NEW DIALECT FORMATION THROUGH LANGUAGE CONTACT: VOCALIC AND PROSODIC DEVELOPMENTS IN MIAMI ENGLISH

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ABSTRACT: The situation of sustained contact between Spanish and English in Miami during the past half century provides a rare opportunity to study contact-induced language change in an ecological context in which speakers of the immigrant language (i.e., Spanish) have become the numerical majority. The study reported here is designed to track the phonetic and prosodic influences of Spanish on the variety of English emerging among second-generation Miami-born Latinx speakers of various national origin backgrounds by examining a suite of variables shown in prior studies to exhibit Spanish substrate influence in other regional contexts. We examine two kinds of phonetic variables in the English spoken by 20 second-generation Latinx and 5 Anglo white speakers: (1) prosodic rhythm and (2) vowel quality. Prosodic rhythm was quantified using Low and Grabe's Pairwise Variability Index (nPVI); results show that Miami-born Latinx speakers are significantly more syllable-timed in casual speech than Miami-born Anglo white speakers. Significant vocalic differences were also observed, with Latinx speakers producing lower and more backed tokens of [æ] in prenasal and nonprenasal positions and more backed tokens of [u].

KEYWORDS: Spanish, substrate influence, prosodic rhythm, vowel quality

No situation of language contact in North America has received more attention from sociolinguists and dialectologists than that between Spanish and English. This is, of course, a testament not only to the large number of Spanish speakers in the United States today, who number nearly 50 million (Escobar and Potowski 2015, 9–10), but also to the historical presence of Spanish throughout vast regions of the United States (Lynch 2018). In addition to these regions, linguists have recently paid attention to places where the presence of Spanish owes to patterns of recent immigration, such as those in the mid-Atlantic South and the Midwest. Our knowledge of the ways that Spanish can influence English structurally has benefited from

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numerous studies conducted in regional settings including California (Metcalf 1972; Godinez and Maddieson 1985; Mendoza-Denton 1997; Fought 2003), Texas and the Southwest (McDowell and McRae 1972; Metcalf 1974; Thompson 1975; Bills 1977; Hamilton 1977; Galindo 1988; Penfield and Ornstein-Galicia 1985; Wald 1984; Santa Ana 1993; Bayley 1994; Thomas 2000, 2001, 2019), the Mid-Atlantic South (Wolfram, Carter, and Moriello 2004; Erickson 2007; Wolfram, Kohn, and Callahan-Price 2011; Tseng 2015; Callahan 2018), and New York City (Labov et al. 1968; Ma and Herasimchuk 1971; Wolfram 1974; Zentella 1997; Newman 2010). On account of these studies, we have seen that varieties of English that developed in bilingual contexts and in sustained contact with Spanish are susceptible to the structural influence of Spanish at all linguistic levels (i.e., phonetics, phonology, prosody, morphosyntax, lexicon). We also know that the type of linguistic influence exerted in a given speech community depends on sociolinguistic factors related to population ecology and the nature of bilingualism in the speech community (Santa Ana 1993).

With respect to situations of language contact in the United States in general, dialectologists and sociolinguists working within the variationist tradition have long been concerned with the role that language contact plays in the process of new dialect formation. Cross-generational community studies conducted by variationists have shown that influences from the immigrant language often persist even after the immigrant language is lost (e.g., Howell 1993; Winford 2005; Purnell, Salmons, and Tepeli 2005; Trudgill 2010). Linguists tend to agree that for the immigrant generation, so-called substrate and transfer effects from a speaker's first language can mark their later acquired English as "nonnative" at the grammatical and phonological levels (Winford 2003). In the speech of the children of immigrants, however, these linguistic-structural effects tend to disappear since children "learn the patterns of their peers" (Labov 1991) rather than that of their parents. Therefore, children do not generally acquire so-called nonnative dialect forms based on parental input (Labov 2008, 317); as a result, the transmission of these forms is interrupted before they effect change within the speech community.

Despite what we know about the language of the children of immigrants, linguists studying situations of language contact between English and various other languages[1] spoken in the United States have long observed that English is not impervious to the structural influence of other languages in situations of sustained contact. This appears to be true even in situations of unstable bilingualism, in which the immigrant language gives way to English in a single generation through the pressures of language shift. Early American dialectologists were attendant to this phenomenon; studies

by Kurath (1949), Kurath and McDavid (1961), and Atwood (1953) were concerned, for example, with documenting various types of phonological, morphosyntactic, and lexical influence from German on varieties of English spoken in Pennsylvania. This tradition of inquiry within the allied fields of sociolinguistics and dialectology has been vibrant ever since,[2] and in the ensuing decades linguists have documented countless situations in which languages other than English have played a role in new dialect formation in the United States. For example, Purnell, Salmons, and Tepeli (2005), following the work of Allen (1973–76), have documented the influence of German and Scandinavian languages on regional varieties of English in Wisconsin, including the monophthongization of /o/ and /e/, as well as final stop devoicing. Rankinen (2014) has recently documented the substrate influence of Finnish on the vowel system in Upper Peninsula Michigan. And sociolinguists have all observed influence from various Native American languages on varieties of English that have developed in Native American speech communities (Leap 1993; Anderson 1999; Coggshall 2008).[3]

Sankoff (2002, 645–46) notes that although substrate influence from a given language on English tends to disappear after the immigrant generation, the "exceptions tend to be cases in which the immigrant group and its descendants have become a local majority population." This type of population ecology—in which the ethnolinguistic minority group becomes the local majority in numerical terms—is characteristic of many Latinx[4] speech communities in the United States, where Spanish and English may coexist for several generations, even as Spanish/English bilingualism gives way to English monolingualism over time. Given the widespread interest in this topic among sociolinguists, the theoretical contribution this type of work makes to our understanding of language contact, and the descriptive contribution it makes to our account of English in the United States, it is noteworthy that Miami, the site of the largest situation of Spanish-English contact taking place in North America today, remains virtually unstudied in terms of Spanish substrate influence on the contiguous variety of English. As we describe further below, the demographic changes taking place in Miami since the end of the Cuban Revolution in 1959 have resulted in the gradual replacement of the historical Anglo white–African American population with a Cuban-dominated pan-Latinx majority that is now four generations deep (Carter and Lynch 2015).

The study presented here forms part of a long-term research initiative designed to describe the mostly undocumented variety of English (see MacDonald 1985, 1989, 1996) emerging in the metropolitan Miami area among Latinx adolescents of Cuban, Nicaraguan, Colombian, and mixed-national-origin backgrounds[5] and is designed to address this gap in the

literature. The first study in this program of research, the results of which we present here, considers the role of Spanish substrate influence in the development of English in Miami at the level of phonetics and focuses on the following phonetic variables, which have been shown in prior studies of English in U.S. Latinx communities to be sensitive to structural influence from Spanish:

1. prosodic rhythm (Fought and Fought 2002; Carter 2005a, 2005b; Henriksen 2013; Robles-Puente 2014; Shousterman 2015; Carter and Wolford 2016)
2. the quality of the high, back, round vowel /u/ (Thomas 2001; Fought 2003; Thomas, Carter, and Coggshall 2006)
3. the quality of the front, low vowel /æ/ in two allophonic contexts, prenasal and nonprenasal (Thomas, Carter, and Coggshall 2006; Tseng 2015)
4. the quality of the diphthong /aɪ/ in two temporal positions, onset and offset (Wolfram, Carter, and Moriello 2004)

We provide an overview of sociolinguistic research conducted on these variables in U.S. Latinx communities below.

