location of the morpheme boundary. Éistedfòdd^, for example, is monomorphemic to the non-Welsh-speaking author, vítamin^ is synchronically monomorphemic despite its etymology (vit- + amine), and bíplàne‿ is dimorphemic, but psỳchólogy‿ is ambiguous, because I have unstable intuitions about which morpheme the *o* belongs to. Three kinds of stress environment were used in this study. They are listed in (1).

(1) Stress environments used in this study
   a. VCv — stressed /ai/, voiceless consonant, unstressed nucleus; e.g. síphon^
   b. V1CV2 — stressed /ai/, voiceless consonant, stressed nucleus that is less stressed than /ai/; e.g. Báikàl‿
   c. V2CV1 — stressed /ai/, voiceless consonant, stressed nucleus that is more stressed than /ai/; e.g. Tàipéi‿

Example words were chosen to minimize ambiguity in the critical stress environment. If the second nucleus was intended to be stressless, that stresslessness had to be demonstrable by either (a) a reduced nucleus, i.e. [ə], [ɪ], or a syllabic consonant (míca^, crísis^, rífle^, chíton^) or (b) a preceding flap (Àphrodíte^). If the

second nucleus was intended to be non-primary-stressed, its syllable had either to be closed or to have a tense nucleus other than [i], [u], and [oʊ].[1]

In preparing the lists, I found that I could not reliably distinguish levels of stress of /ai/ itself at any finer granularity than "main" vs. "other." For example, the first syllables of tycóon_ and Saipán_ sometimes seemed to have a lower level of stress than that of Tàipéi_, but the judgment was not stable from one self-consultation to the next. For that reason, the stress of /ai/ is scored only syntagmatically, as greater than or less than that of the following nucleus. That judgment was stable; e.g. the first syllable of tycóon_ always seemed less stressed than the second. In non-/ai/ nuclei, I use ´ to mark primary stress, and ` to mark non-primary stress, without distinguishing between secondary and less-than-secondary stress.[2]

The three stress categories (VCv, V1CV2, and V2CV1) were factorially combined with the three levels of morpheme-boundary strength (compound, stress-neutral, and non-stress-neutral) to create the basic design. Cells were populated from several sources, mainly previous publications on other Diphthong Raising dialects (especially Chambers 1973, Vance 1987, Idsardi 2006), the list of headwords from Webster's Second New International Dictionary (1934) in the Unix /usr/share/dict/words file, the CELEX lexical database (Baayen and Piepenbrock 1995), the CMU Pronouncing Dictionary, Version 0.7a (Wiede 1996), the current on-line edition of the Oxford English Dictionary, and my own active vocabulary. Many of the words thus found were unfamiliar to me (e.g. díkage^, Pìcrámnia^, hỳpánthium^/_). I also used productive derivation to conjecture words, then searched the World Wide Web via Duck Duck Go or Google to find the ones that actually existed (e.g. Fightology^, Nightarium^, Wrightesque^). The pronunciation in every case is my own.

To anticipate, the descriptive generalization that emerges is stated in (2). The remainder of Section 3 justifies the generalization on the basis of the data.

(2) /ai/ is raised if and only if it is immediately followed by an underlyingly voiceless consonant (Section 3.1) which
a. belongs to the same morpheme (Section 3.2) and of which

b. at least one of the following is true (Section 3.3):
  i. it does not precede a stressed nucleus, or
  ii. it precedes a less-stressed nucleus in the next morpheme, or
  iii. it ends a free morpheme

3.1. The Segmental Trigger Must Be Underlyingly Voiceless

In final stressed syllables of monomorphemic words, [ɑ] and [aɪ] are in complementary distribution, with [aɪ] before voiceless sounds and [ɑ] elsewhere. Only /ai/ alternates; /au/ does not. Examples are shown in (3) and (4).

(3) Underived word-final syllables: [aɪ] before voiceless segments: gripe^, Skype^, slype^, cripes^, light^, right^, site^, igníte^, tyke^, spike^, shrike^, knife^, wife^, rife^, Reith^, price^, vise^, rice^, Christ^, heist^

(4) Underived word-final syllables: [ɑ] elsewhere: I_, eye_, shy_, thigh_, sigh_, why_, Níkolai_, bribe_, tribe_, slide_, tide_, Ides_, Steig_, hive_, shrive_, thrive_, tithe_, writhe_, lithe_, prize_, guise_, Nige (dim. of Nigel)_, oblíge_, rhyme_, lime_, Syme_, Grimes_, nine_, Rhine_, line_, sign_, blind_, mind_, file [fɑl]_, mile [mɑl]_, style [stɑl]_, aisle [ɑl]_, child [tʃɑld]_, Miles [mɑlz]_, Giles [dʒɑlz]_, fire [fɑɹ]_, wire [wɑɹ]_, mire [mɑɹ]_, byre [bɑɹ]_, ours [ɑɹz]_ (sic), iron [ɑɹn]. (Note that file, wire, iron, etc. are monosyllables, not disyllables or sequisyllables.)

When a word-final /t/ is flapped, the /ai/ allophone is the one appropriate for /t/; e.g. in bite^ a cactus, or night^ after níght^, the raised allophone [aɪ] is found. As in the focal Ontario, Inland North, and Virginia dialects, the allophone continues to follow the voicing of the final consonant as it undergoes morphophonological alternation: e.g. knives_, wives_, lives_ (the noun); devíce^, advíce^, incísive^, strife^, and dice^ ; devíse_, advíse_, incíse_, strive_, and die_ (n.).

3.2. The Segmental Trigger Must Be Tautomorphemic With the /ai/

The distinction between the three kinds of morpheme boundary turns out not to make a difference in the focal Mississippi dialect. The examples in Table 2 show that when the segmental trigger is separated from the /ai/ by any of these three boundary types, the unraised /ai/ is found in all three stress environments.

Table 2. The Unraised Allophone Before Heteromorphic Voiceless Consonant

Context	Compound	Stress-neutral affix	Non-stress-neutral affix
V|C	—	[α]: dryth_; i-th_, y-th_, χ-th_, π-th_	—
V|Cv	[α]: hìgh-perfórmance_, flý_ collèction; éye_ protèctor_	[α]: bìconvéx_, síghful_, éyesome_, trìcenténnial_, bìcondítional_, dìsyllábic; trìchromátic_, àntisterílity_	[α]: trícolòn_, bífida_, bífurcàte_, trísomy_, bítheìsm_
V1|CV2	[α]: éyesòre_, éyetèeth_, éyefùll_ (noun), býpàss_, spýcàm_, flýpàper_, hígh schòol_, Hígh Pòint_, frý còok_, drý-pròcess_, Rýe Hòuse; trí-Stàte_, drý-clèan_, éyestràin_, flýspéck_, skýscràper_, spýpròof_, píe-plàte__	[α]: trítòne_, dípòle_, trícòlor_, íPhòne_, bìfòcals_, bícycle ['bɑˌsɪkḷ], dìsýllable; bíceps; bíplàne_, Trístàr_	—
V2|CV1	[α]: hìgh-cóncept_, bì-cúrious_, hìgh-fí_, spỳ-sóldier_ (dvandva, like sìnger-sóngwriter); hìgh-prófile_	[α]: bìpártisan_, bìséxual_, bìtémporal_, dìhédral_, àntìtánk_, mùltìfámily_, àntìsócial_, sèmì-fíctional_, àntìpàrticle_, dìpósitive; bìcúspid; dìchlóride_, àntìtrúst_, sèmìtrópical_, Ántìchrist_, àntìclímax_, Dìprótodòn	—

The unraised allophone is likewise found before the two subsyllabic suffixes -th, in the deadjectival noun dryth^ (a real word, listed in the OED and Webster's Second New International Dictionary), and in Idsardi (2006)'s ordinal examples like i-th_, y-th_, χ-th_, π-th_ (which are raised in Idsardi's dialect). The two -ths are syllabified as codas. I am unsure of the syllable affiliation in the V|Cv non-stress-neutral examples like bítheìsm_ and bífurcate_. In all other cells of Table 2, the C is syllabified as an onset.

3.3. Further Stress and Prosodic Conditions on the Segmental Trigger

Not every tautomorphemic voiceless consonant triggers Diphthong Raising. In order for Raising to happen, the consonant has to satisfy at least one of Conditions (2b-i–iii).

Condition (2b-i) is that the segmental trigger does not precede a stressed nucleus. Word-final voiceless consonants do not precede a stressed nucleus, and we saw in Section 3.1 that they trigger Raising in examples like life^, Christ^, sight^, etc. When a voiceless consonant falls between /ai/ and a tautomorphemic nucleus, the raised allophone is found if and only if the second nucleus is unstressed.

For instance, the raised allophone is found in the VCv words crísis^ and míca^, but not in the V1CV2 words ícòn_ and Báikàl_, nor in the V2CV1 words crìtérion_ and Tàipéi_. The medial C is ambisyllabic in the VCv context, as shown by the occurrence of [ɾ]. Both [α] and [aɪ] are found before [ɾ] in this environment, depending on whether the flap is spelled <d> or <t> (e.g. Ídle_ vs. Éitel^). In the V1CV2 and V2CV1 contexts, the C is exclusively an onset and no flap occurs. Examples are shown in Table 3.Some words have both a VCv and a V1CV2 pronunciation; i.e. the post-/ai/ syllable can bear either no stress or secondary stress. In the former case /ai/ is raised, and in the latter it is not: *stipend* can be either ['staɪpṇd] or ['stɑˌpɪnd]. *Python* the snake is ['paɪθən], *Python* the programming language is ['pɑˌθɑn], and *Monty Python* can be either. Other such examples include *icon* and *Ripon*. In these cases the stress level of the final syllable is clear from the

reduced vs. full status of the nuclear vowel and from the aspiration of the intervocalic consonant.

Table 3. A Tautomorphemic Voiceless Consonant Triggers Raising Unless It Is Followed By a Stressed Nucleus.

