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Language contact and contextual nasalization in Louisiana French

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ABSTRACT

This paper examines variation in Louisiana French nasalized vowels across two time periods: 1977 and 2010–2011. Non-contrastive nasal vowels are typical of English, while contrastive nasal vowels are typical of French. Louisiana French is an endangered language variety. Instead of simplifying to a single type of vowel nasality, as might be expected in a situation of heavy language contact and language shift, Louisiana French maintains a system of phonetic and phonemic nasal vowels. Digitized interviews with 32 native speakers from lower Lafourche Parish provide 2801 data points for analysis. In contrast with previous assertions in the literature, quantitative analyses reveal that contextual nasalization operates almost exclusively within the domain of the word, not the syllable.

PRELIMINARIES

This study looks at contextual vowel nasalization. A widespread phonetic process in Cajun English (Dubois & Horvath, 2000) and Southern English, vowel nasalization also takes place in Louisiana French[1], a severely endangered language variety spoken by fewer and fewer people every year. The current work seeks to understand the dynamics of phonetic vowel nasalization in Louisiana French in order to shed light on the mechanics of language contact, bilingualism, and language death. The diachronic aspect of the analysis affords a comparison through time of speakers born between 1888 and 1953. This section lays out the variables to be considered in the investigation.

The French Triangle of Acadiana, situated in southwestern Louisiana, brings together 22 parishes[2] with a higher-than-average level of French language and/or culture (Breton & Louder, 1979; Estaville, 1988)[3]. There is geographically based linguistic variation in French-speaking Louisiana (Baronian, 2005a, 2005b; Dubois, 2005; Salmon, 2007, 2009), though interdialectal contact may be effectively reducing such variation (Byers, 1988; Rottet, 2004). This study controls for regional variation by examining the Louisiana French spoken in a

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small area of lower Lafourche Parish, at the southeastern corner of the French Triangle.

Louisiana French has been in decline for over a century in urban centers like New Orleans, and since the Second World War in more remote, rural areas of the state like lower Lafourche Parish, as English has come to dominate nearly all linguistic arenas. In such a state of endangerment, Louisiana French is expected to exhibit rapid linguistic change over short periods of time in comparison with varieties spoken in vibrant Francophone communities. Endangered languages also exhibit speech style contraction: since they are "restricted to a few speech situations […] the styles merge with one another" (Dressler & Wodak-Leodolter, 1977:37). Such register contraction is present for semi-speakers under 30 in Lafourche Parish (Rottet, 2005b), but speech register differentiation is still present for older fluent speakers (Blainey, 2009; Carmichael, 2008). It is therefore important to examine the role of speech register in Louisiana French phonetic and phonological variation, which this analysis achieves by contrasting conversation in more formal and less formal settings.

Sex is another factor to consider in a sociolinguistic analysis of language death and sound patterns (Dressler & Wodak-Leodolter, 1977:40)[4]. In St. Landry Parish Cajun English, there are sex-based differences regarding the realization of nasalized consonants (Dubois & Horvath, 1998:164), and Dubois (1999), cited in Dubois and Horvath (2000:311–312), reports that sex is an active variable in Louisiana French vowel nasalization rates. This investigation will test whether or not this observation holds for speakers from lower Lafourche Parish.

A person's linguistic patterns can change over the course of his or her lifespan for a variety of reasons (Sankoff & Blondeau, 2007). With the potential for extensive linguistic change over time, a speaker's age may especially influence the pronunciation variants he or she uses in an endangered language (Bullock & Gerfen, 2004; Dubois & Noetzel, 2005; Rottet, 2001). This raises the question of how to treat the factor of time in studies of language endangerment. Sankoff and Blondeau (2007) contrast *apparent time* (synchronic analyses comparing several generations of speakers from a community recorded at a single point in time) and *real time* (diachronic analyses comparing one or more generations of speakers recorded at different points in time) approaches to explanations of language change. Within the category of real time linguistic research there are both *panel studies*, which compare speech from the same speakers, and *trend studies*, which compare speech from the same linguistic community (Sankoff & Blondeau, 2007).

It is particularly important to have longitudinal evidence available when examining variation and change in an endangered language. However, language death is often closely tied to negative language attitudes, such that native speakers and outsiders see little value in preserving or documenting an endangered language. Thus, earlier recordings of endangered languages do not usually exist. Studies in the domains of syntax and morphology demonstrate the extensive paradigmatic and analogical leveling going on in Louisiana French (e.g., Dubois, 2001; Neumann-Holzschuh, 2009; Rottet, 1998, 2000, 2005a), but

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only a handful of studies have been able to consider diachronic sound change in this language variety (e.g., Dubois, 2005; Dubois, Noetzel, & Salmon, 2005, 2006; Salmon, 2007, 2009). The present work is in a fortunate position: acoustically verified transcriptions of 1970s Louisiana French allow for both an apparent time and a real time analysis of speech patterns in lower Lafourche Parish.

While precise language learning environment information is not available for speakers recorded in the 1970s, the current investigation will examine the effect of a speaker's generation on his or her speech patterns, following previous studies that use Dubois' (1997) classification of Louisiana French speakers (e.g., Dubois, 2005; Salmon, 2007, 2009).

CONTEXTUAL NASALIZATION

The syllable boundary is important for contextual nasalization (also called nasal coarticulation) in both English and French. In English, nasality spreads from a syllable-final nasal consonant to a preceding vowel, as in the example *fan* (/fæn/ → [fæ̃n]) (Cohn, 1993). This regressive or anticipatory nasalization is non-contrastive and is generally delimited by the syllable boundary. French differs from English in two important ways. First, French has both contrastive and non-contrastive nasal vowels. Second, in French, phonetic vowel nasality comes from a preceding nasal segment rather than a following nasal segment. Numerous studies observe this *carryover* (progressive, perseverative) contextual nasalization using acoustic and aerodynamic evidence (Basset, Amelot, Vaissière, & Roubeau, 2001; Delvaux, Demolin, Harmegnies, & Soquet, 2008; Kelly, Poiré & Williams, 2007).

The French-based Creoles spoken in the Antilles and Louisiana French exhibit a more liberal system of phonetic vowel nasalization, in the sense that an oral vowel can nasalize if it either precedes or follows a nasal segment (Valdman & Klingler, 1997). Louisiana French appears to have a larger prosodic domain of application than English and other varieties of French, since previous descriptions of the language variety state that any vowel can become phonetically nasalized by a following nasal segment, even across the word boundary (Guilbeau, 1950; Papen & Rottet, 1996, 1997; Valdman & Klingler, 1997). Since syllable and word boundaries do not block contextual nasalization in all languages of the world (Chafcouloff & Marchal, 2006:76), this examination will look at the strength of the syllable boundary, but also the word boundary. The current investigation concentrates on those mid and low vowels with corresponding phonemic nasal vowels. While high vowels /i, y, u/ can undergo contextual nasalization in Louisiana French (e.g., *cousine* [ku.zĩn] 'female cousin'), they do not have phonemic nasal counterparts (Delvaux, 2000), and are phonetically more nasalized than non-high oral vowels in similar contexts, at least in Standard French (Delvaux et al., 2008).