We situate our study of these diagnostic variables primarily within the variationist study of Spanish-English contact in the United States (e.g., Wolfram 1974; Galindo 1988; Santa Ana 1993; Fought 2003; Thomas 2019) but also more generally within the broader literature on substratal influence on ethnic and regional varieties of English in the United States. In so doing, we hope to achieve three goals: First, by describing a mostly undocumented language variety spoken in one of the largest and most ethnically and linguistically diverse North American cities, we hope to contribute to the overall description of the language varieties used in U.S. Latinx communities, which remain underrepresented in the variationist sociolinguistics literature. Second, we wish to shine further light on the processes of new dialect formation as they unfold in situations of language contact and note that the demographic situation of Spanish-English contact in many parts of the United States, including South Florida, gives linguists an unprecedented opportunity to observe these processes as they take place in real time. In terms of Spanish in the United States in particular, we also note that the overwhelming majority of work examining situations of contact with English has focused on Mexican-origin groups. By turning to Miami, where the majority Latinx subpopulations are non-Mexican in origin, we hope to contribute to the diversification of this literature by focusing on Miami-born Latinx speakers, whose family backgrounds are mostly Caribbean and South American and whose home varieties of Spanish differ from the varieties of Mexican Spanish that form part of the contact situation in the vast majority of the studies that have examined this phenomenon. Finally, we hope that our work brings attention to the understudied situation of language contact

in Miami and promotes further investigation of the unique variety of English being developed there.

In the next section we review some of the relevant historical changes affecting the sociolinguistic situation in Miami.

MIAMI IN SOCIOHISTORICAL AND DIALECTOLOGICAL PERSPECTIVES

MIAMI'S CHANGING TWENTIETH-CENTURY DEMOGRAPHICS. During the latter half of the twentieth century, Miami-Dade County witnessed an unprecedented population shift in which the Anglo white, English-monolingual majority was gradually replaced by a Latinx majority of diverse national origins (Carter and Lynch 2018). This shift—the arrival of Spanish speakers and the outward movement of English speakers—was precipitated by political events in Latin America, beginning with the end of the Cuban Revolution in 1959, at which time the Cuban aristocracy began to relocate to South Florida. The tremendous changes in Miami's demographic profile are evident in data reported by the U.S. Census from 1960 to 2010. Prior to the beginning of the Castro revolution in the 1950s, only a few thousand Cubans resided in South Florida (Carter and Lynch 2018). Following the first major wave of immigration from Cuba during the 1960s, Census data show that the Latinx portion of the population of Miami-Dade County had already grown to 23% in 1970. By 1980, the figure had risen to 36%. The Mariel boatlift, which ended in October 1980, brought as many as 125,000 Cubans to South Florida. During the 1980s, fighting between the Sandanistas and the Contras in Nicaragua resulted in further expansion of Miami's Latinx population, such that in 1990, nearly half (49%) of Miami-Dade's population was Latinx. The Cuban *balsero* 'rafter' crisis during the 1990s and the outbreak of political instability in Colombia resulted in still further expansion of the Latinx population during the same decade, pushing the Hispanic/Latino population to well over half of Miami-Dade County's population (57%) by 2000. During the first decade of the twenty-first century, the Venezuelan population in Miami expanded as discontent with the policies of Hugo Chávez and later Nicolás Maduro grew, and in the wake of the global economic crisis of 2008, immigration increased from across the Spanish-speaking world. According to 2019 census estimates, 69% of Miami-Dade County residents are Latinx. In the City of Miami, the figure is even higher, at 73%, and higher still in the Miami-Dade County municipalities of Doral (84% Hispanic/Latino) and Hialeah (96% Hispanic/Latino), the heart of the Cuban immigrant population (U.S. Census, n.d.). We summarize these changes in the demographic profile of South Florida to illustrate that the

population ecology of Miami-Dade County is precisely the sort described by Sankoff (2002) in which an immigrant group becomes the majority population over time.

Miami's Latinx population differs from the national Latinx population in three ways that are potentially important for the study we report here. First, whereas the largest national-origin Latinx group at the national level are Mexicans, who comprise 64.6% of the U.S. Latinx population in 2011 (Lopez, Gonzalez-Barrera, and Cuddington 2013), Miami's Latinx population is overwhelmingly Caribbean (64%), made up of Cuban (54%), Puerto Rican (6%), and Dominican (4%) subpopulations (Brown and Lopez 2013). Meanwhile, Mexicans make up only 3% of the city's Latinx population. Second, Miami's Latinx population is more diverse than that of other sites where Spanish-English contact has been investigated by sociolinguists. This diversity is reflected in ethnicity, national origin, and socioeconomic status. Finally, as Miami's exile population is comprised largely of political and socioeconomic elites, it is not the case that Spanish in Miami is unambiguously tied to poor or working-class status.

Carter and Lynch (2015) have argued that as an oral phenomenon, Miami, Florida, is now the most bilingual city in North America. The bilingual status of the city owes mostly to the large share of the population that is foreign born (65%), but also to the retention of Spanish as a heritage language among the Miami-born. However, depending on a range of sociocultural factors—matriculation in bilingual schools, the value placed on using Spanish in the home, and proximity to the immigrant generation, among others—not all Miami-born Latinx people speak Spanish. Most born in the second generation do. But irrespective of their bilingualism and their personal or ideological orientation to Spanish, Latinx people born in Miami are native speakers of English, not English learners, who have received their primary education in English, work in English, and for the most part live in English. The preference for English speaking among the Miami-born is supported by the literature on language shift in South Florida. For example, in 1988, Pearson and McGee (1993) polled Latinx junior high school students about their use of English and Spanish and found that 68% reported using "only a few words in Spanish" when talking to friends outside of school, 65% reported the same when talking to their siblings, 68% reported never reading in Spanish, and 58% never watched Spanish-language television. Portes and Schauffler (1996) surveyed 3,000 eighth- and ninth-grade students in Miami-Dade and Broward Counties regarding their language abilities and use. Their data show a general pattern of language shift toward English among all students surveyed, though the authors noted that only about a fourth of the Latinx students included in their study reflected "foreign language loss." This figure dropped to only 11% among Cuban-background children

enrolled in private schools, leading Portes and Schauffler to affirm that their results "indicate that Cuban and other Latin American–origin youth in South Florida are mostly bilingual" (20). According to Eilers, Oller, and Cobo-Lewis (2002, 43), "Spanish is extremely prominent in public life in all of South Florida, and its prestige is high. [...] Yet [...] Hispanic children in Miami [show] strong signs of rejecting Spanish in circumstances where they [have] a choice to speak either language." They later affirm, "In spite of the prominence of Latin culture, Spanish appears to be dying in Miami" (63). Likewise, Otheguy, García, and Roca (2000) and Porcel (2006, 107) remark on the clear patterns of cross-generational language shift among Miami Cubans.