Context	Examples
VC	[aɪ]: gripe^, Skype^, slype^, cripes^, light^, right^, site^, ignite^, tyke^, spike^, shrike^, knife^, wife^, rife^, Reith^, price^, vise^, rice^, Christ^, heist^
VCv	[aɪ]: síphon^, license^, crísis^, rífle^, bíson^, míca^, cýcle^, discíple^, Títan^, Éiffel^, Mícah^; ícon^, Rípon^, pýthon^, stípend (when pronounced with unstressed final syllable), hýpocàust^, hýperspàce^; títle^, níter^, Àphrodíte^, Títus^; cýpress^, Cýprus^, méister^, Éisteddfòdd^, Lýcra^, pícra^, Díjkstra^ (Contrasting [ɑ]: brídle, spíder, cíder)
V1CV2	[ɑ]: lýsìne_, Cambýsès_, Lýsòl_, Níkòn_, Ícàhn_, Mýsòre_, Báikàl_, ÍCÒR_; ícòn_, Rípòn_, pýthòn_, stípènd_ (when pronounced with stressed final syllable); Nýquìl_, Mýcròft_, Nýquìst_, Pýkrète_ [ɑ]/[aɪ]: cýcàd_/^, [aɪ]/[ɑ]: Pòlynícès^/_, micròn^/_
V2CV1	[ɑ]: Tàipéi_, Nìcáea_, Hỳpátia_, Lỳsánder_, Prỳtánia_, Mỳcéne_ [ˌmɑˈsini], Tìcònderóga_, tỳcóon_, tỳphóon_, Sàipán_, crìtérion_, itínerary_; hỳpótenuse_, hỳpónymy_, lìtótès_; nỳstágmus_, Pìcrámnia_

Once the prosody is fixed, Diphthong Raising applies normally; hence, these words are not exceptions to Diphthong Raising.[2] As in other Diphthong Raising dialects (Chambers 1973), when a stress-shifting affix moves stress within a morpheme, the /ai/ realization changes to match, e.g. Tríton^~Trìtónian_, Títan^~Titánic_, license^~licéntious_.

A few V1CV2 words have both /ai/ pronunciations without any apparent difference in stress: cýcàd_/^, Pòlyníces^/_, micròn^/_. The difference could be due to the availability of an alternative bimorphemic parse: cýc-àd (like mon-ad, tri-ad, Ili-ad, Dunci-ad, jeremi-ad), Polyníc-ès (like Socrat-es, Pericl-es, Aristophan-es), micr-òn (like electr-on, neutr-on, decathl-on), which would move the word into the class discussed in the next section.

Condition (2b-ii) is that the segmental trigger precedes a less-stressed nucleus in the next morpheme. When a morphological boundary follows the segmental trigger, the raised allophone is regularly found in the VC|v and V1C|V2 contexts. The examples in Table 4 are composed entirely of bound morphemes; free morphemes are discussed in the next section. The C in the V1C|V2 context is an onset rather than ambisyllabic, as shown by the lack of flapping, but triggers Raising nonetheless.

Table 4. A Voiceless Consonant at the End of a Bound Morpheme Triggers Raising Only If It Is Followed By a Less-Stressed Nucleus.

Context	Compound	Stress-neutral affix	Non-stress-neutral affix
VC|v	[aɪ]: lýcanthròpe^	[aɪ]: vítal^	[aɪ]: Èutýchian^, Hèracléitean^, Sbáikian^, spícous^
V1C|V2	—	[aɪ]: lípàse^, cýtàse^, nítràte^	[aɪ]: phýtòid^, fícòid^
V2C|V1	[ɑ]: lýcánthropy_	[ɑ]: vìtálity_ [aɪ]/[ɑ]: hỳpánthium^/_	[ɑ]: lìtátion_, mìcátion_; phỳtólogy_, cỳtólogy_, mỳcólogy_; psỳchíatry_; rìsórial_, rìpárial_

Condition (2b-iii) is that if the segmental trigger occurs at the end of a free morpheme, the raised allophone is regularly found regardless of the stress environment, as shown in Table 5. Words like cìtée^, knìfétte^, and Rèichésque^ (V2C|V1) have the same surface prosody as Taìpéi_ (V2CV1), but the V2C+V1 words have the raised allophone, while the V2CV1 words have the unraised one. Bìkeólogy^ and Lìghtéria^, with the same surface prosody as crìtérion_, have the raised allophone instead of the unraised one. In a few etymological[3] V2C|V1 words—cìtátion_, tỳpólogy^/_, and pìpétte^/_ —the unraised allophone is found, as if they were V2CV1 words. In all cases, whether regular or exceptional, aspiration and lack of glottalization show that the C of V2C|V1 is syllabified as an onset. Nonetheless, an optional flap is found in some items like Bỳteólogy^.

Table 5. A Voiceless Consonant at the End of a Free Morpheme Triggers Raising Regardless of Morphological or Prosodic Environment.

Context	Compound	Stress-neutral affix	Non-stress-neutral affix
VC|v	[aɪ]: wípe-awày^, spíce assòrtment^; flíght attèndant^, ríght-of-wày^, rìght-abóut^	[aɪ]: wíper^, díkage^, ícy^, rípen^, wífish^, bíkeathòn^, líkeable^; pláywrightess^, wríter^, kníghtage^, recítal^, míghty^, níghtie^, líghted^; Chrístathòn^, Chrístish^ ([ɑ]: ríder_, glídage_, tídal_, wídish_)	[aɪ]: àrchetýpal^, pàradísal^, Wèinréichian; recítal^, Wàinwríghtian^, pỳrítous^, àconítal^; mítral^; wrìtative^
V1C|V2	[aɪ]: knífe-èdge^, pípe-òrgan; whíteòut^, níght-òwl^, Bríghtèyes^, líght-àrmed^	—	[aɪ]: àmanítine^, àconítine^, àmmonítòid^, sàtellítòid
V2C|V1	[aɪ]: vìce-ádmiralty^; Bakùninite-Ówenite^^	—	[aɪ]: cìtée^, ìnvitée^, indìctée^, knìfée^, knìfétte^, wrìtátion^, Spìkétte^, strìpátion^, Spìcétte^, Rèichésque^, Bìkeólogy^, Hìttìtólogy; Bỳtéria^, Lìghtéria (both with unflapped t); Sprìtéttes^, Wrìghtésque^, Bỳteólogy^, Fìghtólogy, lìghtálity (all with optionally flapped t); Bìkeógraphy^, bỳteógraphy; Chrìstésque^, Chrìstólogy [aɪ]/[ɑ]: pìpétte^/_, tỳpólogy^/_ [ɑ]: cìtátion_

4. Recorded Pronunciations (RLM, AM, LAGS-592, LAGS-546)

To check the typicality of the author's judgments, and the stability of the pattern across time, the recordings of the four speakers were searched to find a set of words that exemplified relevant environments, and were as similar as possible across the speakers. For many of the relevant environments, no tokens could be found; e.g. no speaker produced VC+v words like pàradísal^. The tokens were extracted, listened to, and transcribed by EM. In the great majority of cases, each token could be unambiguously classified as [ɑ] or [aɪ]. A few tokens had intermediate offglides, which are transcribed here as [aɛ]. Examples are shown in Figures 1, 2, and 3 in the form of spectrograms made with Praat (Boersma and Weenink 2016) using an 0.005-ms Gaussian window.

Figure 1. Diphthong Raising in Word-Final Stressed Syllables: right^, life^, side_, size_ (2500 ms x 4000 Hz). Speaker is RLM.

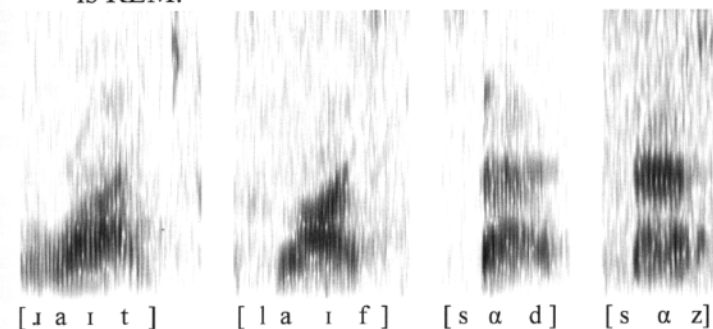

[ɹ a ɪ t]   [l a ɪ f]   [s ɑ d]   [s ɑ z]

Figure 2. Diphthong Raising in Word-Final Stressed Syllables: resigned_, while_, retired_, society_, pie_ (4000 ms x 4000 Hz). Speaker is RLM.
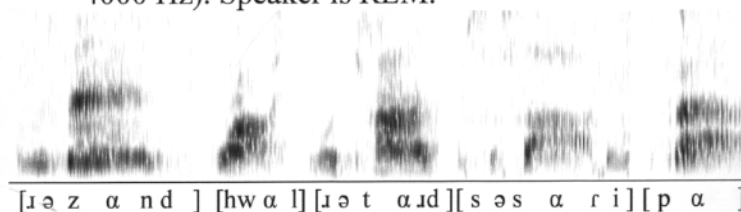

[ɹ ə z ɑ n d] [hw ɑ l][ɹ ə t ɑ ɹd][s ə s ɑ ɹ i][p ɑ]

Figure 3. Crísis^ and Lỳcéum_ Pronounced by RLM and by AM (3200 ms x 4000 Hz).

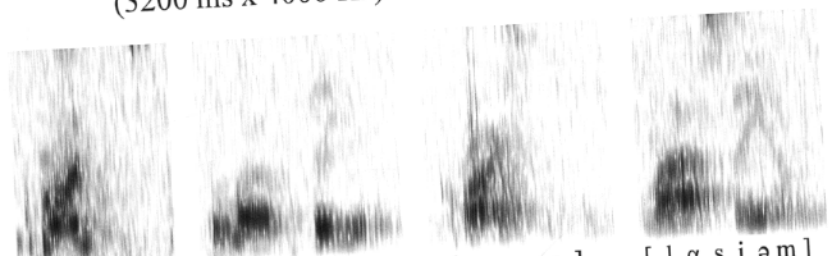[kɹaɪsɪs] [l ɑ s i ə m] [kɹaɪsɪs] [l ɑ s i ə m]

Table 6 shows the parallel examples from the four recorded speakers.

Table 6. Examples Illustrating the Regular Application of Diphthong Raising across Four Speakers. All Words are Monosyllabic Unless Stress Is Indicated.