In a situation of language death, the number of contrastive phonemes is expected to decrease. Specifically, segments that have a phonemic contrast in the dying

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language, but a phonetic contrast in the dominant language, are most likely to disappear (Bullock & Gerfen, 2004:95; Dressler, 1991:100). However, active phonemic contrasts can survive in the dying language (Andersen, 1982:95).

Phonetic nasal vowels are present in both French and English spoken in Louisiana, and so are expected to survive the test of time even though they are not phonemic. Contrastive nasal vowels do not exist in English, but are highly productive phonemes in French, making it reasonable to predict that they will also remain in Louisiana French. Nevertheless, maintaining both phonemic and phonetic nasal vowels makes for a more complex sound system, a characteristic not traditionally predicted in a case of language death. Rather, it would normally be expected that the functioning of these two types of nasal vowels should interact in order to create a simplified system.

Louisiana French has been in intense contact with English since the Second World War in lower Lafourche Parish. Anticipatory vowel nasalization, the type of vowel nasalization associated with English, is a widespread characteristic of Louisiana French (Conwell, 1961; Dubois, 1999, cited in Dubois & Horvath, 2000; Guilbeau, 1950, 1958; Papen & Rottet, 1996, 1997; Parr, 1940). This study sets out to quantify contextual nasalization through time in Louisiana French, controlling for sociolinguistic and systemic factors, in order to understand the extent to which language contact and language death have influenced contextual nasalization over the past 40 years.

SPEAKERS

The analysis draws on two sets of interviews with Francophone residents of Golden Meadow, Louisiana. At the southern end of Lafourche Parish and the southeastern extremity of Acadiana, Golden Meadow sits on the last habitable piece of land before the coastal marshes give way to the Gulf of Mexico. In this town of roughly 2200 people, approximately 28% of the population speaks Louisiana French; this rate is nearly ten times that of the state, which is estimated to be 3% (Census Bureau, 2011). The vast majority of Golden Meadow French speakers are over 50 years of age, since this language is no longer passed on to children. Also, because Louisiana French is an orally transmitted variety, speakers do not read or write the language. However, locals have only been in intense contact with English since the oil boom of the 1940s, in contrast with more heavily populated traditionally Francophone areas such as Baton Rouge or New Orleans, where English has dominated for much longer. This explains the higher-than-average rate of French use in the town.

Alain Larouche carried out the first set of interviews with Golden Meadow French speakers in 1977 (Larouche, 1979, 1980) as part of the Louisiana Project (*Projet Louisiane*, Breton & Louder, 1979; Louder & Waddell, 1979). Since interviewees spoke with a community outsider, the Larouche sound files provide a more formal speech register for analysis (per the attention to speech model [Labov, 1984]). Archivists at the University of Louisiana at Lafayette's Center

for Louisiana Studies digitized surviving cassette tapes in WAV format and made them available for academic research (Center for Louisiana Studies, 2011).

The author conducted a second series of interviews in 2010 and 2011 in the Golden Meadow area (Blainey, 2013), contributing to the international Phonology of Contemporary French project (*la Phonologie du Français Contemporain* [PFC], Durand, Laks, & Lyche, 2002, 2005). The PFC-Louisiana protocol calls for four conversational tasks: guided (formal) conversation, free (informal) conversation, sentence translation, and word translation (Klingler & Lafleur, 2007). More specifically, interviewees carry on the formal conversation with a community outsider and the informal conversation with a community insider in order to maximize the difference between conversational speech registers (Labov, 1984). While the Blainey sound files offer four speech styles, the current analysis considers data from the conversational portions—formal and informal—of the interviews in order to compare them with the Larouche data.

Twelve speakers (seven male, five female) have been selected from the 1977 interviews, based on their demographic characteristics and adequate sound file quality. These speakers have birth years ranging from 1888 to 1939, and spent all or most of their lives in Golden Meadow or neighboring Galliano. There are 20 speakers (10 male, 10 female) interviewed in 2010 or 2011; born between 1921 and 1953, they are all from Golden Meadow or Galliano[5].

Altogether, the 32 speakers represent four generations of Louisiana Francophones as defined in Dubois (1997, 2005). Specifically, Dubois (2005:288–289) identifies monolingual French speakers born between 1888 and 1901 as *ancêtres* ('ancestors'); those born between 1902 and the First World War, with at least some education and differing levels of French-English bilingualism, are the *doyens* ('elders'). Speakers belonging to the *aîné* ('older') generation were born between the end of the First World War and the beginning of the Great Depression, and they learned English early on in life, teaching it to their children and using it in their daily lives (Dubois et al., 2005:29). Finally, the *cadet* ('younger') generation was born during the Depression until after the Second World War, had more access to education, and also had the highest level of exposure and shift to English (Dubois, 2005:289). The speech corpus includes one ancestor, two elders, 16 older speakers and 13 younger speakers.

METHOD: IDENTIFICATION OF NASAL(IZED) VOWELS

In comparison with the spectrographic output of corresponding oral vowels, contrastive and non-contrastive nasal vowels have a weaker, broader first formant (F1) (Delattre, 1954; Vaissière, 1995), a lowered second formant (F2) (Delvaux, Metens, & Soquet, 2002) and a general decrease in energy between 2000 and 3000 Hz (Delvaux, Demolin, Soquet, & Kingston, 2004). This often means that a nasal or nasalized vowel's harmonics are faint or absent from the spectrogram, creating what has been termed a *nasal eye* between the lower and upper formants (Buniet, 1997; Grosjean, 1995). Such a space between formants

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is especially characteristic of back nasal vowels in French (Violin-Wigent, 2006), but also identifies French round vowels (Montagu, 2002; Teffahi, Guerin & Djeradi, 2005), so that it is necessary to use both perceptual and acoustic evidence to distinguish between them. The first nasal formant (F^1) often blends with F1, and measurements of F^1 vary with the researcher, the size and shape of the nasal cavity, and the speaker's sex (Hansen, 1998).

While these considerations advocate for an analysis that relies on more than just spectrographic cues, care must be taken with a perceptual approach as well, since other factors can influence the perceptual salience of a vowel's nasality. The perception of nasality depends on the ratio between the total duration of a given vowel and the duration of the vowel that is nasalized. The contrast between oral and nasal vowels diminishes in fast speech (Vaissière, 1995) due to coarticulatory gestures that may reduce the relative nasality of nasal vowels and increase the relative nasality of oral vowels (Benguerel, Hirose, Sawashima, & Ushijima, 1977). Also, nasal appendices assimilate to a following consonant and may go unnoticed if a purely perceptual approach is adopted (Taylor, 1996–1997). For these reasons, it is important to use both spectrographic and perceptual evidence when working with vowel nasality. In the present study, nasalized vowels were first identified using perceptual cues; any cases of uncertainty were verified using spectrographic cues. Remaining ambiguous tokens were presented to other linguists working with Louisiana French.

