HÁSKÓLI ÍSLANDS
Hugvísindasvið

Determination of a phoneme set for Acazulco Otomí

Linguistic fieldwork in Ndöngü, San Jerónimo Acazulco

Ritgerð til MA-prófs í almennum málvísindum

Marc Daniel Skibsted Volhardt

janúar 2013

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Marc Daniel Skibsted Volhardt
Kt.: 160988-4369

Leiðbeinandi: Kristján Árnason
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Abstract

This thesis discusses the moribund Mesoamerican language San Jerónimo Acazulco Otomí of central Mexico, a member of the Oto-Manguean language family. In the thesis, I will focus on the phonetics and phonology of the language and provide a comprehensive phonological description as well as determining a phoneme set for the language. Different studies of Otomian language varieties have dealt with the consonant systems in various ways. Acazulco Otomí has a remarkable consonant inventory, which, in addition to a three-way voiced/unvoiced/aspiration contrast in its stops, includes ejective stops and typological rarities like unvoiced nasals and approximants, as well as a system of preaspiration. The sound system of Acazulco Otomí preserves many features that it shares with reconstructed earlier stages of Oto-Manguean languages; therefore, the language is a valuable source in typological and historical linguistic studies of Oto-Pamean languages of Mexico. Moreover, this thesis is a result of a field work trip, which was part of a larger interdisciplinary project carried out by linguists, anthropologists, and archæologists. Furthermore, it was part of a general documentation of an understudied language and revitalization process, collecting and transcribing recordings of tales, rituals, etc. A phonological analysis is essential in the process of designing a practical orthography for a language, and through my analysis, I will discuss how to represent the sounds of the language orthographically. An orthography is a crucial aspect in the revitalization process and the possibilities for an endangered language to survive.

Ágrip á íslensku

Þessi ritgerð fjallar um hið dauðvona mesóameríska tungumál San Jerónimo Acazulco otomí sem er upprunið í Mið-Mexíkó og tilheyrir oto-mangue málaættinni. Rauði þráðurinn í ritgerðinni er hljóðfræði og hljóðkerfisfræði og sett er fram yfirgripsmikil hljóðfræðileg lýsing á tungumálinu ásamt því að hljóðön þess eru ákvörðuð. Í mismunandi rannsóknum á afbrigðum otomí tungumála hafa samhljóðakerfi verið skoðuð á marga vegu. Acazulco otomí hefur merkilegt samhljóðakerfi en tungumálið hefur til að mynda þrískipta aðgreiningu milli raddaðra, óraddaðra og fráblásinna lokhljóða, ásamt þrýstihljóðum, málgerðafræðileg fágæti á borð við óröddуð nefhljóð og nándarhljóð ásamt aðblásturskerfi. Hljóðkerfi Acazulco otomí varðveitir marga þætti sem finna má í endurgerðum orðmyndum á fyrri stigum oto-mangue tungumála. Af þeim sökum er tungumálið dýrmæt heimild fyrir rannsóknir á oto-pame tungumálum í Mexíkó, bæði hvað varðar málgerðafræði og söguleg málvísindi. Efni ritgerðarinnar má rekja til vettvangsferðar sem var hluti af mun stærra, þverfræðilegu verkefni sem málvísindamenn, mannfræðingar og fornleifafræðingar komu að. Enn fremur var verkefnið almenn skrásetning á tungumáli sem hefur lítt verið rannsakað. Það mætti tala um nokkurs konar endurlífgunarferli en upptökum af frásögnum, helgisiðum o.s.frv. var safnað og þær skráðar og hljóðritaðar. Hljóðkerfisleg greining er nauðsynleg svo hægt sé að búa til hagnýtt ritmál fyrir tungumál og sýnt verður hvernig hægt er að tákna hljóð tungumálsins skriflega. Ritmál er veigamikill þáttur er kemur að endurlífgun og varðveislu tungumála.

Resumen en español

Esta tesis tiene por objeto la lengua moribunda otomí de San Jerónimo de Acazulco (centro de México), perteneciente a la familia otomangue. En esta tesis me ocuparé de la fonética y la fonología de este idioma, aportando una descripción fonológica exhaustiva y estableciendo su repertorio de fonemas. Los sistemas consonánticos de las variedades de la lengua otomí han sido descritos diversamente por distintos estudios. El otomí de Acazulco tiene un inventario de consonantes notable, que, además de las tres formas de contraste —sonora, sorda y aspirada— en sus oclusivas, incluye oclusivas eyectivas y rarezas tipológicas tales como nasales sordas y aproximantes, así como un sistema de preaspiración. El sistema fonético del otomí de Acazulco conserva muchas características de las anteriores etapas reconstruidas de las lenguas otomangues, por lo que este idioma es una fuente valiosa para los estudios de tipología y de lingüística histórica de las lenguas otopameanas de México. Por otra parte, esta tesis es el resultado de un viaje de trabajo de campo incardinado en un proyecto interdisciplinario más extenso, que fue llevado a cabo por lingüistas, antropólogos y arqueólogos. Además, formaba parte de una documentación general de una lengua poco estudiada y de su proceso de revitalización, con la recolección y transcripción de grabaciones de cuentos, rituales, etc. El análisis fonológico es esencial en el diseño de una ortografía práctica para un idioma, y a través de mi análisis, trataré cómo representar de esta lengua ortográficamente. La ortografía es un aspecto crucial en el proceso de revitalización y para las oportunidades de supervivencia de una lengua amenazada.

Resumé på dansk

Denne afhandling omhandler det døende mesoamerikanske sprog San Jerónimo Acazulco otomí fra den otomangueanske sprogfamilie, som tales i det centrale Mexico. I afhandlingen vil jeg fokusere på sprogets fonetik og fonologi, hvorved jeg vil give en uddybende beskrivelse af sprogets fonologi samt fastlægge et sæt af fonemer for sproget. Forskellige studier af otomianske sprogvarieteter har behandlet konsonantsystemerne på forskellige måder. Acazulco otomí har et bemærkelsesværdigt konsonantsystem i den forstand, at det, ud over af have en tredelt skelnen mellem stemte, ustemte og aspirerede lukkelyde, omfatter ejektive lukkelyde og typologiske sjældenheder, såsom ustemte nasaler og approksimanter samt præaspiration. Lydsystemet i Acazulco otomí har bevaret mange egenskaber, hvilke det har til fælles med rekonstruerede ældre stadier af otomangueanske sprog; derfor er sproget en værdifuld kilde til i typologiske og historisk lingvistiske studier af otopameanske sprog i Mexico. Denne afhandling er endvidere resultatet af en feltlingvistisk rejse, som var en del af et større tværfagligt projekt blandt lingvister, antropologer and arkæologer. Desuden var det en del af en overordnet dokumentering af et lidet studeret sprog samt en revitaliseringsproces, der består i at indsamle og transskribere optagelser af fortællinger, ritualer mv. En fonologisk analyse er en væsentlig del af det at udarbejde en praktisk retskrivning for et sprog, og gennem min analyse vil jeg diskutere hvordan man bedst bør repræsentere sprogets lyde ortografisk. En retskrivning er en afgørende del en revitaliseringsproces og for et truet sprogs fremtidsoversigter for at overleve.

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PREFACE

> *"Wichtig ist, daß man nicht aufhört zu fragen. Neugier hat seinen eigenen Grund für die bestehenden."* — Albert Einstein
>
> "The important thing is not to stop questioning. Curiosity has its own reason for existing."

Quotes like these often hit the nail on the head. This one, though, in more than one sense. Had it not been for my curiosity, the topic of my master's thesis might have been utterly different. In the realm of modern day's social media, on a dark November's day during polar night in Arctic Norway, I commented on a Facebook thread, asking curiously, what lay behind two of my good friends' and colleagues' agreement to making a toast in tequila "when they had arrived in" Mexico. Two months, and a multitude of sudden academic re-planning, later, I found myself in bright January sunlight with these very same people in Ndöngü, San Jerónimo Acazulco, of central Mexico, just about to start two months of linguistic fieldwork on an endangered language. I would like to thank the inhabitants of San Jerónimo Acazulco for their hospitality towards this group of strangers, who suddenly showed up to live in their village for two months. It did not take long, though, for everybody to make us feel safe and at home in Acazulco, and we are all thankful to have got the opportunity the stay in Casa de los Mayordomos during our stay.

I am overly grateful to our trip leader, Ditte Boeg Thomsen, my good colleague and private friend. Without her invitation, I would not have experienced this fantastic trip. I am honoured to have been invited by a person, to whom I really look up. Countless thanks should also go to Katrine Falcon Søby and Amalia García. Without them, the trip would never have been the same. *Tusind tak*, all three of you! Also thanks to Magnus Pharao Hansen and Néstor Hernández-Green for interesting talks on Acazulco Otomí during the stay.

I would like thank my supervisor, Professor Kristján Árnason, for encouraging me at the very beginning of the process, and agreeing to supervise within a language family that was completely new to us both—a linguistic area that lies far beyond the North-Atlantic reality we usually find ourselves studying.

My warmest thanks go to our teachers of Otomí: without them, this very thesis could not have been reality.

Don Feliciano Soler Cesario, Jefe Supremo Otomí de Acazulco
Doña Trinidad Beltrán Gómez
Doña Juana Orta
Doña Encarnación S.
Doña Feliz O.
Doña Juana B.
Don Chavelo G.M.
Doña María P.S.
Doña María C.

Khamädi k'an mähte

Abbreviations, symbols, and conventions

Quotations in Spanish will be given in the original language followed by my own translation into English.

In given examples throughout this thesis, I will not mark lexical tones as this topic in the suprasegmental phonological analysis of Acazulco Otomí is a work in progress, and more than one description of the tonal system exist. A written standard for Acazulco Otomí partially based on Spanish tradition and surrounding languages' orthographies has been proposed by Pharao Hansen & Hernández-Green (2010). For readability to the non-Spanish reader, however, I will provide examples in phonetic transcriptions using IPA, unless otherwise specified (see Appendix 1 for a further introduction to the IPA transcription used throughout the thesis).

Dan.	Danish	SJAO	(San Jerónimo) Acazulco Otomí
DAT	dative case	{x,y}	list of sounds
DU	dual number	[…]	Phonetic representation following the IPA standards, unless otherwise specified
Eng.	English		
Faer.	Faeroese		
Fin.	Finnish	⟦…⟧	Quoted transcription
FEM	feminine gender	/…/	Phonemic, underlying representation
Ice.	Icelandic		
IMP	imperative	‹…›	Orthographical representation
INTERR	interrogative	'…'	Quotation marks, single: translation in English, unless otherwise specified
lit.	literal translation		
Mex.	Mexican Spanish		
NEUT	neuter gender	*	Asterisk: in examples: ungrammaticality; in lexicon: probable diachronic source, reconstructed form; in ungrammatical reconstructed forms, double ** are used
Nah.	Nahuatl		
PL	plural number		
PP	past participle		
RECP	reciprocal voice		
SG	singular number		
Spa.	Spanish (in general)		

1. Introduction

From late January to late March 2013, I took part in the linguistic field trip to the village San Jerónimo Acazulco Otomí[1] (Received Pronunciation [əʊtəˈmiː], Spa. [otoˈmi]; Acazulco Otomí: *yühü* [jũhũ]; henceforth Acazulco Otomí). The trip was part of a larger interdisciplinary project carried out by archæologists, anthropologists, and linguists, who are studying how indigenous groups relate to the landscape that surrounds them in the Toluca Valley of central Mexico, around the volcano of Nevado de Toluca, Xinantécatl[2], 4,690 m (15,400 ft.). Nevado de Toluca is a mythical and sacred place for the Otomí people, and in the two lakes in of the crater, archæologists have found well-preserved wooden statues and lightning, objects and figures, which are reflected in myths throughout the Toluca Valley.

The trip was part of a general documentation of an understudied language and revitalization process, collecting and transcribing recordings of tales, rituals, etc. Our work with Acazulco Otomí is work is progress, and from the trip, hours of recorded sound and video material is yet to be explored.

I addition, I am participating in the translation into Acazulco Otomí of the cartoon book *"Los misterios del volcán"* about the volcano Nevado de Toluca, published by *Instituto Nacional de Antropología e Historia* in Mexico City. The work of elicitation is done and the raw material present, ready to be transcribed, analysed and put into orthography.

In Chapter 2, I will briefly introduce the area we worked in as well as give an overview of Otomí dialectology. In Chapter 3, I will go thoroughly through the sound system of Acazulco Otomí and through phonological discussions and arguments give my opinion on which segments should be treated as independent phonemes and why. In addition, I will go through the practical orthography used to write Otomí.

[1] Wright 2005
[2] Nah. presumably 'The Naked Lord'.

2. Fieldwork

2.1. Linguistic fieldwork and method

The fieldwork data used in this thesis are collected mostly through elicitation and. While in San Jerónimo Acazulco, we visited our teachers, whom we had either heard about from other people who knew that they speak Otomí, or simply from talking to people on the street, in front of the church or on the market. Before noon, we were usually out collecting data material, while we mostly spent the afternoons in the house we were staying in, working with the data we had collected, read books or articles about or relevant to the field trip studies, prepared the next day's work, or dealt with everyday things such as when to bring the next water tank and keeping track of the many invitations to social events that we had got. Being on a fieldtrip is not only studying the language: the linguist fast becomes a part of the little society, and one spends a lot of energy trying to understand the new culture around surrounding oneself, possibly more than on the language itself; by experience, most questions come up after one has returned home. In addition to being a "total" experience socially, working with language through linguistic fieldwork undoubtedly forces the phonetician to also consider both syntax and pragmatics, and vice versa.

For working with data, we used the ELAN to transcribe sound files and the software Toolbox to

2.2. Ndöngü, San Jerónimo Acazulco

The village of San Jerónimo Acazulco (Mex. [san xeˈɾonimo akaˈsulko]; *Acazulco Otomí:* Ndöngü[3], 19°16′00″N 99°25′00″W), municipality of Ocoyoacac, region of Lerma de Villada, lies in the sloping landscape on the border between the mountain range of Sierra de las Cruces and the upper basin of Lerma de Villada. It overlooks the Toluca Valley in an altitude of 2,700 metres (9,000 ft.) above sea level. It lies just south of the heavily

[3] Here written with the practical orthography where diæreses on vowels represent their nasalization, hence pronounced [ndɔ̃ŋgũ], from *ndoho* 'big' and *ngũ* 'house'. The name *Acazulco*, however, is from Nahuatl, like many Mexican place names in, which incorporate the name of the village saint, in Acazulco's case *San Jerónimo*, as well as their Nahuatl name, e.g. San Pedro Atlapulco, San Pedro Tlaltizapán, etc.

trafficked highway between two extensive metropolitan areas: Toluca to the west, and the immense Federal District of Mexico City (Spa. *Distrito Federal*, colloquially D.F. ['de'efe]) to the east. Figure 1 below shows the location of San Jerónimo Acazulco in a larger perspective.

