

Labialization of Word-Final Nasals in Yucatecan Spanish and Yucatec Maya: Language Contact, Prosodic Prominence Marking, and Local Identity

Melanie Uth

Professor of Romance Linguistics, Faculty of Arts, University of Potsdam,
Germany

melanie.uth@uni-potsdam.de

Abstract

This paper provides a comparative analysis of word-final nasals in Yucatecan Spanish and Yucatec Maya based on speech data from Quintana Roo (Mexico). In Yucatecan Spanish, a nasal is often pronounced as [m] if placed at the end of a word (e.g., *Yucatá*[m] instead of *Yucatá*[n]). Since this phenomenon is widespread on the Yucatán Peninsula, but largely unknown in other Spanish-speaking regions, it is often linked to the influence of the indigenous language Yucatec Maya. Our Spanish dataset differs from our Yucatec Maya one in that the labialization rate significantly increases with the length of the subsequent pause in the former, but not in the latter. Thus, even if the feature was originally transferred from Yucatec Maya to Spanish, it seems that it has taken on a life of its own in Yucatecan Spanish, determined by its function as a marker of prosodic prominence.

Keywords

language contact – nasals – Yucatecan Spanish – Yucatec Maya

1 Introduction

This paper investigates the labialization of word-final nasals in Yucatecan Spanish as spoken in the state of Quintana Roo on the Yucatán peninsula in Southern Mexico. The point of departure is the observation that in Yucatecan

Spanish, word-final nasal consonants are often pronounced [m] when placed at the end of a word. For example, instead of saying *Quiero comer* [pan] ('I want to eat bread'), the speakers say *Quiero comer* [pam]. This phenomenon is remarkably widespread on the Yucatán Peninsula, and Yucatecan Spanish speakers are renowned for and often self-identify with this feature to the degree that it is even used for merchandising purposes by locally administered internet pages and souvenir shops in Mérida (Federal State of Yucatán). The social identification function of the labialization of word-final nasals in Yucatecan Spanish has already been analyzed and argued for by Michnowicz (2006b; 2008) for the city of Mérida (see Section 2.2 of the present paper).

The particularity of this feature, which is unknown in most of the other Spanish-speaking regions of the world, becomes especially evident if we consider that word-final [m] has been almost entirely eliminated from Spanish diachronically due to systematic apocopation (e.g., Lat. *regionem* > Sp. *región*) and alveolarization (e.g., Lat. *cum* > Sp. *con*), meaning that there is hardly any word-final [m] in contemporary varieties of Spanish at all.¹

Since the labialization of word-final nasals is so particular to Yucatecan Spanish, several researchers trace it back to the influence of Yucatec Maya, the language Spanish has been in contact with on the Yucatán peninsula for more than 500 years now. For instance, Alvar (1969) argues that

"El español de Yucatán presenta una particularidad totalmente inédita en cuanto se refiere a la realización de -n como -m. [Esta posibilidad] no [parece] tener carácter fonológico, sino que es una [realización fonética] de tradición indígena [...]."

ALVAR, 1969: 169

In this paper, it will be argued that there are indeed several pieces of evidence which point to the influence of Yucatec Maya in this context (see Section 4). However, it is also true that there has not been any systematic empirical research on the labialization of word-final nasals in Yucatec Maya so far, and even for Yucatecan Spanish, we will see that there are several open questions related to this feature and its variability, especially if regions outside of the city of Mérida are considered. The present paper seeks to contribute to the clarification of these issues by providing a variationist study of the feature

¹ As will be detailed in section 2.2 of the present paper, Lope Blanch (1987: 42) notes that labial pronunciations of final nasals are found in Colombia (Flórez, 1951), northern Argentina (Rojas, 1969), and Paraguay (Granda, 1982). A comparative study to approach this issue is planned in collaboration with Élodie Blestel and Santiago Sánchez Moreano, Sorbonne Nouvelle Paris 3, in the near future.

based on speech data from Quintana Roo (see the map in Section 3.1), and an investigation of the pronunciation of word-final nasals in Yucatec Maya. In a nutshell, this data will point towards the conclusion that language contact did indeed play a (triggering) role in the development of word-final [m] in Yucatecan Spanish at the beginning, but that there has been a contact-independent sociolinguistic development of this feature as a prosodic marker of regional identity in this area. As will be argued in section 5, this analysis is largely in line with Michnowicz's (2006a; 2006b; 2007; 2008) investigation of the Meridian region. However, it may be considered complementary in the following regards. First of all, it concentrates on a region outside of the city of Mérida. Secondly, it reveals the feature to have developed a function of prosodic prominence marking in Yucatecan Spanish which it does not seem to have (to this degree) in the contact language Yucatec Maya.

The outline of the paper is as follows. Section 2 presents previous empirical observations and explanatory accounts regarding the labialization of word-final nasals in Yucatecan Spanish. Moreover, this section reviews the scattered remarks in the literature concerning the realization of (syllable- and word-) final nasals in Yucatec Maya, and provides a preliminary discussion of the consideration of language contact in these accounts in order to sharpen the desiderata that need to be tackled in subsequent work with respect to this issue. Section 3 reports the main results of my empirical investigation of Yucatecan Spanish (3.1) and Yucatec Maya (3.2). In section 4, it will be argued that the data corroborate an analysis according to which word-final [m] was indeed initially 'transferred' from Yucatec Maya to Spanish, but subsequently developed into a (sub-)conscious marker of local identity due to the particular prominence-marking function it apparently adopted in the new variety. Finally, section 5 summarizes the main conclusions and mentions open issues to be dealt with in future research.

2 Previous Works

This section presents (i) previous empirical observations and explanatory accounts regarding the labialization of word-final nasals in Yucatecan Spanish, and (ii) the scattered remarks that are available in the literature with respect to the realization of (syllable- and word-) final nasals in Yucatec Maya. Moreover, a preliminary discussion of the main lines of argumentation will reveal the need for (i) more in-depth sociolinguistic studies outside of the city of Mérida, (ii) an analysis of nasal labialization in Yucatec Maya, and (iii) the framing of the results in an integrative socio-cognitive model.

2.1 *Previous Empirical Observations*

The first linguistic work that mentions the Yucatecan labialization of word-final nasals appears to be Alvar (1969), who describes the pronunciation of 10 speakers from different municipalities of the northern part of Yucatán on the basis of questionnaire data elicited by means of word naming and reading tasks.² On this basis, Alvar (1969) finds nasals to be realized as velar consonants (e.g., [paŋ]) among monolingual Spanish speakers, along with “frequent” cases of nasal deletion (e.g., [pã], Alvar 1969: 168). As regards final [m], he notes that this feature occurs with “abrumadora frecuencia” (ibid.) in his data.

García Fajardo (1984) presents the results of an analysis of recorded interviews of 39 speakers from Valladolid (state of Yucatán). In her corpus, word-final [m] arose in 34 out of 39 speakers, with a frequency range of 5% to 40%. 72% of these speakers produced word-final [m] with a frequency of less than 20% (García Fajardo 1984: 76), the majority of tokens ending in alveolar [n].

Lope Blanch (1987) synthesizes data from the *Atlas lingüístico del español de México*, which contains a compilation of 350 recordings of guided conversations and read-out word lists collected during the 1970s (see also Lope Blanch, 1990–2000). On the Yucatán Peninsula, the interviews were conducted with a total of 30 speakers in different villages in the federal states of Quintana Roo, Yucatán, and Campeche. Lope Blanch (1987: 42) found the most frequent word-final nasal in the recorded conversations to be [n] (73%), followed by [m] (12%), [ɲ] (8%), and elision with concomitant nasalization of the vowel (i.e., [ĩ], 2%). Based on the fact that the frequency of word-final [m] more than doubled in the word lists (ibid.), in which the target item is followed by a pause, Lope Blanch concludes that this feature is most frequent in ‘absolute final position before a complete pause’ (“*en posición final absoluta ante pausa total*”, ibid.). In more concrete terms, he suggests that

“tanto la velarización de *-n* final de palabra, como su articulación bilabial (...) son fenómenos que se producen preferentemente – o tal vez exclusivamente – en posición final absoluta ante pausa total (que es la situación que se presenta en los *Cuestionarios*), mientras que en el habla normal (...) – donde las nasales finales de palabra van seguidas de otras voces o de pausas breves – la articulación normal, alveolar [n] es, con mucho, la más abundante.”

LOPE BLANCH 1987: 42

2 As pointed out to me by an anonymous reviewer, the first preserved mention of the phenomenon in the Hispanic philological research tradition seems to be a dictionary entry by Ramos y Duarte (1895: 386) saying “Pam (Yuc), sm. Pan. En Yucatán, muchos pronuncian *pam* en vez de *pan*.” (‘In Yucatán, many [speakers] pronounce *pam* instead of *pan*.’).

The most recent studies dealing with the phenomenon all concentrate on Mérida, the biggest and most important city in the state of Yucatán (see Figure 1).

Yager (1989) provides a sociolinguistic analysis of final [m] in guided conversations (*“conversaciones con habla espontánea dirigida”*, Lope Blanch, 1987: 87) with 25 bilingual and monolingual speakers from Mérida, Yucatán. The database is balanced for age (young – middle-aged – older speakers), language profiles based on self-assessment (active bilinguals – passive bilinguals – monolinguals), socioeconomic class (high – middle – low), and gender (female – male). The two most important results of this study are that monolingual and bilingual speakers do not differ with regard to the rate of labialization of word-final nasals, and that the labialization rate considerably increases with the decreasing age of the speakers: word-final [m] occurring at a rate of 34% among older speakers compared to 55% in the youngest age group.

Another interesting analysis of word-final [m] in Yucatán is provided by Pfeiler (1992), who explores the realization of nasals in guided sociolinguistic



FIGURE 1 Map of Yucatán peninsula from <http://www.yucatan.gob.mx> (retrieved March 18, 2019), with Mérida highlighted by red oval.

interviews with 29 bilingual and monolingual speakers who had immigrated to Mérida before the recordings or had become “merideños” due to the administrative incorporation of their home village into the city. The main result of this study is that the labialization of word-final nasals is more common (i) in utterance-final position or before longer pauses, and (ii) in the speech of monolingual speakers of Spanish compared to bilinguals.