MIAMI IN THE ENGLISH DIALECTOLOGY LITERATURE. The literature on the English of Miami is scant. As Carter and Lynch (2015) point out, the English of Anglo whites in South Florida is by far the most studied variety, even though that group now comprises less than a fifth of Miami's overall population. This owes to the coverage of Anglo whites in several prominent linguistic atlas projects. In the *Linguistic Atlas of the Gulf States* (Pederson et al. 1988), the speech of eight Miami Anglo whites was studied using traditional methods of dialectology, including lexical elicitation tasks and phonetic transcription. Using these data, Pederson et al. grouped Miami-Dade County into a dialect region with Broward and Monroe Counties, which lie to the north. The next work of dialectology to consider Miami is Labov, Ash, and Boberg's (2006) *Atlas of North American English* (*ANAE*), which groups all of South Florida, including Miami, with the Southeastern super-region. They explain:

> The largest of these [marginal areas] is Florida, which lies outside of the definition of the South as the area of monophthongal /ay/. Yet [Florida is] not devoid of Southern character [...] which establishes the Southeastern super-region. It is defined quite simply as an area of fronting of /ow/ [...] and no completion of the low back merger. [137]

This classification is undoubtedly correct insofar as it pertains to the speech of Anglo white speakers; however, as set forth earlier in this section, Anglo white residents now account for only 13% of Miami-Dade County's overall population (based on 2019 census estimates). Since the publication of the *ANAE,* only two studies have examined any aspect of Miami English. Doernberger and Cerny (2008) studied the low back merger among a limited number of Miami speakers (7 Anglo white, 7 African American, and 4 Latinx) and found that "there is a full low back merger in Miami, and it is no longer in transition" (15). Cerny (2009) conducted a limited follow-up study in which he analyzed the speech of 11 Miami residents for acoustic evidence of the Southern Shift that met *ANAE*'s thresholds; he found none.

The only work to focus explicitly on the English of Cuban Americans in Miami is MacDonald (1985, 1989, 1996), who studied the degree of "Spanish influenced" phonological variants for the English phonemes /ʧ, ʃ, ʤ, ʌ/, where /ʧ/ could be pronounced as [ʃ], /ʃ/ could be pronounced as [ʧ], /ʤ/ could be pronounced as [j], and /ʌ/ could be pronounced as [ɔ] or [a]. MacDonald (1985) reports on data collected in 1982 from 33 Cuban American high school students who were born in the United States or arrived by age 10; MacDonald (1989) reports on data collected in 1988 from 40 Cuban American high school students who arrived in Miami by age 10. In both studies, which are summarized in MacDonald (1996), speakers participated in a reading passage and short (10–20 minutes) interview. Both groups (those interviewed in 1982 and in 1988) were found to exhibit some of the "Spanish-influenced" variants, with [ʃ] for /ʧ/ being the most common. However, the most important factor predicting the use of the "Spanish-influenced" phoneme was age of arrival. For the 1988 group, the mean age of arrival was 9.4 years and their percentage of [ʃ] for /ʧ/ was 37%. The 1982 group had a wider range of ages of arrival and was therefore broken into three separate groups. The oldest group (mean age of arrival of 7.8 years) demonstrated a percentage of [ʃ] for /ʧ/ of 40%. This dropped to 10% for the next age group (mean age of arrival 3.8 years), and fell to 4% for the Miami born. For this latter group, only negligible amounts of the other variants were reported.

Thus, in summary, a review of the sociolinguistics and dialectology literature finds that the English of the majority ethnolinguistic group in Miami remains for the most part unstudied.

METALINGUISTIC COMMENTARY. Despite the paucity of research on the English of Miami Latinx speakers, we have found that the Miami-born have a great deal of metalinguistic awareness regarding their dialect. In our sociolinguistic interviews, many speakers told us that they need only pass over the border from Miami-Dade County to Broward County—a short drive from Miami—to start hearing questions like "What country are you from?" and "When did you learn English?" Not only do these provide folk evidence for the emergence of a new variety of English in South Florida, they also cast doubt that English in Miami can still be grouped with the English of contiguous counties, as suggested in the linguistic atlas projects discussed above. Maria, a 22-year-old Cuban American college student, has a fairly typical Miami story: she was born in Cuba, moved with her parents to Miami at the age of four, and grew up in the City of Hialeah, which is the heart of the Cuban American immigrant community. She estimated that during the course of a regular day, she speaks in English about 95% of the time and Spanish about 5%. All of her primary, secondary, and postsecondary education in Miami has been only in English.

I thought I spoke English perfectly, before, like when I was like 14, and then I traveled to Tennessee for the first time, yeah like and I was like, I mean I guess I had always traveled there but when I was 14 I realized, that, someone was like, "Oh but you're like, you're like you know you're from Miami" or "You're from, you're, you're like Hispanic." I'm like, "How can you tell," and they're like "What do you mean? Your accent is like so strong." I'm like, "Really?" And they're like, "Yeah, like really strong." I'm—and then like in Miami everybody speaks the same. We're like, everybody that I associate myself with, they speak the same. [🔊]

Maria's comments are reflective of kinds of metalinguistic commentary we hear throughout our corpus and informally with Latinx residents born in Miami.

DATA, VARIABLES, AND METHODS OF ANALYSIS

In this section we describe the participants and data used in the study, the variables investigated, and the methods of analysis.

PARTICIPANTS AND FIELD METHODS. The data reported in this study come from the speech of 25 male and female college students recruited from university courses, including 20 Latinx and 5 Anglo white residents of Miami-Dade County. This breakdown roughly represents the demographic distribution the county. The Anglo white participants serve as a control group. All Latinx participants were either born in Miami or arrived by the age of five. We made five the age of arrival cutoff in keeping with the findings of MacDonald (1996), who noted this was an important age for the acquisition of "Spanish-influenced" phonology. As reported in the prior section, speakers in her study who were born in Miami or arrived at a young age exhibited virtually none of the "Spanish-influenced" phonology she examined. In our study, all Latinx participants are second-generation Miami residents with parents who originated from various (and sometimes different) Latin American countries, including Colombia, Ecuador, Puerto Rico, and Venezuela. While nearly half (9) of the Latinx participants reported Cuban heritage, we did limit our study to Cuban Americans given the sociological reality in Miami, where the Latinx population is becoming increasingly more diverse and non-Cuban (Mahler 2018).

All of the sociolinguistic interviews, each lasting 30–60 minutes, were conducted by one of two graduate students, one of whom was Latinx. Though interviews were semi-structured, using a predetermined interview schedule focusing on experiences growing up in Miami, participants were given space to speak freely and conversationally.

LINGUISTIC VARIABLES. The variables in this study were chosen because they have been shown either to exhibit influence from Spanish in other studies of Spanish-English contact in the United States or to behave differently in Mexican American speech communities as compared to contiguous communities, even when no direct influence from Spanish can be given.