Just north of the village lies the sacred mountain Hueyamalucan, an important location to the local traditional Otomí culture, as well as the national park and recreational area of La Marquesa (*Acazulco Otomí:* 'Mbatha[4]), where thousands of people go on weekends to escape the rush Mexico City for a while. The village owns a large piece of land here, their ejido[5], where most of the inhabitants work with this weekend tourism. The terrain here exceeds 3,000 metres (10,000 ft.) and is mostly covered in dense oyamel[6] fir forest.

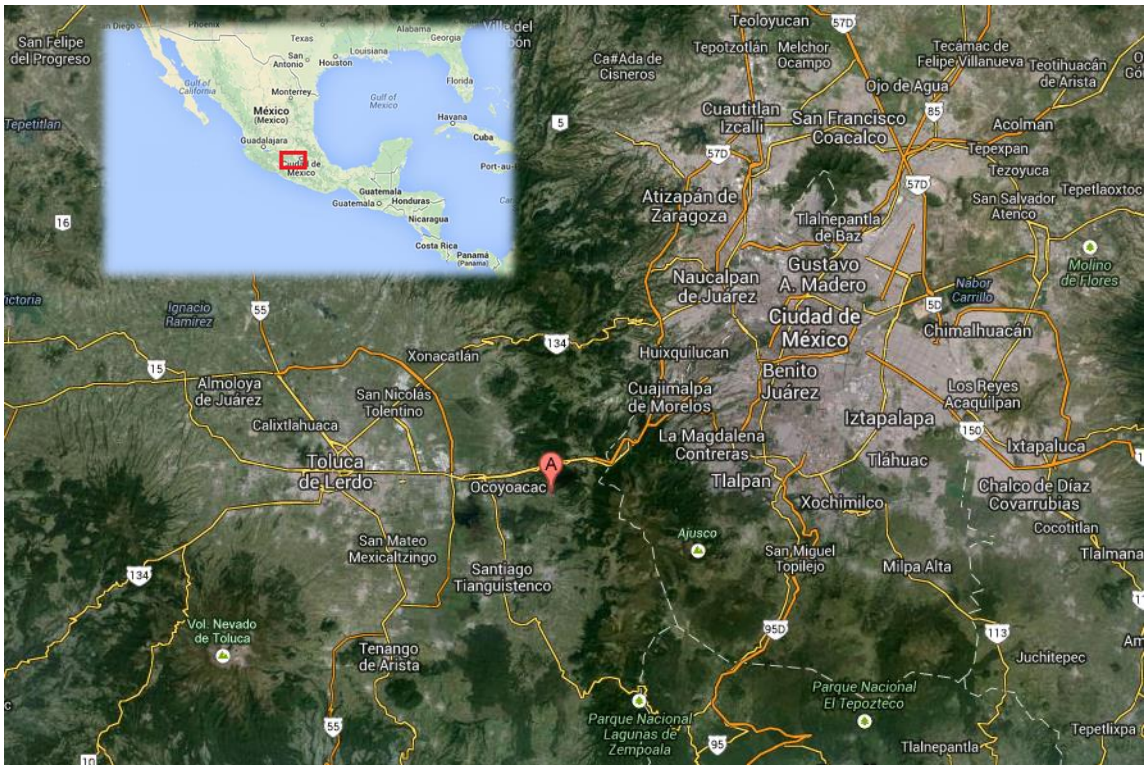


Figure 1 — The letter "A" shows the location of San Jerónimo Acazulco. Source: Google Earth.

[4] [ʔmbatʰa], meaning 'valley' or 'plain'

[5] An *ejido* is in Mexican Spanish "(in Mexico) a piece of land farmed communally under a system supported by the state." Source: Oxford Dictionaries online, www.oxforddictionaries.com.

[6] From Nahuatl *oyamel*, denoting the specific fir species, *abies religiosa*, native to central and southern Mexico. In Acazulco Otomí *'mbɑxü* [ʔmbɔʃũ].

According to the 2005 census[7], San Jerónimo Acazulco has just 4,727 inhabitants distributed within 974 households, which comes to an average of 4.9 individuals per household. It is an indigenous community, where old traditions are still alive despite the fact that the village is surrounded by a Spanish dominated and more modern Mexican society; in the neighbouring communities Atlapulco (pop. 3,662; *Acazulco Otomí:* Mboxkhi[8]), and Ocoyoacac and Tepexoyuca (*Acazulco Otomí:* Nt'a̱t'i, Nts'ophani[9]) the traditional local varieties of Otomí have almost or fully died out, both less than a one hour hike away from Acazulco. All speakers of Acazulco Otomí are above the age of 60, there are no monolingual speakers; we encountered just one, whose Spanish was only on a very simple level. The language has not been taught to the children of the only speakers left, and today only a few people know basic sentences or words. The community, however, is aware that they are an indigenous society, and a couple of years ago, a course in the language was taught at the city council. After he passed away, no teaching has been available. In the local school, I noticed children's drawings with words in Acazulco Otomí on them—although written with a Spanish style orthography—denoting animal names, which seemed to be the most commonly known words. Even some children knew that the word for 'cat' is *mbixtu* [mbiʃtu]. In the nearby recreational area *La Marquesa*, where the inhabitants of San Jerónimo Acazulco owns property and restaurants, I saw many signs and names of restaurants named after the Otomí name of the city *Ndöngü*.

2.3. Otomian dialectology

Viewed in a more extensive perspective, Acazulco Otomí is part of the Oto-Pamean family, which also includes the branches Chichimeca, Mazahua, Pame, and Matlatzinca-Ocuilteco. The family as a whole belongs to the Oto-manguean group, which apart from Oto-Pamean consists of the Amuzgoan, Chinantecan, Mixtecan, Popolocan, Tlapanecan, and Zapotecan language families. Otomian languages are a continuum or more and less mutually intelligible varieties or dialects that are spoken

[7] Source: ▾ http://www.inegi.gob.mx/est/contenidos/espanol/sistemas/conteo2005/iter2005/consultafiltro.aspx.
[8] [mboʃkʰi], from 'black' and 'blood', probably originating from former coal mining near the village. The inhabitants of Atlapulco, however, call themselves ⟦ᵐbɻhiɻgiːʔ⟧, 'the people from the oyamel fir forests' (Canales 2008: 27).
[9] [ntʼɔtʼi], [nt͡sʼopʰani]

by almost 300,000 people, or 280,238 individuals, according to the 1990 census. The Otomís inhabit areas in central Mexico from Veracruz in the east to Michoacán in the west, as well as in the states of Guanajuato, Querétaro, Hidalgo, Mexico State (Spa. Estado de México), Tlaxcala, and Puebla. The Mexican institute for indigenous languages classifies the Oto-manguean languages as shown below in Table 1 (Instituto Nacional de Lenguas Indígenas 2008).

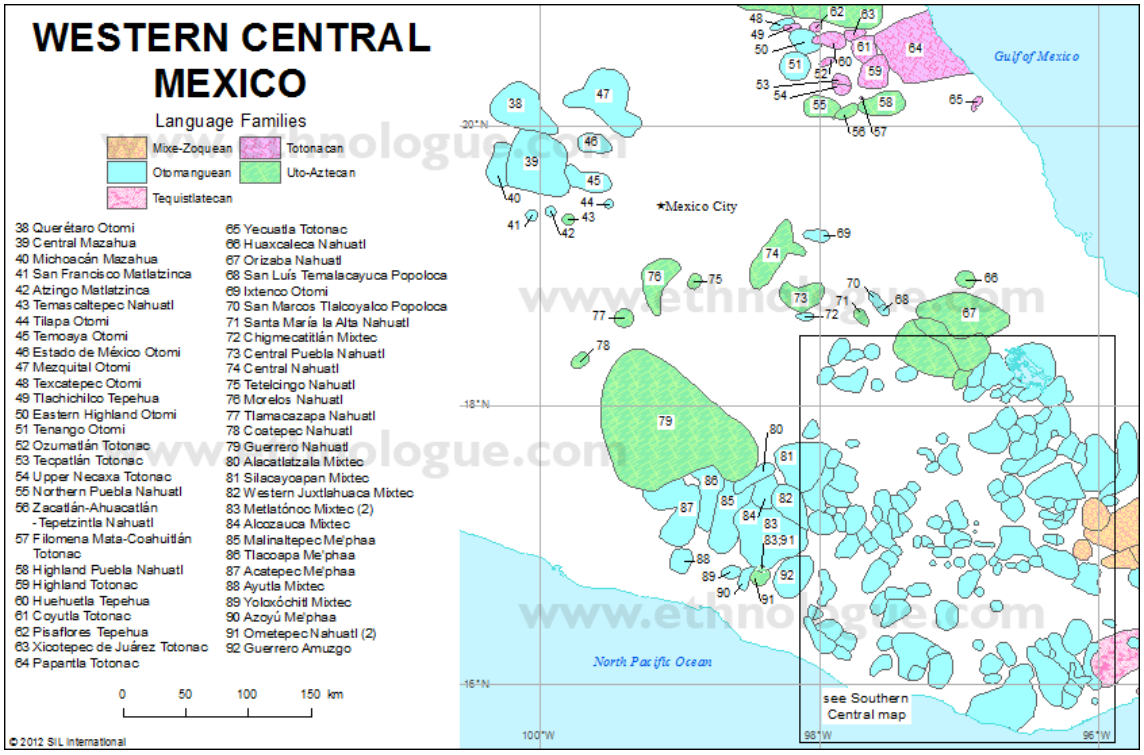


Figure 2 — Areas where Otomian languages are spoken. The colour blue marks Oto-Manguean languages. Source: ethnologue.com

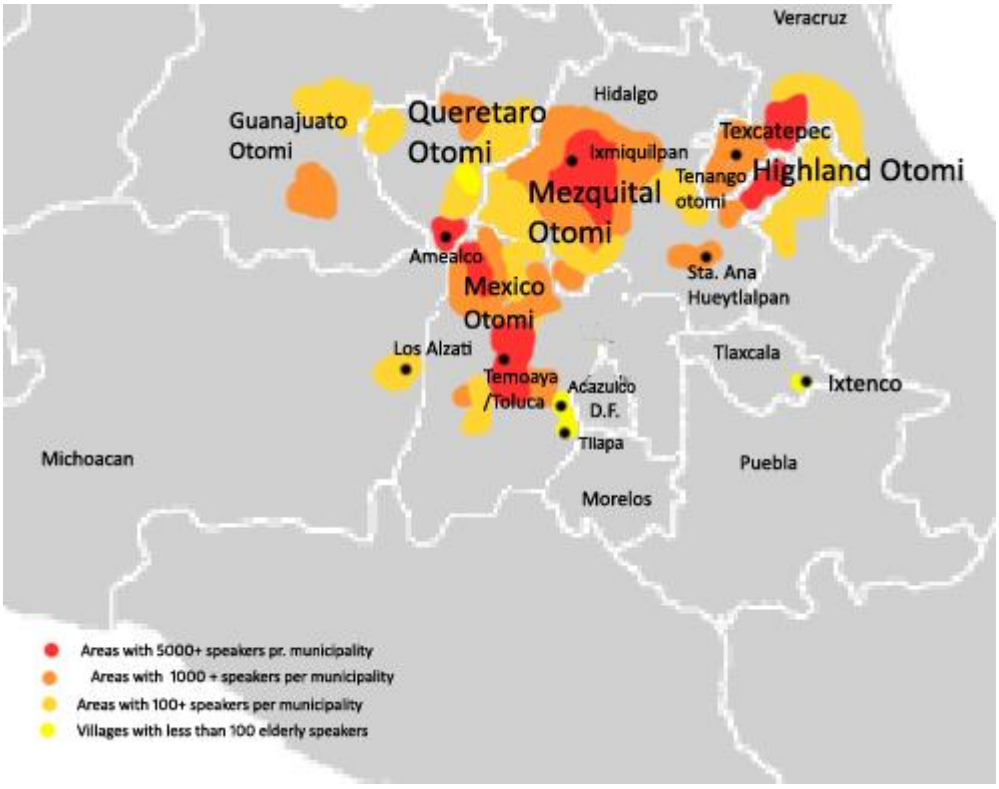


Figure 3 — Geographical location of traditional dialect areas of Otomian varieties

Oto-Mangue	Eastern Oto-Mangue	Oto-Pame-Chinantecan	Oto-Pame	*Otomí*	
				Mazahua	
				Matlatzinca-Tlahuica	*Matlatzinca*
					Tlahuica
				Pame	
				Chichimeca	
			Chinantecan	*Chinanteca*	
		Tlapaneco-Manguean		Tlapaneco-Subtiaba	*Subtiaba* †
					Tlapaneco
				Manguean	*Chiapaneco* †
					Mangue †
	Western Oto-Mangue	Poplocan-Zapotecan	Popolocan	*Mazatec*	
				Ixcatec	
				Chocholtec	
				Popoloca	
			Zapotecan	*Zapotec*	
				Chatino	
		Amuzgoan-Mixtecan	Amuzgoan	*Amuzgo*	
			Mixtecan	*Mixtec*	
				Cuicatec	
				Triqui	

Table 1 — The Oto-Manguean languages

Yolanda Lastra (2001; 2006) classifies three subgroups, each with several subsystems, of Otomian, which she names *dialectal groups*. Hitherto it has not been clear whether to treat the systems referred to as "Otomí" as separate languages or as dialects. Instead, in the literature scholars refer to *varieties* in a *dialectal continuum*, as a compromise between "language" and "dialect". Below I present the Otomian varieties with their local term for "Otomí" in cursive. Numbers in parentheses belong to geographical location of the variety on Figure 2 above.