Renewing the sociolinguistic account of Yager (1989), Michnowicz (2006a; 2006b; 2007; 2008) provides quantitative analyses of word-final nasals in Yucatecan Spanish based on 40 sociolinguistic interviews and 10 language attitude questionnaires (Michnowicz, 2006b; 2007; 2008), as well as a Rapid and Anonymous Survey along the lines of Labov (1966: 47–48) (Michnowicz, 2006a). All recordings were conducted in Mérida, Yucatán. Similar to Yager (1989), the speakers of the non-anonymous recordings were divided by gender (male and female), age (younger – middle-aged – older), socioeconomic class (lower and middle/upper), and language profiles (monolingual Spanish speakers – Spanish-dominant speakers, i.e., speakers of Spanish with a non-fluent or passive knowledge of Yucatec Maya – balanced bilinguals, i.e., “fluent Mayan speakers” in the terms of Michnowicz, 2006b: 68).³ The four most important results of Michnowicz’s fine-grained sociolinguistic investigations are the following. First, final [m] primarily occurs “in absolute final position, i.e., before a pause” (Michnowicz, 2006b: 79). That is to say, while the total frequency of word-final [m] is low in the interview data, the labialization rate of the 1,093 nasals in absolute final position amounts to 25% (Michnowicz, 2006b: 80). Second, word-final [m] is significantly more likely to appear in stressed syllables than in unstressed syllables (Michnowicz, 2006b: 83). Third, word-final [m] appears to be in part lexically conditioned in his data, with *camión* ‘bus, truck’, *nilón* ‘nylon’, and *con* ‘with’ being the lexical items with the highest labialization rates (ibid.). Fourth, the speakers who most frequently use word-final [m] are younger Spanish-dominant bilinguals who “come from lower class Mayan-speaking families and have begun to enter the economic mainstream” (Michnowicz, 2006b: 92).

3 The “non-fluent or passive speakers of Mayan” (Michnowicz, 2006b: 191) are speakers “with some knowledge of Mayan, defined as speakers whose parents or grandparents speak Mayan, and who can at least understand a conversation in that language, even if they respond in Spanish” (Michnowicz, 2006b: 191), whereas the “fluent Mayan speakers” are speakers who speak both Spanish and Yucatec Maya fluently. In the present article, the former will be referred to as “Spanish-dominant speakers”, and the latter will be referred to as “balanced bilingual speakers”.

Finally, as far as Yucatec Maya is concerned, I already mentioned in Section 1 that I am not aware of any systematic empirical research concentrating on the labialization of word-final nasals in Yucatec Maya so far. However, from what I understand from my e-mail correspondence with Victoria Bricker (formerly of Tulane University, Louisiana) in 2017, and from the work on variation in Yucatec child language by Straight (1976), Yucatec Maya is characterized by processes of neutralization of nasals in coda position that are very similar to what is generally attested in Spanish. To begin with, Victoria Bricker reports that the Calepino de Motul⁴ “contains the following examples of root-final <n> assimilating to a root or suffix beginning with a bilabial consonant” (see (1)), or with a dental consonant (see (2)):

- (1) can-bal ---> cam-bal ‘learn’
 hun-pay ---> hum-pay ‘another’
- (2) cim-tan ---> cin-tan ‘wounded, hurt, injured’
 tum-t-ic ---> tun-t-ic ‘test it’

Moreover, Straight (1976) shows that, just as in Spanish, Yucatec Maya has dental or alveolar, velar, and bilabial nasals, as well as elision with concomitant nasalization of the preceding vowel, at the end of the syllable. What is more, he argues that nasal consonants in phrase-final position, i.e., before a pause, are neutralized to different degrees in the speech of adults (partial neutralization) and children (complete neutralization), meaning that the different realizations are “ambiguous” (ibid. p. 173) in that they may represent any of the nasal phonemes, depending on the lexical entry involved. Another source showing the neutralization of Yucatec Maya nasals in (word-) final position is the Yucatec Maya/Spanish dictionary by Martínez Huchim (2014), where we find entries such as the ones displayed in (3), among several others.

- (3) ESP.: *tucán* - MAYA: *pam, pan ch’eel* (‘toucan’),
 ESP.: *estofado* - MAYA: *majkuum, majkuun* (‘stew’),
 ESP.: *estornudar* - MAYA: *je’esiim, je’esiin* (‘sneeze’),
 ESP.: *pozole* - MAYA: *k’eyem, k’eyen* (‘corn stew’)

Interestingly, as far as variation is concerned, Victoria Bricker notes that she has “reason to believe that the phrase-final alternation of <m> and <n> is gender-specific. (...) Male speakers tend to produce <n> or engma, whereas female speakers tend to produce <m>.” More concretely, she reports with

4 Maya/Spanish dictionary, c. 1580–1614; Fr. Antonio de Ciudad Real (see Bolles, 2003 for details).

respect to the co-editors of Bricker et al. (1998), Eleuterio Po'ot Yah and Ofelia Dzul de Po'ot, that, according to her estimation, "Eleuterio Po'ot Yah would say *tim b'in h maan* for 'I'm going shopping', and his wife, Ofelia Dzul de Po'ot, would say *tim b'in h maam*." Further on, she acknowledges that she does not know "how widespread this pattern is, but it is worth exploring." For the present purposes, the most important empirical insights of the above-cited literature are that (i) word-final nasals are neutralized regarding place of articulation in both Yucatecan Spanish and Yucatec Maya, meaning that any contact effect is located at the level of phonetic realization (see again Alvar, 1969); (ii) there is more labialization in "absolute final position"; and (iii) Spanish-dominant and monolingual speakers of Yucatecan Spanish in Mérida, Yucatán, exhibit a higher labialization rate than balanced bilingual speakers of this region.

2.2 *Previous Contact Hypotheses*

The Yucatecan labialization phenomenon attracts attention since it is rare in Spanish and "unexpected in terms of markedness" (Michnowicz, 2008: 283). Accordingly, it is often attributed to the contact with Yucatec Maya in the literature on language contact in Spanish (see Sections 1 and 2.3 of the present paper). Moreover, renowned Hispanists such as Alvar (1969), Cassano (1977), and Lope Blanch (1987) discuss the question of how "Spanish-like" this feature is and whether the Spanish language provides the systemic preconditions for the feature to develop naturally within this language. Thus, according to Alvar (1969: 169), final [m] is 'a totally new feature' ("una particularidad totalmente inédita") that corresponds to a 'phonetic [realization] of indigenous tradition' ("una [realización fonética] de tradición indígena"). By contrast, Lope Blanch (1987: 42) points to the fact that scattered labial pronunciations are found in different regions of Mexico outside of the Yucatán Peninsula and beyond, e.g., in Colombia (Flórez, 1951), northern Argentina (Rojas, 1969), and Paraguay (Granda, 1982). Accordingly, he proposes analyzing word-final [m] as a 'latent possibility of the phonetic system of Spanish' ("posibilidad latente en el sistema fonético español", Lope Blanch, 1987: 62) which has been 'favored by the phonetic reality of the Mayan language, where the bilabial articulation [-m] at the end of the word is absolutely normal' ("favorecida por la realidad fonética de la lengua maya, donde la articulación bilabial [-m] al final de palabra es absolutamente normal", *ibid.*). In other words, his main conclusion is that Yucatecan Spanish word-final [m] "is a natural process of Spanish that has been favored by contact with Mayan" (Michnowicz, 2008: 285). Relying on his polymorphism account, Lope Blanch (1987: 63) furthermore proposes that (i) word-final [m] first arose among Mayan-Spanish bilinguals in Yucatán, and (ii) the contact-induced variability and lack of strong normative pressures in Yucatecan Spanish have combined to permit the subsequent rise of this

feature among monolingual speakers. Pfeiler (1992: 120) generally agrees with this conclusion. At the same time, she points to the fact that her monolingual Yucatecan Spanish data suggest a clear increase in labialization rates over time, suggesting that the labialization of word-final nasals in Yucatecan Spanish is a ‘process which is primarily internal to Spanish’ (‘un proceso primordialmente interno del español yucateco’, Pfeiler, 1992: 120).

As discussed in Section 2.1, both Yager (1989) and Michnowicz (2006a; 2006b; 2007; 2008) focus on the sociolinguistic development of word-final [m] in the city of Mérida. The issue of Mayan influence is briefly discussed in these works, too, but the authors remain rather restrained with respect to this question, deferring it to future research. As noted above, Yager (1989: 94) attributes the increase in word-final [m] in the younger age group to the correlation of the labial with local prestige among middle class female speakers, with [m] later spreading to lower class men. Michnowicz (2008: 299) similarly attributes to word-final [m] its current status as “a (semi-conscious) shibboleth of regional identity (...) in light of the increasing contact with speakers of other varieties of Spanish (...)” (Michnowicz, 2008: 297). However, as far as language contact is concerned, Michnowicz (2006a: 165) still hypothesizes that, “[w]hile it is impossible to say for sure if Mayan has directly influenced the existence of -m in YS, the rarity of -m outside of the Yucatan, as well as phonological parallels in Mayan languages, suggest some influence during the centuries of contact between the two languages”. Moreover, referring to the fact that Yager (1989) did not find any significant correlation between bilingualism in Mayan and the production of word-final [m] in the Spanish variety of Mérida, Michnowicz (2006a: 165) notes that “even if contact with Mayan in some way directly influenced the dialect in the past, the present situation is more complicated”.

Finally, a further suggestion by Michnowicz (2006b: 184, *inter alia*) is that the development of word-final [m] as an identity marker was fostered by its presumed perceptual salience. More concretely, referring to Jun (1995) and Winters (2000), Michnowicz (2006b: 184) argues that “[i]n coda position, labials are more salient than coronals or velars”, so that the relative perceptual salience of this segment “may have allowed for increased attention to be paid, thereby enabling its rapid adoption as a marker of identity”.

Thus, in total, there are at least three ways of approaching the proliferation of word-final [m] on the Yucatán Peninsula. The first is the global contact hypothesis, according to which this phenomenon simply corresponds to a “phonetic realization of indigenous tradition” (see again Alvar 1969: 169).⁵

5 The term *global language hypothesis* is used in this paragraph in order to capture the fact that the influence of the contact language is assumed without considering any sociolinguistic details.

Second, it is assumed that Yucatec Maya “triggered” (Cassano 1977: 111) a “natural development internal to the Spanish language” (triggering hypothesis). Third, word-final [m] is analyzed as a local identity marker in Mérida, and its development is traced back to the assumed salience of labial nasals in coda position (perceptual salience hypothesis).

2.3 *Desiderata*

It is evident that the above-cited contact hypotheses approach the Yucatecan labialization of word-final nasals from different perspectives, each one signaling one or several important aspects that need to be considered in the analysis to be developed below. In what follows, I will briefly discuss the three hypotheses, thereby highlighting their benefits while concomitantly suggesting ways to further amplify (i.e., broaden and/or deepen) the empirical analysis and to eventually improve the explanatory approach.⁶

The global contact hypothesis is based on the assumption that the Mayan language is very likely to be an important component in the overall development of the phenomenon, drawing on the insights that word-final [m] is largely non-existent in Standard Spanish (see again Section 1), but that it is reported to “be absolutely normal in Yucatec Maya” (Lope Blanch, 1987: 62, see again Section 2.2). Although there are no in-depth counts so far due to the lack of empirical research, my preliminary investigation suggests that lexical items ending in <-m> represent approximately 5% of entries in digital Yucatec Maya databases, such as the glossary of 744 basic vocabulary items that was compiled by Nikolai Grube, University of Bonn, in 2016 (e.g., *am* ‘spider’, *balam* ‘jaguar’, *úcham* ‘husband’).⁷

Thus, the virtual non-existence of word-final [m] in Spanish contrasts sharply with the robust number of word-final labial nasals in Yucatec Maya, and against this background, the plausibility of the global contact hypothesis is undeniable. However, as regards the actual coming into being of the phenomenon, this hypothesis is obviously not very illuminating, since it does not relate the presumed contact effect to the overall sociolinguistic development of the feature or to the corresponding socio-cultural setting.