	RLM		AM		LAGS-592		LAGS-546	
_#	pie try	α α	pie	α	pie spry	α α	high Julý	α, aε aε
_[vowel]	socíety príor	α α	socíety scíenc e	α α	íodine fire	α α [fɑə]	scíenti st	α
_[voiced obstruent]#	five side surprís e	α α α	side réalize	α α [ɹɪlɑz]	five side size	α α α	five side réalize	α, aε α, aε α [ɹiəlɑ z]
_[nasal]#	time nine	α, ε α	time nine	α α	time nine	α α	time nine	α α
_[l](C)#	while (n.)	α	while (n.) files	α α	while(n .) mile	α α	style miles	α α
_[ɹ](C)#	iron fire	α [ɑɹn] α [fɑɹ]	—		iron andiron s	α [ɑɹn] α [ɑɹnz]	iron	α [ɑɹn]

_[voiceless]#	stripe right twice	aɪ aɪ aɪ	right	aɪ	striped bite slice	aɪ aɪ aɪ	gripe right Price	aɪ aɪ, α aɪ
Nasal + voiceless	nínetèe n	aɪ	—		nínetèe n nínetée n ninth	aɪ aɪ aɪ	nínetèe n pint	aɪ aɪ
Morphophone mic alternation	life lives	aɪ α	—		knife knives	aɪ, aε α	life lives	aɪ α
VCv	crísis lícense	aɪ aɪ	crísis	aɪ	—		cýpres s	aɪ
V1C#V2	—		—		trícỳcle	α	—	
V2CV1	Lỳcéu m	α	Lỳcéu m	α	—		—	
/t/ in VCv	night of	naɪɾə v	indícte d	ɪndaɪɾı d	líghtere d	laɪɾə- d	wríter míghty	ɹaɪɾə- maɪɾı
Has flapping?	yes		yes		yes		yes	
/au/ alternates too?	no		no		no		no	

Where comparable data exists, the four recorded speakers agree with each other, and with the EM judgments, except in the following cases: In the non-raising environment, LAGS-546 sometimes produces a diphthong with a low onset and an non-high offglide, here transcribed as [aε] and illustrated in Figure 4.

Figure 4. High, Julý and *five* Pronounced by LAGS-546, Illustrating [aε].

[h a ε] [dʒ j u l a ε] [f a ε v]
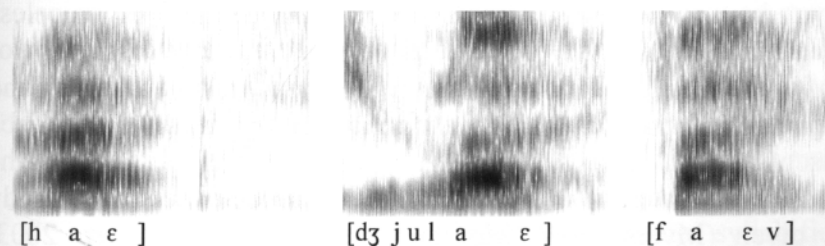
This diphthong occurs in about half of the word-final cases, and is also found in some final voiced-obstruent cases as well. LAGS-546 also produces a monophthongal [ɑ] in one of five tokens of right. LAGS-592 has [aɛ] in one of the two tokens of knife in her data. Aside from those instances, all five speakers are in agreement.

The data suffices to confirm that the phonetic identity of the vocoids, and the set of segmental triggers, remained stable across seven decades. The opaque interaction with flapping is also confirmed, as is the effect of stress in the tautomorphemic context. One datum, LAGS-592's unraised tricỳcle_, corroborates EM's judgement that raising does not occur in the V1C#V2 context. However, the contexts which put morphological structure in conflict with stress did not occur in any of these multi-hour samples, which shows that they are rare relative to the other contexts.

5. Formal Analysis of the Regular Pattern

The regular, productive pattern in this dialect, given above in (2), is restated here as (2') for convenience, and illustrated with examples in Table 7.
(2') /ai/ is raised if and only if it is immediately followed by an underlyingly voiceless consonant (Section 3.1) which
   a. belongs to the same morpheme (Section 3.2) and of which
   b. at least one of the following is true (Section 3.3):
      i. it does not precede a stressed nucleus, or
      ii. it precedes a less-stressed nucleus in the next morpheme, or
      iii. it ends a free morpheme

Following Paradis (1980), we begin by assuming that the critical prosodic condition for Diphthong Raising is that the voiceless consonant be a syllabic coda to the /ai/, either exclusively or ambisyllabically. (This assumption is supported by intuitions and objective diagnostics such as aspiration, except in the cases to be discussed in the next section.) There are several proposals as to the constraints that choose the appropriate allophone once the prosody is given (Myers 1997, Moreton 1999, Bermúdez-Otero 2003, Hayes 2004, Pater 2014); here we discuss instead the problem of

getting the right syllabification.

Table 7. Effects of Morphology and Stress on /ai/ Preceding a Singleton Voiceless Consonant (EM judgments).

	Base is free	All morphemes are bound
Tautomorphemic		
VC	life^, Christ^ (2a, b-i)	metábolìte^ (2a, b-i)
VCv	cípher^, lícense^, cýpress^ (2a, b-i)	hýpocàust^ (2a, b-i)
V1CV2	ícòn_, Báikàl_, Nýquìl_ (2a)	—
V2CV1	tỳphóon_, Tàipéi_, nỳstágmus_, licéntious_ (2a)	ìtineràry_, critérion_ (2a)
VC|v	wíper^, àrchetýpal^, mítral^ (2a, b-i)	Èutýchian^, spícous^ (2a, b-i)
V1C|V2	àconítìne^, àmanítìne^ (2a, b-ii)	lípàse^, nítràte^ (2a, b-ii)
V2C|V1	Hìttìtólogy^, strìpátion^, Chrìstésque^ (2a, b-iii)	cỳtólogy_, litátion_, risórial_ (2a)
Heteromorphemic		
V|C	dryth_, i-th_	—
V|Cv	síghful_, trícolòn_	bífurcàte_, trísomy_
V1|CV2	trítòne_, bíplàne_	bícèps_, díplèx_
V2|CV1	bìséxual_, dìchlóride__	bicúspid_, Dìprótodòn_

Bold = raised, roman = unraised.

We assume the constraints in (3):
(3) Constraints
   a. NoCoda: "No syllable has a coda." Assign one violation mark for every syllable which has a coda (after Prince and Smolensky 1993/2004).
   b. Coincide (C, stressed syllable): "Every consonant must belong to a stressed syllable." Assign one violation mark for every surface consonant which is not syllabified into a stressed syllable (after Zoll 1996, 1998, 2004). Abbreviated as C/stress.
   c. Coincide (C, main-stressed syllable): "Every consonant must belong to a main-stressed syllable." Assign one violation mark for every surface consonant which is not syllabified into a main-stressed syllable (after Zoll 1996, 1998, 2004).

Abbreviated as C/main.

d. Align (morpheme, R, syllable, R): "The right edge of every morpheme should be aligned with the right edge of some syllable." Assign one violation mark for every surface segment that is immediately followed by a heteromorphemic segment in the same syllable (after McCarthy and Prince 1993, McCarthy 2003). Abbreviated as Align-R.

NoCoda makes rightward syllabification of an intervocalic consonant into the default. Diphthong Raising occurs when the other constraints, singly or in combination, overpower NoCoda and put a voiceless consonant into the coda (i.e. making the consonant either an exclusive coda, or ambisyllabic). The constraints act additively, as we will see; hence, this analysis is couched in the framework of Harmonic Grammar (Legendre, Miyata and Smolensky 1990; for a recent review, see Pater to appear). The basic cases—tautomorphemic VCv, V1CV2, V2CV1, and their heteromorphemic counterparts VC|v, V1C|V2, and bound-stem V2C|V1—will be dealt with briefly before we turn to the complications presented by free-stem words like Fightólogy^.

The role of the two Coincide constraints is to explain how come the medial C is syllabified as a coda when the stress of the preceding nucleus (the /ai/) is greater than that of the following nucleus. In both tautomorphemic VCv cases like síphon^ and heteromorphemic VC|v cases like spíc|ous^, the medial C syllabifies as a coda to the stressed syllable in order to avoid belonging exclusively to the unstressed one. Hence w (C/stress), the weight of the C/stress constraint, exceeds w (NoCoda). In tautomorphemic V1CV2 ícòn_, the main-stressed initial syllable does not attract the medial consonant into coda position, because C/stress can be satisfied by syllabifying the C as an onset to the C/stress can be satisfied by syllabifying the C as an onset to the final (secondary-stressed) syllable. But in heteromorphemic V1C|V2 líp|àse^, the medial C is syllabified as a coda. Thus C/main is too weak to overcome NoCoda by itself, but can do so when assisted by Align-R: w (NoCoda) > w (C/main), but w (C/main) + w (Align-R) > w (NoCoda). However, Align-R by itself is not sufficient to overcome NoCoda, since the medial C is itself is not sufficient to overcome NoCoda, since the medial C is an onset, not a coda, in heteromorphemic V2C|V1 cỳt|ólogy_; thus,

w (NoCoda) > w (Align-R). A set of weights satisfying these criteria is shown in the summary tableau in Table 8.

Table 8. Interaction of Morphology and Stress

		C/stress 7	NoCoda 6	Align-R 5	C/main 3	H
a. síphon^	→ VC.v		−1			−6
	V.Cv	−1			−1	−10
b spíc|ous^	→ VC|.v		−1			−6
	V.C|v	−1		−1	−1	−15
c. ícòn_	V1C.V2		−1			−6
	→ V1.CV2				−1	−3
d. líp|àse^	→ V1C|.V2		−1			−6
	V1.C|V2			−1	−1	−8
e. tỳphóon_	V2C.V1		−1		−1	−9
	→ V2.CV1					0
f. cỳt|ólogy_	V2C|.V1		−1		−1	−9
	→ V2.C|V1			−1		−5

In Table 8, Examples (a) and (b), the generic stressed /ai/ is coincidentally the main-stressed syllable, but that is not crucial to the analysis, since the correct candidate's margin of victory exceeds the contribution of C/main.

Table 9. Align-R and NoCoda Combine to Overcome Coincide.

		C/stress 7	NoCoda 6	Align-R 5	C/main 3	H
a. síphon^	→ VC.v		−1			−6
	V.Cv	−1			−1	−10
b sigh|ful_	V|Cv	−1	−1			−11
	→ V|.Cv	−1			−1	−10

The same constraints and weights also account for the cases in which a morpheme boundary precedes the potential segmental trigger. In those cases, as shown in Table 9, Align-R and NoCoda combine to make the medial consonant syllabify as an onset, against the opposition of the Coincide constraints.