METHOD: SELECTION CRITERIA

The analysis considers those vowels that have phonemic nasal counterparts in French ([e, ɛ, a, ɔ, o, œ, ø]). All vowels classified as phonetically nasalized must not be phonemically nasal in Standard French; thus, the vowel in the feminine adjective *bonne* (/bɔn/ 'good') is a potential candidate, while the vowel in masculine *bon* (/bɔ̃/ 'good') is not[6]. Also, any vowel preceded or followed by a nasal segment is checked for phonetic nasality, so that the vowel in the feminine pronoun *ma* (/ma/ 'my') is checked for nasalization[7]. Finally, a vowel must be perceptibly nasal in order to be identified as a nasalized vowel (see the preceding section).

The current analysis considers five minutes of speech for each speaker and, for the later recordings, for each speech style, giving a total of 260 minutes of conversational Louisiana French (60 minutes from 1977; 200 minutes from 2010–2011). All speech has been phonemically transcribed and verified with a native Louisiana French speaker from lower Lafourche Parish. The nasalized vowel identification method outlined above yields 1260 nasalized vowels for analysis.

In order to understand how often contextual nasalization takes place, it is necessary for the analysis to include vowels that do not nasalize even though they are in a contextual nasalization environment. How should such vowels be identified? The distribution of nasalized vowels in the corpus reveals that 82% of all identified nasalized vowels ($n = 1037/1260$) come after oral segments. This

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means that the preceding phonetic environment is not a good predictor for the presence of contextual nasalization. When singling out cases where no nasalized vowel surfaces (but potentially could), the analysis includes only oral vowels with a nasal element in the *following* phonetic environment (e.g., *bonne* [b**ɔn**] 'good', *avait un* [av**eɛ̃**] 'had a'), excluding oral vowels with a nasal segment in the preceding phonetic environment, unless there is a following nasal element (e.g., *ma* [**ma**] 'my', *aime aussi* [ɛ**mo**si] 'like as well'). There are 1541 cases of unrealized contextual nasalization (vowels before a nasal that could have nasalized, but did not). In sum, the study looks at 2801 tokens of potential vowel nasalization.

RESULTS: QUANTITATIVE SUMMARY

This section considers the rate of vowel nasalization through the lens of several factors, beginning with a quantitative summary of the surrounding phonetic environment of phonetic nasal vowels. Logistic regression analyses then explore the relative importance of the following systemic and sociolinguistic factors on variable contextual vowel nasalization: the word membership of the following segment; the syllable membership of the following segment; the nasality of the preceding segment; the quality of the potentially nasalized vowel; the speaker's generation and the data set[8]; and the speaker's sex.

Table 1 contains all tokens under analysis, and shows that the rate of contextual nasalization has decreased over the past four decades, even though contact with and shift towards English have increased. The difference in the overall rate of contextual nasalization is significant between the 1977 data set and 2010–2011 data sets[9].

Contextual nasalization occurs most often before a nasal segment, but nasalized vowels appear in other phonetic environments as well. Table 2 explores only the nasalized vowels for each data set, laying out their distribution by the surrounding phonetic context.

Table 2 demonstrates that only a very small percentage of nasalized vowels can be found without a following nasal segment of some sort. Since the first phonetic context in the table, "Before Nasal Segment", accounts for the overwhelming majority of nasalized vowels in all three data sets (between 88% and 96%), the quantitative analysis now focuses on data from this environment, excluding contexts b-f.

Previous descriptions of Louisiana French assert that the process of vowel nasalization is largely governed by the syllable domain, as it is in English, with contextual nasalization occurring variably across the syllable and word boundaries (Guilbeau, 1950, 1958; Papen & Rottet, 1996, 1997; Valdman & Klingler, 1997). Table 3 considers all nasalized and non-nasalized tokens that precede a nasal segment, subdividing them by the following nasal segment's word and syllable membership. Table 3 clearly demonstrates that the syllable boundary alone cannot account for vowel nasalization patterns. Specifically, if the following nasal segment is syllable-internal, but word-external, nasalization

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TABLE 1. *Rate of contextual nasalization by data set: 1977, 2010–2011 Formal (2010-F) and 2010–2011 Informal (2010-I) data sets*

	1977	2010-F	2010-I
Nasalized/Total	285/555	532/1233	443/1013
Rate (%)	51	43	44

TABLE 2. *Number and percentage of contextually nasalized vowels ([Ṽ]) by phonetic context: 1977, 2010–2011 Formal (2010-F) and 2010–2011 Informal (2010-I) data sets*

	1977		2010-F		2010-I	
Phonetic Context	#[Ṽ]	%	#[Ṽ]	%	#[Ṽ]	%
a) Before nasal segment *une* /ɛn/ → [ɛ̃n] 'a, one'	251	88	512	96	427	96
b) Before unrealized nasal segment *semaine* /səmɛn/ → [smɛ̃] 'week'	6	2	4	1	1	0.2
c) Before nasal V with intervening C *équand* /ekɑ̃/ → [ɑ̃.kɑ̃] 'when'	1	0.4	4	1	1	0.2
d) After nasal segment *ans après* /ɑ̃#apʀe/ → [ɑ̃.ɑ̃.pʀe] 'years after'	7	3	3	1	6	1
e) Between nasal segments *donné une* /dɔn + e#ɛn/ → [dɑ̃.nɛ̃.ɛ̃n] 'gave a'	16	6	6	1	2	1
f) No nasal segments *oublié* /ubli + e/ → [ɔ̃.bli.je] 'forgot'	4	1	3	1	6	1
Total	285	100	532	100	443	100

TABLE 3. *Rate of contextual nasalization with a following nasal segment by word and syllable boundaries for all data sets combined*

Following Nasal Segment		Example	Nasalization Rate *n*	%
Word-external	Syllable-external	*trois mille* /tʀa#mil/ → [tʀa.mil] 'three thousand'	36/1295	3
	Syllable-internal	*a menu* /a#mən + y/ → [am.ny] 'has come'	6/91	7
Word-internal	Syllable-external	*ami* /ami/ → [ɑ̃.mi] 'friend'	590/723	82
	Syllable-internal	*comme* /kɔ̃m/ → [kɔ̃m] 'like'	558/622	90

occurs only 7% of the time. However, if the following nasal segment is syllable-external, but word-internal, the vowel nasalizes 82% of the time. Thus, contextual nasalization occurs regularly across the syllable boundary, but rarely across the word boundary. This runs counter to earlier assumptions about contextual nasalization in Louisiana French.