Eastern dialects:

▸ **Group A: Otomí de la Sierra:**

ɲũhũ	Ixhuatlán de Madero, Cruz Blanca San Pablito, Santa Ana Hueytlalpan, Texcatepec (48), Tenango (51)
jũhũ	San Antonio el Grande, Huehuetla (50)
ɲãhɲũ	Tutotepec, San Jerónimo[10]

▸ **Group B** ("western" eastern varieties [red.]):

ɲũʔhũ	Santiago Tilapa (44)
jũhũ	**San Jerónimo Acazulco**
ɲũhũ	San Pedro Atlapulco[11]

▸ **Group C:**

jũʰmu	Ixtenco (69)

North-western dialects:

▸ **Group A: Valle de Mezquital** (47)

ʰɲãʰɲu / ɲanʰmu:	Gundhó, Gandhó, Ganzdá

▸ **Group B:**

Querétaro

ʰɲõɲhõ	San Ildefonso Tultepec
ʰñãɲho	Santiago Mexquititlán (38)
	Tolimán, Cadereyta, Mintehe

Guanajuato

	Tierra Blanca, Cruz de Palmar

South-western dialects:

ɲoʰɲo	San Martín Tuchicuitlapilco (Jilotepec)
ɲatʰo	Temoaya/Toluca/San Andrés Cuexcontitlan, Santa Ana Jilotzingo, San Lorenzo Nenamicoyan (Jilotepec) (45)
ɲõtʰõ	Amealco, Dongú (Chiapa de Mota)
ʰɲatʰo	Otomí of Mexico State/San Felipe (46)

[10] Not to be confused with San Jerónimo Acazulco, which is dealt with in this thesis.

[11] Atlapulco Otomí is not listed in Lastra (2001; 2006). In INLI (2008), Atlapulco Otomí is classified as a south-western variety; however, Canales (2008: 27) argues that the variety should be grouped together with Acazulco and Tilapa Otomí as an linguistically eastern variant though otherwise surrounded by western varieties.

In Table 2 below sounds from cognates from different varieties are listed systematically.

FEATURE ▸ VILLAGE ▾	I	II	III	IV	V	VI	VII	VIII	IX	X	XII	XIII
Atlapulco	voiced	no	t͡s	mpʰ	b	mb	b	ɲũ	varies	ni	ɔ → o ~ a	ã
Cadereyta	voiced	no	s	m	b	ʔb	ʔba	ɲũ	yes	ɾi	ɔ → a	ã → ɔ̃
Cruz del Palmar	voiced	no	s	m	b	m	ʔba	ɲũ	varies	ɾi	ɔ	ã → ɔ̃
Cuexcontitlan	voiced	no	t͡ʃʰ	m	b	ʔb	ʔba	ɲũ	yes	ɾi	ɔ	ã
Gandhó	voiced	no	s	m	b	ʔb	pʔa[12]	ɲũ	yes	ɾi	ɔ	ã
Ganzdá	voiced	no	s	m	m	m	ʔma	ɲũ	yes	ɾi	ɔ	ã
Gundhó	voiced	no	s	m	m	m	ʔma	ɲũ	yes	ɾi	ɔ	ã
Ixhuatlán	voiced	no	s	m	b	m	ʔba	ɲũ	yes	ɾi	ɔ	ã
Ixtenco	voiced	no	t͡sʰ	ʔm	m	m	ʔma	ʔjũ	yes	ɾi	ɔ	ã
Jilotepec	voiced	no	s	m	b	ʔb	ʔba	ɲũ	yes	ɾi	ɔ → a	ã → ɔ̃
Mezquital	voiced	no	s	m	b	ʔb	ʔba	ɲũ	yes	ɾi	ɔ → a	ã
Mintehe	voiced	no	s	m	b	ʔb	ʔba	ɲũ	yes	ɾi	ɔ → a	ã → ɔ̃
Other dialects[13]	voiced	no	s	m	b	ʔb	ʔba	ɲũ	yes	ɾi	ɔ	ã
S.J. Acazulco	**tenuis**	**no**	**t͡ʃʰ**	**mb**	**b**	**mb**	**ʔma**	**ʔjũ**	**yes**	**ɾi**	**ɔ**	**ã → ɔ̃**
San Antonio	t	no	s	m	b	ʔb	ʔba	ʔjũ	yes	ni	ɔ	ã
San Felipe	voiced	no	t͡ʃ	m	b	m	ʔba	ɲũ	yes	ni	ɔ	ã
San Jerónimo	voiced	no	s	m	b	m	ʔba	ɲũ	yes	ɾi	ɔ	ã
San Pablito	t	no	t͡ʃ	m	b	ʔb	ʔba	ʔjũ	yes	ni	ɔ	ã
Santa Ana Hueytlalpan	t,k	no	s	mp	p	p	ʔba	ɲũ	no	ni	ɔ	ã
Texcatepec	voiced	no	s	m	m	ʔb	ʔba	ɲũ	yes	ni	ɔ	ã
Texcatepec	voiced	no	s	m	b	m	ʔba	ɲũ	yes	ɾi	ɔ	ã
Tierra Blanca	voiced	no	s	m	b	ʔb	ʔba	ʔjũ	yes	ɾi	ɔ	ã
Tilapa	tenuis	t͡s	t͡ʃʰ	mb	m	mb	ʔba	ɲũ	varies	di	ɔ → o	ã → ɔ̃
Tolimán	voiced	no	t͡ʃʰ	m	b	ʔb	ʔba	ɲũ	yes	ɾi	ɔ	ã
Tutotepec	voiced	no	t͡ʃ	mp	b	m	ʔba	ʔjũ	yes	ni	ɔ	ã

Table 2 — Phonetic features of various Otomian dialects, based on the work of Butragueño (2004: 37–50).[14]
Eastern variants are highlighted in orange; north-western in blue; south-western in green

[12] I analyse Lastra's (2004) groups of tenuis plus glottal stops as ejective stops on the surface. Hence, the glottal feature, so to say, will manifest itself as ejectiveness when associated with unvoiced segments, pʔ → p', whereas with voiced segments it will surface as a preceding glottal stop, ʔ{b,m} → ʔ{b,m}.

[13] I use "dialect" as a literal translation of the original Spanish tag *Resto de los dialectos*

[14] The table is based on Canales (2008), through the work of Lastra, although edited to fit into this thesis. Edits include colouring according to dialect groups proposed in Lastra (2001), translation to English, as well as re-transcription into international IPA (where a North American style system often used in Hispanic linguistics literature is used, e.g. with /c/ and /č/ for IPA /t͡s/ and /t͡ʃ/). Furthermore, "Texcatepec" appears twice, one of which should presumably have been "Tenango" instead. I refer to Butragueño (2004: 37–50) for further details.

I. Full, partial, or no preservation of tenuis stops
II. Varieties preserving the affricate /t͡s/ in the word "ash"
III. Initial affricate in "nixtamal"⋆ is /t͡s/, /t͡sʰ/, /t͡ʃ/, or /s/
IV. Realization of the group is /mp/, /mb/, or /ʔm/
V. Initial sound in "ash" is /p/, /b/, or /m/
VI. Sound in "(type of plant, Spa. *escoba*, also 'broom')" is /mp/, /p/, /m/, or /ʔb/
VII. Sound in "milk" is /p/, /m/, or /ʔb/
VIII. The word "path" is /ʔjũ/ or /ɲũ/
IX. Dialects where /h/ is lost intervocalically
X. The variety uses /ni/, /di/, or /ɾi/ for the second person possessive
XI. Destiny of original /ɔ/
XII. Destiny of original /ã/

⋆Mex. *nixtamal* (< Nah. *nixtamalli*) is the term used for prepared grains of maize cooked in an alkaline solution before grinding it for making dough used for tortillas, etc.)

Newer studies have proposed a new division of the Otomian varieties (Lastra 2010), where four different groups are accounted for:

Northern Otomí:	Dialect continuum
Eastern Otomí:	Dialect continuum
Western Otomí:	Dialect continuum
Southern Otomí:	Three independent languages: *Ixtenco Otomí*, *Acazulco Otomí*, *Tilapa Otomí*

3. The sound system of Acazulco Otomí

In the sections below, I will go through the sound system of Acazulco Otomí, phonetically as well as phonologically. Through my analysis, I will suggest which sound are phonemic and which ones are not. When considering the sound underlying phonemes of a language, one must work on different linguistic levels to understand the processes and the true nature of the sounds. Thus, it is necessary to consider both phonetics and phonology just as important as it is to work with the morphology of the language. In Chapter 3.1., I will concentrate on segmental phonology and in 3.2. I will consider the suprasegmental phonology with special focus on preaspiration.

3.1. Segmental phonology

3.1.1. Oral vowels

The vowel system of Acazulco Otomí consists of 9 oral vowel phonemes with three contrasting heights, presented below in Table 3. This system is the most common one found across varieties of Otomí (Andrews 1949; Bernard 1967; Bartholomew 1968; Blight & Pike 1976; Lastra 2001).

i	ɨ	u
e	ɘ	o
ɛ	a	ɔ

Table 3 — Oral vowel phonemes of Acazulco Otomí

In 1) below, these vowels are shown in words forming (near) minimal pairs.[15]

1)	t͡si	'bring'	t͡sɨ	'cause'	t͡su	'woman'
	t͡e	'INTERR'	t͡sɘ	'star'	t͡so	'fall'
	t͡sɛ	'cold'	t͡sa	'bribe'	t͡sɔ	'feel'

[15] Examples organized in Hernández-Green (n.d.: 3).

Vowels are as a rule always preceded by a glottal stop in initial position, with the exception of loanwords and some interrogative pronouns. Hence, we have native examples like *ʔɛ̃hɛ̃̀* 'arrive' and *ʔɘni* 'chicken' as opposed to the interrogative *abɨ* 'where' and loanwords from Spanish such as *iskula* (< *escuela* [esˈkwela] 'school') and *asɨga* (< *azúcar* [aˈsukaɾ] 'sugar').

As Table 3 above suggests, vowels are either front, central, or back on the front/back dimension, and they are either high, mid or low in the openness dimension. This makes a satisfyingly symmetrical system. This is a phonologically stylized picture, which makes it possible to use only four distinctive features in describing them, namely [±high], [±low], [±front], and [±back]. In this way, the phoneme /i/ would be analysed as [+high,–low,+front,–back], and /ɘ/ as [–high,–low,–front,–back].

Surface manifestations would require the phoneme /a/ to naturally be placed a step lower. In Figure 4, Turnbull (2011) shows how the /a/ qualities reach as low as 750 Hz as the only vowel, whereas the minimum F_1 for /ɛ/[16] and /ɔ/ does only go as far as 675 Hz and 650 Hz, respectively.

[16] There is an overlap between /e/ and /ɛ/ which I will discuss below.

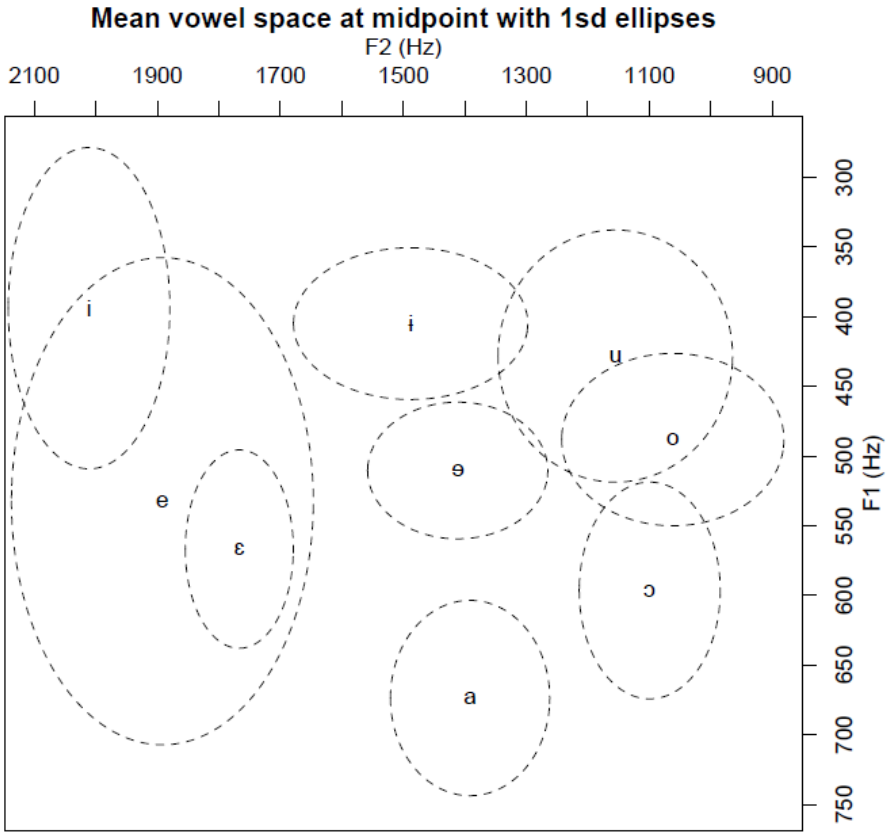


Figure 4 — Mean vowel space at midpoint with 1sd ellipses for oral vowels in Acazulco Otomí (Turnbull 2011)

The outline in Figure 1.1 below is more faithful to the actual pronunciation, though still with the vowels evenly distributed throughout the vocal space.

i	ɨ	u
e	ɘ	o
ɛ		ɔ
	a	

Table 3.1 — Phonetic representation of oral vowels in SJAO

3.1.1.1. On the mid central vowel phoneme

In several accounts of both Acazulco Otomí and Otomí languages in general, the mid central vowel phoneme have long been described with /ø/, and descriptions of this phoneme have been inconsistent amongst different studies. One of the very early descriptions of the sound appears in Neve & Molina (1767: 3–4), where it is explained as the guttural type of 'e':

> "La *E* es de quatro maneras (…) La quarta ſe llama guttural: eſcribeſe aſſi: e̬, y ſe pronuncia entre cerrados los dientes, y ſacando la voz algo forzada de la garganta … (Eng. *The* E *has a quadruple nature (…) The fourth one is called guttural: it is written: e̬, and it is pronounced between closed teeth, and has a rather forced voice from the throat*)."