6 Note that I do not wish to say that the three approaches identified above are mutually exclusive. In fact, they rather differ in their level of detail, with the triggering hypothesis incorporating the insights of the global contact hypothesis, and Michnowicz’ approach incorporating in turn those of the triggering hypothesis (and the global contact hypothesis), i.e., Michnowicz’ approach \supset triggering hypothesis \supset global contact hypothesis.

7 As noted by one of the anonymous reviewers, the 5% of words in Maya that end in <-m> may have served to initiate the introduction of word-final [m] into Spanish, much in the same way as the English filler <um> has been argued to open the door to the introduction of schwa into US Spanish (Erker and Bruso, 2017).

The triggering hypothesis is considerably more nuanced compared to the global contact hypothesis, since it assumes at least two separate processes, i.e., (i) a process of linguistic transfer of word-final [m] from Yucatec Maya to Spanish within the group of the Mayan-Spanish bilingual speakers, and (ii) a linguistic “development internal to Spanish” which took place during the subsequent rise of this feature among monolingual speakers (see Section 2.2). However, the corresponding discussion in the literature is largely committed to the traditions of historical-comparative and structuralist linguistics in that it focuses on the structural make-up of *languages* rather than focusing on the actual speakers in their concrete sociolinguistic environments.⁸ Based on the above, it is evident that Michnowicz’s approach is most suitable for the present purposes; hence the variationist analysis of my data presented in Section 3 is mainly pursued along the lines of this account. However, as noted above, Michnowicz is largely agnostic regarding the issue of language contact itself, and there are several reasons to doubt his general perceptual salience hypothesis, according to which word-final [m] might have been chosen as an identity marker due to an alleged *general* perceptual salience of labials in coda position. It is true that Winters (2000) contributes evidence in favor of the general visual-perceptual salience of labials in coda position in bisyllabic nonsense words. However, note, first of all, that the relevance of this kind of *general* perceptual salience for the development of word-final nasals in Spanish is foiled by the processes of systematic diachronic and synchronic delabialization in that language. In fact, word-final [m] has been diachronically eliminated from Spanish by systematic apocopes (4a.) and alveolarizations (4b.). Synchronically, the “resistance” of Spanish speakers towards word-final [m] is evident in the lexicon, too (see e.g., (4c.)), to the extent that word-final nasals in Spanish ‘are limited to the phoneme /n/, even though orthographically we find *m* in certain words: *álbum*, *referéndum*, *memorándum*, and others of learned nature’ (“quedan limitadas al fonema /n/, por más que ortográficamente encontremos *m* en ciertas palabras: *álbum*, *referéndum*, *memorándum*, y otras de carácter culto”, Fernández-Sevilla, 1980: 488). This ‘resistance towards [m]’ does not seem to be in line with the hypothesis that the above-mentioned kind of (hypothesized) general perceptual salience of [m] would play a role in the development of word-final nasals in Spanish.

8 As pointed out by an anonymous reviewer, Lope Blanch (1987) does indeed analyze the language of 30 “actual speakers”. However, as has also been pointed out by the very same reviewer, the data collected by Lope Blanch (1987) are dialectal rather than sociolinguistic in nature, as is frequently noted by Lope Blanch himself in his various papers (e.g., Lope Blanch, 1987: 23). Moreover, and irrespective of the data issue, Lope Blanch’s reasoning is based on the structuralist paradigm and adheres to the *language*-centered perspective characteristic of both historical-comparative and structuralist linguistics.

- (4) a. [m] apocope:
 Lat. ORBEM > Sp. *orbe*
 Lat. CONSULEM > Sp. *cónsul*
 Lat. REGIONEM > Sp. *región*
- b. [m] alveolarization, diachronic:
 Lat. CUM > Sp. *con*
 Lat. QUEM > Sp. *quien*
 Lat. TAM > Sp. *tan*
- c. [m] alveolarization, synchronic:
 Hebr. *Jochim* > Sp. *Joaquín*
 Engl. *Adam* > Sp. *Adán*
 Engl. *Miriam* > Sp. *Mirían*
 Engl. *ice cream* > US.Sp. *aíscrín* (Moreno Fernández 2018)
 Engl. *randomly* > US.Sp. *alrandón* (ibid.)
 Engl. *rim* > Mx.Sp. *rin* (<http://dem.colmex.mx>)

Moreover, the results of Goodin-Mayeda's (2016: 71–91) studies on the perception of nasals in Mexican Spanish raise doubts about the hypothesis of the *general* perceptual salience of labial nasals, too. For example, in one of her experiments, Goodin-Mayeda (2016) compares 12 native speakers of English and 12 native speakers of Mexican Spanish with respect to the accuracy of perception of the nasals [m, n, ñ] and [ɲ] in isolation, onset, and coda position in VC syllables. The most important result of this study for the present purposes is that Spanish listeners perceived [n], not [m], most accurately in the coda position. In addition, the comparison between English and Spanish listeners revealed that Spanish listeners' perception of coda [n] was more accurate than that of English listeners. According to Goodin-Mayeda (2016: 87), this result "follows from simple frequency effects, since [n] occurs more commonly in absolute final position in Spanish, since it is the only nasal allowed in that position (in Mexican Spanish, at least)". Given these results, it is difficult to maintain the hypothesis of the general perceptual salience of labial nasals in coda position in Spanish, since word-final [m] would have to be perceived more easily than [n] if it were true that "[i]n coda position, labials are [generally (MU)] more salient than coronals or velars" (Michnowicz, 2006b: 184).

Finally, note again that the above reasoning only refers to the notion of the *general* perceptual salience of [m] proposed by Winters (2000), and adopted by Michnowicz (2006b, *inter alia*): word-final [m] cannot be more salient than word-final [n] *in general*, since, if it were so generally salient, it would not have been rejected in word-final position in (Mexican) Spanish, and it would have been perceived more accurately by the Mexican Spanish speakers of Goodin-Mayeda's (2016: 71–91) studies. In fact, as will be examined more

closely in section 4 of the present paper, the notion of salience will be crucial for my analysis of the labialization of word-final [m] in Yucatecan Spanish, as well. However, it will be argued in section 4 that any intent to develop a salience-based explanation of the coming into being of the labialization phenomenon in Yucatecan Spanish needs to concentrate on the socio-cognitive reality of the individual speakers involved, instead of considering salience at the general level of perception and/or at the level of entire languages.

3 Corpus Study

This section presents the main results of my empirical investigation in Yucatecan Spanish and Yucatec Maya as spoken in Felipe Carrillo Puerto, a small town with approx. 26,000 residents, including approx. 10,000 (38%) bilingual Spanish-Mayan speakers, and approx. 300 monolingual Mayan speakers (INEGI 2010), in Quintana Roo (Figure 2).



FIGURE 2 Map of the Yucatán peninsula from <http://www.yucatan.gob.mx> (retrieved March 18, 2019), with Quintana Roo highlighted by red oval.

In what follows, section 3.1 deals with the Yucatecan Spanish data, and section 3.2. presents the Yucatec Maya data. Section 3.3 provides a comparative overview of the results of 3.1 and 3.2.

3.1 *Yucatecan Spanish*

This section is subdivided into three subsections presenting the database (3.1.1), the methodology of the annotation and analysis (3.1.2), and the main results (3.1.3).

3.1.1 Database

The data for the present analysis of Yucatecan Spanish word-final nasals stems from an elicitation experiment consisting of twenty cartoon pictures accompanied by questions. The ten participants in the study were 20 to 70-year-old speakers of Yucatecan Spanish with varying degrees of knowledge of Yucatec Maya. They have all lived on the Yucatán peninsula since birth. Five participants are Spanish-dominant (in the sense of Michnowicz (2006b: 68); see section 2.1, footnote 3 of the present paper), while the remaining five speakers are balanced bilinguals. The interviews were conducted by a local field work assistant in order to avoid distracting effects of social distance, foreigner talk or cross-variational convergence. Although the questions were originally designed redundancy to elicit semi-controlled utterances with broadly or contrastively focused constituents, the corpus turned out to be fruitful for the study of word-final labialization, too, since the design contains many proper names (*La Familia Burrón*, *Memín Pinguín*, etc.) and definite descriptions (*buzón*, *pan*, *sillón*, etc.) ending in a nasal consonant. A further advantage of the appropriation of this particular dataset is that any design-related bias with respect to the research questions can be excluded from the outset.

3.1.2 Methodology

In total, the above-described corpus (henceforth ELIC01) contains 104 non-assimilative word-final nasals that are unevenly distributed over the utterance sets of the ten speakers (see subsection 3.1.3 for details). The categorization of the target items into “labial” ([m, ñm]) and “non-labial” ([n, ŋ, ʋ]) tokens was based on the combination of forced choice perception judgments by native speakers of Spanish (1 speaker) and German (3 speakers) alongside the acoustic analysis of the second formant and the duration of the relevant segments.

Figure 3 shows the number of labial and non-labial judgments per rater (R1–R4). Note that the distribution is in line with the above-mentioned Spanish speakers’ non-affinity with word-final [m], insofar as the native speaker of Spanish (R1) exhibits the lowest rate of labial ratings of all raters. However,

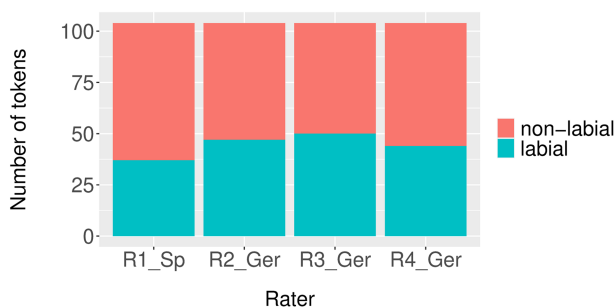


FIGURE 3 Number of labial vs. non-labial judgments per rater (R1 = native speaker of Spanish, R2-R4 = native speakers of German)

although being equally based on perception, this interrater exercise is not comparable to Goodin Mayeda's (2016) experimental setting for several reasons. First of all, all raters were involved in the preparation and analysis of the data and thus necessarily performed the rating from a "non-naïve" perspective. Secondly, the native Spanish-speaking rater is an experienced phonetician who had already published an acoustic study of word-final nasals in León Spanish a couple of years before doing the rating described here (see Martínez García, 2014).

The degree of interrater agreement was calculated by means of the Fleiss-Kappa statistic (Fleiss 1971), which measures the degree of agreement between two or more annotators on a nominal scale of $\kappa \in [-1, 1]$. Since this test yields $\kappa = 0$ if the number of agreements is equal to what is expected based on chance level and $\kappa = 1$ if all annotators agree on all rated items, the obtained agreement rate of $\kappa = 0.712$ indicates a substantial agreement between the four raters.