Further precisions come in Table 4, which shows the rate of contextual nasalization for each underlying oral vowel across the data sets, considering only

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TABLE 4. *Rate of contextual nasalization before a word-internal nasal segment by vowel quality:1977, 2010–2011 Formal (2010-F) and 2010–2011 Informal (2010-I) data sets*

	Data Set					
Underlying Vowel(s)	1977		2010-F		2010-I	
	n	%	*n*	%	*n*	%
/œ/	2/4	50	15/19	79	1/3	33
/a/	52/65	80	107/152	70	95/116	82
/e/, /ɛ/	94/107	88	207/234	89	167/184	91
/o/, /ɔ/	94/96	98	166/181	92	148/184	80

those cases with a word-internal following nasal segment. Overall, the three vowels nasalize between 75% and 98% of the time in this environment. Vowel nasalization becomes less frequent for /o/ ~ /ɔ/ across time and speech register.

RESULTS: LOGISTIC REGRESSIONS

The examination now turns to logistic regressions carried out using Goldvarb software (Sankoff, Tagliamonte, & Smith, 2005) to test how these factors compare in their influence on contextual nasalization rates, along with sociolinguistic factors. Specifically, the regression analyses include the systemic factor groups of vowel quality (/e/ ~ /ɛ/, /o/ ~ /ɔ/, /a/), nasality of the preceding segment (oral, nasal), syllable membership of the following segment (syllable-internal, syllable-external) and word membership of the following segment (word-internal, word-external). Significant factor groups are presented wherever possible by range in decreasing order[10]. Note that due to a low number of available tokens, the 45 data points involving the vowel quality /œ/ do not figure in the logistic regressions. Also, 70 cases of vowel nasalization are excluded from the analysis, since oral counterparts in the same phonetic contexts are not part of the data set (see Table 2, contexts b-f). In addition, the nasality of the following segment is not included as a factor group, since all tokens under analysis come before a nasal segment.

The logistic regressions also include the external factor groups of generation (ancestor, elder, older, younger), data set (1977, 2010-F, 2010-I), and sex (male, female). Regarding the generation and sex factor groups, in the 1977 data set, female speakers are all part of the older generation, and there is a single male speaker from the younger generation. As a result, the intergenerational analysis of the 1977 corpus only considers male speakers, excluding the younger generation speaker and grouping together the speakers from the ancestor and elder generations. In terms of data sets, comparisons are of the 1977 and 2010-F data on the one hand, since they share the same speech style but vary in terms of time period, and the 2010-F and 2010-I data sets on the other hand, as they come from the same time period but differ in the degree of formality.

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TABLE 5. *Factors contributing to vowel nasalization for six male speakers in the 1977 data set*
Input = .358
n = 224

Factor	Weight	%	*n*
Following Segment			
Word-internal	.95	89	109
Word-external	.06	4	115
Range	*89*		
Following Segment			
Syllable-internal	.80	77	56
Syllable-external	.39	35	168
Range	*41*		
Generation			
Older	.67	54	119
Ancestor/Elder	.31	35	105
Range	*36*		
Vowel Quality			
/o/ ~ /ɔ/	[.76]	90	39
/e/ ~ /ɛ/	[.54]	43	104
/a/	[.32]	26	81
Preceding Segment			
Nasal	[.73]	61	28
Oral	[.46]	43	196

Note: Statistically insignificant factor weights appear in brackets.

1977 MALE SPEAKERS

Table 5 summarizes the analysis of six male speakers from the 1977 data set. Three of the five factor groups (word membership of the following segment, syllable membership of the following segment, generation) have a statistically significant effect on the occurrence of vowel nasalization. Specifically, the factor weights show that contextual nasalization is strongly favored when the following segment is word-internal, at .95; when the following segment is syllable-internal, at .80; and among the older generation of male speakers interviewed in 1977, at .67. Neither vowel quality nor the nasality of the preceding segment has a significant effect on contextual nasalization in this data set.

OLDER GENERATION SPEAKERS

The analysis now compares results for speakers from the same generation, first contrasting the interview time period (1977 versus 2010-F) and then the speech style (2010-F versus 2010-I), since these can be important factors in sound pattern variation and change. The younger generation is not examined, because although the 2010–2011 interviewees include six men and six women belonging to the younger generation, there is only one speaker interviewed in 1977 who is part of this age group. However, the even distribution of older generation

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TABLE 6. *Factors contributing to vowel nasalization for eight older speakers from each data set*

	1977 Input: .544, *n* = 373			2010-F Input: .186, *n* = 469			2010-I Input: .234, *n* = 416		
Factor	Weight	%	*n*	Weight	%	*n*	Weight	%	*n*
Following Segment									
Word-internal	.91	94	200	.97	85	210	.96	87	192
Word-external	.06	4	173	.06	2	259	.06	2	224
Range	*85*			*91*			*90*		
Vowel Quality									
/o/ ~ /ɔ/	.79	93	81	[.60]	73	74	.36	62	84
/e/ ~ /ɛ/	.45	47	161	[.53]	35	245	.65	39	205
/a/	.35	33	131	[.41]	29	150	.35	32	127
Range	*44*						*30*		
Following Segment									
Syllable-internal	.79	92	97	.66	83	113	[.56]	73	122
Syllable-external	.39	38	276	.45	25	356	[.48]	28	294
Range	*40*			*21*					
Preceding Segment									
Nasal	[.52]	59	56	.19	37	74	[.48]	47	64
Oral	[.38]	51	317	.57	40	395	[.53]	40	352
Range				*38*					
Sex									
Male	[.57]	54	119	[.44]	39	241	[.53]	40	212
Female	[.47]	51	254	[.57]	39	228	[.47]	43	204

Note: Statistically insignificant factor weights appear in brackets.

speakers interviewed in each time period makes this generation ideal for a longitudinal comparison. Eight of the speakers interviewed in 1977 (three men, five women) have birth years between 1918 and 1931, and there are also four men and four women from the 2010–2011 interviews born during the same time period. Table 6 gives the results for older generation speakers in the 1977 and 2010–2011 interviews.

Beginning with the comparison of time periods, Table 6 shows that the word membership of the following nasal segment is the most powerful factor group in both 1977 and 2010-F speech, with a range between 85 and 91. Specifically, a word-internal nasal segment strongly encourages vowel nasalization, while a word-external nasal segment almost always blocks contextual nasalization[11]. The syllable boundary plays a secondary role in accounting for vowel nasalization patterns, and it becomes less important over time, since the range for this factor group relative to those of the other factor groups in each analysis is smaller in 2010-F than in 1977. Also, the speaker's sex is not selected as a significant factor group in either regression. In terms of differences, the quality of the vowel is a significant factor in 1977 formal speech, but not in 2010–2011 formal speech, though the direction of effect is the same. In addition, the nasality of the preceding segment is a significant factor group in the 2010-F data set, but cross tabulations show that this is because of an uneven distribution of tokens by the

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nasality of the preceding segment within the word and syllable membership factor groups.