If the final sound of dryth_ and i-th_ is analyzed as an appendix to the prosodic word, outside the syllable, then the same analysis extends to the two subsyllabic -th affixes: In dryth_, Align-R and NoCoda combine to force the -th suffix into the appendix, whereas in life^, NoCoda alone is not strong enough on its own to overcome the opposition of the Coincide constraints (or even of C/stress). This is shown in Table 10.

Table 10. Extension of the Model to Subsyllabic Affixes

		C/stress	NoCoda	Align-R	C/main	H
		7	6	5	3	
a. life^	→ VC		−1			−6
	V.C	−1			−1	−10
b dry|th_	V|C		−1	−1		−11
	→ V|.C	−1			−1	−10

This analysis does not distinguish between free and bound bases, and hence incorrectly predicts no difference between Fightólogy^ and cytólogy_. The weighted constraints correctly syllabify the two words alike, as shown in Table 11, Cases (a) and (b); however, in Fightólogy^, the /ai/ allophone does not match the surface syllabification.

This difference between Fightólogy^ and cytólogy_ cannot be captured by any mechanism whose effect is to preserve intact the entire surface form of the free base in the affixed form, because only base-final /ai/C sequences are protected. The free base Títan^ is raised like the free base Fight^, but the suffixed form Titánic_, though prosodically parallel to Fightólogy^, is not raised (19 b, c). For example, an Output-Output Faithfulness constraint (Benua 1995, 1997) enforcing identical vowel height in a free base and its affixed form would correctly compel Fightólogy^ to faithfuly copy

the raised /ai/ of Fight^, while cytólogy_ would be exempt due to lack of a free base to be faithful to. However, the same constraint would copy the raised /ai/ of Títan^ to yield *Titánic^.

Table 11. The Model Correctly Predicts the Syllabification of the Medial C as an Onset in all Three Cases, But the Diphthong Height in Case (b) Is Unexpected Given That Syllabification.

		C/stress	NoCoda	Align-R	C/main	H
		7	6	5	3	
a. cyt|ólogy_	V2C|.V1		−1		−1	−9
	→ V2.C|V1			−1		−5
b Fight|ólogy^	V2C|.V1		−1		−1	−9
	→ V2.C|V1			−1		−5
c. Titán|ic_	V2C.V1		−1		−1	−9
	→ V2.CV1					0

The same difficulty would afflict an account based on cyclic rule application. The problem again is that Fightólogy^ and Titánic_ have the same underlying morphological structure, a free root plus a Level 1 suffix, and the same surface prosodic structure, V2CV1. Starting from non-raised underlying representations, the first cycle would assign stress and syllabification and raise the /ai/ in both roots, yielding [[Fíght^]ology] and [[Títan^]ic]. The second cycle would correctly alter the stress and syllabification, but by then it would be too late; the diphthong in both words would already be raised, predicting Fightólogy^ and *Titánic^. Even if we were to hypothesize an additional rule of Diphthong Lowering, whose function was to lower raised /ai/ in the elsewhere environment, the resulting model would again fail by treating both words alike, this time predicting *Fightólogy_ and Titánic_. An example derivation, based on the discussion of titanic in connection with Philadelphia æ-Tensing by Kiparsky (1988:401), is shown in Table 12.[4]

Table 12. Cyclic Derivation of *Cytology, Fightology, Titanic* predicts wrong allophone of *Titanic*

Input	cytology /sɑt-aladʒi/	Fightology /fɑt-aladʒi/	Titanic /tɑtæn-ɪk/
Cycle 1 Syllabification and stress	/|/||/| [ˌsɑˈtaladʒi]	/|\ [[ˈfɑt]aladʒi]	/|\ /|\ [[ˈtɑtæn]ɪk]
Diphthong Raising—		/|\ [[ˈfaɪt]aladʒi]	/|\ /|| [[ˈtaɪtæn]ɪk]
Cycle 2 Syllabification and stress	—	/|/||/| [ˌfaɪˈtaladʒi]	/| /|/|\ [ˌtaɪˈtænɪk]
Diphthong Raising—		—	—
Output	/|/||/| ˌsɑˈtaladʒi	/|/||/| ˌfaɪˈtaladʒi	/| /|/|\ *ˌtaɪˈtænɪk

A combination of Output-Output faithfulness (Benua 1995, 1997) with Positional Faithfulness (Beckman 1997) offers a solution. There is independent evidence that features in final syllables are phonologically privileged, i.e. they resist synchronic changes that affect the same features elsewhere (Barnes 2002, Walker 2005, Kaplan 2015), and Walker (2005) has proposed Input-Output faithfulness to vowel height in final syllables in order to explain metaphony in Italian dialects. The theory of Output-Output faithfulness predicts the existence of an Output-Output version of the same constraint, relativized to Level 1 affixes (see Benua 1997, Chapter 5) and stated in (4). A large weight on OO1-Ident ([high], final-σ) will cause the /ai/ allophone in Fightólogy^ to copy the height of /ai/ in Fíght^, in spite of the lack of a voiceless coda. It will have no effect on cýtólogy_, because there is no output (no free base) to be faithful to. Finally, it will also have no effect on Titánic, because the relevant /ai/ is not in the final syllable of the base Títan.

(4) OO1-Ident ([high], final-σ): "Preserve vowel height of the final syllable." Give one violation mark to an affixed candidate for each segment which OO-corresponds to the vowel of the final syllable of the base, but differs from it in height.

This analysis, while serviceable, does not explain why OO1-Ident ([high], final-σ) would have such a high weight. A learner could infer the weights of the syllabification constraints in (10)–(13)—not necessarily those exact weights, but weights that would achieve the same effect—by observing the syllabification of common words, including words which have no /ai/ in them at all. In contrast, opportunities to learn the high weight of OO1-Ident ([high], final-σ) are few and far between, being dependent mainly on the infrequent invítee and novelties like Fightólogy. Since initial syllables are cross-linguistically a "strong" position (Beckman 1998), there is just as much theoretical reason to posit OO1-Ident ([high], initial-σ) as OO1-Ident ([high], final-σ). Why should the former be too weak to do to Titánic_ what the latter is strong enough to do to Hittitólogy^? One suspects that a more interesting explanation awaits discovery.

6. Exceptions and Apparent Exceptions

Raising in the focal Mississippi dialect, at least as spoken by EM, is regular and productive. There are many apparent exceptions that can be reanalyzed as regular application to an underlying representation other than the one suggested by orthography or etymology. There is also a small residue of outright exceptions.

6.1. Apparent Exceptions

When an underlying nasal-plus-voiceless-stop cluster is syllabified as a coda, speakers may realize the nasal phonetically not as an independent consonant like in pine, but as nasalization on the vowel (Malécot 1960, Cohn 1993), and may interpret the cluster phonologically as a sequence of a nasalized vowel followed by a voiceless stop, as shown by naïve spellings (Treiman, Zukowski and Richmond-Welty 1995). This explains the apparent exception that [aɪ] occurs in pint^, tèe-nínecy^ ([tinãɪ̃tsi] 'very small'), ninth^, nínetèen(th)^/ninetéen(th)^, Reince^, and in Mainz^ and Heinz^ if the orthographic <z> is pronounced with its German value of [ts]. Since the actual consonant following the vowel is voiceless, [aɪ] is in fact the regularly expected allophone: pint^ is [pãɪ̃t] or [pãɪ̃ʔ]; nineteen^ is [nãɪ̃t.tĩn] or [nãɪ̃ʔ.tĩn] (RLM, LAGS-592, LAGS-546, EM; no data for AM). Examples are shown in Table 5: Nineteen^

has the raised allophone, while nine_ has the unraised one. However, in ninety, RLM and LAGS-592 have [aɪ], while EM has [ɑ]. Neither pronunciation is unambiguously an exception to Diphthong Raising, as they are the expected outputs for the underlying representations /ˈnɑnti/ and /ˈnɑni/, respectively. Variable raising in pint has been reported in the Inland North by Dailey-O'Cain (1997). In Ontario, *pint* is variously reported as raised (Idsardi 2006) or unraised (Chambers 2006), while *ninth* and *nineteen* were found to be raised by K. C. Hall (2005).

Figure 5. Diphthong Raising before underlying nasal consonants. Nineteen^ sixty-nine_ (RLM); ninety^ (RLM); nineteen^-ninety_ (EM). (3000 ms x 4000 Hz.)

[nãɪ nt ĩn s ɪ k s t in ɑ n]   [n ã ĩ n i]   [n ãɪ n t t i n n   ɑ n i]
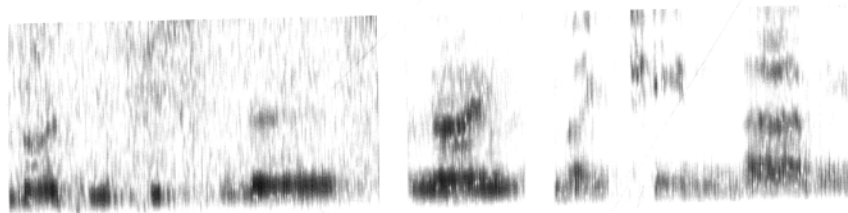
As noted in the discussion of the V2C|V1 structure above, familiar words, like cìtátion_ and pìpétte^/_, may have unraised /ai/ as if they were monomorphemic V2CV1 words, whereas less-familiar words like indìctée^ or Fìghtólogy^ have the raised /ai/ of their familiar free roots indíct^ and fight^. The same thing happens with the two subsyllabic suffixes -th. The regular pattern of no raising before a morpheme boundary is obeyed in the unfamiliar deadjectival noun *dryth*, and in ordinal examples like i-th, y-th, χ-th, π-th, but the familiar ninth^ has a raised /ai/ as if it were monomorphemic like *pint*. Idsardi (2006) describes the same phenomenon in an Ontario dialect.