Following the rating procedure, all tokens were subjected to a manual acoustic analysis in PRAAT (Boersma and Weenink, 2018) that took into consideration the following three acoustic features. First, the second formant (F2) usually rises when it transitions from a vowel to a non-labial nasal (Figure 4), but has the tendency to decline as it transitions from a vowel to a labial nasal (Figure 5; see also Michnowicz, 2006b: 75, referring to Kent and Read, 1992).

Secondly, and closely related to the first feature, the F2 value at the borderline between a vowel and a nasal consonant tends to be lower in labial consonants than in non-labial consonants (see also e.g., Quilis, 1981; García and Rodríguez, 1998). Third, all other things being equal, labial nasal consonants tend to be longer than non-labial nasal consonants in Spanish. The measurements conducted took into consideration a Gaussian window of 10ms centered on the borderline between the vowel and the nasal (first and second features) and the intersections with zero of the first and last periodical waves of the nasal consonant (third feature).

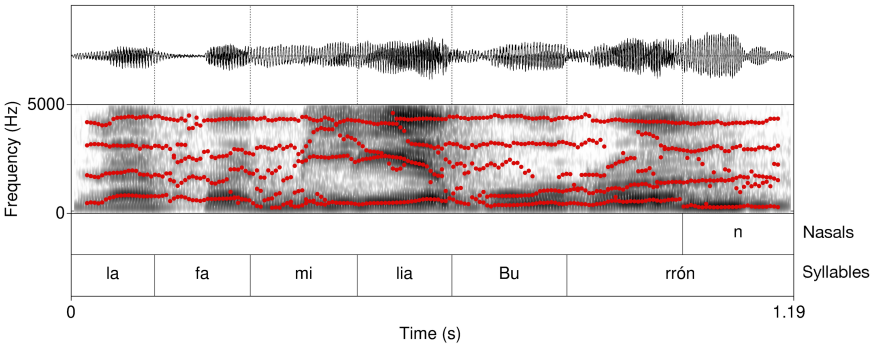


FIGURE 4 Spectrogram with formants in red and orthographic description of the utterance element *la familia Burrón* ('the Burrón family') from ELICOL.

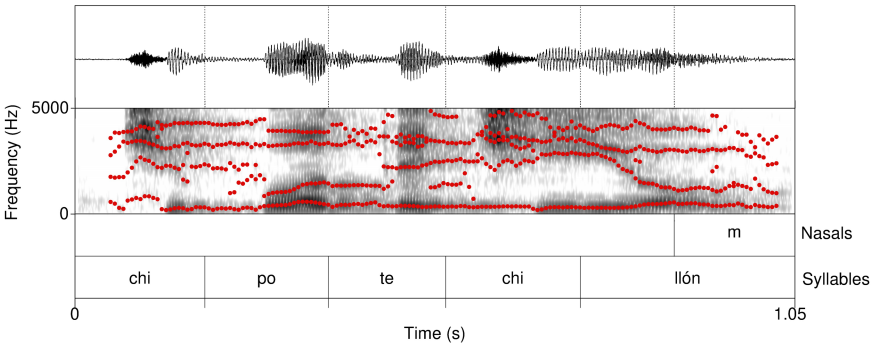


FIGURE 5 Spectrogram with formants in red and orthographic description of the utterance element *chipote chillón* ('gaudy lump', i.e., a sort of red hammer) from ELICOL.

The spectrograms of the tokens that the four raters agreed upon generally complied with the above-mentioned tendencies. The spectrograms of the rest of the tokens were less clear. In these cases, different criteria (partial agreement of judges, contour and height of F₂, duration of segments) were combined in order to reach the most reliable classification. A post-hoc comparison revealed that the classification we reached corresponds to the tendencies cited in the literature, in that the mean of the F₂ values of the tokens classified as “labial” is lower than that of the tokens classified as “non-labial”, with 1,208Hz in the case of the labials compared to 1,644Hz in the case of the non-labials (see Figure 6). In addition, the “labial” tokens are longer than the “non-labial” ones, with a mean duration of 173ms for the former compared to 150ms for the latter (see Figure 7).⁹

9 Note that I would expect the formant-related and durational differences between labial and non-labial tokens to result in an even more clear-cut analysis based on normalized formant

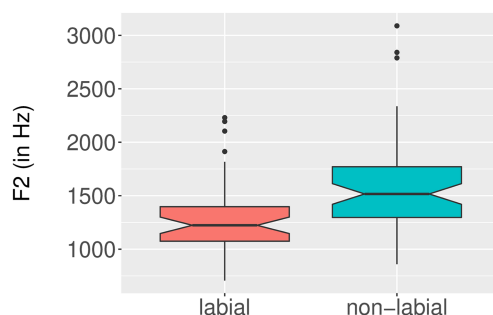


FIGURE 6 Height of F2 at the borderline between word-final nasals and preceding vowels: “labials” vs. “non-labials” in the ELIC01 corpus.

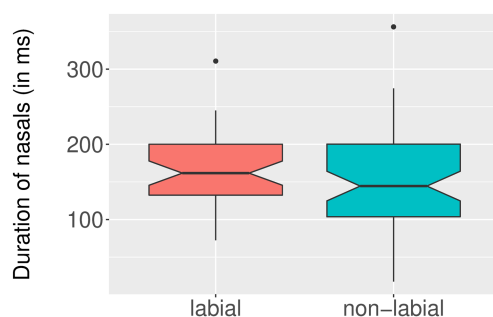


FIGURE 7 Duration of “labial” vs. “non-labial” word-final nasals in the ELIC01 corpus.

3.1.3 Results

According to the above classification, the data reveal a labialization rate of 42%, i.e., 44 out of 104 word-final nasals correspond to labial realizations (Figure 8). Moreover, the labializations in the corpus are distributed over the speakers in such a way that each individual speaker produces at least a couple of labialized word-final nasals (Figure 9).

Several χ^2 tests and logistic regression models were run in R (see R Core Team 2017, in bibliography) using the *chisq.test()* and *glm()* functions with the dependent variable labialization [\pm labial] in order to determine the effects of the following independent variables: language profile [YSdom/YSYM], age

and duration values. However, since (i) the main methodological instrument of the present paper is the interrater agreement exercise, since (ii) we obtained substantial agreement ($\kappa = 0.712$) between our four raters, and since (iii) even the non-normalized formant and duration values do already comply with the rating results from a global perspective, the analysis based on normalized values is not essential for the current study and is hence left for future works on the same phenomenon.

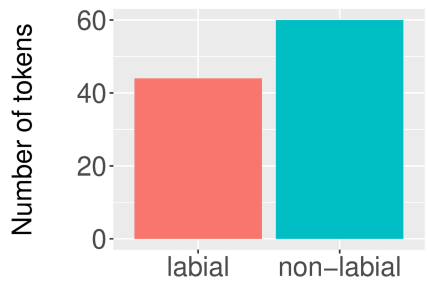


FIGURE 8 Number of labial vs. non-labial word-final nasals in the ELICO1 corpus.



FIGURE 9 Number of labial vs. non-labial word-final nasals in the ELICO1 corpus for individual speakers.

[groups 1/2/3], preceding vowel [a,e,i,o], length of the subsequent pause [milliseconds], and lexical stress [final/penultimate].

Since the corpus was not originally designed for this kind of investigation, it is not balanced for gender, age, or lexical stress. As far as these variables are concerned, the following three aspects should be noted. First, the χ^2 statistics for the relationship between [\pm labial] and gender were inconclusive since the corpus (9f/1m) only contains eight [+labial] tokens in the masculine category. Although we can thus not infer any gender-related hypotheses based on this data, it is still worth noting the low labialization rate of the male speaker (MAK5(m)), since it shows that the present results are in accordance with (or at least do not go against) Michnowicz's (2006a; 2006b; 2007; 2008) and Yager's (1989) observation that women tend to use the labial variant more than men. Second, the effect of lexical stress could not be calculated either,

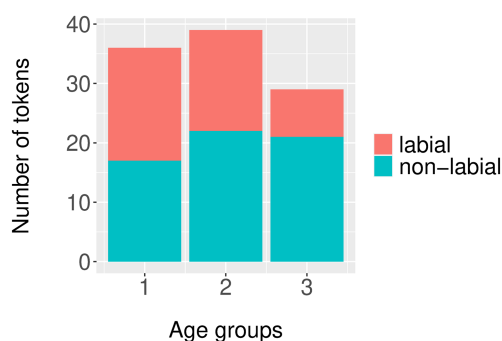


FIGURE 10 Number of labial vs. non-labial word-final nasals in the ELICO1 corpus for the post hoc age groups 1 (=age 36), 2 (ages 40–43), and 3 (ages 47–75).

for the very same reason. In fact, 97 target items in the dataset have final stress (e.g., *sillón*, see above), compared to only seven target items with penultimate stress (e.g., *alguien*). However, none of the seven items with penultimate stress is labialized, suggesting an effect of lexical stress similar to that observed by Michnowicz (2006b, *inter alia*). Third, the labialization rates of the three (post hoc determined) age groups 1 (age 36, three speakers), 2 (ages 40–43, four speakers), and 3 (ages 47–75, three speakers) coincide with the datasets analyzed by Michnowicz and Yager inasmuch as the labialization rate is highest in group 1 and lowest in group 3 (Figure 10). However, this effect is not significant in our dataset ($\chi^2 = 12.051$, $p = 0.06$).¹⁰

The effects of the language profiles were modeled using the *chisq.test()* and *glm()* functions without difficulty based on 59 tokens from the YSYM speakers and 45 tokens from the YSdom group. There are no statistically significant differences between the groups ($\chi^2 = 0.9724$, $p = 0.32$), but the data again coincides with the previous datasets from Mérida (Yager 1989; Pfeiler 1992; Michnowicz 2006a) inasmuch as the Spanish-dominant speakers have a higher labialization rate than the balanced bilingual speakers (Figure 11). It is interesting to see that, in spite of the different elicitation methods, the results for the social variables coincide with those of previous studies, as has also been pointed out by an anonymous reviewer.

¹⁰ The age groups of the present study have been defined post hoc in a way to keep the groups and data sets as equal as possible in terms of size. This classification is different from Michnowicz's (2006b, *inter alia*) studies, which are based on the following three age groups: 19 to 29, 30 to 49, and 50+, and it is true that this difference might impede comparability. Still, the data coincide in relational terms in that inter-group comparison indicates in both instances an increase of labialization in the data of the younger speakers compared to the older ones.

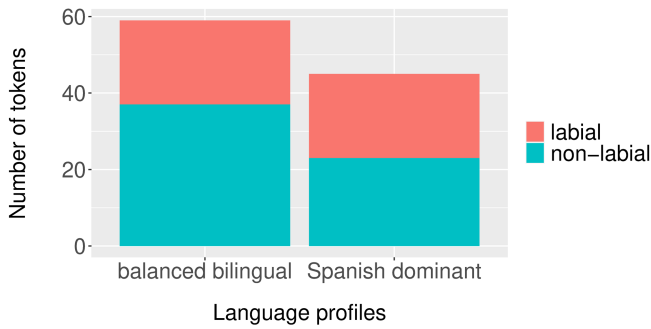


FIGURE 11 Number of labial vs. non-labial word-final nasals in the ELICO1 corpus according to language profile.