In Lastra (2001) it is described as "semejante a la del francés en *bœuf* (Eng. *similar to the [sound] in French* bœuf)", which suggests a front rounded vowel similar to [œ]. In the first edition of Pharao Hansen & Hernández-Green (2010: 3) the letter ‹o̲› used for this phoneme is described "… como un "e" español pero con los labios redondeados como para besar (Eng. *like a Spanish "e", but with rounded lips as for kissing*)." This describes another front vowel [ø̞].[17] In later editions of this book this is changed to: "La pronunciación del **o̲** está entre el "e" y el "o" del español pero con la lengua floja (Eng. *The pronunciation of the* **o̲** *is between the Spanish "e" and "o" but with a loose tongue*[18])," which suggests a vowel pronounced farther back. However, the use of /ø/ is nowhere explicitly described as a "front rounded vowel", and the boundary between phonetic/phonological transcription and orthography is diffuse: one may simply have used the letter ‹ø› without describing it in further detail than above.[19] This is true for the eastern Sierra Otomí, which uses the letter ‹ø› for the phoneme described as having the sound [ɘ] (Voigtlander 1979: 16).[20]

In other descriptions it is not rounded, hence Newman & Weitlaner's (1950: 7) Proto-Otomí phoneme */ʌ/, which is described as an "unrounded o" (which would technically be [ɤ]). In Cruz & al. (2010: xviii) it is described as a mid central unrounded vowel as in this thesis, although it is transcribed there with the symbol /ʌ/, technically denoting a back vowel. The description as a *mid central unrounded vowel*, described as /ɘ/ and orthographically as ‹o̲›, is followed by Palancar (2009; 2012: 37) for both Tultepec and Tilapa Otomí in Mexico State, and by Hernández-Green (n.d.) for Acazulco Otomí. The

[17] I use the lowering diacritic, [̞], since in the Spanish five-vowel system /e/ (and /o/) are generally truly mid, i.e. exactly in the middle of close mid and open mid, [e̞]. With lip rounding added this gives [ø̞].
[18] I am not sure what a "loose tongue" means exactly in this context, but possibly this is to make the learner produce a sound, which is closer to a schwa, [ə]. The schwa is a good approximation of the sound [ɘ] if the Spanish L1 learner has difficulties with the foreign vowel qualities.
[19] Unsurprisingly, this may have been even more misleading for our field team consisting of first language Danish speakers, since the letter ‹ø› is a letter of the Danish alphabet and since it always stands for a front vowel phoneme, either /ø/ or /œ/.
[20] In the specific variety described, they use bar overlay diacritics for two vowel sounds that are not found in Spanish, i.e. ‹ø ʉ̵› [ɘ ɨ̵], in the same way as the underline diacritic does in Acazulco Otomí, ‹o̲ u̲›. The closely related Mazahua—which has a vowel inventory similar to SJAO—uses overlay bar diacritics for these phonemes /ɔ ɛ ə ɨ̵/, ‹ɑ̵ ɐ̵ ø ʉ̵›.

same description is found for Mezquital Otomí in Bernard (1967: 247). One of the more precise descriptions is found in Voigtlander (1979: 16) for Sierra Otomí as a sound "between e and o": "Se pone la boca en posición para la **e** y sin redondear los labios se trata de decir **o** (Eng. *You put your mouth in the position of **e**, and without rounding your lips you try to say **o***)."

Figure 2 shows that the central mid vowel /ɘ/ is truly central. Furthermore, video recordings from our field trip show that the lips are definitely not rounded. Quite the reverse: when we asked our teachers to say words like *ʔɘni* 'chicken' and *tˀɘhɘ* 'volcano', the lips formed a rectangular shape. When pronouncing the high central [ɨ], in *t͡sˀɨnt͡sˀɨ* 'bird' and *t͡sˀɨŋkʰɨ* 'bean', the speakers' teeth were close together and the lips formed a long and narrow horizontal opening.

If the phoneme were rounded, it would have created a typologically unexpected vowel system. It should also be noted that this phoneme might of course have slightly different qualities in different Otomian varieties.

3.1.1.2. Uncertainty in high-mid and low-mid vowels[21]

While vowel ellipses in Figure 2 all cover at least some independent area—or do indeed not overlap, in the case of /a/—the set of plots for the front phoneme /ɛ/ is fully contained in the bigger set of /e/, i.e. all manifestations of /ɛ/ are not pronounced distinctively from the possible manifestations of /e/. It is true for some speakers, that it is very difficult to detect a distinction between the two vowels, while for other speakers, the two vowels do indeed represent to different phonemes, for instance in the words *ʔje* 'rain' which is different from *ʔjɛ* 'hand; arm'.

A similar situation, but not as extensive as the front vowels, can be seen between the back phonemes /o/ and /ɔ/. Again, there is variation amongst the speakers in the village (Pharao Hansen *&* al. 2013). Conservative varieties of Otomí still have the distinction, while amongst modern ones the phonemes have often merged into one. Often there is a merger between /o/ and /ɔ/, e.g. in the Ixtenco variety, where *do* means both 'stone' and 'eye'[22]; alternatively, /ɔ/ will deround and merge with /a/, which has happened in the Mezquital Otomí, a member of the north-western dialect group (Lastra

[21] Phonetically high-mid and low-mid.
[22] In dialects preserving this distinction, Acazulco Otomí, the word for 'stone' has the higher /o/ while 'eye' has the lower /ɔ/.

2001: 30, 134). Canales (2008) describes the situation in the neighbouring village and Otomí community San Pedro Atlapulco farther up the valley where the word *do* is homonymic, as in Ixtenco. This is also true from my own notes from Atlapulco, where there is uncertainty in words like 'finger', which is in Acazulco Otomí *ʃɔ*. Not sure if I heard the answer correctly, and expecting to hear a lower quality, I specifically repeated the vowel, asking if [ɔ] was right, and got the answer back: "Yes, [o]," which shows the merger in this speaker's vowel system. Another speaker, however, had a clear [ɔ] in 'finger', which again shows how systems vary within speech communities. What is true for San Pedro Atlapulco is an ever-shrinking number of speakers, who never or almost never communicate in the local Otomí variety anymore.

3.1.2. Nasal vowels

The nasal vowel phonological inventory of Acazulco Otomí is presented in Table 4 below.

ĩ		ũ
ɛ̃	ã	ɔ̃

Table 4 – Nasal vowel phonemes of Acazulco Otomí

The phonetic nature of the nasal vowels is given in Figure 5 below, which shows that the vowels /ɛ̃/ and /ɔ̃/ are with phonetic support transcribed with symbols for low-mid vowels rather than /ẽ/ and /õ/. However, this is a question of the degree phonological abstractness. Again, I have worked with two vowel heights in the phonological representation above, whereas phonetically, the /ã/ could be represented a step lower. Palancar (2009) argues that in San Ildefonso Tultepec Otomí, the nasal /ã/ is phonetically a pronounced farther back, [ɑ̃], which does not seem to be the case for Acazulco Otomí.

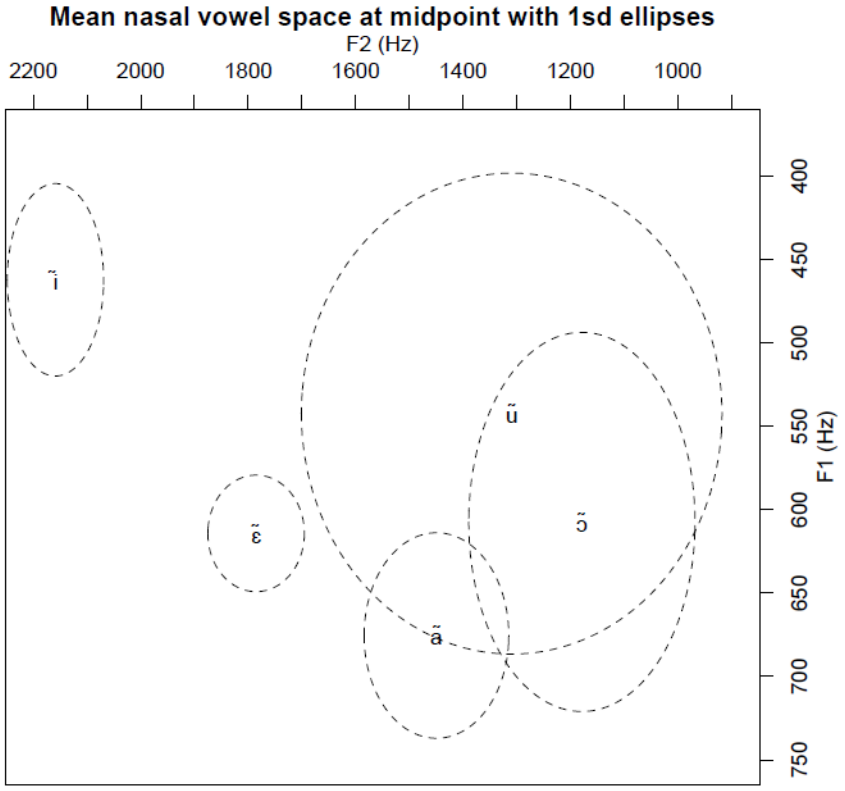


Figure 5 — Mean vowel space at midpoint with 1sd ellipses for nasal vowels in Acazulco Otomí (Turnbull 2011)

The nasal vowels occur in the words listed below.

2) ʔwĩ ‘dream’ ʔũ ‘salt’
ʔɛ̃hɛ̃ ‘come’ ʔã ‘he’ ʔɔ̃hɔ̃ ‘yes’

Cross-linguistically, languages with nasal vowels have fewer nasal than oral vowels. Across the varieties of Otomí, it is most common for the inventories to have a system of four nasal vowels, although it varies which four nasal vowels these are, with the high front and back vowels being the most stable: all varieties have [ĩ] and almost all except one has [ũ] (Lastra 2001; Bartholomew 1968; Blight & Pike 1976). In only one other variety of Otomí, namely the one from Atlapulco, a high central nasal vowel, [ɨ̃], is attested. Canales (2008: 37–38) finds it in two lexemes, in ⟦i˩ dːɨ̃˥ni˥⟧ ‘the flower’ and in ⟦kʰɨ̃˥nja˥⟧ ‘grind’.[23] The cognates in their dictionary forms are in Acazulco Otomí

[23] The latter appears in a conjugated form, probably with a third person object: the Acazulco Otomí cognate with a third person subject preclitic and a third person object postclitic is *da-gɨn-d͡ʒa* ‘s/he will grind it’.

tɘni and *kɨni*, and in Mezquital Otomí *dɘni* and *kɨni* (Cruz & al. 2010), respectively. Since the data that Canales transcribes are directly phonetic, the [ĩ] seems instead to be an allophone of an underlying oral vowel before a nasal consonant.

3.1.2.1. The status of /ã/

The vowel [ã] appears in very restricted environments only, i.e. before a nasal consonant or after any labiovelar approximant, /(ʔ)/(h)w/ (Hernández-Green n.d.). The [ã] cannot stand in initial position as the other nasal vowels can. It appears to be an allophone of /a/ before nasal vowels, since oral [a]'s never occur in this position. After labiovelar approximants, it appears to be an allophone of [ã]. Supporting this theory, cognates from different dialectal groups, both Tilapa and San Ildefonso Tultepec Otomí, have [ɔ̃] after /(ʔ)/(h)w/ where Acazulco has [ã]. The obvious exception, as presented in the examples above, is the personal pronoun *ʔã* 'he'. It is, however, also the only exception. Nevertheless, I choose to include it in the phonological register, since it would otherwise be hard to explain the existence of this phone, which does not appear in any of the two restricted environments described above. Lastra (2001) does not include the phoneme /ã/.

3.1.3. Oral diphthongs

Acazulco Otomí has five oral diphthong, as presented in Table 5 below. They are falling diphthongs, all gliding towards the palatal segment, [Vj].

	ɨj	
	ɘj	
ɛj	aj	ɔj

Table 5 – Phonemic representation of oral diphthongs of Acazulco Otomí

I analyse Acazulco Otomí diphthongs as sequences of vowel plus semivowel, /VV̯/.[24] Analysing diphthongs as sequences of two vowels /VV/ would cause an irregular exception in the distribution of vowels, since there are no other instances of syllable-internal adjacent vowels otherwise, again with the exception of loan words such as *pei*

[24] Using the symbol [j] for the semivocalic off-glide, we can avoid accounting for its possible rounding in cases where the nucleus is rounded. Technically, the symbol [i̯] is inherently unrounded.

‘comb oneself’ (< Spa. *peinarse*). Here, the latter vowel is transcribed with high tone, *peí* [peɻiˀ˥], in Pharao Hansen *&* Hernández-Green (n.d.), meaning that they must be tauto-syllabic vowels and not a diphthong, since they have different tonal features. Consequently, syllable nuclei can be of the form /V(j)/. Besides that, if the vowels in [peɻiˀ˥] were a diphthong, we would have had to add a sixth one, /ej/, to the chart above, at least for this loanword. Some words containing the diphthongs are presented below.

3) ʔjɨj ‘root’
t͡sʼəj ‘pot’
tʼɛj ‘barley’ kʷʰaj ‘knife’ hɔj ‘earth’

3.1.4. Nasal diphthongs

The nasal diphthongs of Acazulco Otomí come in an asymmetrical system with only one diphthong representing a high vowel nucleus. Like their oral counterparts, the nasal diphthongs are all falling diphthongs that glide towards a palatal segment [j]. Table 6 gives the phonological representation of nasal diphthongs in Acazulco Otomí:

		ũj
ɛ̃j	ãj	ɔ̃j

Table 6 – Phonemic representation of nasal diphthongs of Acazulco Otomí

Nasal diphthongs are nasal all through their realization. This is explained by accounting for auto-segmental nasal spreading to an adjacent vocoid segment, i.e. /j/, resulting in /Ṽj/ → [Ṽj̃]. The words below demonstrate how the nasal vowels appear in words.

4) ʃũj̃ ‘night’
nɛ̃j̃ ‘dance’ ʔwãj̃ ‘rain’ ŋgɔ̃j̃ ‘descent’

3.1.5. Consonants

In these next sections, I will go through a phonological analysis of the consonants occurring in Acazulco Otomí. In the beginning I will present the consonant sounds of the language, and in the conclusion in 3.1.5.9., I will present the phonemes as the result of the analysis. Acazulco Otomí has a rather large consonant inventory. It is remarkable in the sense that it has a three-way contrast in its stops between voiced, tenuis, and aspirated, as well as having a series of ejective stops for the same places of articulation. It is typologically significant by having both aspirated and glottalized segments in both nasals and approximants. Historically, it is remarkable because it preserves many features that it shares with reconstructed earlier stages of Oto-Manguean languages. As an example, it has preserved a series of tenuis stops, which in other dialects have become voiced, /p t k k^w/ → [b d g g^w], and it has preserved aspirated stops, which are not stable segments in other varieties of Otomí. In all north-western varieties of Valle de Mezquital, for example, the aspirated stops have become fricatives, /p^h t^h k^h k^{hw}/ → [ɸ θ x x^w]. In Table 7 below, I shall present the consonant phones of Acazulco Otomí.