Turning to the comparison of speech styles among older generation speakers recorded in 2010–2011, only the word boundary and the vowel quality have a significant effect on contextual nasalization in the less formal speech style. This means that the syllable boundary, already a less powerful factor in 2010–2011 formal speech than it was in 1977, does not have a significant effect on vowel nasalization in less formal speech.

OLDER AND YOUNGER GENERATION SPEAKERS

Is there a generational difference in contextual nasalization among speakers interviewed in 2010–2011? In order to address this question, the analysis considers logistic regressions for each speech style, including the factor group of generation.

In Table 7, the overall factor group ranking by range is consistent between the two speech styles. Regarding systemic factors, the word boundary and the vowel quality are statistically significant factor groups for vowel nasalization in more and less formal speech. However, while the nasality of the preceding segment and the syllable membership of the following segment are statistically significant factor groups in formal speech, they are not in less formal speech. Note that for the 2010-I data set, there is a mismatch between the factor weights and percentages in the vowel quality factor group. Cross tabulations reveal that this discrepancy is due to the distribution of /o/∼/ɔ/ with respect to the word membership of the following nasal segment: tokens from underlying /o/∼/ɔ/ make up a very small proportion of the tokens with a following word-external nasal segment ($n = 32/501$), but form a large proportion of the tokens with a following word-internal nasal segment ($n = 184/484$) in the 2010-I corpus.

As for the sociolinguistic variables of generation and sex, Table 7 shows that in the 2010–2011 interviews, there is no statistically significant difference between older and younger generation speakers regarding contextual vowel nasalization. The factor group of sex appears significant in formal speech (with a small range of 12), even though men and women nasalize vowels at the same rate. Cross tabulations indicate that this is due to an imbalanced ratio of word-internal to word-external following nasal segments by sex, such that women produce 54% of the tokens with a word-internal following nasal segment ($n = 168/309$), while men produce 52% of the tokens with a word-external following nasal segment ($n = 456/877$).

In sum, the logistic regressions confirm that the word domain is the best predictor of vowel nasalization in all subsets of the speech data. Specifically, vowel nasalization almost never crosses the word boundary, although it can cross the syllable boundary. Different factor group ranges suggest that some of the factors controlling this process have changed over time and may also vary depending on the formality level of the conversation.

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TABLE 7. *Factors contributing to vowel nasalization for older and younger speakers in 2010–2011*

	2010-F Input: .267, *n* = 1186			2010-I Input: .288, *n* = 985		
Factor	Weight	%	*n*	Weight	%	*n*
Following Segment						
Word-internal	.94	85	567	.94	85	501
Word-external	.08	3	619	.07	3	484
Range	*86*			*87*		
Vowel Quality						
/o/ ~ /ɔ/	.62	78	212	.39	69	216
/e/ ~ /ɛ/	.58	39	576	.62	39	463
/a/	.32	27	398	.40	32	306
Range	*30*			*16*		
Previous Segment						
Oral	.55	43	985	[.52]	43	852
Nasal	.29	38	201	[.37]	45	133
Range	*26*					
Following Segment						
Syllable-internal	.67	81	309	[.55]	76	245
Syllable-external	.44	28	877	[.48]	33	740
Range	*23*					
Sex						
Female	.56	42	589	[.48]	46	474
Male	.44	42	597	[.52]	41	511
Range	*12*					
Generation						
Younger	[.51]	44	717	[.49]	45	569
Older	[.49]	39	469	[.51]	41	416

Note: Statistically insignificant factor weights appear in brackets.

DISCUSSION

Altogether, a quantitative review of the data has shown that the overall rate of contextual nasalization has decreased significantly over time, and that contextual nasalization often crosses the syllable boundary, but rarely crosses the word boundary. Logistic regressions have verified that a word-internal following nasal segment is the best predictor for vowel nasalization in all subsets of the data. Importantly, these results have provided clear evidence that contextual nasalization in Louisiana French is primarily governed by the scope of a given word, rather than a given syllable[12], which goes against earlier impressionistic reports of phonetic vowel nasalization.

The analysis compared older generation speakers recorded in 1977 to older generation speakers recorded in 2010–2011. For both groups, the word membership and the syllable membership of the following segment were significant factors. However, a comparison of 2010–2011 formal and informal speech for older generation speakers indicated that in the less formal speech register, the syllable membership of the following segment no longer had a

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statistically significant effect on contextual vowel nasalization. The investigation of older and younger generation speakers recorded in 2010–2011 suggested that contextual nasalization currently involves more factors in formal speech than in less formal speech.

Logistic regressions also showed that there is no statistically significant difference between older and younger generation speakers regarding contextual vowel nasalization in the 2010–2011 interview data. This stands in contrast to the results of the 1977 data analysis, which revealed a generational split amongst six male speakers. While the 1977 data sample cannot be compared directly to the 2010–2011 sample, as the former includes ancestors and elders while excluding female speakers, and the latter includes female speakers in addition to younger speakers, it is still worthwhile to note that a generational divide appears to have existed, at least for male speakers, in 1977, but does not exist in 2010–2011.

Neither sex nor, in 2010–2011, generation is a significant factor group for vowel nasalization, indicating that speakers do not appear to use the phonetic process of contextual nasalization to identify with one or more sub-groups of the population. Previous work found that sex and generation are active sociolinguistic factors for nasalized consonants in Cajun English (Dubois & Horvath, 1998) and nasalized vowels in Louisiana French (Dubois, 1999, cited in Dubois & Horvath, 2000). It may be that methodological differences explain the contrasting results, as the current study employed both impressionistic and acoustic cues to identify nasalized vowels, or that demographic differences between the speaker samples are at the root of the divergence.

It should be noted that there are rare cases, in all three data sets, of contrastive nasal vowels influencing non-contrastive nasal vowels when the latter surface without a following nasal segment (e.g., *troisième* /tʀwa + zjɛm/ → [tʀa.zjɛ̃] 'third') or nasalize without a nasal conditioning environment (e.g., *aussi* /osi/ → [ɔ̃.si] 'also'). This evidence of blurred boundaries may suggest that the two types of nasal vowels in Louisiana French are just beginning to overlap in their application. However, the vast majority of nasal vowels appear without a following nasal segment, while virtually all nasalized vowels are produced with a following nasal segment. This indicates that the two types of vowel nasality remain separate, even though Louisiana French is seriously endangered.

Considering the length of time between the 1977 and 2010–2011 interviews and Louisiana French's severely threatened status, it is remarkable that the phonetic process of contextual nasalization has maintained such a relative level of stability. This is likely because contextual nasalization is also a phonetic process in English, and is thus reinforced as a dynamic process in Louisiana French. Just the same, phonetic nasal vowels are included in past descriptions of Francophone communities where English was not yet the majority language. Additionally, while contextual nasalization is regressive in both Louisiana French and English, the domain of application is different in each language. Furthermore, the rate of vowel nasalization has actually gone down over time, even as the influence of English has increased in the Golden Meadow area. Therefore, it is important to recognize that although contact with English may be

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encouraging contextual vowel nasalization in present-day Louisiana French, it does not appear to be the origin of this phenomenon.