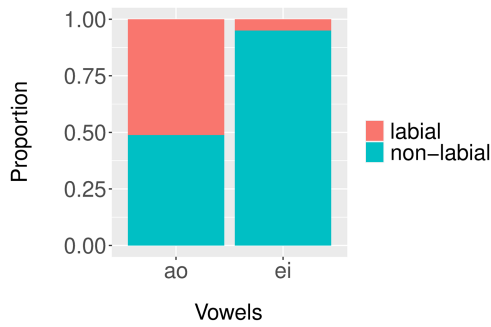


FIGURE 12 Proportion of labial vs. non-labial word-final nasals in the ELICO1 corpus according to the preceding vowel.

The remaining two variables, i.e., preceding vowel [a,o vs. e,i] and length of subsequent pause [milliseconds], both turned out to have significant effects on the dependent variable: Figure 12 shows that labial nasals are clearly more frequent when preceded by the vowels [a, o, n = 84] than when preceded by [e, I, n = 20] ($\chi^2 = 12.291$, $p < 0.001$), and most importantly for the present purposes, Figure 13 shows that the proportion of the labial cases in utterance-medial position significantly increases with the length of the subsequent pause ($z = 3.04$, $p = 0.002$).¹¹ The density plot is based on the values/ratings per pause length displayed in Table 1.

¹¹ As noted by an anonymous reviewer, this result is (roughly) in line with Lope Blanch's (1987: 42) observation according to which "the bilabial articulation is a phenomenon which preferably – or maybe exclusively – occurs in absolute final position before a complete pause (...), whereas in normal speech (...), the normal, alveolar articulation [n] is by far the most frequent one" (see section 2.1 of the present paper).

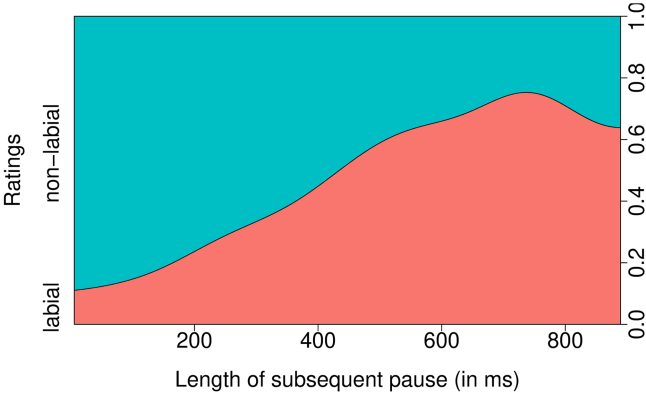


FIGURE 13 Density of labial vs. non-labial word-final nasals in the ELIC01 corpus according to the length of the subsequent pause for the non-final target items (n= 66).

TABLE 1 Ratings of utterance-medial tokens per length of subsequent pause in milliseconds, with 'nl' = non-labial, and 'l' = labial ratings.

No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Length of subseq. pause in msec.	132	133	145	173	177	186	195	216	245	247	259	273	278	280	282	307
Binary ratings	nl	nl	l	nl	nl	nl	nl	l	nl	nl	nl	nl	l	nl	l	l
No.	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Length of subseq. pause in msec.	320	321	337	348	351	365	381	402	409	422	432	433	453	465	470	473
Binary ratings	nl	nl	l	nl	nl	nl	nl	l	l	nl	nl	nl	l	l	nl	l
No.	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	
Length of subseq. pause in msec.	481	490	491	502	531	535	575	628	632	695	703	757	840	890	948	
Binary ratings	nl	l	l	l	l	l	nl	l	nl	l	l	l	nl	l	nl	

Finally, mixed effects models with random intercepts for tokens and speakers were calculated to determine whether random effects should be taken into account in the final model. However, the model comparison using the *anova()* function did not reveal any significant differences between the mixed effects

models and ordinary logistic regression ($p = 0.214$), meaning that random effects can be disregarded in this dataset.

3.2 *Yucatec Maya*

Like section 3.1, this subsection contains three subsections presenting the database (3.2.1), the methodology of the annotation and analysis (3.2.2), and the main results (3.2.3).

3.2.1 Database

The data for the present analysis of Yucatec Mayan word-final nasals originates from 10 semi-guided sociolinguistic interviews of about 8 to 10 minutes each, which were recorded in 2017 in two villages in the municipality of Felipe Carrillo Puerto, Quintana Roo, Mexico. The ten participants were 44 to 70-year-old female speakers of Yucatec Maya with varying degrees of knowledge of Spanish. They have all lived in Quintana Roo since birth. The interviews were conducted by a familiar native speaker of the local variety, in order to avoid distracting effects of social distance, foreigner talk or linguistic convergence, and transcribed by local field work assistants. Recordings were made in a silent room with an AKG C 544 L head-mounted microphone connected to a Presonus Audiobox USB in the presence of Nuria Martínez García, a researcher on project A5, CRC 1252, University of Cologne at the time.

3.2.2 Methodology

In total, the above-described corpus (henceforth INT_YM) contains 153 non-assimilative word-final nasals unevenly distributed over the utterance sets of the ten speakers (see section 3.2.3 for details). As a first step, all lexical items with non-assimilative word-final nasals before a pause of at least 50 milliseconds were extracted and annotated manually and separately for each speaker. Secondly, the categorization of the target items into “labial” ([m, nm]) and “non-labial” ([n, ŋ, ñ]) tokens was based on forced choice perception judgments by the four Spanish- and German-speaking raters mentioned in Section 3.1.2 of the present paper. The variants could not be subjected to a manual acoustic analysis in PRAAT (Boersma and Weenink, 2018), comparable to the one conducted for the Spanish variants, due to the lower acoustic quality of the data and, in particular, to the abundant creaky realization of sentence endings (see Keating et al., 2015 for a definition of creaky voice quality, and Figure 14 for a prototypical token of our data set).

The pervasiveness of creaky voice is a common feature of (sentence endings in) Yucatec Maya and has been studied in detail by Frazier (2008; 2013; 2016). Since creaky voice is known to particularly influence the F2 values of

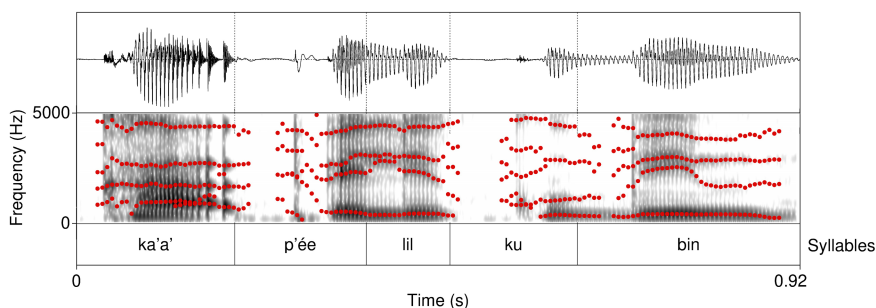


FIGURE 14 Spectrogram with formants in red and orthographic description of the utterance *Ka'a' p'ée lil ku bin* ('He/she/it is leaving again') from INT_YM.

female voices in languages such as English, at least (see e.g., Moosmüller, 2001), and since there are no studies on possible effects of creaky voice on formant height or segment length in Yucatec Maya, we needed to refrain from comparable formant and duration analyses in the context of the Yucatec Mayan data set. However, the degree of interrater agreement was calculated by means of the Fleiss-Kappa statistic (Fleiss, 1971), and the agreement rate of $\kappa = 0.773$ obtained (again) indicates a substantial agreement between our four raters. Moreover, in order to circumvent any self-confirmation bias, the calculations of the data analysis presented below are based on the rater who was most inclined towards perceiving labial nasals in the data set (perception of 19 labializations compared to an average of 16.5 word-final labial nasals), this set of ratings being the one which fits least well with the line of argumentation proposed in section 4.

3.2.3 Results

The first result of this analysis is that only 18 out of the 153 word-final nasals in the INT_YM corpus (i.e., 12%) correspond to labial realizations (Figure 15). Moreover, labialized word-final nasals are only produced by six of the ten speakers (Figure 16).

For significance testing, a logistic regression model was run in R (see R Core Team 2017 in bibliography) using the *glm()* function with the dependent variable [\pm labial] in order to determine the effects of the following independent variables: preceding vowel [a, e, i, o, u], and length of subsequent pause [milliseconds].

Figure 17 shows that the labialized word-final nasals in the INT_YM corpus are distributed over the range of preceding vowels in a fairly even way. Accordingly, the corresponding variable (preceding vowel) did not show any significant effect in our data (vowel coefficient (in logits): -0.08435 , $p = 0.8714$),

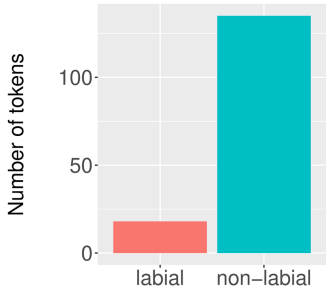


FIGURE 15 Number of labial vs. non-labial word-final nasals in the INT_YM corpus.

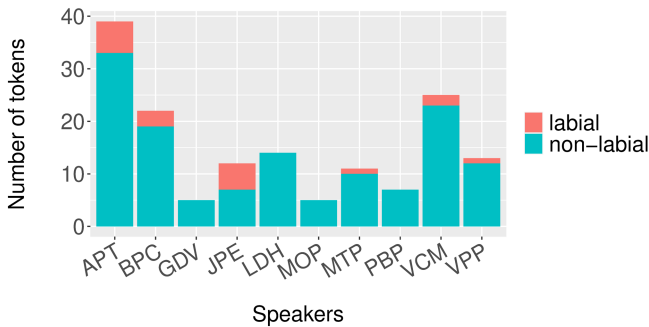


FIGURE 16 Number of labial vs. non-labial word-final nasals in the INT_YM corpus for individual speakers.



FIGURE 17 Proportion of labial vs. non-labial word-final nasals in the INT_YM corpus according to the preceding vowel, with $n(A) = 67$, $n(E) = 37$, $n(I) = 31$, $n(O) = 13$, $n(U) = 5$ tokens.

contrary to what has been observed for the Yucatecan Spanish dataset (compare Figure 17 with Figure 12 in subsection 3.1.3).