Table 7 — Consonant phones of Acazulco Otomí. Phones listed in parentheses occur only in Spanish loanwords.

manner of articulation	*phonation type*	labial	dental	alveolar	alveolo(palatal)	velar	labiovelar	glottal
STOPS	tenuis/fortis	p	t	t͡s	t͡ʃ	k	k^w	ʔ
	preaspirated	^{h}p	^{h}t	^{h}t͡s	^{h}t͡ʃ	^{h}k	$^h k^w$	
	glottalized	pʼ	tʼ	t͡sʼ	t͡ʃʼ	kʼ	k^wʼ	
	aspirated	p^h	t^h	t͡s^h	t͡ʃ^h	k^h	k^{wh}	
	voiced/lenis	b ~ β	d ~ ð	z	ʒ	g ~ ɣ	g^w ~ $ɣ^w$ ~ w	
FRICATIVES		(ɸ)		s	ʃ			h
NASALS	plain	m		n	ɲ	ŋ		
	glottalized	ʔm		ʔn				
	aspirated	m̥		n̥				
LIQUIDS				l				
				ɾ				
				(r)				
APPROXIMANTS	plain				j		w	
	glottalized				ʔj		ʔw	
	aspirated				ç		ʍ	
	affricated				d͡ʒ			

In the consonant table above, I have listed the consonant phones morphophonologically, which is why [z] and [ʒ] appear in the section of stops, which, phonetically, they are clearly not.[25] In addition, the phone [d͡ʒ] is clearly not a phonetic approximant, but an affricate, which in a plain phonetic context would of course be grouped together with its unvoiced counterpart, [t͡ʃ]. The table is morphophonological in the sense that it groups together sounds, which are morphophonologically related. In this way, /z/ and /ʒ/ are related to /t͡s/ and /t͡ʃ/, respectively, and /d͡ʒ/ is related to /j/. As we shall see, these relations will make sense in a consonantal mutation system, which we find in verbal conjugations, cf. Section 3.1.5.7. This is where the tags *fortis* and *lenis*—which I have used in the stops—are appropriate.

A number of phonemes listed in the chart above do only because morphophonological processes have produced them. Hence, I will not consider them to be phonemic, since they can easily be accounted for with phonological rules; I will call them *non-phonemic syllable-boundary segments*, namely the ejective segments [p' t͡ʃ' kʷ'] as well as [t͡ʃʰ d͡ʒ ʔŋg]. The latter, [ʔŋg], is phonetically trisegmental but behaves as one, we will see how it resembles the phonologically glottalized nasal phonemes in Section 3.1.5.8 below, where the syllable-boundary segments will be discussed further detail.

The labiodental dental place of articulation is not represented in Acazulco Otomí. There is no segment such as /v/;[26] the voiced labial fricative found in the language, which is the outcome of the lenition of its voiced stop counterpart, /b/ → [β], is always bilabial.[27] Likewise, sporadic instances of unvoiced labial fricatives from Spanish loanwords are always bilabial, [ɸ], when pronounced by Otomí speakers. This is clear from elicitations, where I intended to examine the pronunciation of the non-native phoneme /f/. I will represent this phoneme as /ɸ/, reflecting its bilabial pronunciation.

[25] As a convention, I use the superscript glottal stop, /ˀ/, to indicate phonological voicing. It surfaces as either ejectiveness when associated with stops, or it is realized as a full glottal stop when associated with nasals and approximants, as we will learn below. Having various uses in IPA, it is often used to indicate prosodic *stød* in Danish.

[26] As it is also the case in the current dominating language, Spanish, which has bilabial [β] but a counterpart fricative that is labiodental, [f].

[27] In other languages, phonological /b/'s that have undergone lenition surface as labio*dental*, [v]. Historically, Greek ‹β› denoted [b], whereas in Modern Greek it stands for [v] after having undergone the change [b] → [β] → [v], e.g. *βαίνω* ['vẹnọ] 'I go'. In colloquial Danish, phonological /b/'s are often realized as the labiovelar [w] syllable-finally, i.e. *løb!* 'run (IMP)' [løːˀb̥] alternates with [løwˀ].

The alveolar nasal /n/ assimilates for place of articulation of a following sound, /n/⟶ [αart]/_[αart]. That results in the allophones [m n ɲ ŋ].

There are no geminate consonants in Acazulco Otomí, so that the sequence /C_1C_1/ is not allowed.

3.1.5.1. Labialized series

I analyse the labiovelar stop series as single phonemes, /k^w k^{wh} g^w/. Most descriptions of modern Otomí varieties analyse these as consonant groups of the form /C/+/w/. Both Bartholomew (1960) and Newman *&* Weitlaner (1950) reconstruct a tenuis labialized stop phoneme, /k^w/, for Proto-Otomí, which I choose to treat the same way in modern Acazulco Otomí. Further argumentation for the labialized-aspirated phoneme /k^{wh}/ will be given in Section 3.1.5.4. below about aspirated phonemes.

The phoneme /g^w/, i.e. phone [$ɣ^w$] after lenition,[28] seems to undergo further lenition to become an approximant, [w], whereas the other three seem to have more noise when articulated. This is a very common development, and it is analogous to the local Spanish pronunciation of *g* followed by a semivocalic *u*, as in Mex. *güero* ['weɾo] 'blond person',[29] or in the name of the city *Guadalajara* [waðala'xaɾa]. We may analyse the development from /g^w/ to [w] through the steps, g^w ⟶ $ɣ^w$ ⟶ $ɯ^w$ = w; by the third step, the original "labiovelar stop" has become a "labiovelarized velar approximant", equivalent to a labio-velar approximant [w]. In modern social media of the Spanish-speaking world, spellings with initial ‹w-› are common, e.g. ‹wapo› for *guapo*, reflecting the pronunciation ['wapo]. Dictionaries traditionally provide the standardized pronunciation ['gwapo]. As mentioned, similar developments are common in many languages. In Icelandic, the rounded velar fricative [$ɣ^w$], co-articulatorically rounded with adjacent rounded vowels, has turned into glides in the pronunciation of Modern Icelandic, hence *fljúgum* [flju:wʏm] 'we fly', and *þrúgum* [θru:wʏm] 'snowshoes.DAT' (Árnason 2005). Similarly, phonological Danish /g/ is in Modern Danish pronounced [w] in words like *tåge* ['tˢɔ:wə] 'fog' and *hagl* [haw^{ʔ}l] 'hail', formerly with [ɣ], today only existing among the oldest generations (Grønnum 2005). In both Bartholomew's (1960) and Newman *&*

[28] See Section 3.1.5.3. about lention of voiced stops.
[29] The term *güero* (feminine *-a*) is a seemingly neutral term for a blond person. From our experience, it can be used as a greeting on the street from people passing by, *¡Güero!*, stating that one is blond and the person passing by is not.

Weitlaner's (1950) reconstructions of Proto-Otomí consonants, the voiced counterpart to */kʷ/ is */w/ and not **/gʷ/. Bartholomew lists the pronunciation [kʷ] for one modern north-eastern dialect, whereas the north-western and north-eastern modern dialects both have [w]. In Acazulco Otomí, I will give the phonological representation /gʷ/ and account for the realization [w] as the type of lenition described above, the reason being that the phoneme is pronounced with a full plosive when occurring after a nasal, e.g. in a word like *ŋgʷani* 'descent (n.)'.

3.1.5.2. Tenuis stops and affricates

In this section I will focus on the plain[30]—or, tenuis—series, i.e. unvoiced and unaspirated. Tenuis stop phones are [p t k kʷ], as well a the glottal stop [ʔ]. Additionally, there are two tenuis affricates, [t͡s t͡ʃ].

Across the Otomian varieties, tenuis stops have often become voiced. Together with varieties from San Pablito, Tilapa, and Santa Ana Hueytlalpan, Acazulco Otomí preserves these tenuis stop phonemes. Where the word for 'water' in most dialects is *dehe*, it is *tehe* in Acazulco Otomí (Lastra 2001). In my notes from Atlapulco Otomí, the same voicing happens, thus the word for 'husband; grandfather' is *dɔ̃ta*,[31] whereas in Acazulco Otomí it is *tɔ̃ʰta*.

3.1.5.3. Voiced stops

The voiced stop series of Acazulco Otomí includes the following phones: [b d g gʷ]. Intervocalically, only their fricative counterparts occur, [β ð ɣ ɣʷ]. From Acazulco this includes examples like [t͡siβi] 'light', which could phonologically be represented as /t͡sibi/, as well as [çaði] 'sun', /ʰjadi/. This process also seems to happen in the beginning of an utterance, even before a consonant. As an example, one of the speakers would pronounce the verbal conjugational suffix /dɾa/ as [ðɾa]. I will represent the phones with four voiced stop phonemes, /b d g gʷ/. See also the further discussion about /gʷ/ in Section 3.1.5.1. above.

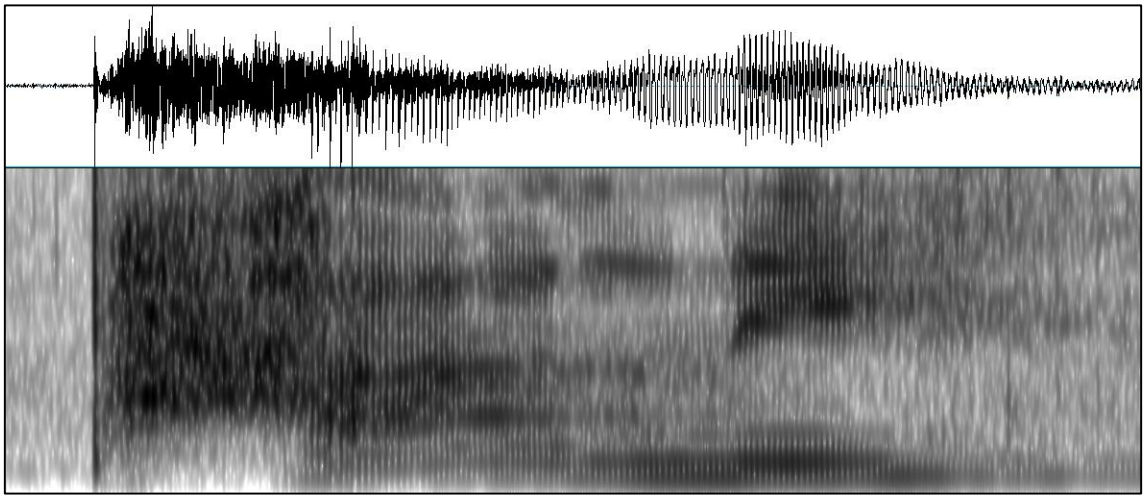
[30] Plain in the sense that, cross-linguistically, tenuis stops are the most unmarked of stops (1996).
[31] Furthermore, the voiced stop was usually further fricativized, so that what I transcribed was [ðɔ̃ta], even in the beginning of an utterance. Furthermore, interestingly, there was no preaspiration, as one would expect with this structure in Acazulco Otomí, cf. SJAO *tɔ̃ʰta*.

3.1.5.4. Aspirates

Acazulco Otomí features stops and affricates with phonetic postaspiration, as well as unvoiced nasals and approximants. They can all be accounted for under the same group as being phonologically aspirated, if we analyse the different surfacing sounds as outcomes of different realizations of the phonological feature aspiration.

3.1.5.4.1. Aspirated stops

Acazulco Otomí has four stops with phonetic postaspiration, [pʰ tʰ kʰ kʷʰ] and two aspirated affricates, [t͡sʰ t͡ʃʰ]. However, the latter [t͡ʃʰ] exists only at syllable boundaries, and hence is not phonemic. Its status will be discussed in Section 3.1.5.7. below. Here, phonological aspiration is hence realized as postaspiration. The spectrogram below made in Praat shows a significant voice onset time from the explosion of [p] until modal voice begins in [a].



pʰani **/pʰani/ ‹phani› ‘horse’**

As a conservative feature, aspirated segments are preserved in Otomí [pʰ tʰ t͡sʰ kʰ kʷʰ]. Across the Otomian varieties, there is a strong tendency for aspirated stops—not affricates—to become fricatives, i.e. when [pʰ tʰ kʰ kʷʰ] become [ɸ θ x xʷ], in some variants,

the bilabial [ɸ] merges with the labiodental [f] from Spanish.[32] Lastra (2006: 49–50) describes that it is an ongoing process, and that the "new" fricatives, i.e. the fricatives coming from older stages' aspirated stop consonants, are especially prominent in the varieties of Valle del Mezquital, Guanajuato, Querétaro, and the Puebla. Judging from the data in Palancar (2009: 24), it seems like in Tultepec Otomí only the labial aspirate [pʰ] has undergone the change so far, which likewise shows that the change is an ongoing process.

From our data from Atlapulco Otomí, as well as from Canales (2008), it is obvious that the status of aspirated stops in also unstable here. Examples showing fricativization from elicitations in Atlapulco include:

Atlapulco	**Acazulco**
[zɛ**ɸ**ɨj] 'hat'	[zɛ**p**ʰɨj]
[ʃĩː**ɸ**i] 'petate (bedroll)[33]'	[ʃĩ**p**ʰi]
[ni**x**ɔ̃] 'church'	[ni**k**ʰɔ̃]

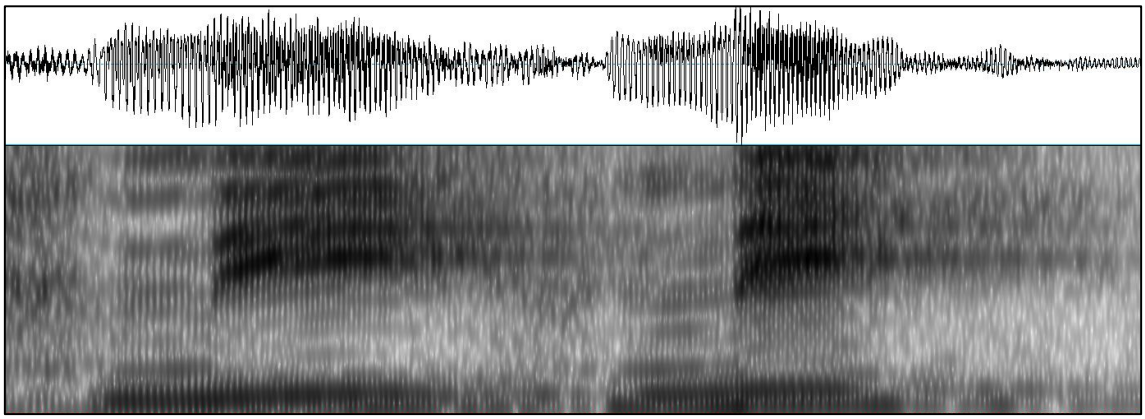
Interestingly, for speakers of Acazulco Otomí, the aspirated stops and unvoiced fricatives seem to be equivalent for the same places of articulation, and in some loanwords, the sound [f] does not only become bilabial [ɸ] when passing through the phonological constraints of Acazulco Otomí. Instead, it is turned all the way "back" into an aspirated stop, as in [pʰleʰʧa] (< Spa. *flecha* ['fleʧa]) and [kapʰe] (< Spa. *café* [ka'fe]). The same phenomenon can be found for the velar place of articulation, as in [naɾaŋkʰa] (< Spa. *naranja* [na'ɾaŋxa]).[34]