The first two variables (/æ/ and /æN/) are the two allophones of /æ/ characteristic of English in North America, which are conditioned by the nasality or nonnasality of the following phonetic context. Dialectological studies of English in North America (e.g., Labov, Ash, and Boberg 2006) have demonstrated that /æ/ is raised in prenasal contexts (e.g., *man, can,* and *hand*) while being less raised nonprenasally (e.g., *bat, cap,* and *hatch*). Acoustic studies of English conducted in some Mexican American communities (e.g., Thomas 2001; Thomas, Carter, and Coggshall 2006) have shown that Mexican Americans systematically resist the raising of /æ/ characteristic in contiguous dialect groups, with productions of /æ/ tending to be lower and backer than those of non-Latinx speakers. Though it is difficult to posit direct substrate influence from Spanish, we note that Spanish lacks an equivalent low front vowel, and the resistance to /æ/-raising may in this sense be an artifact of Spanish phonology. A number of studies of Chicano English in diverse regional settings have shown that /æ/ is conditioned not only by nasality and phonetic environment but also by social factors such as age and gender (Gordon 2000; Fought 2003; Roeder 2010; Tseng 2015). Roeder (2010), for example, has demonstrated that Mexican American speakers in the Northern Cities Shift (NCS) region use the low backed variant of /æ/ as well as the raised variant associated with NCS and that these usages are socially conditioned.

The third variable is the quality of /u/, with particular attention to the location of /u/ on the F2 dimension. While Spanish and English both have /u/ phonologically, the phonetic differences between them are well attested. /u/ in Spanish is generally described as a high, back vowel; however, /u/-fronting is a well-attested feature of many varieties of U.S. English and is especially associated with varieties of the U.S. South. In acoustic studies of Mexican American communities (Thomas 2001; Fought 2003; Thomas, Carter, and Coggshall 2006), speakers have been shown to resist the general fronting of /u/, producing more backed variants on the F2 dimension. The nonfronting of /u/ in Mexican American speech communities can be understood as a consequence of contact with Spanish, where fronting of /u/ does not occur.

The fourth variable is the diphthong /aɪ/, for which we took two temporal measurements: onset and offset. Like /u/, /aɪ/ figures as a part of the phonological inventory of both languages. Outside of the U.S. South, the /aɪ/ diphthong may be characterized with a significant offglide. Within the U.S. South, the glide may instead be reduced according to one of two pat-

terns: (1) general reduction regardless of following phonetic environment and (2) reduction only in prevoiced positions, including voiced obstruents and nasals (Wolfram and Schilling 2016). While Labov, Ash, and Boberg (2006) characterize South Florida as belonging to "general Southern," we do not believe glide reduction to be widely characteristic of Anglo white speech in Miami today. Differences between Spanish and English /aɪ/ unrelated to Southern glide reduction have been discussed in the literature, and the general consensus is that /aɪ/ in Spanish and English are not phonetically isomorphic (Borzone de Manrique 1979) with respect to issues such as the duration of the nucleus and glide and the trajectory of glide (Lindau, Norlin, and Svantesson 1990; Peeters 1991). In terms of /aɪ/ in contact situations in the United States, Wolfram, Carter, and Moriello (2004) found that Mexican American speakers in North Carolina produced offsets closer to [i] and longer durational trajectories compared to Anglo white speakers.

The fifth variable is prosodic rhythm, which has been shown to be susceptible to cross-linguistic influence in a number of contact situations, including many involving Spanish and English in the United States. The traditional literature in phonetics accounts for two systems of prosodic rhythm in the languages of the world (e.g., Pike 1945; Abercrombie 1967). In terms of the languages considered in the current study—English and Spanish—phoneticians considered English to be characteristic of the so-called "stress-timed" languages, common in the Germanic branch of Indo-European, while Spanish was characteristic of the "syllable-timed" languages, common in the Romance branch of Indo-European.[6] Syllable-timed languages are those in which syllables of equal duration recur at regular intervals, while stress-timed languages are those in which syllables of different durations recur at irregular intervals. Today it is unclear whether or not stress-timed and syllable-timed languages are neatly dichotomous or even whether prosodic rhythm constitutes a suprasegmental system unto itself or is instead an epiphenomenon of other parts of the linguistic system, such as segmental phonology. In any case, sociolinguists studying Spanish-English contact in the United States have been especially concerned with it because differences in prosody can be quantified, using a number of methods discussed below, and are indicative of cross-linguistic influence due to contact.

Several studies of rhythm in U.S. Latinx communities conducted by sociolinguists using naturalistic speech data are especially important for the work discussed here. First, Fought and Fought (2002) compared the timing of Chicano English in California with the English of Anglo white speakers in contiguous communities. They found more syllable timing for the Chicano speakers than for the Anglo white speakers, though syllable timing was concentrated only within the first five syllables of an utterance. Likewise, they found a similar concentration of syllable timing in Mexican Spanish,

indicating a possible substratal link between Mexican Spanish and California Chicano English. Similarly, Carter (2005a, 2005b) found that the speech of Mexican Americans in North Carolina is significantly more syllable timed than the speech of non-Latinx speakers, though this pattern was not limited to a particular location in the utterance, as in Fought and Fought (2002). Shousterman (2015) has shown that Puerto Rican women in Spanish Harlem are maintaining syllable-timed rhythm when speaking English, though younger speakers exhibit a wider prosodic range than older speakers. Two recent studies have measured prosodic rhythm using PVI for Spanish-English bilinguals who were asked to read passages in both languages. Robles-Puente (2014) conducted a study of prosodic rhythm among Mexican American and Mexican immigrant residents of Los Angeles, who were recorded reading a passage in Spanish and English. Participants were divided into five groups: English monolinguals, adult early bilinguals, Los Angeles–born bilinguals, adult late bilinguals, and Spanish monolinguals. Robles-Puente shows that the English monolinguals and adult early bilinguals produce English-like rhythm in both languages, while the adult late bilinguals and the Spanish monolinguals produced Spanish-like rhythm in both languages. In contrast to these groups, the Los Angeles–born bilinguals accommodate the rhythm of the language in which they are reading. Henriksen's (2013) study of native Spanish speakers learning English shows that language learners demonstrate an intermediate pattern of prosodic rhythm. This provides further evidence that substrate influence on the prosody in immigrant speech communities takes place with second-language learners.

Aside from Spanish and English in the United States, linguists have examined the ways in which languages in contact with English have exerted substrate influence at the level of prosody.[7] Low, Grabe, and Nolan (2000) showed that Singapore English was significantly more syllable timed than varieties of English in the United Kingdom. Szakay (2006) found that Maori English is significantly more syllable timed than Pakeha English, the variety used by speakers of European descent. Coggshall (2008) observed that the variety of Cherokee English spoken in the Appalachian Mountains of western North Carolina is significantly more syllable timed than the variety of speakers of European descent in the same region.