Tídy_/^ can be either [tɑɾi] or [taɪɾi] (EM). As with *ninety*, the variation can be accounted for as fluctuation between two underlying representations, /tɑti/ and /tɑdi/. Vance (1987) reports variable pronunciations for *colitis, neuritis, cider, idle, spider*, all of which are open to the same analysis as *tidy*. Shewmake

(1925:492) reports unraised *spider* in Eastern Virginia, confirmed by Tresidder (1947: 95). In the focal Mississippi dialect, *spider* is also unraised (EM judgments; LAGS-592's three tokens of *spiderweb*).

6.2. Genuine Exceptions

A small residue of genuine exceptions remains that cannot be derived by Diphthong Raising from any underlying representation. Specifically, /g/ has the same raising effect as a voiceless consonant in words which begin with /tag/ followed by a rhotic. Thus we have unexpected VCv tíger^, tígress^, Tígris^ and V1C|V2 tígròid^, but regular V2C|V1 tìgrólysis_ . The exceptional behavior is confined to the environment /#t_gɚ/: Géiger_, Néiger_, Éigles_, Kutrígur_, mígrant_ are all unraised. Even Stéiger_, where /ai/ occurs in the same immediate environment as in tíger^, is unraised. Táiga_/^ can be pronounced with either diphthong (EM).

In a handful of words that have a consistent VCv stress pattern, an unraised pronunciation is nonetheless possible in the focal Mississippi dialect: díaper^/_ is [ˈdaɪpɚ] or [ˈdɑpɚ]; Ísis^/_ is [ˈaɪsɪs] or [ˈɑsɪs]; likewise Dýson^/_, Týson^/_, Dréyfus_/^. Each of the last three may be explained by free variation between a mono- and a dimorphemic parse, but not díaper^/_ and Ísis^/_.

7. Comparison with Other English Diphthong Raising Dialects
7.1. Segmental Triggers and Affected Vocoids

In the focal Mississippi dialect, the segments which condition Diphthong Raising are the underlyingly voiceless consonants, including flapped /t/. Only /ai/ is affected, alternating between [ɑ] and [aɪ]. Ample data is available about triggering vs. non-triggering segments in the other focal dialects. The focal Virginia dialect is described as having the same segmental triggers, although no examples are given for /r/ (Shewmake 1925, 1943, 1945). In that dialect, /au/ and /ai/ both alternate ([aɪ]~[ʌɪ] and [aʊ]~[ʌʊ]). Shewmake gives niter^va and vital^va alongside cipher^va and viper^va as instances of the raised diphthong in a voiceless environment, suggesting that /t/ in the VCv environment

was not flapped in East Virginia at that time. Independent corroboration for this conclusion comes from an 1881 description of American English by James Mercer Garnett, who was born in 1840 in Virginia, and was on the University of Virginia faculty at the time of writing. He notes both the Diphthong Raising and the lack of Flapping:

> The common narrowing and shortening of the diphthongal sounds i, ei (ai), and ou (au), as in mite, night, sleight, and house, mouse, grouse, is not noticed by Storm, nor, I believe, by Sweet, as perhaps it does not prevail in England, but being so common in this country, phonetists should make note of it... (Garnett 1881: 489).

In Storm's symbols it would be, I suppose, [məit] and [məus], not [mait maus]; writer = [rəitə] and rider = [rai'də] show the distinction, also house = [həus] and hound = [haund].

Shewmake's generalization therefore holds without qualification in the focal Virginia dialect: The raised diphthongs are only found before sounds that are voiceless.[5]

As described by Chambers (1973, 1989, 2006), Diphthong Raising in the focal Ontario dialect is likewise triggered by underlyingly voiceless consonants, including flapped /t/, and affects both /ai/ and /au/ ([aɪ]~[ʌɪ] and [au]~[ʌʊ]). It is thus nearly identical in these respects to the focal Virginia dialect, except that the Ontario dialect has Flapping. In the focal Inland North dialects described by Vance (1987) and Dailey-O'Cain (1997), only /ai/ alternates regularly ([aɪ]~[ʌɪ]). The set of segmental triggers consists of underlyingly voiced consonants (including flapped /t/) plus /ɹ/ and /ɚ/ (Vance 1987: 200–201). This pre-rhotic raising is unambiguously a foot-based rather than a syllable-based process (see Section 9 below), since raising occurs before both VCv /ɹ/ (íris^, írony^) and unstressed syllabic /ɚ/ (íron^, íre^), and but not in V2CV1 (irónic_) or V2C|V1 (iráte) contexts.

7.2. Effect of Stress and Morphology

Judgments of the full matrix of stress environments crossed with morphological environments, as in Section 3, is not available for the other focal dialects. Only a subset of cells can be compared, and non-primary stress is sometimes not available.

The focal Mississippi pattern is indistinguishable from the focal Virginia one with respect to the effects of stress and morphology, but that may be due only to lack of relevant data. Shewmake's description runs as follows:

> In typical Eastern Virginia speech, diphthongal i is given the dialectal sound represented by [ɒi][6] under two conditions: (1) when the diphthong is immediately followed in the same syllable by the sound of a voiceless consonant; and (2) when the diphthong occurs at the end of a syllable which is immediately followed in the same word by an unaccented syllable beginning with the sound of a voiceless consonant and containing an obscurely pronounced vowel. Under all other conditions standard i is employed (Shewmake 1925: 491).

Stress is not transcribed, but if standard dictionary stress is assumed, the examples given (1925: 491–2; 1945) are consistent with the description: VCv cipher^, hyphen^, hypodermic^, license^, rifle^, stifle^, viper^, niter^, and nitrogen^ are raised, V1CV2 typhoid_ is not, nor are V2CV1 Hyperion_, nitrogenous_, licentious_, licentiate_, citation_, and vitality_. The implication is that morphological structure is irrelevant, but supporting examples (like Tàipéi vs. knifée) are lacking.[7] Cìtátion_ is unraised, but it could be exceptional in focal Virginia as in focal Mississippi. Shewmake notes nítràte^ as exceptionally raised, and suggests that "the presence of r before a leaves the voiceless t free to influence i" (1925: 491, fn. 6); however, nítràte^ is regular with respect to (2). Since all of Shewmake's actual examples behave exactly the same way in both dialects, it is possible that (2) applies to the focal Virginia dialect as well.

In the focal Ontario dialect, Chambers (1973) and Paradis (1980) agree that Raising occurs in the V1CV2 context, unlike in the focal Mississippi dialect; i.e. word-internally, /ai/ is raised if and only if it is followed by a voiceless consonant that precedes a less-stressed nucleus. The evidence that Raising occurs in the V1CV2 context consists of ícòn^, psýchò^, Psýchè^, all described as having secondary stress on the final syllable, and mícrobe^, nítrate^, and nìtro(glýcerine)^, described as having tertiary stress on the final syllable (Chambers 1973: 126-127). In focal

Misssissippi. ícòn_ is V1CV2 and unraised; nítràte^ and mícròbe^ are raised; psycho^, Psyche^, and nitro^ are raised, but their final-syllable stress is uncertain (see Section 3.2 above). Thus ícòn is the only datum distinguishing the two dialects. Chambers (1989: 79-80) attributes to stress the apparent blocking effect of morphology in the V1#CV2 and V2#CV1 contexts (bífòcals_ and bìcúspid_) versus no blocking in V+Cv, which implies that raising is not universal in V1CV2 contexts, but examples to corroborate this are lacking.[8]

In the focal Inland North dialect, Vance found consistently raised /ai/ in the VCv environment (with a few exceptions like bíson_ [baɪsn̩], p. 200), but conflicting judgments for many V2CV1 and V1CV2 words, e.g. ìtínerary was judged as raised by one speaker, unraised by another, and "uncertain" by the third (pp. 198ff.). The crucial icon is noted as exceptionally unraised (p. 200), implying that V1CV2 words are normally raised in the Inland North, but examples of the normal pattern are lacking.[9] Vance (1987: 199) argues that stress-neutral and non-stress-neutral morpheme boundaries have different effects in the focal Inland North dialect. He gives examples of unraised diphthongs in a V#Cv context: bicentennial_, trisyllabic_, anti-Semitic_, and an example of a raised diphthong in a V+Cv context, bicycle^. The focal Mississippi dialect likewise has no raising in V#Cv, but has no raising in V+Cv either (e.g. bítheism_).

All of this adds up to evidence that prosodic and morphological conditioning can differ between Diphthong Raising dialects, but leaves us with little knowledge of specifics, aside from the difference in the V1CV2 environments.

7.3. Exceptions

Diphthong Raising in all four dialects is categorical enough that there are lexical exceptions and minimal or near-minimal pairs (Mielke et al. 2003, Hayes 2004, Pater 2014). Notably, tíger is exceptionally raised in the focal Mississippi dialect (Section 5.2 above) and in the focal Inland North (Vance 1987, Table 5), but it is unraised in focal Ontario (Chambers 1999: 119) and focal Virginia (Shewmake 1925: 492). In Ontario, K. C. Hall (2005) has

observed several similar clusters of exceptions involving specific phoneme sequences that are not morphemes.

Díaper^/_ and Ísis^/_ were noted above as isolated exceptions in the focal Mississippi dialect. Vance found exceptionally unraised nice in two of three Inland North speakers (1987, Table 3), but nice is regular in the focal Mississippi dialect.

There is also variation across dialects in the apparent exceptions, but those can be accounted for by assuming different segmental, prosodic, or morphological representations for individual words. For example, spíder^in_ms_va (Vance 1987: 201, Shewmake 1925: 492) could reflect a difference between the underlying representations /spaɪtɚ/ and /spaɪdɚ/, rather than a lexicalized exception to Diphthong Raising. High school, which is raised by some Ontario and Inland North speakers (Chambers 1973: 116–117; Vance 1987: 198), could be another case of a familiar bimorphemic word behaving as if it were monomorphemic (see Section 3.3 above).

Two dialects are unlikely to share an exception or variant by chance, but no clear historical picture emerges from the pattern of sharing in these four dialects.

8. Abrupt Appearance of Diphthong Raising in the Focal Mississippi Dialect

The most direct testimony we have about the English of North Mississippi suggests that neither Diphthong Raising nor Flapping had yet taken hold there even in the late 19th Century, and that /ai/ had not developed into a monophthong in any context. In an 1893 University of Mississippi doctoral thesis, H. A. Shands undertakes to describe the speech of speakers both educated and uneducated, both black and white. Of /ai/, he writes (p. 10):

> Long i (ai) is nearly always correctly pronounced, and seems to follow no rule in those changes that it does undergo. There is no group of related or similar words in which it suffers any regular change. In a few isolated examples there is incorrect pronunciation of this i, but nearly all of these are old words and owe their present forms to etymological spelling or assimilative change. Long i (ai) is changed to (î) in (blîdgd) for obliged, to

(ê) in (tʃêni) for china, to (au) in (mauti) and (maut) for mighty and might. All of these pronunciations indicated by the phonetic spelling have been, at some time in the past, current in England.