Moreover, and most importantly in the context of our analysis, the Yucatec Maya labialization data also differ from our Yucatecan Spanish dataset

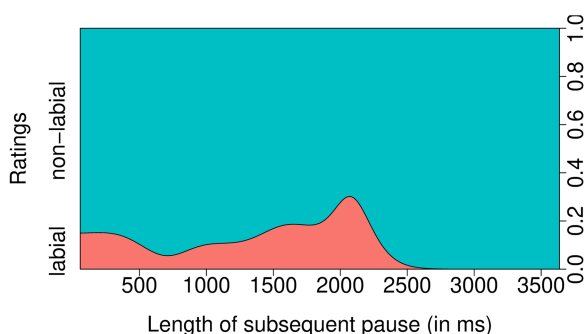


FIGURE 18 Density of labial vs. non-labial word-final nasals in the INT_YM corpus according to the length of the subsequent pause.

regarding the effect of the subsequent pauses. While, in the Yucatecan Spanish dataset, the labialization of word-final nasals significantly increases with the length of the subsequent pause, there was no such (significant) effect in the Maya data (pause coefficient (in logits): 0.00001177, $p = 0.8931$; compare Figure 18 with Figure 13 in subsection 3.1.3).

Finally, we tried to calculate a mixed effects model using the *glmer()* function with random intercepts for tokens and speakers to determine whether random effects should be taken into account in the final model. However, the model failed to converge due to the low number of observations per speaker. Nevertheless, the small effect sizes of the logistic regression suggest that the effects would not turn out to be significant in a mixed effects model either.

3.3 Summary of Results

As far as the comparison between the two datasets (of Yucatecan Spanish and Yucatec Maya) is concerned, it is true that the opportunities are limited due both to their dissimilarity and to the fact that none of the datasets is balanced for gender, age, or lexical stress. Nevertheless, the analyses described in sections 3.1 and 3.2 reveal that the two datasets are markedly different as regards all comparable features, i.e., “overall rate”, “speakers”, “preceding vowel”, and “length of subsequent pause”. First of all, the overall labialization rate in the Yucatec Maya data is considerably lower than in the Yucatecan Spanish dataset (12% vs. 42%). Secondly, labialized word-final nasals are only produced by six of the ten speakers of Yucatec Maya, whereas they are distributed somewhat more evenly in the Yucatecan Spanish dataset, to such a degree that each individual speaker produces at least a couple of labialized word-final nasals. Finally, the labialized nasals in the Yucatec Maya data are evenly distributed over the various phonetic contexts (defined in terms of preceding vowels and

subsequent pauses), whereas, in the Yucatecan Spanish dataset, the labialization of word-final nasals is largely restricted to the non-anterior vowels [a] and [o] and significantly increases with the length of the subsequent pause.

4 Discussion

The last-mentioned result is especially interesting since it suggests that labialized nasals are used by the speakers of Yucatecan Spanish to emphasize the right boundary of an intonational domain. In order to illustrate the role of word-final labializations for emphasizing right-hand prosodic edges, the example mentioned in the introduction is repeated below in (5) with a schematization of the two relevant intonation domains of the utterance separated by a pause (as indicated by <SIL>), thereby highlighting the crucial role of the final nasal of <pan> at the right edge of its prosodic domain.

(5) < ip Está poniendo su pa[m] > <SIL> < ip en el horno>

Moreover, our empirical analysis of the INT_YM corpus suggests that the feature does not have any comparable function in Yucatec Maya. Thus, even if it is plausible to assume that the feature was originally introduced into the regional Yucatecan “feature pool” (Mufwene 2001, among others) by bilingual Maya-Spanish speakers in the form of, e.g., a temporary cross-linguistic interference during bilingual conversations (see e.g., Simonet, 2014), it seems to have taken on a life of its own as a linguistic marker of right-edge prosodic prominence in this variety of Yucatecan Spanish.

One way to relate the “new” function of word-final [m] in the input of the Yucatecan speakers to the overall entrenchment of the feature in this variety is by correlating the mental states (attention, awareness) of the speakers with the degree of conceptual elaboration of the relevant activation patterns (i.e., those engendered by the labialized stimuli) in the speakers’ memory components, as is generally done in recent neuro-cognitive research or work on cognitive entrenchment (see e.g., Cohen et al., 2012; Kuhl and Chun, 2014: 814; Drager and Kirtley, 2016: 13; Moors, 2016: 274; and Schmid, 2016: 21, among others). Based on various neuro-cognitive studies, these authors argue, first of all, that attention promotes and is promoted by higher levels of conceptual integration, since even in the absence of awareness, “attention may be measured through behavioral (i.e., depth of priming ...) or neural changes (i.e., amount of activation in a particular region)” (Cohen et al., 2012: 412). The second repeatedly mentioned insight of this research is that conceptual integration increases

with the number of interconnections between information units, the latter being promoted by e.g., a feature's developing a new (socio)linguistic function. With respect to our issue of linguistic transfer, this means that there are at least two ways in which a new stimulus or feature may be sustainably transferred from one language (e.g., Yucatec Maya) into another (Yucatecan Spanish): first of all, the speakers' attentive processing of the feature due to its cognitive salience or "otherness", and secondly, its deeper conceptual integration due to its developing a particular new function. Based on these insights, I suggest that, as a first step in the development of word-final [m] in Yucatecan Spanish, the infrequent instances of this phenomenon attracted the speakers' attention (this is not to be equated with awareness) due to the rarity and unexpectedness of [m], compared to the much more frequent word-final [n]. This kind of *cognitive* salience corresponds to the relational property of being new, rare, unexpected, or surprising compared to input that is usual, known, or expected against the background of the speakers' cognitive systems (see e.g., Auer, 2014; Rácz, 2013; Jaeger and Weatherholtz, 2016; Blumenthal-Dramé, et al., 2017).¹² The speakers' attentive processing of word-final [m] paved the way for the cognitive entrenchment of the feature within particular speaker groups of the variety (see below). This cognitive entrenchment was in turn enabled by the processing of word-final [m] as a marker of right-edge boundary strength, since this new function further strengthened the conceptual elaboration of the feature in the relevant memory components of the speakers involved.¹³ In the case of word-final labialization in Yucatecan Spanish, entrenchment was thus achieved by endowing word-final [m] with an additional level of complexity, leading to a deeper level of processing compared to the processing of, e.g., a "useless" allophonic variant. The development of the corresponding cognitive parameters is summarized in Table 2.

From a behavioral perspective, this means that the speakers can employ the feature in a more meaningful and systematic way. From the perspective of processing, the corresponding mental representation is activated faster and (thus) more frequently than more ambiguous or less elaborated representations in the appropriate linguistic context. Among other things, the feature thus becomes more easily available for processes of social indexicality.

12 This notion of (cognitive) salience is hence notably distinct from the hypothesis of general perceptual salience of bilabial nasals in coda position put forth by Winters (2000) and Michnowicz (2006b) (see section 2.3).

13 As an alternative to this neuro-cognitive approach, the corresponding entrenchment process can also be conceived of in terms of linguistic behavior: if a linguistic feature develops a particular function, it is used more systematically and thus retained more easily, so that it is arguably conserved more reliably in the relevant linguistic system.

TABLE 2 Gradual cognitive entrenchment of word-final [m] in Yucatecan Spanish

Steps	Processes
Step 1	Otherness of stimuli > high cognitive salience > attentive processing
Step 2	Attentive processing + development of prosodic function > deeper processing
Step 3	Deeper processing > increase of conceptual relations > entrenchment

This leads us to the assumed fourth stage of development, the convergence of the Spanish-dominant and monolingual Spanish speakers of Yucatecan Spanish towards the use of word-final [m] for the purposes of social indexicality in a context of socio-cultural demarcation. This kind of convergence of individual speakers or speaker groups towards the use of particular features is generally attributed to the *social* salience of the corresponding linguistic phenomena (see e.g., Kerswill and Williams, 2002; Honeybone and Watson, 2013; Jensen, 2013; 2016; Auer, 2014). The concept of social salience is also called “socio-cognitive salience” (Jensen, 2016) or “sociolinguistic salience” (Auer, 2014) in the literature and may roughly be defined as the “association of social content and linguistic forms in the cognitive domain” *ibid.*: 3). First of all, note again that the increase in the labialization rate among the Spanish-dominant speakers in the ELICO1 data largely corroborates the quantitative differences between balanced bilinguals and Spanish-dominant speakers revealed by Michnowicz (2006a; 2006b; 2007; 2008) and Pfeiler (1992) for different speech communities in Mérida. In order to evaluate our results against the background of Michnowicz’s analysis of word-final [m] as a local identity marker, it is helpful to briefly compare the sociolinguistic background of the relevant speakers. As noted earlier, Michnowicz proposes that word-final [m] is a “(semi-conscious) shibboleth of regional identity [...] in light of the increasing contact with speakers of other varieties of Spanish, particularly from Yucatan’s traditional rivals in central Mexico, through [...] increased immigration, tourism and industry” (Michnowicz 2008: 297). As far as Quintana Roo is concerned, we know from socio-cultural interviews that the Spanish-dominant and monolingual speakers in our studies are socially and culturally oriented towards the city of Felipe Carrillo Puerto for various reasons, whereas the balanced bilingual speakers are much more affiliated with the surrounding *comunidades mayas* (Mayan communities). For example, when asked to talk about the local district (*Cuéntame algo de tu ciudad o municipio*, ‘Tell me something

about your city or municipality'), the Spanish-dominant speakers generally show their sense of belonging by means of positive attitudes towards regional and cultural features of Quintana Roo or Felipe Carrillo Puerto:

- (6) Carrillo ha ido desarrollándose en todos los aspectos tanto en lo educativo como en artesanía tiene/, es rico en artesanías también y pues tiene lagunas, tiene cenotes cerca para ir a echarnos un chapuzón, la verdad Carrillo Puerto es un punto muy importante de, del Estado de Quintana Roo. (fcp:mme:encuesta2017)

In particular, the high valuation of Felipe Carrillo Puerto is evident when comparing their local place of residence to the huge tourist area that extends to the north-east of the municipality:

- (7) [*Felipe Carrillo Puerto*] *me gusta porque es una ciudad muy tranquila, eeh <hes> muy tradicional, eeh <hes>, de gente muy este <hes> amable, donde se ve mucho la raíz de la cultura maya, más que en otras ciudades, ... Y me gusta aparte de que es un lugar, no es muy grande, es estén <hes> pequeño, casi lo considero como si fuera un pueblo, ... casi la mayoría nos conocemos, con, a pesar de que es una ciudad pus uno ya identifica quienes son, nos conocemos entre todos.* (fcp:lqr:encuesta2017)

It is true that the Spanish-dominant participants share this appreciation of their comparatively traditional municipality with the balanced bilingual speakers of our studies. However, when bilingual speakers are asked the question *Cuéntame algo sobre tu ciudad o municipio*, they mostly report on their *comunidades mayas* (see Table 3) which, being located on the outskirts of Felipe Carrillo Puerto, still largely observe Yucatec Mayan traditions and culture, suggesting that this speaker group has a strong sense of ethnic belonging.