CONCLUSION

In his description of Golden Meadow Louisiana French, Guilbeau (1950:53–54) asserts that contextual nasalization is regressive (anticipatory) and happens within the word boundary, but he also observes that both progressive (carryover) contextual nasalization and anticipatory nasalization across word boundaries occur in Golden Meadow Louisiana French, without specifying the relative frequency of these phenomena.

The analysis of data from interviews with 32 native speakers, yielding nearly 3000 data points for analysis, has clearly shown that contextual nasalization functions differently than has been assumed in the past: it is almost exclusively regressive in Louisiana French, with nasality rarely crossing the word boundary or moving from left to right in the speech stream, and systemic variables are most actively involved in the process.

The results have demonstrated that contextual nasalization rates have gone down in Golden Meadow Louisiana French over the past 40 years. This runs counter to expectations, since contextual nasalization is a widespread process in English, the dominant contact language, and would normally be predicted to thrive in Louisiana French[13]. Moreover, the domain of application for phonetic vowel nasality has not changed to mirror the English syllable-level template. Thus, while English contextual nasalization seems to be encouraging the maintenance of this phonetic contrast in French, at least to a certain extent, it is not the root of this phenomenon in Louisiana French.

Predictions in the literature on language death and sound systems have focused on the phonemic inventory, but contextual nasalization allows the study of a phonetic process that is widespread in both the dying and the dominant language. Results suggest that such a process may still decline in a situation of severe language endangerment, but not as quickly as phonetic processes not shared with the dominant language. It is hoped that this research will spur further linguistic investigations of this disappearing language variety.

NOTES

1. Louisiana French is also referred to as Cajun French and Louisiana Regional French. There is a longstanding and complicated interplay of linguistic and ethnic labels in Francophone Louisiana (Dajko, 2012; Klingler, 2003, 2005). As the current study only looks at one of several varieties of French spoken in Louisiana, linguistic characteristics define the term *Louisiana French*, distinguishing it from Louisiana Creole (Brasseaux, 2005) and Plantation Society French (Picone, 1998).

2. A parish is the Louisiana equivalent of a county.

3. But see Picone (2006) for a review of Louisiana French language use outside of Acadiana.

4. Studies such as Salmon (2007, 2009) control for the factor of sex by focusing on only female speakers.

5. A reviewer asks if any speakers interviewed in 1977 were also interviewed in 2010–2011. One speaker, LC1-1918-M, was interviewed in both time periods, but he is not one of the 2010–2011 speakers included in the Blainey (2013) corpus.

6. Following two anonymous reviewers' suggestions, 19 tokens have been removed because they are potentially phonemic nasal vowels. In particular, one case coded as *gros* ([gʀõ] 'big') is excluded because it could be a case of *grand* (/gʀɑ̃/ 'big'); one case coded as *apporte* ([ɑ̃.pɔʀ] 'bring') could be homophonous *emporte* (/ɑ̃.pɔʀt/ 'bring'); and one case coded as *moi-même* ([mɔ̃.mɛ̃m] 'myself') could be *mon-même* ([mɔ̃.mɛ̃m] 'myself'). The other 16 tokens are excluded because of the possible presence of *en* (/ɑ̃/ 'at'), and involve *à* ([ɑ̃] 'at'), *au(x)* ([ɑ̃] 'at the'), *jusqu'à* ([ʃkɑ̃] 'to, until'), *me* ([mɑ̃] 'to myself'), or *là* ([lɑ̃] 'there').

7. The vowel and nasal segment do not have to belong to the same syllable or word. Thus, the vowel /a/ in *il a menu* (/il#a#məny/ 'he came') is also scanned for contextual nasalization because it precedes a word-external nasal segment, and the vowel /a/ in *ans après* (/ɑ̃#apʀe/ 'years after') is checked for nasality because it follows a word-external nasal segment.

8. The current study adopts the following short forms for the data sets under analysis: '1977' denotes the Larouche speakers and data; '2010-F' identifies the Blainey speakers and data coming from the more formal speech register; and '2010-I' represents the Blainey speakers and data from the less formal speech style.

9. The rate of contextual nasalization is significantly different between the 1977 and 2010-F data sets, χ^2 (1, n = 1,788) = 10.38, p = .00. It is also significant between the 1977 and 2010-I data sets, χ^2 (1, n = 1,568) = 8.37, p = .00. However, there is no significant difference in the overall rate of contextual nasalization between the two speech styles in the 2010–2011 corpus, χ^2 (1, n = 2246) = .08, p = .78. The analysis maintains the 2010-F and 2010-I distinction in order to further examine these speech styles in the logistic regressions.

10. Each factor group's range is calculated by subtracting the smallest factor weight from the largest factor weight and multiplying by 100.

11. A reviewer wonders whether there are not any lexical effects in factors with small *n*s. One possible example is cases of nasalized vowels that come before a word-external nasal segment in Table 6. Nearly all of these tokens come before the determiner *un(e)* ([ɛ̃] ~ [ɛ̃n] 'a, one'): 7/7 in 1977; 3/4 in 2010-F; and 4/5 in 2010-I. However, the majority of tokens appearing before *un(e)* remain oral: 30/37 in 1977; 51/54 in 2010-F; and 40/44 in 2010-I. Thus, while it is true that virtually all cases of vowel nasalization across the word boundary involve the following word *un(e)*, it is *not* true that the following word *un(e)* encourages vowel nasalization across the word boundary in the majority of cases.

12. Thanks to an anonymous reviewer for suggesting this wording.

13. A reviewer points out that it is possible for bilinguals to have phonetic outputs that are intermediate between monolingual targets, citing Flege and Hillenbrand's (1984) study of VOT in French-English bilinguals. The reviewer also notes that ideally, a diachronic analysis with comparable vowel nasalization data from American English would enrich this study of Louisiana French vowel nasalization.

REFERENCES

Andersen, Roger W. (1982). Determining the Linguistic Attributes of Language Attrition. In R. D. Lambert & B. F. Freed (eds.), *The Loss of language skills*. Rowley: Newbury House Publishers. 83–118.

Baronian, Luc V. (2005a). Pre-Acadian Cajun French. *Papers from the 31st Annual Meeting of the Berkeley Linguistics Society*. Berkeley: Berkeley Linguistics Society. 37–48.

_____ (2005b). Une influence probable du créole louisianais sur le français cadien. *La Linguistique* 41 (1):133–140.

Basset, Patricia, Amelot, Angélique, Vaissière, Jacqueline, & Roubeau, Bernard. (2001). Nasal airflow in French spontaneous speech. *Journal of the International Phonetic Association* 31:87–99.

Benguerel, André-Pierre, Hirose, Hajime, Sawashima, Masayuki, & Ushijima, Tatsujiro. (1977). Velar coarticulation in French: a fiberscopic study. *Journal of Phonetics* 5:149–158.