Shands says nothing of Flapping, and transcribes t in CVc contexts as [t] (e.g. *kritter* is transcribed as [kritə], p. 47; *school-butter* as [skûl-bɐtə], p. 55, see also mighty in the above-quoted paragraph).[10] Grandgent (1891), surveying written self-reports from readers of Modern Language Notes, reports that:

> In many parts of the South the case is quite different. Before a voiceless consonant ai is ëi, ai, or æi, and au is ëu or ɒu; before a voiced consonant or at the end of a word, ai is ae or aə, au is au or (occasionally) æu. According to the answers I have received, this distinction is universal for both diphthongs in eastern Virginia and North Carolina; for ai it is common also in Kentucky, Tennessee, and South Carolina, and less general in Maryland and central and western Virginia; for au it occurs (I cannot tell how frequently) in Maryland, Kentucky, Tennessee, and central and western Virginia (Grandgent 1891: 460).

Since Grandgent's Southern respondents included representatives of Mississippi and Louisiana, the failure of those States to appear in the quoted list provides some corroboration for Shands's claim that /ai/ did not alternate in Mississippi among adult speakers in the early 1890s, i.e. speakers born before about 1870. Yet Speakers LAGS-592 and LAGS-546, born within ten years of Shands's writing, into the demographic group with which Shands was likely most familiar (educated white speakers from near Oxford or Jackson), had both Diphthong Raising and Flapping as adults, with the usual opaque interaction between the two processes. Once established, the pattern remained stable across the three generations represented by the speakers in this study. Thus, a short period of rapid change was followed by a long period of apparent stasis.[11]

I am not able to say whether focal Mississippi Diphthong Raising is historically cognate with, or independent of, the other three dialects. Where the development of Diphthong Raising has been observed over time, it seems to take about three generations to move gradually from a subtle phonetic alternation to a large

phonological one (Labov 1963, Moreton and Thomas 2007, Fruehwald 2015). Its sudden appearance in Mississippi may therefore mean that it was not phonologized locally from the common phonetic precursor, but imported already phonologized via contact with speakers in the other areas mentioned by Grandgent (1891), or elsewhere.[12]

9. Summary and Conclusions

Although the focal Mississippi dialect is based on the same phonetic precursor as the focal Virginia, Ontario, and Inland North dialects, it differs from them in several ways. One is the phonetic identity of the allophones of /ai/. That is not especially surprising, as Diphthong Raising dialects vary widely in this respect (see Table 1 above). Another is the set of segmental triggers, but there it is the Inland North dialect, with its pre-rhotic raising, that is the outlier. More interesting is the difference in prosodic conditioning in tautomorphemic contexts: V1CV2 words like ícòn are unraised in the focal Mississippi dialect, but raised in the focal Ontario and Inland North dialects.

Perhaps the most surprising finding is the interaction between prosody and morphology in the focal Mississippi dialect, analyzed above in Section 5. There are two main hypotheses about how stress affects Diphthong Raising in other Diphthong Raising dialects. One is that Diphthong Raising happens only if /ai/ and the segmental trigger are in the same syllable (Shewmake 1925, Paradis 1980, Chambers 1989, Moreton and Thomas 2007, Idsardi 2008). The other is that raising happens only if they are in the same foot (Kiparsky 1979, McCarthy 1982, Jensen 2000, Bermúdez-Otero 2003). Both of these hypotheses correctly predict Raising in VC and VCv cases like life^ms and lícense^ms, and no Raising in V1CV2 and V2CV1 cases like ícòn_ms and critérion_ms. But in V2C|V1 cases with a free base like Hìttitólogy^ms, strìpátion^ms, and invìtée^ms, Raising occurs even though the segmental trigger is an onset to a stressed syllable and hence neither a coda nor foot-internal. In V|C examples like like dryth_ms and i-th_ms, and in V|Cv examples like síghful_ms and bífurcàte_ms, a voiceless coda or foot-internal segment fails to trigger Raising. Only in

cỳtólogy_ms, lìtátion_ms, and other V2C|V1 words lacking a free base does prosodic affiliation trump morphological affiliation. Chambers (1989: 79-80) has proposed that in the focal Ontario dialect, morphology affects Raising indirectly, via its effect on surface prosodic structure, but that proposal does not explain the differences in the focal Mississippi dialect between pairs of prosodically identical contexts which differ in morphological structure and in Diphthong Raising, e.g. ícòn^ms and lípàse_ms (V1CV2 vs. bound V1C|V2), or crìtérion_ms and ìnvìtée^ms (V2CV1 vs. free V2C|V1), or lìtátion_ms and strìpátion^ms (bound V2C|V1 vs. free V2C|V1).

What could cause multiple phonologizations of the same phonetic precursor to differ in the effects of relatively abstract factors like prosody and morphology? One possibility is that before phonologization, the dialects' grammars already differed in ways that automatically extended to the phonologized pattern. For example, the focal Mississippi and Ontario dialects may have already differed in their prosodification of tautomorphemic V1CV2 strings, so that when speakers in both dialects phonologized the same phonetic precursor as raising before voiceless codas, the outcomes automatically differed in that environment. If that is what happened, then these grammatical differences should be detectable in data not involving Diphthong Raising; e.g. /t/ in the V1CV2 environment should be aspirated in the focal Mississippi dialect, and flapped or glottalized in the focal Ontario dialect. Even if the grammatical difference is a "hidden ranking," difficult or impossible to observe in ordinary linguistic data, it may still be detectable experimentally (Davidson 2001).

An alternative possibility is that the phonologized patterns are different because the phonetic precursors were different. Both prosodic and morphological structure can affect low-level phonetic phenomena such as vowel duration and hyper- vs. hypoarticulation, and can do so differently in different languages (Maddieson 1984, De Jong 2004, Frazier 2005, Keating et al. 2004, Sugahara and Turk 2009). The prosodic and morphological effects could thus have been phonologized faithfully from subtly different phonetic precursors. In that case, the differences should still be detectable in the unphonologized residue of the precursor.

Phonetic pre-voiceless raising affects all tense English diphthongs to a degree proportional to the articulatory difference between the nucleus and offglide (Moreton 2004). This precursor is phonologized most often for /ai/, the diphthong with the greatest nucleus-offglide difference, less often for /au/, and rarely or never for /oi/ and /ei/. The unphonologized phonetic raising of /oi/ and /ei/ in the V1CV2 environment is therefore predicted by this hypothesis to be greater for focal Ontario speakers than for focal Mississippi speakers.

Most of the contexts used in the present study have not been systematically investigated in other dialects or, indeed, other idiolects. Many of the most informative words, like *invitee*, *Fightology* or *dryth*, have almost no chance of occurring spontaneously in a sociolinguistic interview, and are not represented in even the most detailed phonological-judgment studies. Morphological structure and non-primary stress can be hard to judge accurately. Consequently, we do not know yet know how much even the focal dialects differ in the subtleties of the interactions between Diphthong Raising, prosody, and morphology. Since Diphthong Raising is frequently re-innovated, it can be observed at many different stages of the phonologization process, and the relevant data will not be hard to get from living speakers.

NOTES

[1] These three tense vowels can occur word-finally with or without stress (Chomsky and Halle 1968, Hammond 1997), creating ambiguity in the prosodic environment that is reflected in both flapping and Diphthong Raising: *Plato* (*Tito, vibrato*, etc.) can be either ['pleɪˌtoʊ] or ['pleɪroʊ]; likewise, *taiko* can be either ['tɑˌkoʊ] or ['taɪkoʊ].

[2] Vance (1987: Table 3) reports within- and between-speaker variation in *icon, python,* and *stipend* in the Inland North. Secondary stress is not indicated, so it is not clear whether the variation in /ai/ is due to variation in lexical stress.

[3] *Citation* is not historically derived from *cite* in English (*Oxford English Dictionary*, at *citation*).

[4] It is possible that although the *-ology* of *cỳtólogy_* is a Level 1 suffix, attaching to bound roots and affecting word stress, the *-ology* of *Fìghtólogy^* and *Hìttìteólogy^* has some other status X—a Level 2 suffix, an element of a compound, part of a lexical blend, etc. In order for this possibility to serve as the

basis for an alternative analysis, we would have to ascribe the same dual nature to -ation (of *stripátion^*), -ality (of *lightálity^*), -ee (of *invìtée^*), etc., but not to -ic. Suppose we did so. That would not solve the current problem that Diphthong Raising applies too early to *Titánic_*. Whatever *X* may turn out to be, it can only change the analysis by delaying the application of Diphthong Raising to *Fìghtólogy^* (since, in the current analysis, Diphthong Raising applies to *Fìghtólogy^* on the very first cycle) — and doing so would either leave the output unchanged, or derive **Fìghtólogy_*.

[5] Primer (1890) likewise transcribes Eastern Virginian (Fredericksburg) *kettle* as "[kɪtl] or [ketl]," with a voiceless [t]. Twenty years after Shewmake, the Tidewater Virginia subgroup of the college students studied by Tresidder (1943) had very frequent voicing of /t/ in the flapping environment.

[6] The transcription is Shewmake's. He states (p. 491) that [ɒ] is the vowel in *but*, and [i] the vowel in *pin*.

[7] As in Mississippi, the first nuclei in *biceps* (Shewmake 1925: 492) and *eyesight* (Shewmake 1945: 153) are unraised, but that proves nothing about sensitivity to morphology, since the unraised nuclei are adequately explained by their V^1CV^2 stress.

[8] McCarthy (1982: 586) mentions a dialect in which Diphthong Raising is blocked in a VC#v context, e.g. *bicenténnial, trisyllábic*, but it is not clear whether it is the same dialect described by Chambers (1973, 1989). Chambers (1989: 79-80) does not mention these examples in discussing the V^1#CV^2 and V^2#CV^1 contexts.