VOWEL ANALYSIS. Each vowel token for each variable was measured acoustically using PRAAT (Boersma and Weenink 2017). For each speaker, 15–25 tokens were taken for each of the first two variables, /æ/ and /æN/, yielding just under 1,000 tokens across the speaker sample. Measurements of the first two formants (F1 and F2) were taken at the midpoint of the vowel for both /æ/ and /æN/, as described in Thomas (2001). For the third variable,

the high back vowel /u/, we took a single temporal measurement for F1 and F2 at the midpoint of the vowel. For the final variable, /aɪ/, we took two temporal measurements: one representing the onset, taken 30 ms into the duration of the diphthong, and one the offset, taken 30 ms from of its end. Using this 30-ms margin helps minimize the effects of neighboring phonetic environments (Thomas 2001). Tokens preceding /r, l, g/ and following /r, w, j/ were excluded from analysis due to well-established coarticulatory effects. To account for possible lexicalization of certain words, no more than two tokens were measured for any single lexical item for each speaker. A summary of each variable, the temporal location where measurements were taken, and the number of tokens analyzed is presented in table 1. To test for significance, we first normalized the vowel data using Bark difference metrics modeled after Syrdal and Gopal (1986) as described in Thomas (2010, 163).

PROSODIC RHYTHM. Recent work in laboratory phonology on prosodic rhythm (e.g., Arvaniti 2012; Prieto et al. 2012) makes it clear that no single quantitative measure perfectly captures cross-linguistic rhythmic differences, as rhythm is influenced by a host of factors including individual speaker differences, differences in experimental task, and cross-linguistic phonological differences. We have chosen to work with Low and Grabe's (1995) Pairwise Variability Index (PVI) formula, which quantifies prosodic rhythm by taking the absolute value of the difference between adjacent syllables divided by the mean of these syllables. This method purports to measure the degree of stress or syllable timing by comparing the duration of syllable pairs while controlling for speaking rate. This method is ideal for sociolinguistic work for two reasons. First, sociolinguistic interviews are conducted in the field and contain naturalistic speech, not reading passages collected in soundproof booths. PVI is easily adaptable to these types of data. Second, beginning with Fought and Fought (2002), sociolinguists studying prosodic rhythm have relied on nPVI to quantify speech rhythm. The data reported here are therefore instantly comparable to those data reported in similar community-based sociolinguistic studies.

TABLE 1

Token Counts for Each Variable in the Vowel Analysis

Variable	*Number of Tokens*
/u/ (midpoint)	248
/æ/ (midpoint)	530
/æN/ (midpoint)	414
/aɪ/ (onset, offset)	353

TABLE 2
Number of Measurements Used in the Analysis of Prosody Rhythm

Group	*No. of Participants*	*No. of nPVI*
Latinos	20	2,357
Non-Latinos	5	485

Duration measurements were taken at the onset and offset of the vocalic nucleus of each syllable considered. As presented in table 2, a minimum of 125 measurements was taken for each of the 25 speakers studied (20 Latinx and 5 Anglo white), yielding nearly 3,000 unique measurements for this analysis. Mean scores were calculated for each individual speaker as well as for each group, Latinx and Anglo white.

RESULTS

In this section, we present the results of our quantitative analysis of the five variables investigated in this study, which we separate into two sections: vowel analysis (/æ/, /æN/, /u/, and /aɪ/) and prosodic rhythm.

VOWEL ANALYSIS. Figure 1 provides a broad view of the vowel data. It displays the mean F1 and F2 values for each of the vocalic variables analyzed for each of the 20 Latinx and 5 Anglo white participants in the study.[8] In the figure, each point represents the mean values for one speaker. The vowel plot shows the major vowel space differences between the groups, which we discuss in turn. For the vowel analysis, mixed linear effect regression modeling was conducted using STATA 15 (StataCorp 2017), with the main effect hypothesis related to the dependent variable (numerical values for F1 and F2 for each of the variables) and the main independent variable (speaker ethnicity). Though it does not relate to our main hypothesis, speaker sex was also included as an independent variable.

We begin with /æN/ (i.e., /æ/ in the prenasal position), which was included in this analysis in order to ascertain the extent to which resistance to /æN/-raising among Latinx speakers reported in the dialectology literature in the United States is also present in the English of Miami-born Latinx speakers. Figure 2 depicts the normalized F1 and F2 values for /æN/ for each speaker. Our primary interest is in F1, which tells us about the raising of /æN/. The vowel plot shows a lower F1 location for /æN/ for a majority of Latinx speakers as compared to Anglo white speakers, a finding borne out in the results of the regression analysis ($p < .001$). Since raising also affects the position of the vowel on the front-back dimension, we also analyzed the differences in F2, which was also significant ($p < .001$).

FIGURE 1
Each Speaker's Mean Formant Values for the Vowels Analyzed

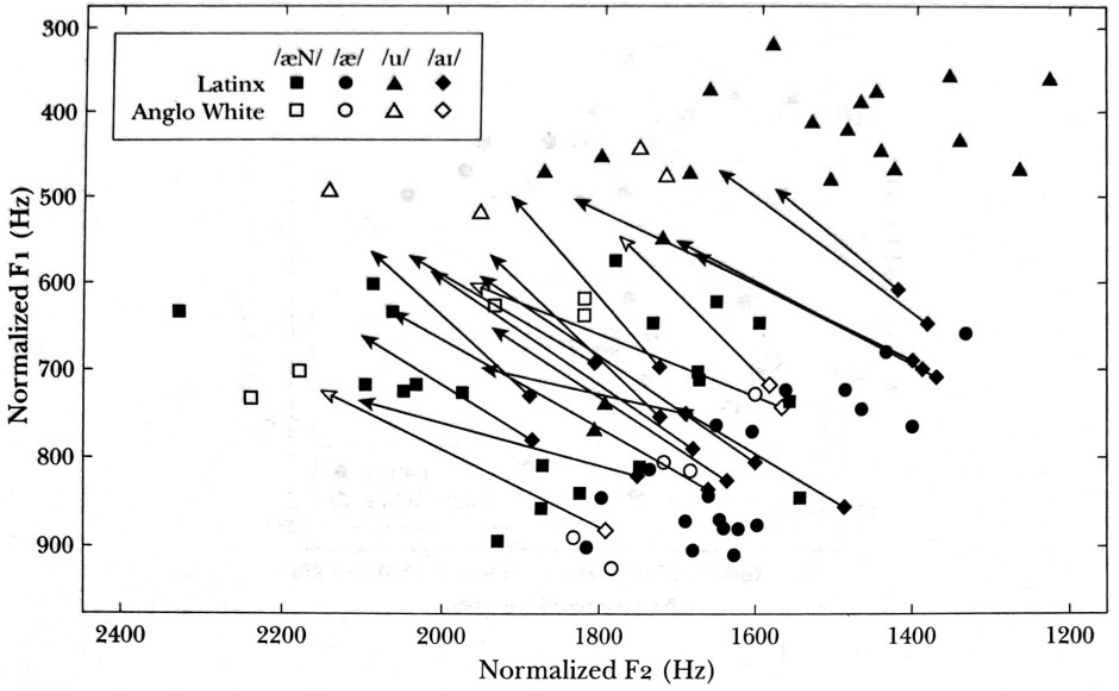
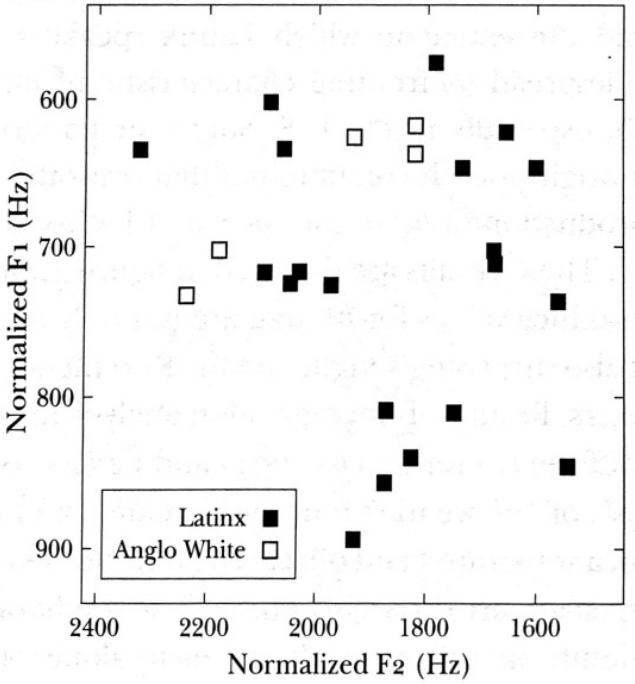
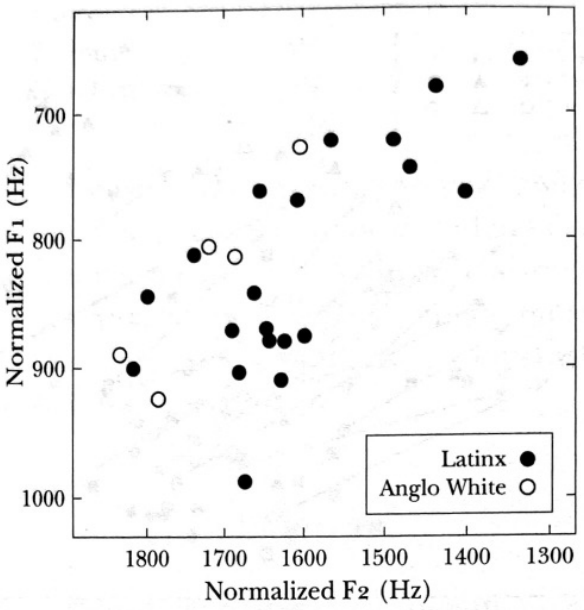