3.1.5.4.2. Aspirated nasals: Unvoiced nasals

I Acazulco Otomí we encounter two unvoiced nasals, [m̥ n̥]. They are semantically distinctive, cf. the words *mĩ* 'sit down' and *m̥ĩ* 'face'. In many descriptions of Otomian languages, as well as in the reconstruction of Proto-Otomí, these sounds are analysed

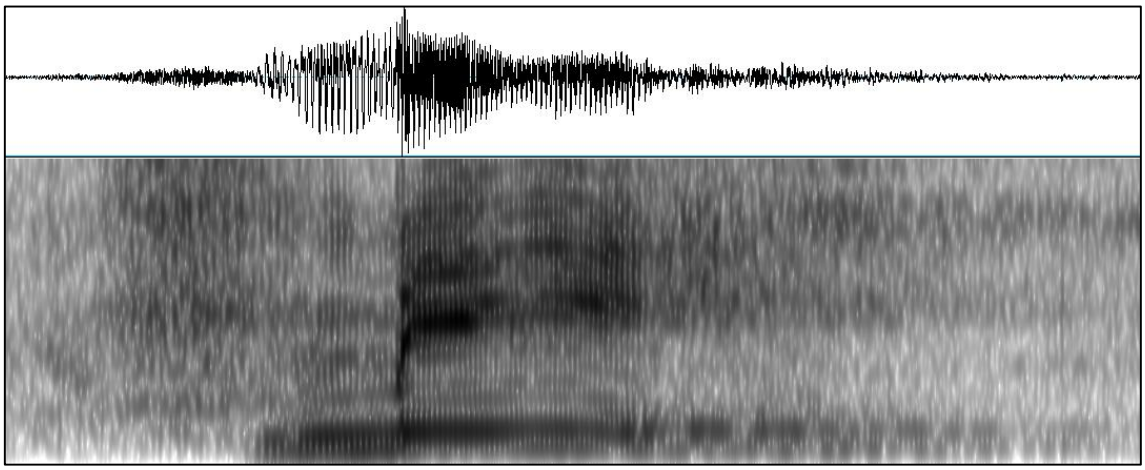
[32] Fricativization of aspirated stops is a common phonological change to happen. A well-known historical example is Greek, where in Classical Greek, the phonetic values of the letters ‹φ θ χ› were [pʰ tʰ kʰ], whereas in Modern Greek they have become fricatives, [f θ x].
[33] From Nah. *petlatl*.
[34] Since the sound [θ] does not exist in Mexican Spanish, no instances of backwards change θ → tʰ are found.

phonetically as consonantal groups of /h/ plus nasal (Newman & Weitlaner 1950; Bartholomew 1960; Lastra 2001). Unvoiced nasals are cross-linguistically. In Europe, they are known from Welsh and Icelandic. In addition, the south-east Asian Sino-Tibetan language Burmese is known for its unvoiced nasals. In the spectrograms below, I will show some words from Acazulco Otomí. Consider the word for 'village':



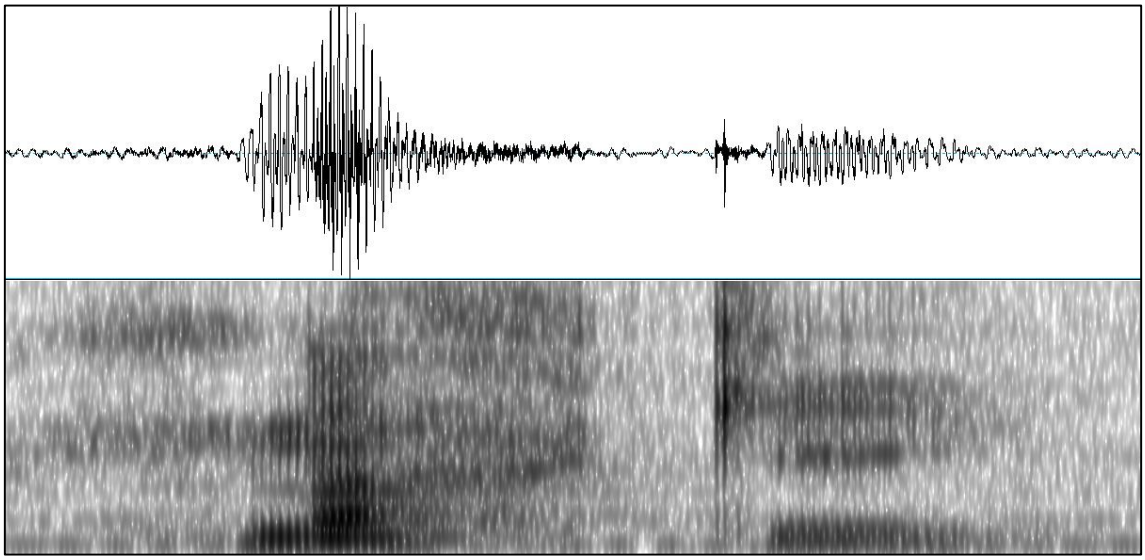
***n̥in̥i* /ʰniʰni/ ‹hnihni› 'village'**

At the very left of the spectrogram, we see the unvoiced phase with [n̥]. Looking at the very bottom of the spectrogram, we notice that modal voicing seems to appear in between this phase and the vowel [i], making a narrower transcription of the first syllable be [n̥n̥i-]. Articulatory, it is hard to go directly from [n̥] to [i], and the velum will often lift before the vowel begins, resulting in a phase of a nasal consonant. The same is true for the word *ŋe* 'tortilla', which we will examine below.



m̥e /ʰme/ ‹hme› 'tortilla'

Icelandic is another language famous for its unvoiced nasals. Consider the spectrogram below, where we will examine the word *hnakki* [ˈn̥ahcɪ] 'back of the neck'' where we see the similarities with the unvoiced nasals from Acazulco Otomí.



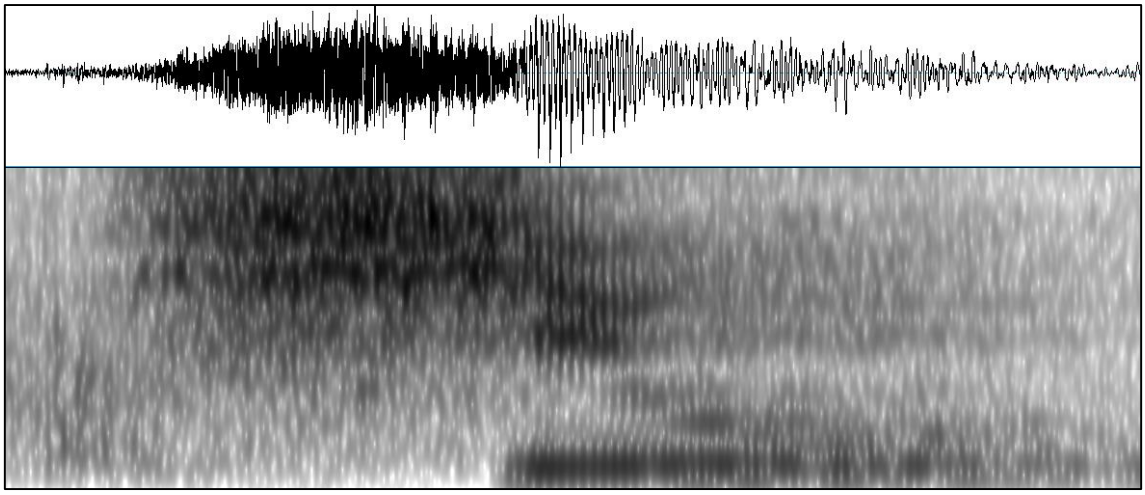
***hnakki* [n̥ahcɪ], Ice. 'back of the neck'**

Palancar (2013: 2) notes that unvoiced nasal segments often surface as preaspirated nasals, "but not always." A classification a preaspirated nasal instead of a pure unvoiced nasal, would imply a longer phase of modal voicing in the nasal, which is actually the case when we compare the data from Acazulco Otomí and Icelandic above: in Icelandic, the voiced nasal phase is shorter. In addition, it seems like realizations among speakers vary between preaspirated nasals and true unvoiced nasals. During elicitation, I often happened that a speaker had just pronounced preaspirated nasal, and in the next sentence, the same word would have a fully unvoiced nasal.

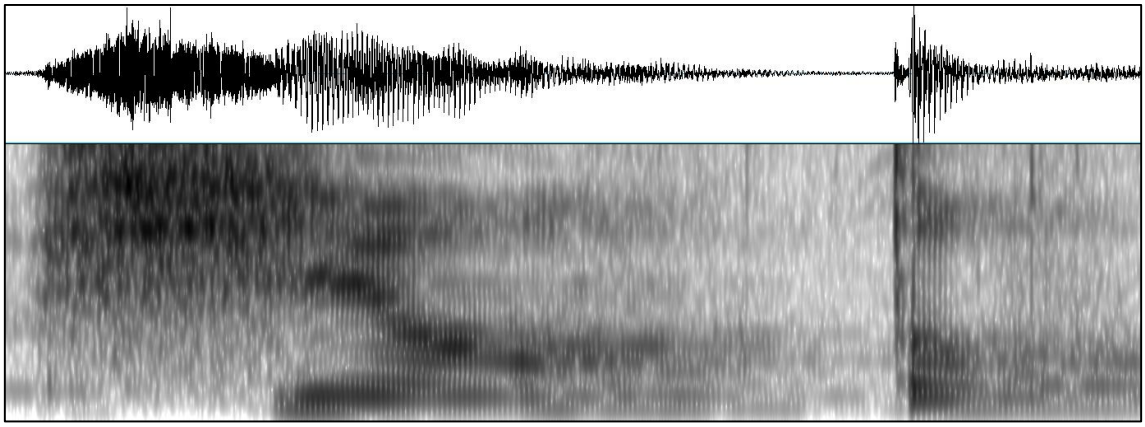
In Acazulco Otomí, we analyse voicelessness in nasals to be the realization of phonological aspiration. Hence, we can group it together with both aspirated stops and approximants. Notating the phonological aspiration *before* the nasal /ʰm ʰn/ is of course arbitrary on a phonological level. However, faithful to its phonetic nature that we examined above, the transcription /ʰm ʰn/ seems the most logical.

3.1.5.4.3. Aspirated approximants: Unvoiced approximants or fricatives

Approximants with phonological aspiration are analysed in the same way as aspirated nasals. On the surface, we encounter voiceless approximants, [ʍ̥ ɻ̊], or rather their counterpart fricatives, [ʍ ç], as they were pronounced with quite a lot of audible noise. Hence, they undergo fortification and become full fricatives. Voiceless approximants are extremely rare cross-linguistically. Consider *çũ*, the word for '3' below:



çũ **/ʰjũ/ ‹hyü› '3'**



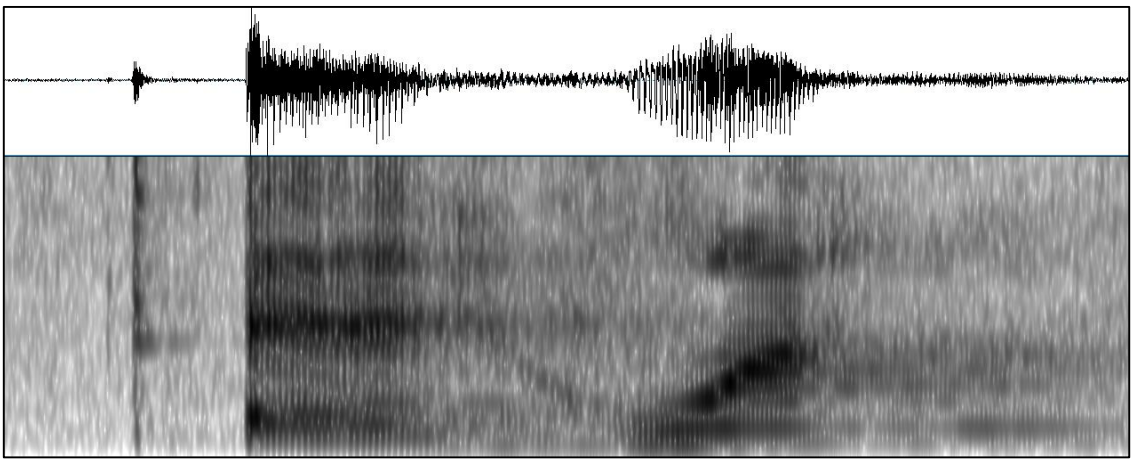
çɔ̃ʰto **/ʰjõto/ ‹hyöhto› '8'**

3.1.5.5. Glottalized phonemes

3.1.5.5.1. Glottalized stops: Ejective stops

On the surface, Acazulco Otomí has six ejective segments: [pʼ tʼ t͡sʼ t͡ʃʼ kʼ kʷʼ]. Ejective stops are characterized by a higher amount of built up pressure before the sound bursts in a sharper sounding and more dramatic release than regular stops. Ejective stops are common in languages throughout western parts of the Americas, in Caucasian languages, and in Semitic languages in Ethiopia. It is hence not a unexpected to encounter these kinds of sounds in Acazulco Otomí.

Three of the six sounds listed above occur word-initially: [tʼ t͡sʼ kʼ], and are independent phonemes. The other ones are syllable-boundary segments. Their distribution will be discussed in Section below. Consider *tʼɛʍɑ̃* 'fish':



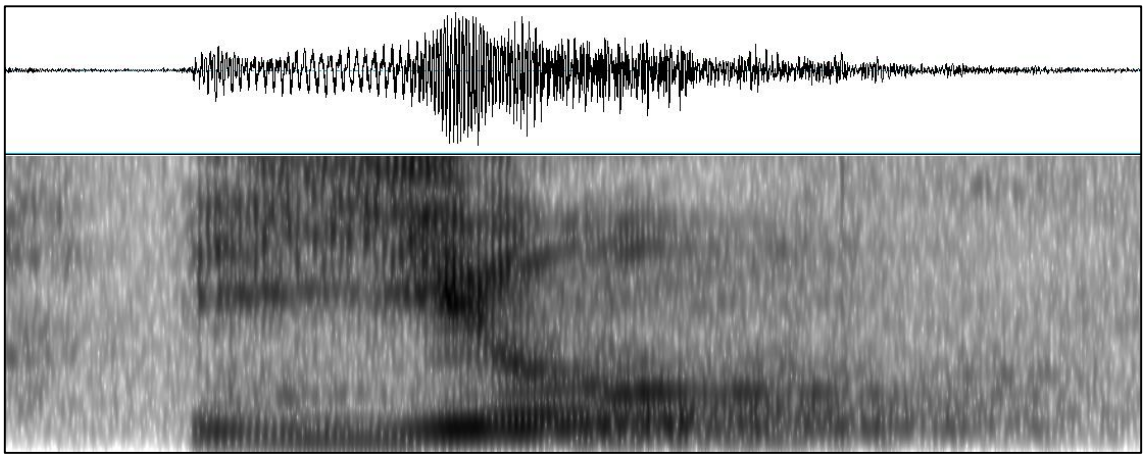
tʼɛʍɑ̃ /tˀɛʰwɑ̃/ ‹t'ẹhwä› 'fish'

This picture gives a good illustration of the nature of the segment [tʼ]. After the initial burst, it is clear that it takes a moment for modal voice to start, and that when it starts it starts abruptly.