[9] Vance (1987) does not mark secondary stress, but does say that words are chosen to have the same stress patterns as those of Chambers (1973: 124-127). I therefore mark secondary stress on Vance's words following Chambers.

[10] The focal Mississippi and Virginia dialects are not unusual in lacking Flapping in the late nineteenth century. MacMahon (1998) notes its absence from several detailed phonetic descriptions of American English dialects dating from 1860 to 1895. The style sheet of *Dialect Notes*, Volume 1 (1896) transcribes [t] in words that today would be flapped, as do Emerson (1896: 76f.) and Grandgent (1896). Yet less than twenty-five years later, Krapp (1919: 9, 100), describing "standard English in America," notes regular voicing of /t/ between a stressed and an unstressed syllable. Less than two decades later, Haugen (1937) mentions "the sound commonly known as 'voiced T'", and linguists writing in the 1940s and later assume that flapping is familiar to their readers (Bloch 1941, Joos 1942, Trager 1942, Oswald 1943). Lehmann (1953: 271) comments that "this phenomenon is of considerable interest because it is one of the first sound changes that is being observed and documented by linguists in its successive stages."

[11] Other dialects seem to have gone directly from /aɪ/ to /ɑ/ or /a/ regardless of consonant voicing, without ever passing through a stage of Diphthong Raising. Eber Carle Perrow (1912), describing southern Appalachian speech of the late 19th Century—Perrow, born in 1880, says on pp. 140 and 144 that he moved to Eastern Tennessee as a child and spent twenty years there—states categorically

that speakers have only non-alternating /aɪ/ (pp. 139–140). But in the late 1930s, J. S. Hall (1942: 43) found that adult speakers in the mountains of eastern Tennessee and western North Carolina had only non-alternating [aˑ] or [aˑ] in all environments.

[12] At the time of its first appearance in Mississippi, it could have been an alternation between two diphthongs. In Southern dialects which had Diphthong Raising, monophthongization of the elsewhere diphthong ("Southern Glide Weakening," Thomas 2005) seems to have set in among speakers born towards the end of the 19th Century. Both black and white Texans born in the 1890s had [aɪ] before voiceless consonants and nearly pure [a] before voiced ones (Bailey and Thomas 1998). William Read, of Louisiana State University, described voicing-conditioned Diphthong Raising in "the South," but said nothing of monophthongization (1909: 73-74). A quarter-century later, his LSU colleague C. M. Wise (1933, 1936) reported monophthongization of the unraised diphthong. Writing in 1931, Greet says of the Williamsburg, Virginia dialect that "[aɪ] tends towards [ɑ] or [a] in *I, mind, find, my, while*, and *by it* but of course the sound seldom entirely loses its diphthongal character" (p. 166). William B. Edgerton (born 1914 in North Carolina) writes that "Southern long *i* is not, however, simply [a]. There is a scarcely perceptible glide towards [ɪ]" (1935: 190). Thus the fact that late-19th-Century attestations of Diphthong Raising in the South refer to two diphthongs, rather than to a diphthong and a monophthong like Diphthong Raising in the focal Mississippi dialect, does not preclude the possibility that the focal Mississippi dialect borrowed Diphthong Raising from another Southern dialect and then monophthongized the lower diphthong.

REFERENCES

BAAYEN, R. H., R. PIEPENBROCK and L. GULICKERS. 1995. The CELEX Lexical Database. Philadelphia: Linguistic Data Consortium [CD-ROM].

BAILEY, GUY and ERIK R. THOMAS. 1998. Some aspects of AAVE phonology. African-American English: Structure, History and Use, ed. by Salikoko S. Mufwene, John R. Rickford, Guy Bailey and John Baugh, 85-109. London and New York: Routledge.

BAILEY, GUY. 1998. When did Southern American English begin? Englishes Around the World: Studies in Honor of Manfred Görlach, ed. by Edgar W. Schneider, 255-275. Amsterdam: John Benjamins.

BARNES, JONATHAN. 2002. Positional Neutralization: A Phonologization Approach to Typological Patterns. Ph.D. dissertation, University of California, Berkeley.

BENUA, LAURA. 1995. Identity effects in morphological truncation. University of Massachusetts Occasional Papers in Linguistics 18: 77-136.

_____. 1997. Phonological Relations Between Words. Ph.D. dissertation, University of Massachusetts, Amherst.

BERMÚDEZ-OTERO, RICARDO. 2003. The acquisition of phonological opacity. Variation within Optimality Theory: Proceedings of the Stockholm Workshop on Variation within Optimality Theory, ed. by Jennifer Spenader, Anders Eriksson and Östen Dahl, 25-36. Stockholm: Department of Linguistics, Stockholm University.

BLOCH, BERNARD. 1941. Phonemic overlapping. American Speech 16: 278-284.

BOERSMA, PAUL and DAVID WEENINK. 2015. Praat Version 5.4.08. Software downloaded from www.praat.org on March 24, 2015.

BRITAIN, DAVID. 1997. Dialect contact and phonological reallocation: "Canadian Raising" in the English Fens. Language in Society 26: 15-46

BROOKS, CLEANTH. 1935 [1972]. The Relation of the Alabama-Georgia Dialect to the Provincial Dialects of Great Britain. Port Washington, New York: Kennikat Press.

CHAMBERS, J. K. 1973. Canadian Raising. Canadian Journal of Linguistics/Revue Canadienne de Linguistique 18: 113-135.

_____. 1989. Canadian Raising: blocking, fronting, etc. American Speech 64 (1): 75-88.

_____. 1999. Converging features in the Englishes of North America. Cuadernos de Filología Inglesa 8: 117-128.

_____. 2006. Canadian Raising: Retrospect and prospect. Canadian Journal of Linguistics/Revue Canadienne de Linguistique 51 (2/3): 108-115.

CHOMSKY, NOAM and Morris HALLE. 1968. The Sound Pattern of English. Cambridge, MA: MIT Press.

COHN, ABIGAIL C. 1993. Nasalisation in English: phonology or phonetics. Phonology 10 (1): 43-81.

DAILEY-O'CAIN, J. 1997. Canadian Raising in a midwestern U. S. city. Language Variation and Change 9: 107-120.

DAVIDSON, LISA. 2001. Hidden rankings in the final state of the English grammar. RuLing Papers II, ed. by Graham Horwood and Se-Kyung Kim, 21-48. New Brunswick: Rutgers University.

DE JONG, KENNETH. 2004. Stress, lexical focus, and segmental focus in English: patterns of variation in vowel duration. Journal of Phonetics 32 (4): 493-516.

DORRILL, GEORGE TOWNSEND. 1986. Black and white speech in the southern United States: Evidence from the Linguistic Atlas of the Middle and South Atlantic States. Bamberger Beiträge zur englischen Sprachwissenschaft, Vol. 19. Frankfurt am Main: Peter Lang.

EDGERTON, WILLIAM B. 1935. Another note on the Southern pronunciation of 'long i'. American Speech 10 (3): 190.

EMERSON, OLIVER FARRAR. 1896. The Ithaca dialect: a study of present English. Dialect Notes 1: 85-173.

EVANS, MEDFORD. 1935. Southern "long i." American Speech 10 (3): 188-190.

FLEXNER, STUART BERT and LENORE CRARY HAUCK (eds.). 1987. The Random House Dictionary of the English Language, 2nd edition. New York: Random House.

FOUGERON, CÉCILE, and PATRICIA A. KEATING. 1997. Articulatory strengthening at edges of prosodic domains. Journal of the Acoustical Society of America, 101 (6): 3728-3740.

FRAZIER, MELISSA. 2006. Output-output faithfulness to moraic structure: Evidence from American English. Proceedings of the 36th Meeting of the Northeast Linguistics Society (NELS 36), ed. by Christoper Davis, Amy Rose Deal, and Youri Zabbal. Amherst, MA: Graduate Linguistics Students' Association.

FRUEHWALD, JOSEPH. 2016. The early influence of phonology on a phonetic change. Language 92 (2): 376-410.

GARNETT, J. M. 1881. Review of Englische Philologie: Anleitung zum wissenschaftlichen Studium der englischen Sprache, by Johann Storm. American Journal of Philology 2 (8): 484-496.

GRANDGENT, CHARLES H. 1891. More notes on American pronunciation. Modern Language Notes 6 (8): 229-234.

GRANDGENT, CHARLES H. 1896. English sentences in American mouths. Dialect Notes 1: 199-204.

GREET, WILLIAM CABELL. 1931. A phonographic expedition to Williamsburg, Virginia. American Speech 6 (3): 161-172.

HALL, JOSEPH SARGENT. 1942. The phonetics of Great Smoky Mountain speech. American Speech 17 (2, Part 2): 1-110.

HALL, KATHLEEN CURRIE. 2005. Defining phonological rules over lexical neighborhoods: Evidence from Canadian Raising. Proceedings of the 24th West Coast Conference on Formal Linguistics, ed. by John Alderete, Chung-hye Han, and Alexei Kochetov. Somerville, Massachusetts: Cascadilla Proceedings Project.

HAMMOND, MICHAEL. 1997. Vowel quantity and syllabification in English. Language 73 (1): 1-17.

HAUGEN, EINAR. 1937. Notes on 'Voiced T' in American English. Dialect Notes 6: 627-631.

HAYES, BRUCE. 2004. Phonological acquisition in Optimality Theory: The early stages. Constraints in phonological acquisition, ed. by René Kager, Joe Pater, and Wim Zonneveld, 158-203. Cambridge, England: Cambridge University Press.

_____ . 2000. Gradient well-formedness in Optimality Theory. Optimality Theory: Phonology, syntax, and acquisition, ed. by Joost Dekkers, Frank van der Leeuw and Jeroen van de Weijer, 88-120. Oxford: Oxford University Press.

HYMAN, LARRY M. 1976. Phonologization. Linguistic Studies Offered to Joseph Greenberg, Second Volume: Phonology, ed. by Alphonse Juilland, 407-418. Saratoga, California: Anma Libri.

IDSARDI, WILLIAM. 2006. Canadian Raising, opacity, and rephonemicization. Canadian Journal of Linguistics/Revue canadienne de linquistique 51 (2/3): 119-126.

JENSEN, JOHN T. 2000. Against ambisyllabicity. Phonology 17 (2): 187-235.