Blainey, Darcie L. (2009). Schwa behaviour in formal and informal speech in the French of Ville Platte, Louisiana. In F. Mailhot (ed.), *2009 Canadian Linguistics Association (CLA) Conference Proceedings*. Ottawa.

_____ (2013). *First to come, last to go: Phonological change and resilience in Louisiana Regional French*. Doctoral dissertation, Tulane University.

Brasseaux, Carl A. (2005). *French, Cajun, Creole, Houma: a primer on francophone Louisiana*. Baton Rouge: Louisiana State University Press.

Breton, Roland J.-L., & Louder, Dean. (1979). La géographie linguistique de l'Acadiana. *Cahiers de géographie du Québec* 23(59):217–238.

https://doi.org/10.1017/S0954394515000216 Published online by Cambridge University Press

Bullock, Barbara E., & Gerfen, Chip. (2004). Phonological convergence in a contracting language variety. *Bilingualism: Language and Cognition* 7(2):95–104.
Buniet, Laurent. (1997). *Traitement automatique de la parole en milieu bruité: étude de modèles connexionnistes statiques et dynamiques*. Doctoral dissertation, l'Université Henri Poincaré.
Byers, Bruce A. (1988). *Defining norms for a non-standardized language: A study of verb and pronoun variation in Cajun French*. Doctoral dissertation, Indiana University.
Carmichael, Katie. (2008). *Language Death and Stylistic Variation: An Intergenerational Study of the Substitution of /h/ for /ɦ/ in the French of the Pointe-Au-Chien Indians*. Master's thesis, Tulane University.
Census Bureau, United States. (2011). Language Spoken at Home by Ability to Speak English for the Population Five Years and Older. 2007–2011 American Community Survey 5-Year Estimates.
Center for Louisiana Studies. (2011). Archives of Creole and Cajun Folklore: Projet Louisiane. Available at: http://lastudiesfilemaker.louisiana.edu/fmi/iwp/cgi?-db=ACCF_1&-loadframes. Accessed September 15, 2011.
Chafcouloff, Michel, & Marchal, Alain. (2006). Velopharyngeal coarticulation. In W. J. Hardcastle & N. Hewlett (eds.), *Coarticulation: Theory, Data and Techniques*. Cambridge: Cambridge University Press. 69–79.
Cohn, Abigail C. (1993). Nasalisation in English: phonology or phonetics. *Phonology* 10(01):43–81.
Conwell, Marilyn Jane. (1961). *Lafayette French phonology: a descriptive, comparative, and historical study of a Louisiana French dialect*. Doctoral dissertation, University of Pennsylvania.
Dajko, Nathalie. (2012). Sociolinguistics of Ethnicity in Francophone Louisiana. *Language and Linguistics Compass* 6(5):279–295.
Delattre, Pierre. (1954). Les attributs acoustiques de la nasalité vocalique et consonantique. *Studia Linguistica* 8:103–108.
Delvaux, Véronique. (2000). Étude aérodynamique de la nasalité en français. *XXIIIèmes Journées d'Étude sur la Parole*. Aussois. 141–144.
Delvaux, Véronique, Demolin, Didier, Harmegnies, Bernard, & Soquet, Alain. (2008). The aerodynamics of nasalization in French. *Journal of Phonetics* 36(4):578–606.
Delvaux, Véronique, Demolin, Didier, Soquet, Alain, & Kingston, John. (2004). La perception des voyelles nasales du français. *XXVèmes Journées d'Étude sur la Parole*. Fès. 157–160.
Delvaux, Véronique, Metens, Thierry, & Soquet, Alain. (2002). Propriétés acoustiques et articulatoires des voyelles nasales du français. *XXIVèmes Journées d'Étude sur la Parole*. Nancy. 348–352.
Dressler, Wolfgang U. (1991). The sociolinguistic and patholinguistic attrition of Breton phonology, morphology, and morphonology. In H. W. Seliger & R. M. Vago (eds.), *First Language Attrition*. Cambridge; New York: Cambridge University Press. 99–112.
Dressler, Wolfgang U., & Wodak-Leodolter, Ruth. (1977). Language Preservation and Language Death in Brittany. *Linguistics* 191:33–44.
Dubois, Sylvie. (1997). Field Methods in Four Cajun Communities in Louisiana. In A. Valdman (ed.), *French and Creole in Louisiana*. New York: Plenum Press. 47–70.
_____. (1999). The Cajun French report. Maintenance and attrition. *Unpublished final report (SBR-9514831) to National Science Foundation*.
_____. (2001). Attrition linguistique ou convergence dialectale: JE, MOI/JE et MOI en français cadien. *Faits de langues: Langues de diaspora, langues en contact* 18:149–165.
_____. (2005). Un siècle de français cadien parlé en Louisiane: persistance linguistique, hétérogénéité géographique et évolution. In A. Valdman, J. Auger & D. Piston-Hatlen (eds.), *Le français en Amérique du Nord: état présent*. Sainte-Foy: Les Presses de l'Université Laval. 287–305.
Dubois, Sylvie, & Horvath, Barbara M. (1998). From accent to marker in Cajun English: A study of dialect formation in progress. *English World-Wide* 19(2):161–188.
_____ (2000). When the music changes, you change too: Gender and language change in Cajun English. *Language Variation and Change* 11:287–313.
Dubois, Sylvie, & Noetzel, Sibylle. (2005). Intergenerational pattern of interference and internally-motivated changes in Cajun French. *Bilingualism: Language and Cognition* 8(2):131–143.
Dubois, Sylvie, Noetzel, Sibylle, & Salmon, Carole. (2005). Les innovations en français cadien: interférences ou changements motivés de façon interne au système? In P. Brasseur & A. Falkert (eds.), *Français d'Amérique: Approches Morphosyntaxiques. Actes du colloque international Grammaire comparée des variétés de français d'Amérique (Université d'Avignon, 17–20 mai 2004)*. Paris: L'Harmattan. 27–38.
_____. (2006). L'usage des pratiques bilingues dans la communauté cadienne. *Canadian Journal of Applied Linguistics/Revue canadienne de linguistique appliquée* 9(2):207–219.

Durand, Jacques, Laks, Bernard, & Lyche, Chantal. (2002). La phonologie du français contemporain: usages, variétés et structures. In C. D. Pusch & W. Raible (eds.), *Romanistische Korpuslinguistik-Korpora und gesprochene Sprache*. Tübingen: Gunter Narr Verlag. 93–106.

_____. (2005). Un corpus numérisé pour la phonologie du français. In G. Williams (ed.), *La linguistique de corpus*. Rennes: Presses universitaires de Rennes.

Estaville Jr., Lawrence E. (1988). The Louisiana French in 1900. *Journal of Historical Geography* 14 (4):342–359.

Flege, James, & Hillenbrand, James. (1984). Limits on phonetic accuracy in foreign language speech production. *Journal of the Acoustical Society of America* 76:708–721.