There is a long-standing debate regarding ethnicity and identity of the Mayan population in different parts of the Yucatán Peninsula and beyond (see e.g., Gabbert, 2004a; Hervik, 1999; Hostettler and Restall, 2001; the contributions in Koechert and Pfeiler, 1999; or *The Journal of Latin American Anthropology* 2004, 9(1), to cite but some examples). In short, the discussion centers on the fact that the term "Maya" was hardly used until the 19th century (Savarino, 1999: 79). For our present purposes, the most important insight from these discussions is that the particular history of the region has "fostered, on the one hand, the emergence of ethnic consciousness among the [Mayan] rebels and, on the other hand, the development of a socially and culturally homogeneous Mayan-speaking [...] class [...] with a localized sense of loyalty" (Gabbert, 2004b: 92). In accordance with this, it seems that the balanced bilingual speakers in our study share a historically rooted ethnic consciousness, and hence feel considerably more connected to their *comunidades* than to the city of Felipe Carrillo Puerto. Another crucial characteristic of this group of speakers is that they

TABLE 3 Socio-cultural and regional orientation of Quintana Roo speakers as evidenced by their answers to the interview question *Cuéntame algo sobre tu ciudad o municipio*.

Balanced bilingual speakers	Spanish dominant speakers
TIHOSUCO - <i>hermosísima cultura</i>	FCP - <i>grande historia y cultura</i>
TEPICH - <i>orgulloso de ser de allá</i>	FCP - <i>tranquilo (me gusta)</i>
UH-MAY - <i>gente humilde</i>	FCP - <i>tranquilo, y personas se conocen</i>
XPICHIL - <i>apreciación a cultura maya</i>	FCP - <i>apacible, tranquilo</i>
XHAZIL-SUR - <i>costumbres bonitos</i>	FCP - <i>gente muy amable, muy jovial</i>
UH-MAY - <i>muchas tradiciones</i>	FCP - <i>tranquilo (me gusta)</i>
	FCP - <i>punto muy importante de QR</i>
	FCP - <i>seguro, estable, mayor convivencia</i>
	FCP - <i>el ideal para vivir en familia</i>
	FCP - <i>muy bonito, mucha cultura, comida rica</i>
	FCP - <i>gente honesta, trabajadora</i>
	FCP - <i>rico en artesanía, lagunas</i>
	FCP - <i>tranquilo, con gente amable</i>

have both family members (grandparents, parents, uncles/aunts, cousins) and homes in their particular *comunidad* and generally go there on a weekly basis. Conversely, the Spanish-dominant speakers do indeed appreciate the cultural assets of the indigenous *comunidades*, but do not have any closer affiliation with them. Rather, they are socially and culturally oriented towards the city of Felipe Carrillo Puerto and enjoy living there, since it is (still) “more quiet” and “less anonymous” than the coastal region, with its high degree of cultural mixing and population fluctuations due to mass tourism and the concomitant increased immigration rates.

Against this background, and considering Michnowicz’s (2006a; 2006b; 2007; 2008) results, the fact that the Spanish-dominant speakers in the ELIC01 study show more labialization of word-final [m] than the balanced bilingual ones suggests that the use of this feature seems to be related to the speakers’ identifying with the local Hispanophone culture, which is not true (to the same degree) for the balanced bilingual speakers. What is more, the idea that the development of word-final [m] in Felipe Carrillo Puerto might be related to social indexicality, similar to (albeit not the same as) that in Mérida, is further corroborated by the fact that it is arguably developing in a context of delimitation in both regions: in Mérida, the relevant speakers are apparently seeking to distance themselves from new immigrants (see again Michnowicz, 2008),

while Felipe Carrillo Puerto is highly appreciated by the inhabitants due to the fact that it is calmer and less anonymous than the large tourist area in the (north-)east. Moreover, our anthropological field notes and interviews suggest that the desire to distance oneself from newcomers is to a certain extent similar in both regions:

- (8) Carrillo Puerto es un espacio, un lugar en el cual aún se conserva muchas/, mucha gente con mucha forma de pensar más natural, mucha gente eh honesta, trabajadora y que poco a poco está siendo relegada por gente que viene de otros lugares. (fcp:mme:encuesta2017)

Thus, following Michnowicz's line of argumentation, I suggest that this desire for delimitation may have been one of the reasons for the spread of word-final [m] in this contact region.

This being said, it is to be noted that the development of word-final [m] does not seem to be entirely parallel in both regions. In general, regional Yucatecan Spanish expressions and particularities appear to be perceived and treated in a more conscious way in Mérida compared to Felipe Carrillo Puerto. To cite but two pieces of evidence in favor of this generalization, note, first, that typically "Meridian" merchandisers such as *Mayan Xic* (Figure 19) and *Donia Way* (Figure 20) would not be easily conceivable in Felipe Carrillo Puerto today for sociohistorical reasons.



FIGURE 19 Detail from the Internet shop of the local merchandising company *Mayan Xic* based in Mérida, Yucatán (retrieved July 9, 2020 from <http://www.mayanxic.com>).



FIGURE 20 Detail from the Internet site of the local cultural-commercial label Donia Way based in Mérida, Yucatán (retrieved July 9, 2020 from <http://www.doniaway.com>.)

Second, neither our local fieldwork assistants nor any of the speakers recorded during our fieldwork visits seemed to be aware of the “Yucatecan” labialization of word-final nasals, though most if not all exhibited word-final labialization to a greater or lesser extent. This suggests that the (presumed) use of word-final [m] in order to mark one’s belonging to the local Hispanophone (*mestizo*) culture is best conceived of as a subconscious process in Felipe Carrillo Puerto and the surrounding area.

5 Conclusions

Summing up the line of argumentation pursued in this article, I first argued that several pieces of evidence reveal a triggering function of Yucatec Maya for the development of word-final nasals in Spanish (see again Lope Blanch, 1987: 42; Michnowicz, 2006a: 165), the most important one being that word-final [m] is largely non-existent in Standard Spanish, but common in Yucatec Maya. Subsequently, I argued that neither the global contact hypothesis nor the more nuanced triggering hypothesis can account for the phenomenon in its entirety,

since they focus on the contact component but disregard (to a large extent) crucial sociolinguistic developments. By contrast, the sociolinguistic approaches by Yager (1989) and especially Michnowicz (2006a; 2006b; 2007; 2008) provide detailed variationist analyses of how the feature is actually used in certain determined speaker groups in Mérida; however, they are rather restrained with respect to possible contact hypotheses. It is true that all of these approaches are deliberately designed to cover specific aspects of development, meaning that the above-mentioned points are not actually shortcomings at all. To the contrary, the labialization studies by Michnowicz (2006a; 2006b; 2007; 2008) are in fact very illuminating with respect to the sociolinguistics of word-final labialization in the variety of Yucatecan Spanish spoken in the city of Mérida. However, it is still true that, due to their particular focus on the sociolinguistics of Yucatecan Spanish, (i) Yucatec Maya is not analyzed empirically, and (ii) statements with respect to the contact issue are explicitly restrained. Thus, the present study has aimed to contribute further details to the exploration of the phenomenon of word-final labialization in Yucatecan Spanish by combining a detailed contact hypothesis with both variationist investigations outside of Mérida and an empirical (variationist) analysis of the labialization feature in Yucatec Maya.

Based on the corresponding empirical analyses, I suggested that the labialization of word-final nasals in the Quintana Roo contact region is characterized by the following three-step development. In a first stage, native speakers of Yucatec Maya “transferred” the labialization of word-final nasals from Yucatec Maya to “their” L2 Spanish, thereby introducing the feature to the input of the region’s monolingual and bilingual speakers of Spanish (Lope Blanch, 1987; Michnowicz, 2006a). After this, the feature developed its function as a marker of right-edge prosodic prominence in the (speakers’ mental representations of the) Spanish language of that region. This prominence-marking function of word-final [m] lent the phenomenon a degree of salience such that it was subconsciously chosen as a marker of local identity by the Spanish-dominant and monolingual speakers of Felipe Carrillo Puerto and possibly beyond.

That being said, it is important to note that the acquisition of Spanish as a second language was not institutionalized in this region until the 1940s, meaning that the L2 acquisition of Spanish in the initial phase was arguably very different from the school-guided acquisition of Spanish of today’s bilingual speakers. Thus, it is entirely possible that the native speakers of Yucatec Maya initially “transferred” the labialization of word-final nasals to their L2 Spanish, although the actual bilingual speakers show fewer cross-linguistic effects than the Spanish-dominant and monolingual Spanish speakers in this context at present.

Finally, note that the present investigation should ideally be flanked by at least the following three complementary studies. First of all, the phonetics and phonology of modern-day Yucatec Mayan and (Yucatecan) Spanish nasals might not necessarily be the same as they were historically, especially at the time of the initial contact of Spanish with the indigenous language. Therefore, a robust piece of evidence for a transfer origin of the labialized nasal of Yucatecan Spanish would be the documentation (or comparative reconstructions) of word final $[-m]$ in historic Mayan varieties.¹⁴ Secondly, the two databases used in the present study are qualitatively rather different (semi-spontaneous elicitation in the case of Yucatecan Spanish vs. sociolinguistic interviews in the case of Yucatec Maya). Since there are reasons to believe that the labialization is higher in more controlled (and hence slower) speech, the present study on Yucatecan Spanish word-final nasals should be broadened by an investigation of spontaneous speech from sociolinguistic interviews. Thirdly, it has already been mentioned in section 2.2 of the present paper that scattered labial pronunciations are found in different regions of Mexico outside of the Yucatán Peninsula and beyond, including in Colombia (Flórez, 1951), northern Argentina (Rojas, 1969), and Paraguay (Granda, 1982). For this reason, one of the next steps to amplify the present investigation will be the comparison of the Yucatecan Spanish data with similar datasets recorded in 2017 by Élodie Blestel and Santiago Sánchez Moreano, Sorbonne Nouvelle Paris 3, in Paraguay (É. Blestel) and Colombia (S. Sánchez Moreano).

Acknowledgements

Parts of this research have been funded by the German Research Foundation (DFG) as part of the CRC 1252 “Prominence in Language”, project A5 “Prominence marking and language contact in Spanish”, grant no. 281511265. The formant and duration measures of the word-final labials of our Yucatecan Spanish data set were contributed by Nuria Martínez García, SFB 1252, A05. I wish to thank the speakers interviewed in Quintana Roo for their readiness to take part in the experiments and interviews, and our local field assistant and Nuria Martínez García for their assistance in the recording and the preparation of the data for further analysis, respectively. I also wish to thank the two

14 Thanks to Holman Tse, St. Catherine University, St. Paul, MN, for pointing out a similar concern to me at this year’s virtual RUEG Conference - Dynamics of Language Contact, New Perspectives on Emerging Grammars, Variation and Change, Berlin, 21st to 23rd February 2021.

anonymous reviewers of the present article and the journal editor for their highly valuable comments and suggestions. Furthermore, many thanks go to Patrick Auhagen and Leonard Rick for taking part in the interrater agreement tasks.