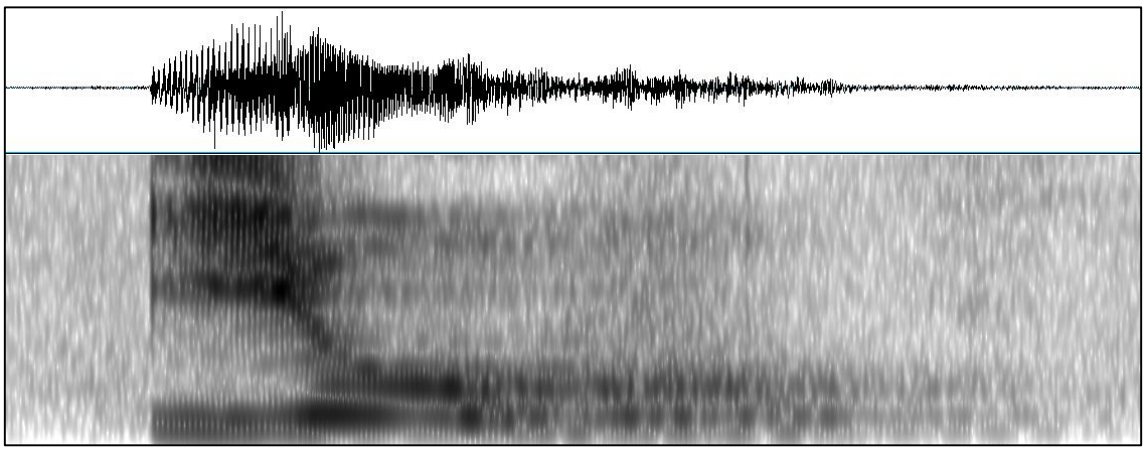
In Acazulco Otomí, the three ejective segments above are analysed as glottalized stops; together with two groups of sound below, they form a group of sounds with phonological glottalization, transcribed with the symbol /ˀ/. When associated with stops, phonological glottalization surfaces as ejectiveness. Thus, the three phones [tʼ t͡sʼ kʼ] are transcribed phonologically as /tˀ t͡sˀ kˀ/.

3.1.5.5.2. Glottalized approximants

When phonological glottalization is associated with approximants it surfaces as a preceding glottal stop segment, [ʔ]. Hence, when a single underlying phonological surfaces, it is phonetically bisegmental. Consider the following spectrograms of the phonologically minimal pair *jo* 'candle' and *ʔjo* 'dog'.



***jo* /jo/ 'candle' ‹yo›**



***ʔjo* /ˀjo/ ‹'yo› 'dog'**

In *ʔjo*, modal voice enters far more explosively than in *jo*. This is clear when we take a look at the modal voice onsets: there is a sharp line marking the beginning of the vowel; in *jo*, the transition from silence to the [j] phase is much more gradual. We furthermore see that the following approximant phase is pronounced much more forcefully in *ʔjo* than it is the case with *jo*.

Analysing the bisegmental sounds as having phonological glottalization to surface as a glottal stop, we can analyse the following two sequences of Acazulco Otomí, [ʔj ʔw], as being underlying glottalized approximants /ˀj ˀw/.

3.1.5.5.3. Glottalized nasals

When associated with nasals, a glottal phonological feature /ˀ/ surfaces in a slightly different way, making three different ways that such glottalization can surface, in opposition to the feature aspiration, which can surfaces as only two, namely postaspiration and voicelessness.

On the surface, there are no sequences such as [ʔN][35] in Acazulco Otomí. However, we find instances of [ʔND][36], i.e. [ʔmb], [ʔnd] and a very restricted amount of [ʔŋg], occurring in a few inflected verbs forms.

In reconstructed phonemes of Proto-Otomí, Bartholomew (1960) reconstructs the groups */ʔm/ and */ʔn/ how modern reflexes vary between [ʔm] and [ʔb]. When we examine cognates with [ʔm] and [ʔb] across the varieties of Otomí, it becomes clear that Acazulco Otomí has [ʔmb] in that same position. This suggests that we can analyse the triple segment with glottal stop + nasal + voiced stop as a reflex of *[ʔm] or *preglottalized nasals* in Otomian proto-phonemes. The outcome matches well with the rest of the system of glottalized consonants. Thus we have the phonemes /ˀm ˀn/, and we account for epenthesis so that /ˀm ˀn/ in their basic forms surface as [ˀmb ˀnd], as in the words *ʔmbatʰa* 'valley; plain' and *ʔndɘzɔ̃* 'sack'.

Examples with [ʔŋg] in the current wordlist are so few that it is difficult to account for a velar phoneme */ˀŋ/. Furthermore, there is no velar nasal phoneme /ŋ/, which would make an unexpected gap in the consonant inventory: it is not plausible to have a glottalized /ˀŋ/ if there is no /ŋ/.

As a final note, it is up to discussion how to formally represent the "glottalized", whether to write them with their epenthetic stops, /ˀmb ˀnd/, or whether to choose the more abstract, historical presentation /ˀm ˀn/ which is directly faithful to their name "glottalized nasal".

[35] Where /N/ represents any nasal consonant.
[36] Where /D/ represents any voiced stop.

3.1.5.6. Liquids

In Acazulco Otomí, there are two R-sounds, the tap [ɾ] and the trill [r]. However only [ɾ] is native, representing a phoneme, /ɾ/. The phone [r] is not native: it appears only in loanwords from Spanish, e.g. in *rrahta* 'mouse' (< Spa. *rata* ['rata]) and *karro* 'car' (< Mex. *carro* ['karo]).[37] I will account for this phone as geminated /ɾɾ/. This is also reasonable, when ones takes the phonetic nature of the sound into account: the native /ɾ/ ⟶ [ɾ] is tapped only once, whereas to pronounce the Spanish /ɾɾ/ ⟶ [r], the tongue has to hit the alveolar ridge several times. In the orthography, this is reflected as ‹rr›, with single ‹r› representing the tap phoneme /ɾ/.

The segment [l] occurs only very marginally in words like *t͡ʃ'ilu* 'dog', *kolo* 'spider', and *lɛʰku* 'small person/object'.

3.1.5.7. Syllable-boundary segments and syllable-boundary processes

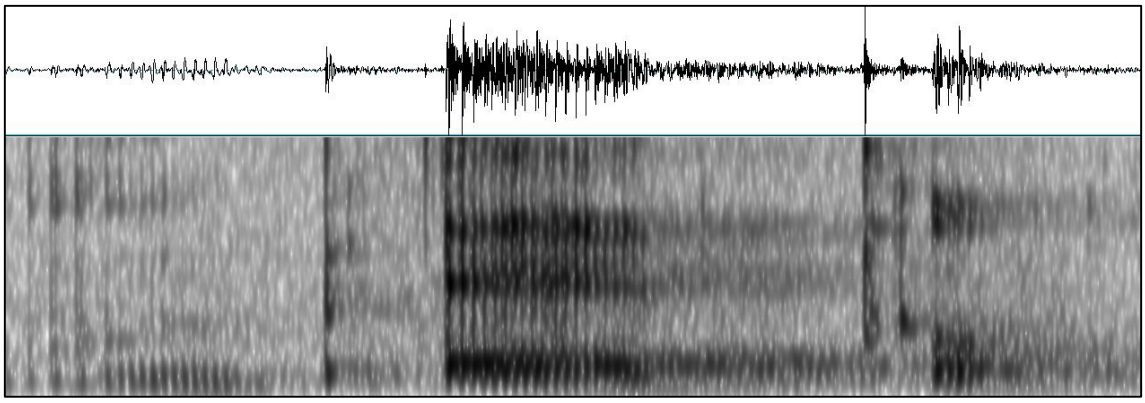
Some segments in Acazulco Otomí appear only on syllable boundaries, and exist only because they are the result of morphophonological processes. What is interesting about these processes is that three of them, nasal vowels are involved. In Hernández-Green's (n.d.) studies of verbal morphology in Acazulco Otomí, he has found that certain sounds change when words a derived with a nasal morpheme /-N/, which as different meanings. The changes are presented below:

<u>Morphophonological changes in contact with nasals:</u>

nʔ → ɲt͡ʃ'	*ʔjo* 'walk'	⟶	*ra-ɲt͡ʃ'o-wi* '3-RECP-walk-DU (n.)' > 'same-sex sibling or cousin'
	ʔɛ̃mbi 'tell sby'	⟶	*ɲt͡ʃɛ̃mbi* 'tell oneself'
nj → ɲd͡ʒ	*johto* '7'	⟶	*ɲ-d͡ʒohto* 'within a week'
nh → ɲt͡ʃʰ	*ho* 'bang sth'	⟶	*n-t͡ʃʰo* 'bang oneself'

A preceding nasal is also what we find associated with the phone [p'], which only occurs in the sequence [mp']. Consider *mp'ɛt'o* 'before':

[37] When geminated or in initial position, Spanish /ɾ/ is pronounced as a trill, [r].



***mp'ɛt'o* /mˀmɛtˀo/ ‹mp'e̱t'o› 'antes'**

Both of the ejective stops show their burst, and we can see how the vocal chords start to vibrate more slowly from the glottalization, particularly in the initial nasal phase [m], but also to some extent in the subsequent [ɛ], when preparing to articulate the ejectives. In a narrow transcription with co-articulation, we could notate it with creaky voice diacritics, [m̰p'ḛt'o], or restricting it to the nasal, [m̰p'ɛt'o].[38] When analysing the surface sequence [mp'], it turns out that it occurs when nasals and the sequence [ʔmb] stand next to each other.

ʔmb → mp'	*ʔmbɛt'o* 'go ahead'	→	*m-p'ɛt'o* 'first (adv.)'
	ʔmbɨ 'then, when'	→	*mak^{h}am-p'ɨ* 'before, in former times'

In addition, there seems to be a relationship between the numbers '1' and '6':[39]

ʔnd → nt'	*ʔnt'a* '1'	→	*ʔnda^{h}to* '6'

From Section 3.1.5.5.3. above, sequences [ʔND] are analysed phonologically as /ˀN/. Thus we can be phonologically analyse a sequence of glottal stop + nasal + voiced stop, [ʔND], as an underlying plain nasal followed by an underlying glottalized nasal, /N ˀN/. The example above, [ʔmbɛt'o], may then be written phonologically as /n-ˀmɛtˀo/.[40] In

[38] For an ear trained in listening to Danish, the co-articulatory voicing effects in a sonorant consonant or vowel preceding an ejective, it sounds similar to a vowel with *stød*. Supporting this, it is argued, that Danish stød can be analysed as creaky voice and be transcribed [◌̰] just as well as the standard [◌ˀ].
[39] See also Section 3.3.2.1. below.
[40] We know already, the suffix surfacing as [m] is a phonological /n/.

addition, we see this change in allomorphs of the verbal conjugational /ʔme/ cf. the following examples:

*dɾa-khohki-**ʔmbe***	'go ahead', from *khohki*
*dɾa-ʔɛ̃m-**p'e***	'go ahead', from *ɛ̃na*

Hence, in every case above, it is a process of epenthesis working, which inserts a homorganic stop or affricate between a nasal and another sound. When the subsequent sound is glottal, [h ʔ], the epenthetic consonant is palatoalveolar. The epenthetic consonant if the morphological clash /NʔN/ is ejective, and it is hence unvoiced. Voiced consonants cannot be ejective.[41]

What we also see here is a phonological metathesis of the glottal feature /ʔ/: from appearing in the middle of the phonological nasals, it has moved to the position *after* the nasals on the surface, e.g. /mʔm/ → [mp'], and it seems to be going on systematically that glottal features are not realized between consonantal segments. The first person verbal marker has three realizations, namely an underlying voiced onset *=ga*, an unvoiced onset *=ka*,[42] and a glottalized (ejective) *=k'a*.[43] The glottal allomorph is very likely the result of metathesis of the glottal feature when attached to a glottal stem. Consider the following example:

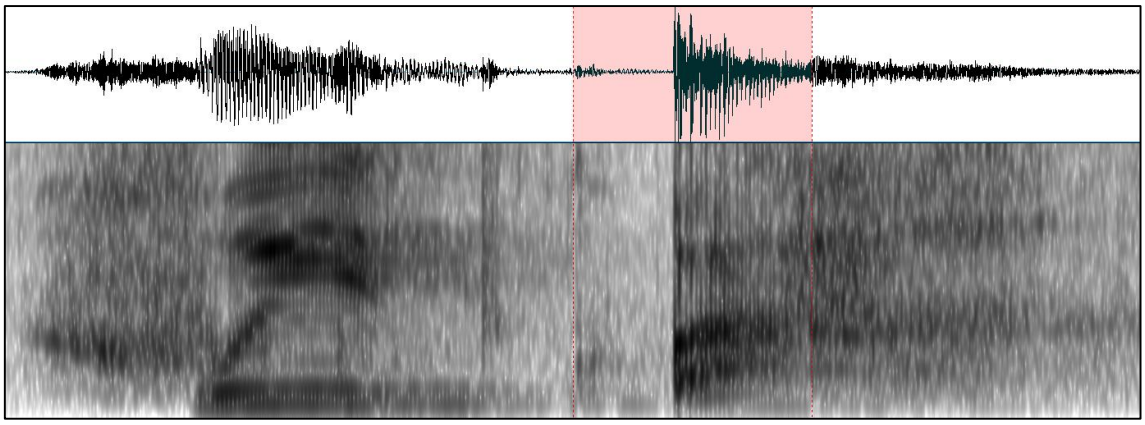
t'g → tk'	*paʔt'i* 'make oneself warm'	→	*da-paʔtk'i* 'make myself warm'
t͡s'k → sk'	*ndants'i* 'wake up'	→	*dɾa-ndansk'a* 'I wake up'

We can explain these changes by accounting for the rule:[44]

/CʔC/ → /CCʔ/

[41] In other Mesoamerican languages, phonologically glottalized stops are realized as implosives like [ɓ].
[42] We shall learn more about this in Section 3.2.2. about preaspiration.
[43] Again, voiced stops cannot bear phonological glottalization in Acazulco Otomí. Ejective stops are always unvoiced, hence the initial *k'*-.
[44] A similar rule in Tultepec Otomí seems to happen with phonologically triggered preaspiration. Aspiration from suffixes with fortis onsets that cause the (vocalic) coda of the preceding syllable to carry the aspiration, [ʰ$T]—what we can call preaspiration of the suffix fortis stop—moves to the preceding segment, if this segment is T, a tenuis/fortis stop, suggesting Tʰ$T → ʰT$T. A similar distribution of this kind of aspiration is found in Faeroese, where a word like *røkta* 'take care of' is pronounced [ɹœʰkta], not *[ɹœkʰta]. In the closely related language Icelandic, however, the aspiration does not move, but realizes itself by fricativizing the preceding T, which explains the pronunciation [răɻxta] of the cognate *rækta*. See also 3.3.2. about preaspiration in Acazulco Otomí.