Grosjean, Michèle. (1995). Changements de voix, changements de position dans le travail de la sage-femme. *La Revue de musicothérapie* 15(1):12–28.

Guilbeau, John J. (1950). *The French spoken in Lafourche Parish, Louisiana*. Doctoral dissertation, University of North Carolina Chapel Hill.

_____ (1958). La phonologie et les études des parlers franco-louisianais. *Comptes-rendus de l'Athenée louisianais*:28–39.

Hansen, Anita B. (1998). *Les voyelles nasales du français parisien moderne: aspects linguistiques, sociolinguistiques et perceptuels des changements en cours*. København: Museum Tusculanum Press.

Kelly, Stephanie, Poiré, François, & Williams, Darcie. (2007). The Nasal Appendix in Canadian French. *Proceedings of the 33rd Conference of the Linguistic Association of Canada and the United State (LACUS)*. Toronto. 317–327.

Klingler, Thomas A. (2003). *If I Could Turn My Tongue Like That: The Creole Language of Pointe Coupee Parish, Louisiana*. Baton Rouge: Louisiana State University Press.

_____ (2005). Le problème de la démarcation des variétés de langues en Louisiane: étiquettes et usages linguistiques. In A. Valdman, J. Auger, & D. Piston-Hatlen (eds.), *Le français en Amérique du Nord: état présent*. Sainte-Foy: Les Presses de l'Université Laval. 349–367.

Klingler, Thomas A., & Lafleur, Amanda. (2007). L'enquête PFC en Louisiane. In S. Detey & D. Nouveau (eds.), *Bulletin PFC N. 7: PFC: enjeux descriptifs, théoriques et didactiques 2007*. Toulouse: Université de Toulouse II. 395.

Labov, William. (1984). Field Methods of the Project in Linguistic Change and Variation. In J. Baugh & J. Sherzer (eds.), *Language in Use: Readings in Sociolinguistics*. Englewood Cliffs: Prentice-Hall. 28–53.

Larouche, Alain H. (1979). Les cadjins du Canal Yankee: Problèmes d'identité culturelle dans la paroisse Lafourche. *Cahiers de géographie du Québec* 23(59): 239–262.

_____ (1980). *Ethnicité, pêche et pétrole: Les cadjins du Bayou Lafourche en Lousisiane francophone*. Master's thesis, York University.

Louder, Dean, & Waddell, Eric. (1979). À la recherche de la Louisiane française. *Cahiers de géographie du Québec* 23(59):193–197.

Montagu, Julie. (2002). L'articulation labiale des voyelles nasales postérieures du français: comparaison entre locuteurs français et anglo-américains. *XXIVèmes Journées d'Étude sur la Parole*. Nancy.

Neumann-Holzschuh, Ingrid. (2009). Contact-induced structural change in Acadian and Louisiana French: mechanisms and motivations. *Langage et Société* 129(3):47–68.

Papen, Robert A., & Rottet, Kevin J. (1996). Le français cadjin du bassin Lafourche: sa situation sociolinguistique et son système pronominal. In L. Dubois & A. Boudreau (eds.), *Les Acadiens et leur(s) langue(s): quand le francais est minoritaire, Actes du colloque*. Moncton: Editions d'Acadie. 233–252.

_____ (1997). A Structural Sketch of the Cajun French Spoken in Lafourche and Terrebonne Parishes. In A. Valdman (ed.), *French and Creole in Louisiana*. New York: Plenum Press. 71–107.

Parr, Una M. (1940). *A glossary of the variants from standard French in Terrebonne Parish, with an appendix of popular beliefs, superstitions, medicine, and cooking recipes*. Master's thesis, Louisiana State University.

Picone, Michael D. (1998). Historic French diglossia in Louisiana. *58th Annual Meeting of the Southeastern Conference on Linguistics (SECOL)*. University of Southwestern Louisiana, Lafayette.

_____ (2006). Le français louisianais hors de l'Acadiana. *Canadian Journal of Applied Linguistics/ Revue canadienne de linguistique appliquée* 9(2):221–231.

Rottet, Kevin J. (1998). Clause Subordination Structures in Language Decline. *Journal of French Language Studies* 8(1):63–95.

_____ (2000). The Calquing of Phrasal Verbs in Language Contact. In J. Auger & A. Word-Allbritton (eds.), *The CVC of Sociolinguistics: Contact, Variation, and Culture. Working Papers in Linguistics*. Bloomington: IULC. 109–126.

_____ (2001). *Language Shift in the Coastal Marshes of Louisiana*. New York: Peter Lang.
_____ (2004). Inanimate interrogatives and settlement patterns in Francophone Louisiana. *Journal of French Language Studies* 14(2):169–188.
_____ (2005a). Attestation et disparition du type *j'avons* en Louisiane. In P. Brasseur & A. Falkert (eds.), *Français d'Amérique: approches morphosyntaxiques*. Paris: L'Harmattan. 213–227.
_____ (2005b). Variation et étoilement en français cadien. In A. Valdman, J. Auger & D. Piston-Hatlen (eds.), *Le français en Amérique du Nord: état présent*. Sainte-Foy: Les Presses de l'Université Laval. 243–260.
Salmon, Carole. (2007). *Français acadien, français cadien: variation stylistique et maintenance de formes phonétiques dans le parler de quatre générations de femmes cadiennes*. Doctoral dissertation, Louisiana State University.
_____. (2009). *Cent ans de français cadien en Louisiane: étude sociolinguistique du parler des femmes*. New York: Peter Lang.
Sankoff, David, Tagliamonte, Sali A., & Smith, Eric. (2005). Goldvarb X: A variable rule application for Macintosh and Windows. Department of Linguistics, University of Toronto.
Sankoff, Gillian, & Blondeau, Hélène. (2007). Language change across the lifespan: /r/ in Montreal French. *Language* 83(3):560–588.
Taylor, Jill. (1996–1997). Voyelles nasales et norme locale à Aix en Provence. *Cahiers de l'Institut de Linguistique de Louvain* (*CILL*) 22–23(3–4 / 1–2):369–373.
Teffahi, Hocine, Guerin, Bernard, & Djeradi, Amar. (2005). Étude par Simulation de Caractéristiques Acoustiques du Conduit Vocal avec Pertes. *Canadian Acoustics* 33(2):13–24.
Vaissière, Jacqueline. (1995). Nasalité et phonétique. *Le voile du palais et la parole, Conférence Tutorielle Invitée. Colloque sur le voile pathologique*. Lyon: La Société Française d'Acoustique.
Valdman, Albert, & Klingler, Thomas A. (1997). The Structure of Louisiana Creole. In A. Valdman (ed.), *French and Creole in Louisiana*. New York: Plenum Press. 109–144.
Violin-Wigent, Anne. (2006). Southeastern French Nasal Vowels: Perceptual and Acoustic Elements. *The Canadian Journal of Linguistics/La revue canadienne de linguistique* 51(1):15–43.