References

- Alvar, Manuel. 1969. Nuevas notas sobre el español de Yucatán. *Iberoromania* 1. 159–189.
- Auer, Peter. 2014. Anmerkungen zum Salienzbeff in der Soziolinguistik. *Linguistik Online* (66): 7–20.
- Blumenthal-Dramé, Alice, Hanulikova, Adriana; Kortmann, Bernd (ed.). 2017. Perceptual linguistic salience: Modeling causes and consequences. Special Issue, *Frontiers in Psychology* 8.
- Boersma, Paul and Weenink, David. 2018. Praat: doing phonetics by computer [Computer program].
- Bolles, David. 2003. The Mayan Franciscan Vocabularies. A preliminary survey. *Estudios de Cultura Maya XXIV*: 61–84.
- Bricker, Victoria, Po'ot Yah, Eleuterio and Dzul de Po'ot, Ofelia. 1998. A Dictionary of the Maya Language as Spoken in Hocabá, Yucatán. Salt Lake City: University of Utah Press.
- Cassano, Paul V. 1977. La influencia del maya en la fonología del español de Yucatan. *Anuario de Letras* (15): 95–113.
- Cohen, Michael A., Cavanagh, Patrick, Chun, Marvin M. and Nakayama, Ken. 2012. The attentional requirements of consciousness. *Trends in Cognitive Sciences* 16(8): 411–417.
- Drager, Katie and Kirtley, M. Joelle 2016. Awareness, Salience, and Stereotypes in Exemplar-Based Models of Speech Production and Perception. In Babel, Anna M. (ed.), *Awareness and Control in Sociolinguistic Research*. Cambridge and Mass: Cambridge University Press. 1–24.
- Fernández-Sevilla, Julio. 1980. Los fonemas implosivos en español. *Boletín del Instituto Caro y Cuervo* 35(3): 456–505.
- Fleiss, Joseph L. 1971. Measuring nominal scale agreement among many raters. *Psychological Bulletin* 76(5): 378–382.
- Flórez, Luis. 1951. La pronunciación del español en Bogotá. Bogotá: Instituto Caro y Cuervo.
- Frazier, Melissa. 2016. Pitch and Glottalization as Cues to Contrast in Yucatec Maya. In Avelino, Heriberto, Coler, Matt, and Wetzels, Leo (eds.), *The Phonetics and Phonology of Laryngeal Features in Native American Languages*. Leiden, Netherlands: Brill. 203–229. doi: https://doi.org/10.1163/9789004303218_009.

- Frazier, M. 2013. The phonetics of Yucatec Maya and the typology of laryngeal complexity, *STUF - Language Typology and Universals* 66(1): 7–21.
- Frazier, Melissa. 2008. The interaction of pitch and creaky voice: data from Yucatec Maya and cross-linguistic implications. UBC Working Papers in Linguistics: Proceedings of Workshop on Structure and Constituency in the Languages of the Americas (WSCLA), 112–125.
- Gabbert, Wolfgang. 2004b. Of Friends and Foes: The Caste War and Ethnicity in Yucatan. *Journal of Latin American Anthropology* 9(1): 90–118.
- Gabbert, Wolfgang. 2004a. *Becoming Maya: Ethnicity and Social Inequality in Yucatán since 1500*. University of Arizona Press.
- García, Marisol; Rodríguez, Manuel. 1998. Estudio acústico de las consonantes nasales del español. *Corpus Linguistics and Linguistic Theory*, 9: 37–64.
- García Fajardo, Josefina. 1984. *Fonética del español de Valladolid, Yucatán*. Mexico City: Universidad Autónoma de México.
- Goodin-Mayeda, C. E. 2016. Nasals and nasalization in Spanish and Portuguese: Perception, phonetics and phonology. *Issues in Hispanic and Lusophone linguistics (IHLL)* 9.
- Granda, Germán de. 1982. Observaciones sobre la fonética del español en el Paraguay. *Anuario de Letras* 20: 145–194.
- Hervik, Peter. 1999. Mayan people within and beyond boundaries: Social categories and lived identity in Yucatán. *Studies in anthropology and history* 25. Amsterdam: Harwood Academic Publishers.
- Honeybone, Patrick and Watson, Kevin. 2013. Salience and the sociolinguistics of Scouse spelling: Exploring the phonology of the Contemporary Humorous Localised Dialect Literature of Liverpool. *English World-Wide* 34(3): 305–340.
- Hostettler, Ueli and Restall, Matthew (eds.). 2001. *Maya survivalism*. Markt Schwaben: A. Saurwein.
- Jaeger, T. Florian; Weatherholtz, Kodi 2016: What the Heck Is Salience? How Predictive Language Processing Contributes to Sociolinguistic Perception. *Frontiers in Psychology*, 7: 1115.
- Jensen, Marie M. 2013. *Salience in Language Change: A Socio-Cognitive Study of Tyneside English*. Ph.D. thesis, University of Northumbria, Newcastle.
- Jensen, Marie M. 2016. Linking Place and Mind: Localness As a Factor in Socio-Cognitive Salience. *Frontiers in Psychology* 7: 213–226.
- Jun, Jongho. 1995. *Perceptual and Articulatory Factors in Place Assimilation: An Optimality Theoretic Approach*. Unpublished doctoral dissertation, University of California, Los Angeles.
- Keating, Patricia, Garellek, Marc and Kreiman, Jody. 2015. Acoustic properties of different kinds of creaky voice. *Proceedings of the 18th International Congress of Phonetic Sciences*. Glasgow. ISBN 978-0-85261-941-4. Paper number 0821, retrieved

- from <http://www.internationalphoneticassociation.org/icphs-proceedings/ICPhS2015/Papers/ICPHS0821.pdf>.
- Kent, Raymond D. and Read, Charles. 1992. *The Acoustic Analysis of Speech*. San Diego, CA: Singular.
- Kerswill, Paul and Williams, Ann. 2002. "Salience" as an explanatory factor in language change: Evidence from dialect levelling in urban English. *Language Change* 86: 81–110.
- Klee, Carol A. and Lynch, Andrew. 2009. *El español en contacto con otras lenguas*. Washington, D.C.: Georgetown University Press.
- Koechert, Andreas and Pfeiler, Barbara (eds.). 1999. *Interculturalidad e Identidad Indígena: Preguntas Abiertas a la Globalización en México*. Hannover: Verlag für Ethnologie.
- Kuhl, B. A. and Chun, M. 2014. Memory and attention. *Oxford Handbooks Online*. DOI: 10.1093/oxfordhb/9780199675111.013.034.
- Labov, William. 1966. *The social stratification of English in New York City*. Cambridge: Cambridge University Press.
- Lope Blanch, Juan M. (ed.). 1990–2000. *Atlas lingüístico de México*. México: El Colegio de México - UNAM - Fondo de Cultura Económica.
- Lope Blanch, Juan M. 1987. *Estudios sobre el español de Yucatán*. Mexico City: UNAM.
- Martínez García, Nuria. 2014. Estudio acústico de /n/ en contexto de resilabeo en el español de León. In Congosto Martín, Y., Montero Curiel, M. L., and Salvador Plans, A. (eds.), *Fonética experimental, educación superior e investigación*. Universidad de Cáceres y Universidad de Sevilla. 377–397.
- Martínez Huchim, Patricia. 2014. *Diccionario Maya de bolsillo*. Mérida, México: Editorial Dante.
- Michnowicz, Jim. 2007. El habla de Yuacatám: Final [m] in a Dialect in Contact. In: Holmquist, Jonathan, Lorenzino, Augusto and Lotfi Sayahi (eds.), *Selected proceedings of The Third Workshop on Spanish Sociolinguistics (WSS3)*, Somerville and MA: Cascadia Proceedings Project. 83–43.
- Michnowicz, Jim. 2008. Final nasal variation in Merida, Yucatán. *Spanish in Context* 5 (2): 278–303.
- Michnowicz, Jim. 2006b. *Linguistic and social variables in Yucatán Spanish*. Ph.D. thesis, Pennsylvania State University.
- Michnowicz, Jim. 2006a. Final -m in Yucatan Spanish: a rapid and anonymous survey. In Montreuil, Jean-Pierre Y. (ed.), *New Perspectives on Romance Linguistics*. Vol. 2: Phonetics, phonology, and dialectology. Selected papers from the 35th Linguistic Symposium on Romance Languages, Austin, Texas, 02.2005, 155–165. Amsterdam: John Benjamins.
- Moosmüller, Sylvia. 2001. The influence of creaky voice on *formant* frequency changes. *International Journal of Speech, Language and the Law* 8(1): 100–112.

- Moors, Agnes. 2016. Automaticity: Componential, Causal, and Mechanistic Explanations. *Annual Review of Psychology* 67(1): 263–287.
- Moreno Fernández, Francisco. 2018. Diccionario de anglicismos del español estadounidense /Dictionary of Anglicisms of US Spanish. Cambridge, Mass.: Instituto Cervantes at Harvard University.
- Mufwene, Salikoko S. 2001. The ecology of language evolution. Cambridge and New York: Cambridge University Press.
- Pfeiler, Barbara. 1992. Así som, los de Yucatán. In *Memorias del Primer Congreso Internacional de Mayistas*. San Cristóbal de las Casas, Mexico, 110–122.
- R Core Team. 2017. R: A Language and Environment for Statistical Computing. R Foundation for Statistical Computing, Vienna, Austria.
- Rácz, Péter. 2013. *Salience in Sociolinguistics: A Quantitative Approach*. Berlin [u.a.]: de Gruyter.
- Ramos i Duarte, Félix. 1895. Diccionario de mejicanismos. Colección de locuciones i frases viciosas, con sus correspondientes críticas i correcciones fundadas en autoridades de la lengua; máximas, refranes, provincialismos y retoques populares de todos los Estados de la República Mejicana. Mexico: Imprenta de Eduardo Dub.
- Rojas, Elena M. 1969. Aspectos del habla de San Miguel de Tucumán. Tucumán: Universidad Nacional de Tucumán.
- Savarino, Franco. 1999. Etnicidad y estado-nación: La construcción de la identidad étnica en Yucatán. In Koechert, Andreas and Pfeiler, Barbara (eds.), *Interculturalidad e Identidad Indígena: Preguntas Abiertas a la Globalización en México*. 65–87. Hannover, Germany: Verlag für Ethnologie.
- Schmid, Hans-Jörg. 2016. A framework for understanding linguistic entrenchment and its psychological foundations. In Schmid, Hans-Jörg (ed.), *Entrenchment and the psychology of language learning: How we reorganize and adapt linguistic knowledge* (Language and the human lifespan series), 9–35. Berlin [u.a.]: De Gruyter.
- Simonet, Miquel. 2014. Phonetic consequences of dynamic cross-linguistic interference in proficient bilinguals. *Journal of Phonetics* 43: 26–37.
- Straight, Steven H. 1976. The acquisition of Maya phonology: variation in Yucatec child language. New York: Garland Pub.
- Winters, Steve. 2000. Turning phonology inside out, or testing the relative salience of audio-visual cues for place of articulation. *OSU Working Papers in Linguistics* 53. 168–199.
- Yager, Kent. 1989. La -m bilabial en posición final absoluta en el español hablado en Mérida, Yucatán (Mexico). *Nueva Revista de Filología Hispánica* 37: 83–94.