JOOS, MARTIN. 1942. A phonological dilemma in Canadian English. Language 18: 141-144.

KAPLAN, AARON. 2015. Maximal prominence and a theory of possible licensers. Natural Language and Linguistic Theory 33: 1235-1270.

KAYE, JONATHAN. 1990. Whatever happened to Dialect B? Grammar in Progress: GLOW Essays for Henk van Riemsdijk, ed. by Joan Mascaro and Marina Nespor, 259-263. Dordrect: Foris.

KEATING, PATRICIA, TAEHONG CHO, CÉCILE FOUGERON and CHAI-SHUNE HSU. 2004. Domain-initial articulatory strengthening in four languages. Phonetic interpretation: Papers in laboratory phonology VI: 143-161.

KIPARSKY, PAUL. 1979. Metrical structure assignment is cyclic. Linguistic Inquiry 10 (3): 421-444.

_____ . 1988. Phonological change. Linguistics: The Cambridge Survey, Volume I, Linguistic Theory: Foundations, ed. by Frederick Newmeyer, 363-415. Cambridge, England: Cambridge University Press.

KRAPP, GEORGE PHILIP. 1919. The Pronunciation of Standard English in America. New York, NY: Oxford University Press, American Branch.

LABOV, WILLIAM. 1963. The social motivation of a sound change. Word 19: 273-309.

LEGENDRE, GÉRALDINE, YOSHIRO MIYATA and PAUL SMOLENSKY. 1990. Can connectionism contribute to syntax? Harmonic Grammar, with an application. Proceedings of the 26th Regional Meeting of the Chicago Linguistic Society, ed. by M. Ziolkowski and M. Noske and K. Deaton, 237-252. Chicago: Chicago Linguistic Society.

LEHMANN, WINFRED P. 1953. A note on the change of American English /t/. American Speech 28 (4): 271-275.

MACMAHON, MICHAEL K. C. 1998. Phonology. The Cambridge history of the English language, Vol. IV, ed. by Suzanne Romaine. Cambridge, England: Cambridge University Press.

MADDIESON, IAN. 1984. Phonetic cues to syllabification. UCLA Working Papers in Phonetics 59: 85-101.

MALÉCOT, ANDRÉ. 1960. Nasal syllabics in American English. Journal of Speech and Hearing Research 3 (3): 268-274.

MCCARTHY, JOHN J. and ALAN PRINCE. 1993. Generalized Alignment. Yearbook of Morphology 1993, ed. by Geert Booij and Jaap van Marle, 79-153. Amsterdam: Kluwer.

MCCARTHY, JOHN J. 2003. OT constraints are categorical. Phonology 20 (1): 75-138.

MIELKE, JEFF, MIKE ARMSTRONG and ELIZABETH HUME. 2003. Looking through opacity. Theoretical Linguistics 29: 123-139.

MORETON, ELLIOTT. 1999. Raise-Alpha. MS, Department of Linguistics, University of Massachusetts, Amherst.

_____ . 2004. Realization of the English postvocalic [voice] contrast in F1 and F2. Journal of Phonetics 32: 1-33.

MORETON, ELLIOTT and ERIK R. THOMAS. 2007. Origins of Canadian Raising in voiceless-coda effects: A case study in phonologization. Papers in Laboratory Phonology 9, ed. by Jennifer S. Cole and José Ignacio Hualde, 37-64. Berlin: Mouton.

MYERS, JAMES. 1997. Candian Raising and the representation of gradient timing relations. Studies in the Linguistic Sciences 27 (1): 169-184.

OSWALD, VICTOR A. 1943. 'Voiced T'—a misnomer. American Speech 18: 18-25.

PARADIS, CAROLE. 1980. La règle de Canadian Raising et l'analyse en structure syllabique. Candian Journal of Linguistics/Revue Canadienne de Linguistique 25 (1): 35-45.

PATER, JOE. 2014. Canadian Raising with language-specific weighted constraints. Language 90 (1): 230-240.

_____ . (in press). Universal Grammar with weighted constraints. To appear in: Harmonic Grammar and Harmonic Serialism, ed. by Joe Pater and John McCarthy. London: Equinox Press.

PEDERSON, LEE, SUSAN LEAS MCDANIEL, GUY BAILEY and Marvin Bassett. 1986. Linguistic Atlas of the Gulf States, vol. 1: Handbook for the Linguistic Atlas of the Gulf States. Athens, Georgia: University of Georgia Press.

PERROW, E. C. 2012. Songs and rhythms from the South. Journal of American Folklore 25 (96): 137-155.

PRIMER, SYLVESTER. 1890. The pronunciation of Fredericksburg, Virginia. Publications of the Modern Language Association 6 (3): 161-170.

SHANDS, HUBERT ANTHONY. 1893. Some Peculiarities of Speech in Mississippi. Boston: Norwood Press.

SHEWMAKE, EDWIN F. 1925. Laws of pronunciation in eastern Virginia. Modern Language Notes 40 (8): 489-492.

_____ . 1943. Distinctive Virginia pronunciation. American Speech 18 (1): 33-38.

_____ . 1945. How to find [ʌɪ] in eastern Virginia. American Speech 20 (2): 152-153.

SIEGEL, DOROTHY C. 1974. Topics in English morphology. Ph.D. dissertation, Massachusetts Institute of Technology.

SLEDD, JAMES D. 1966. Breaking, umlaut, and the Southern drawl. Language 42 (1): 18-41.

SOULE, RICHARD and WILLIAM A. WHEELER. 1877. Manual of English Pronunciation and Spelling. Boston: Lee and Shepard.

STERIADE, DONCA. 2000. Paradigm uniformity and the phonetics-phonology boundary. Papers in Laboratory Phonology V: Acquisition and the Lexicon, ed. by Michael B. Broe and Janet B. Pierrehumbert, 313-334. Cambridge, England: Cambridge University Press.

SUGAHARA, MARIKO and ALICE TURK. 2009. Durational correlates of English sublexical constituent structure. Phonology 26 (3): 477-524.

THOMAS, ERIK R. 2000. Spectral differences in /ai/ offsets conditioned by voicing of the following consonant. Journal of Phonetics 28 (1): 1-25.

_____ . 2003. Secrets revealed by Southern vowel shifting. American Speech 78 (2): 150-170.

THOMAS, ERIK R. and GUY BAILEY. 1998. Parallels between vowel subsystems of African American Vernacular English and Caribbean Anglophone Creoles. Journal of Pidgin and Creole Languages 13: 267-96.

TRAGER, GEORGE L. 1942. The Phoneme 'T': A Study in Theory and Method. American Speech 17 (3): 144-148.

TREIMAN, REBECCA, ANDREA ZUKOWSKI and E. DAYLENE RICHMOND-WELTY. 1995. What happened to the "n" of sink? Children's spellings of final consonant clusters. Cognition 55 (1): 1-38.

TRESIDDER, ARGUS. 1937. The speech of the Shenandoah valley. American Speech 12 (4): 284-288.

TRESIDDER, ARGUS. 1941. Notes on Virginia speech. American Speech 16 (2): 112-120.

_____. 1943. The sounds of Virginia speech. American Speech 18 (4): 261-272.

TRUDGILL, PETER. 1986. Dialects in Contact. New York: Blackwell.

_____. 1999. The Dialects of England, second edition. Oxford: Blackwell.

VANCE, TIMOTHY J. 1987. "Canadian Raising" in some dialects of the northern United States. American Speech 62 (3): 195-210.

WALKER, RACHEL. 2005. Weak triggers in vowel harmony. Natural Language and Linguistic Theory 23 (4): 917-989.

WEIDE, R. L. 1998. Carnegie-Mellon pronouncing dictionary, Release 0.6. Online: http://www.speech.cs.cmu.edu.

WISE, C. M. 1933. Southern American dialect. American Speech 8 (2): 37-43.

_____. 1936. Common errors in our daily speech. Southern Speech Journal 2 (1): 1-8.

WISE, C. M., W. SCOTT NOBLE and HERBERT METZ. 1954. The Southern American diphthong [aɪ]. The Southern Speech Journal 19 (4): 304-312.

ZOLL, CHERYL. 1996. Parsing Below the Segment in a Constraint-Based Framework. Ph.D. dissertation, University of California, Berkeley.

_____. 1998. Positional asymmetries and licensing. MS, Rutgers Optimality Archive (http://roa.rutgers.edu).

_____. 2004. Positional asymmetries and licensing. Optimality Theory in Phonology: A Reader, ed. by John McCarthy, 365-378. Wiley-Blackwell.

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Being Specific and More Specific: On Information Packaging, Determinedness and Intonation in Bulgarian and Other Languages

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Dedication

I met Rebecca Larche Moreton in late July of 1988 when I came to Oxford, Mississippi, to interview for the position of assistant professor of Russian. I had recently interviewed for the position of language training coordinator at the Foreign Service Institute in Washington, D.C., and my resume stated I had Level 4 FSI skills in Bulgarian. Becky knew what that meant, having worked at FSI as an LTC herself in Lao years earlier, and she wanted to know why I had such information on my c.v. After I took the job, Becky and I became fast friends, sharing a common love for all kinds of linguistics and a desire for the Department of Modern Languages at the University of Mississippi to raise its game at the teaching of language. Among other things, she was in large part responsible for bringing Japanese-language instruction to UM through her involvement with the Hokkaido Foundation in the 1990s, for over three decades, she taught French, phonology and grammar courses in our department. After she went to Tulane University to complete a Ph.D. in Linguistics and returned to Oxford in semi-retirement, we spent much time talking about language pedagogy and various topics in linguistics, including my work on Bulgarian word order and definiteness. I hereby offer what follows as my personal tribute to Becky Moreton, a truly wonderful mind and a more wonderful person, in the hopes that she would have enjoyed reading it (and later asking me questions about the material!). I should note that in the material from which I derived some of this article,[1] I thanked Becky for help with the translation of some French material on definiteness into English. It is thus truly fitting that this material make its way back into print in a volume dedicated to her many years later. In fact, if this is the last time someone "cites" Becky in print, I would be honored to be that person!

1. Determinedness in Bulgarian

Nominal material (nouns, pronouns and the like) in Bulgarian can be determined[2] morphologically, syntactically or phonologically. The language's robust system for the specification of nouns includes pre-posed and post-posed articles and other