FIGURE 2
Each Speaker's Mean Formant Values for Prenasal /æ/ (/æN/)



To ascertain whether Miami-born Latinx speakers demonstrate or resist the allophonic split for /æ/ based on phonetic environment, we also analyzed F1 and F2 values for /æ/ in nonprenasal positions. These results are shown in figure 3, which indicates that Latinx participants produce more backed /æ/

FIGURE 3
Each Speaker's Mean Formant Values for Nonprenasal /æ/



along the F2 dimension in nonprenasal contexts compared to Anglo white participants. Results of the regression analysis show that this difference is significant ($p = .01$). There was no significant difference for nonprenasal /æ/ between Latinx and Anglo participants on the F1 dimension ($p = .07$).

To understand the extent to which Latinx speakers in Miami participate in the widespread /u/-fronting characteristic of many varieties of American English, especially in the U.S. South, or pattern more closely with the Mexican-origin speech communities that resist this phenomenon, we investigated production of /u/ in the speech of Latinx and Anglo white speakers in Miami. These results are depicted in figure 4, which shows that Latinx speakers produce values for /u/ that are not only more back on the F2 dimension but also surprisingly higher on the F1 dimension compared to Anglo white speakers. Results of the regression analysis for the main effect show significant differences for F1 ($p < .001$) and F2 ($p < .001$).

For our analysis of /aɪ/, we took four measurements: F1 and F2 in each of two temporal locations, onset and offset. The trajectories of /aɪ/ for Latinx and Anglo white speakers are shown in figure 5. The results of our regression analysis show no significant differences for ethnicity alone for any of the four measurements taken (onset: F1, $p = .987$, F2, $p = .228$; offset: F1, $p = .674$, F2, $p = .647$). We did find one significant interaction effect between ethnicity and gender and several additional gender effects. For F1 of the offset location, a significant interaction between ethnicity and gender was present ($p = .01$): Anglo male speakers demonstrate a significantly raised quality compared to Anglo female speakers. This difference does not hold for the

FIGURE 4
Each Speaker's Mean Formant Values for /u/

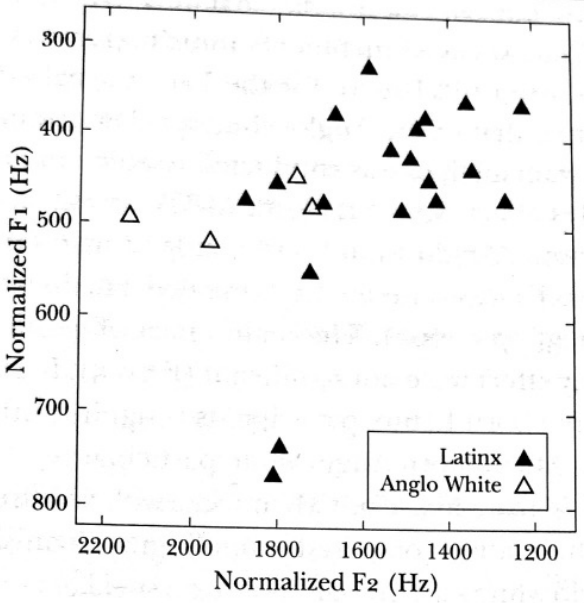
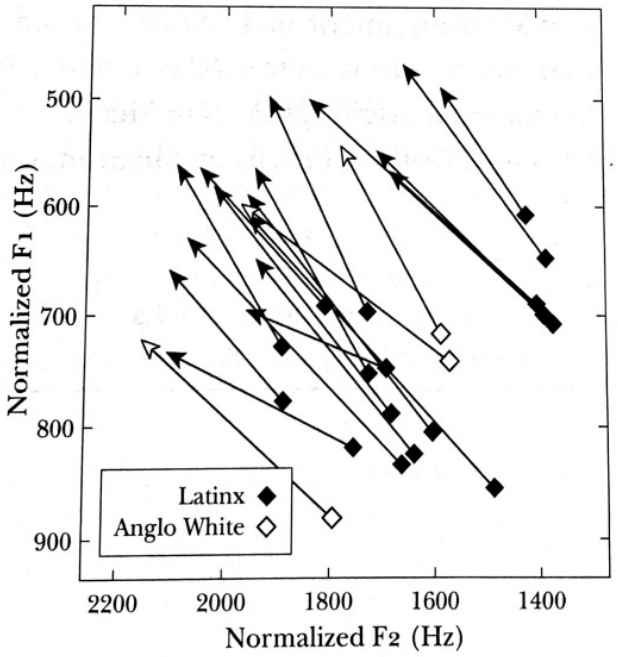


FIGURE 5
Each Speaker's Mean Formant Values for the Onset and Offset of /aɪ/



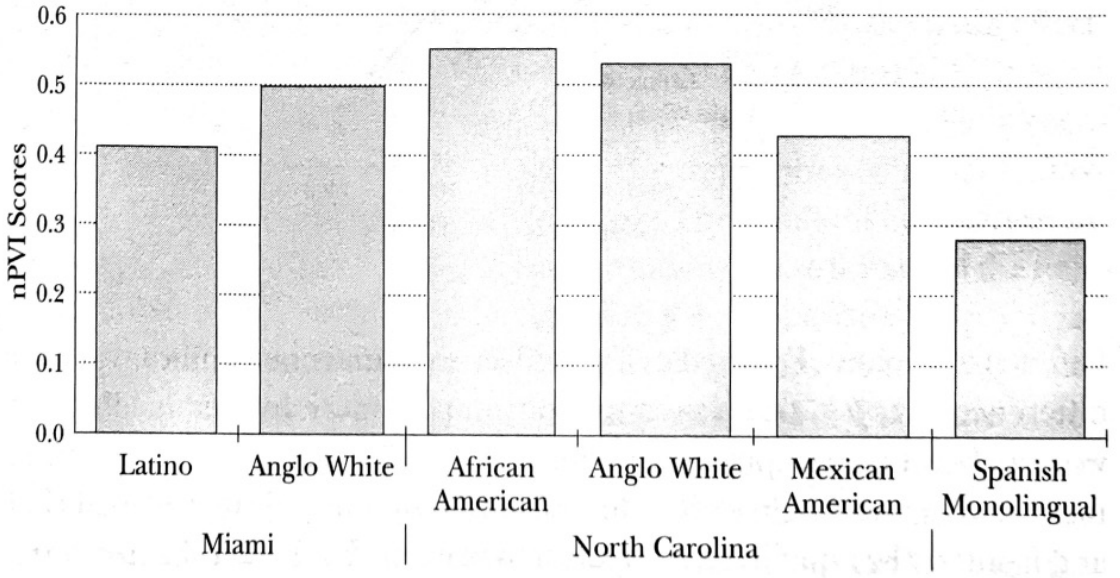
Latinx participants. For the F2 of the offset, we found one significant gender difference (F2, $p < .001$): men demonstrated a more fronted quality than women. For the onset position, we found two significant gender differences: men (Latinx and Anglo white) demonstrated significantly more raised (F1) and fronted (F2) quality as compared to women (F1, $p = .01$; F2, $p < .001$).

PROSODIC RHYTHM. Figure 6 shows mean nPVI scores of the two comparison groups. Higher nPVI scores indicate more stress-timing (typical of English), while lower scores indicate more syllable-timing (typical of Spanish). A comparison of PVI scores as a function of ethnicity (Latinx vs. Anglo white) revealed that the mean nPVI score for the Latinx speaker group was significantly lower than that of the Anglo white speaker group ($t(24) = 4.13$, $p < .001$). A follow-up analysis was conducted to rule out gender effects as contributing to this effect. Specifically, an ANOVA was run on nPVI scores with ethnicity (Latinx/Anglo white) and gender (male/female) included as between-subjects factors. This analysis revealed a main effect of ethnicity only, ($F(1,21)=15.38$, $p < .001$). The main effect of gender as well as the gender by ethnicity effect were not significant ($F < 0.5$). In sum, we find that the speech of Miami-born Latinx participants is significantly more syllable-timed than that of Miami-born Anglo white participants.

Figure 6 goes on to compare our Miami data with data from Thomas and Carter (2006). Their study compared monolingual Spanish speakers with the speech of Anglo white and African American speakers in North Carolina and Mexican Americans speaking English. Although we cannot run statistical analysis across studies, we have included this graph to make one very important point: U.S.-born Latinx speakers from at least two regional field sites seem to demonstrate remarkably similar productions of prosodic rhythm. That is, the prosodic rhythm of Mexican Americans in North Carolina (Thomas and Carter 2004; Carter 2005a, 2005b) is quite similar to that of Cuban, Colombian, and Venezuelan national origin speakers in Miami. Further, when we consider work by Carter and Wolford (2016) on Mexican American English

FIGURE 6

Mean Pairwise Variability (nPVI) Scores for Miami Latinos and Non-Latinos, Thomas and Carter's (2006) North Carolina Speakers, and Spanish Speakers



in South Texas and Shousterman's (2015) study of Puerto Rican English in New York City, it appears that this pattern of prosodic rhythm, which falls between the syllable timing of Spanish monolinguals and the stress timing of non-Latinx English speakers, has become a feature of English in U.S. Latinx communities throughout the United States. This suggests three things: first, that prosody is particularly sensitive to cross-linguistic influence in situations of language contact; second, that in situations of Spanish-English contact in the United States, Spanish-like syllable timing may get instantiated early in the process of new dialect formation; and third, that an intermediate pattern of prosodic rhythm may be a durable dialect feature in varieties of English spoken by Latinx speakers in the United States, independent of national-origin background.

DISCUSSION AND CONCLUSIONS

This study has presented a quantitative sociolinguistic analysis of two kinds of phonetic variables—vowel quality and prosodic rhythm—in the speech of native English-Spanish bilingual Latinx speakers in Miami, Florida. The study was conducted to document the variety of English emerging from the situation of language contact taking place there and to ascertain the extent to which this variety bears the structural influence of Spanish. In this section, we offer conclusions corresponding to both of these aims.

Considering the big picture first, we found ample evidence to suggest the emergence of a distinctive ethnolinguistic speech variety in South Florida. Though our sample is relatively small and limited to university students, we found statistically significant differences between Latinx and Anglo white speakers for every variable analyzed, which support both the metalinguistic awareness of Latinx speakers in our study who perceive their speech to be unique and our own impressionistic observations of English in Miami. We do not believe that the findings reported here are indicative of a community of practice limited to the university campus where the participants studied, but rather they reflect broader community patterns of ethnolinguistic alignment that are emerging in Miami among Latinx speakers today and that likely have been taking shape over several decades. We use the term "emerging" not only in the general theoretical sense that a language variety is never fully "formed" (Andresen and Carter 2016) but also in the specific sense that the situation of bilingualism in Miami—and the patterns of immigration that precipitate it—are dynamic and vary by generation, neighborhood, and national-origin group (see Benor 2010 and Becker 2014 on ethnolinguistic repertoire). To that end, we can easily conclude that Spanish is undoubtedly related to the shape that English has taken in Miami during the last half century, but the

precise mechanisms through which it has shaped English in Miami remain unclear for two reasons: First, sociolinguistic studies of Spanish-English bilingualism in Miami tend to agree that, while language shift is underway (Lynch 2000; Portes and Schauffler 1996; Roca 1991; Pearson and McGee 1993), levels of Spanish maintenance are quite high in the second generation, at least as an oral phenomenon. Therefore, although the speakers in this study are English-dominant bilinguals, we cannot say the presence of the features we analyzed owes only to the historical presence of Spanish in the community, and not possibly (also) to the bilingualism of the individual. Second, not all of the variables we studied here have clear analogs in Spanish; we therefore cannot maintain that their distinctive use among Latinx speakers in Miami owes to direct influence from Spanish in the South Florida contact situation. We nevertheless maintain that data presented here are generally representative of the kind of English we hear in Miami and represent an important snapshot of the development of the variety of English emerging alongside the historical and contemporary presence of Spanish in the region.

With respect to the linguistic variables analyzed, we can draw five conclusions: First, we found statistically significant vowel quality differences for the main effect of ethnicity for each of the vowel variables we studied, except for /aɪ/, for which we found an interaction effect between ethnicity and gender, in which a significant difference in offset location between Anglo white men and women is not present for Latinx speakers. This suggests that variation in the production of /aɪ/ is in the early stages of acquiring stable social meaning in the speech community, though we are hesitant to make this claim outright without data from a nonstudent population. With respect to /u/, we found that the Latinx speakers do not participate in the /u/-fronting we found among the Anglo white speakers. Fought's (2003) study of speakers of Chicanx English in California found that some Chicanx speakers participated in the fronting of /u/ associated with California English, while others did not. Rather than being a marker of ethnic identity as such, Fought found /u/ to be highly susceptible to sociolinguistic variation, correlating with socioeconomic class, gender, and gang affiliation for Chicanx speakers. Rogers and Alvord (2017) conducted a study of English among Cuban Americans in Miami using read speech in a laboratory setting. They found that the position of F2 differed significantly between a group they called "Spanish dominant," whose /u/ was more backed, and a group they called "English dominant," whose /u/ was more fronted. Their group who used Spanish and English more or less equally was in the middle. This suggests that the bilingualism of the individual does bear on the production of the English vowel system. At this stage in our study of Miami English, we can only say that /u/ varies by ethnicity, and this likely owes to the contact situation with Spanish, in which language /u/

is not subject to fronting. With respect to the quality of the two allophones of /æ/, prenasal and nonprenasal, we did not find the allophonic collapse reported in Thomas, Carter, and Coggshall (2006) for Mexican American speakers in South Texas or in Thomas (2019), in which /æN/ is not raised on the F1 dimension. Instead, we found that Latinx speakers in our study keep the allophones separate, with raising of F1 in the prenasal position, but that both F1 and F2 productions are significantly different from those of the Anglo white speakers in the study. Thomas (2019) has found that, although young Mexican Americans in Perasall, Texas, maintain distinctive productions of /æN/, where they resist raising on the F1 dimension, they have neutralized distinctive productions of /æ/ before coronals, in contrast to their parents and grandparents. His data suggest that this allophonic merger may be a durable feature of Mexican American varieties, even as other distinct productions of /æ/ fade. Rogers and Alvord (2017) did not study the question of /æ/ allophony in particular but did examine /æ/-backing (in English) relative to the location of the low central Spanish /a/ and found that all three generations of Cuban American speakers studied demonstrate some degree of /æ/-backing. Fought (2003) found /æ/-backing and raising (the latter mostly before nasals) among Chicanx speakers in California and, as with /u/-fronting, finds that both correlate with gender and gang affiliation, though socioeconomic class was not a predictor. With respect to the question of the effect of bilingualism on the production of these variables, Fought suggests that there may well be none at all, noting that the bilinguals in her study did not differ at all from the monolinguals in their use of any of the variables, including /u/ and /æ/. Here again, because all speakers in this study are bilingual, we cannot claim that results we report are independent of this bilingualism. More time will need to pass in Miami before we can determine whether the vowel features we examined here can be described as ethnic markers derived from the initial contact situation and stable beyond that situation, along the lines of Fought (2003) and Mendoza-Denton (2008).

Turning to the analysis of prosodic rhythm, we found that the English of second-generation bilingual Latinx speakers in Miami is characterized by an intermediate pattern of prosodic rhythm that falls in line with the patterns observed for Latinx speakers in Los Angeles, New York, South Texas, and North Carolina. These data from Miami provide further evidence for durable Spanish influence at the level of prosody in U.S. Latinx communities across the country. While we are not surprised by the presence of relatively more syllable-timed English among these speakers given our impressionistic observation of Miami English during the past several years, we are aware that the college student population is less vernacular than the general population and therefore find it noteworthy that their prosodic timing is so closely

aligned with Latinx prosodies from other speech communities. This leads us to hypothesize that prosodic features such as rhythm may get instantiated early in the new dialect formation process and in the case of Miami may not have risen to the level of conscious awareness.

Finally, as we listen to our field recordings, we are aware that there is a great deal more that needs to be documented before we can make broad, generalizable claims about the influence of Spanish on English in Miami—consonants such as /r, l/ and other prosodic features such as intonation need our attention. The shape that English takes in Miami in the future will very much depend on population ecological factors related to immigration, educational factors that will promote or further erode the place of Spanish in South Florida, and ideological factors related to bilingualism and Spanish maintenance. These are important pieces of the puzzle that must be considered as we continue to document the development of English in contact with Spanish in South Florida.

NOTES

We are grateful to Tim Hayes for his guidance on the statistical analysis used in this research. We would also like to thank Melissa Baralt and Andrew Lynch for their comments on earlier stages of the work, the two anonymous reviewers who provided feedback on the manuscript, and Greg Guy and Renée Blake for their comments on the project when presented at New York University. We are especially indebted to Erik Thomas for his influence and guidance on many aspects of this research over several years.

1. We refrain from using the term "immigrant language" to avoid the implication that English is less of an immigrant language than Spanish.
2. We do not wish to imply that the interest in the structural effects of language contact in North America began with the dialectologists. As Koerner (1991, 64) notes, Max Weinreich was publishing on bilingualism in the 1930s, and Uriel Weinreich published *Languages in Contact* in 1953.
3. The ways in which ethnolinguistic variables get deployed by speakers to construct identity in immigrant and ethnolinguistic minority communities has been a recent focus in this line of research (Dubois and Horvath 1998; Fought 2003; Mendoza-Denton 2008). We will take up this issue in further research.
4. Following the zeitgeist in the humanistic and interpretive social scientific disciplines, we have chosen to use the term *Lantix* from several other possible terms (e.g., *Latina/o, Latin@*). *Latinx* is preferred because it does not choose a default gender or leave one gender marked or unmarked. We use the term *Hispanic/Latino* in historical contexts, such as reporting prior U.S. Census data.
5. As set forth in Carter and Lynch (2015), these are the largest national-origin Latinx groups in Miami-Dade County.

6. Although Spanish is widely thought to be a syllable-timed language, Borzone de Manrique and Signorini (1983) studied the syllable structure of Spanish and found unequal syllable duration, a trait more commonly associated with stress-timed languages.
7. For an example of Spanish in contact with a language other than English, see Gabriel and Kireva (2014), who compared the prosodic rhythm of Italian to Peninsular and Porteño Spanish, an Argentine variety thought to have been historically influenced by Italian. They report high nPVI scores for both groups, suggesting Italian influence both historically and in the speech of Italian learners of Spanish.
8. Not all speakers appear in each of the vowel plots presented. Our normalization procedure returned unusable formant values for some speakers.

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