I will use rule to account for the phonological representation /kʔw/ for the phonetically monosegmental [kʷ’]. Consider now *ʍitkʷ’a* ‘long underwear’:



***ʍitkʷ’a* /ʰwitkʔwa/ ‹hwitk'wa› ‘long underwear’**

The syllable *kʷ’a* marked with red in the illustration truly has a surfacing rounded ejective [kʷ’], not *[k’]. Between the explosion and the beginning of modal voice, a clearly noise that sounds like a whispered [ụ] can be heard if replayed. When modal voice sets in with /a/, practically no rounding is left, making the auditory impression a clear [kʷ’a] rather than [k’wa]. Additionally, the /t/ is rather glottalized, a creaky voice phonation, which actually spreads all the way backwards into the segment /i/, affected by the following glottalization of /kʔ/: the larynx is already making its way upwards in order to establish enough internal pressure to burst as an ejective.

Based on the discussions above, none of these sounds can be accounted for as being phonemic.

3.1.5.8. Morphophonological consonant mutation

The voiced fricative sound [ʒ] never appears in other words than in verbal conjugation forms, apparently from any (modern)[45] morphophonological change. Consider the example:

[45] However, there is probably very likely at some earlier state. which I have not been able to find. What I do know, though, is that—as an example—the so-called *soft* mutation in Modern Welsh, whereby voiced consonants become fricatives. This was originally triggered by the fact that these consonants came to appear in intervocalic position and hence underwent lenition. The earlier vowels have now disappeared, leaving behind only the affected consonant.

t͡ʃi͡ts'i	'bring sby'
da ʒiʃa	'she brought him'

Hernández-Green (n.d.) shows that in Acazulco Otomí, there is a system of mutation of some but not all initial consonants verb-initially.

Several well-studied languages show morphophonologically triggered consonant alternations. Celtic languages are known for initial consonant mutation. Many Finno-Ugric languages show stem-internal alternations, traditionally referred to as *consonant gradation*, for instance in Finnish, Estonian, and several Saami languages of Northern Scandinavia and the Kola Peninsula (Gordon n.d.).

There are three types of consonant mutation in Acazulco Otomí, by which stem-initial consonants in verbs alternate, shown in table 8:

basic	***lenis***	***nasal***	***palatal***
p, p^h	b	mb	–
t, t^h	d	nd	–
t͡s	z	nz	–
t͡ʃ	ʒ	ɲʒ	–
k, k^h	g	ŋg	–
k^w, k^{wh}	g^w	ŋg^w	–
h	–	–	ç
ʔ	–	–	ʔj

Table 8 — Consonant mutation represented phonetically in Acazulco Otomí (as in Hernández-Green n.d.).

I have marked the field where [ʒ] appears. This how the chart in 3.1.5. is morphophonological. Here we see how the fricatives [z] and [ʒ] belong to the affricates [t͡s] and [t͡ʃ] in the stop section.

With nasal mutation, we have to account for the fact that one phonological segment is split in two, although the resulting two segments function in the context as a single unit, for instance /k/ > /n/+/g/. Based on that, we have to let [ʒ] be an independent phoneme if we argue that we can split the basic form /t͡ʃ/ into /n/+/ʒ/ This makes us able to assign the phoneme /ʒ/ for the [ʒ] which is a result of lenis mutation of /t͡ʃ/, without having to postulate that the [ʒ] is some abstract underlying allophone of /t͡ʃ/. Questions then arise on whether the for instance the [z] that is a result of lenis mutation of /t͡s/ is "the same kind of [z]" as the "real" /z/ that we find in words like *za* 'tree'. In some

analyses of Welsh consonant mutation, certain *morphophonemes* are accounted for (Hamp 1951). These do not surface, but makes another phoneme surface differently. In this way, the word *dad* [da:d] 'father' which in its neutral form is *tad* [ta:d] is analysed phonologically as /Ltad/.[46] The initial [d], /Ld/, in *dad* is thus not of the same phonological nature as the final one, /d/.

3.1.5.9. Conclusion

Following the discussion in the sections above, the chart below presents the phonemes of Acazulco Otomí.

manner of articulation	*phonation type*	labial	dental	alveolar	alveolo(palatal)	velar	labiovelar	glottal
STOPS	tenuis/fortis	p	t	t͡s	t͡ʃ	k	k^w	ʔ
	glottalized		$t^ʔ$	$t͡s^ʔ$		$k^ʔ$		
	aspirated	p^h	t^h	$t͡s^h$	$t͡ʃ^h$	k^h	k^{wh}	
	voiced/lenis	b	d	z	ʒ	g	g^w	
FRICATIVES				s	ʃ			h
NASALS	plain	m		n				
	glottalized	^ʔm		^ʔn				
	aspirated	^hm		^hn				
LIQUIDS				l				
				ɾ				
APPROXI-MANTS	plain				j		w	
	glottalized				^ʔj		^ʔw	
	aspirated				^hj		^hw	

Table 9 — Consonant phonemes of Acazulco Otomí

[46] "L" stands for "lenition".

3.2. Suprasegmental phonology

3.2.1. Lexical word tones

Most descriptions of Acazulco Otomí to this point have dealt with tones in the way that any syllable can have one of three tones: low, high, or rising, which in accordance will transcribe [◌́ ◌̀ ◌̌],[47] respectively, in the following examples. Tones in Acazulco Otomí can be distinctive:

ʔɔ̀hɔ́	'yes'
ʔɔ́hɔ̀	'to be asleep'

However, Turnbull (2013) argues that Acazulco Otomí, and possibly other varieties, too, can be described with only two tones. He argues that each word in Acazulco Otomí has "one and only tonal sequence—either /H/ or /HL/."

> "A phonetic analysis revealed that underlyingly-tonal syllables are phonetically distinct from non-tonal syllables: those with /H/ are produced with greater vocal effort (measured by spectral tilt), and those with /HL/ are longer, louder, and bear a higher f_0 (fundamental frequency), compared with non-tonal syllables." (Turnbull 2013)

Tonal syllables are lexical and must be learnt for each word. Underlying tonal syllables are phonetically distinct from non-tonal syllables. Auto-segmental right spreading makes syllables subsequent to the tonal syllable have the same tone. The first pretonic syllable has low tone, every possible before that have a high tone.

[47] Alternatively, they can be placed *after* the syllable nucleus as [˥ ˧ ˩], respectively.

3.2.2. Preaspiration

3.2.2.1. Introduction to the phonetics of [h] in Acazulco Otomí

One of the first things in Acazulco Otomí that strikes the phonetically observant listener is the abundance of [h] segments, seemingly occurring in every thinkable position. Let me list the possibilities, for now transcribing an [h] in phonetic transcriptions in all other instances than postaspiration of stops. An [h] can be found syllable-initially:

[**h**ɔj]	'earth'
[**h**ũ.t͡ʃ'i]	'sit on top of sth'
[t'ɘ.**h**ɘ]	'volcano'
[ʃɔ̃.**h**i]	'ixtle (agave fibre for weaving)'

A discussed above, a glottal aspirated feature is also found in initial position before sonorants, in which the feature manifests as phonetic devoicing, [◌̥], or phonological aspiration, /ʰ◌/:[48] I treat the resulting unvoiced segments as independent phonemes. Sequences of [h] also occur after stops. Again, I analyse this as (post)aspiration, /◌ʰ/, and it will thus be ignored in this analysis.

Outstandingly, an [h] segment is also present in final position, as the following examples show:

[gɨˈʔɘ**h**.ka]	'I shall hear'
[ʃũ**h**.t͡ʃi]	'girl'
[ʃɔ̃**h**.peni]	'guava'
[biˈçɘ**h**]	'it fell (about snow)'

Other examples show an [h] appearing in internal position after a vowel, [VhC.]:

[diˈpɔ**h**p.ki]	'I like (sth)'
[diˈʔmbɛ**h**p.ka]	'I gave (sby) order'
[diˈzɘ**h**t.ka]	'I collected (sth)'

We notice, that the [h] can only appear in non-initial position in a syllable if nothing or a tenuis stop or affricate follows, [hT],[49] it indeed looks like it is obligatory in this

[48] See further discussion in section 3.1.5.4.
[49] I shall henceforth use /T/ for any tenuis stop or affricate.

position and that a sequence of so-called *preaspiration*, [ʰT],[50] before a phonological tautosyllabic /.T/ might be triggered phonologically. Supporting this theory, there appears to be alternation between [T] and [hT] in words involving the same noun stems, as the following example shows, as well as in intriguing connection between certain pairs of numerals which are formed with a suffix /to/:

[tɔ̃**h**.tsu]	'elder woman'; from tɔ̃ 'big' and t͡su 'woman'
[mbe]	'mother'
[mbe**h**.ko]	'a man's sister-in-law'; ko means 'brother-in-law'
[nt'a]	'1'
[ʔnda**h**.to]	'6'
[çũ]	'3'
[çɔ̃**h**.to]	'8'

It becomes even clearer that the aspiration is triggered phonologically when we consider loanwords from Spanish taken into Acazulco Otomí:[51]

[ɸo**h**.ko]	Spa. foco ['fo.ko]
[se.ɲo.ɾi**h**.ta]	Spa. señorita [se.ɲo.'ɾi.ta]
[li**h**.kʷa.ðo.ɾa]	Spa. licuadora [li. kwa.'ðo.ɾa]
[pʰle**h**.t͡ʃa]	Spa. flecha ['fle.t͡ʃa]

3.2.2.2. On the typology of preaspiration

Preaspiration is a well-known feature of languages spoken around the eastern North Atlantic, namely Icelandic, Faeroese, Scottish Gaelic and all of the Saami languages but one of the northern Scandinavian Peninsula, as well as in selected dialects of Norwegian, Swedish, Irish Gaelic, Northern Welsh, and English (Helgason 2002, Morris 2010, Árnason 2013). Preaspiration can surface as a pure glottal fricative [hT], it can take on noise, [xT], or it can assimilate towards the place of articulation of the sound following it, [fp çt xk].

[50] Instances of assured phonological preaspiration with no phonological value are transcribed [ʰ] henceforth, as opposed to a phonological /h/; in the analysis below, the yet unsure nature of any instance of [h] will hence be shown by transcribing it [h].
[51] More on loanwords in section 3.4. below.

It is a typological Sprachbund feature, i.e. that the languages share the feature owing to their geographical closeness rather than linguistic relatedness[52], which is certainly true for Icelandic (Indo-European) and Saami (Uralic). Outside this area preaspiration is extremely rare, found in scattered places around the world, most notably in other languages of North and Central Asia, i.e. Nenets (Uralic) and Halh Mongolian (Mongolic), as well as in indigenous languages of the Americas such as Tarascan/Purepecha (isolate; Mexico), Huautla Mazatec (western Oto-Mangue; Mexico) and Otomian languages, Ojibwa (Algonquian; Canada and northern USA), Fox (Algonquian; central USA), Southern Paiute (Uto-Aztecan; southern USA), Hopi and Tohono O'odham (Uto-Aztecan; Southern USA) Goajiro/Wayuu (Arawakan; Venezuela and Colombia), Chamicuro (Arawakan; Peru) (Ladefoged *&* Maddieson 1996, Silverman 2003, Clayton 2010). Preaspiration is, however, not attested in either Africa or Oceania.

Interestingly, the Huautla Mazatec, a language closely related to Otomí, preaspirated stops do not only occur in syllable-final position, but also syllable-initially. Below I will give examples of preaspiration from the works cited above.

Icelandic[53]
[θah.ka] *þakka* 'thank'
[sahkna] *sakna* 'to miss'

Faeroese
[tʰaʰkːa] *takka* 'thank'
[saʰk.na] *vatn* 'to miss'

Scottish Gaelic
⟦kl̪̊axk⟧ *glac* 'grab'
⟦ʎɛxk⟧ *leac* 'flagstone'
⟦ahpə⟧ *apa* 'ape'

Skolt Saami[54]
⟦suɛʰcˑĕ⟧ *sue´ǩǩ* 'birch'
⟦t̪ʃ̪æːʰt̪s̪ᵊ⟧ *čää´cc* 'water'
⟦vuɔʰpːʰməʃ⟧ *vuåppmõš* 'supervision'

[52] It is for instance argued, that preaspiration in Gaelic languages on the British Isles and Saami languages in northern Scandinavia has emerged as a result of historical contact with Nordic languages (Posti 1954, Borgstrøm 1974, Hansson 1997).
[53] In Icelandic the preaspiration phase of a phonological geminate stop is measurable longer than the actual stop phase itself, and it is treated as a full segment, hence transcribed [h], phonetically practically the same as a Finnish /h/ in the two words Fin. *lahti* 'bay' and Ice. *latti* 'dissuaded'. The same is not true for Faeroese, which is the reason for the transcription [ʰ] (Helgason 2002: 13, Árnason 2013: 219–230).
[54] Examples are from Feist (2010).

Huautla Mazatec

⟦ʰti⟧	'fish'
⟦ʰʧʃi⟧	'little'
⟦ʰka⟧	'stubble'

In the western North Germanic languages Icelandic and Faeroese as well as in Scottish Gaelic and the Saami languages, preaspiration occurs in environments similar to those we have seen in Acazulco Otomí, i.e. before syllable-final fortis stops, /p t k/.[55] Moreover, preaspiration is often seen in connection with devoicing of a preceding sonorous segment, which can be interpreted as the feature [+spread glottis] from a fortis segment /T/ that is realized as voicelessness in the preceding segment (Árnason 2013: 219*ff*). On the surface, voicing becomes the only feature that distinguishes pairs like the Icelandic female names *Björg* [pjœrk] vs. *Björk* [pjœr̥k]; and Faer. *koyrd* [kʰɔiɻt] 'driven (PP.FEM)' vs. *koyrt* [kʰɔiɻ̊t] 'driven (PP.NEUT)'. In Scottish Gaelic, the phoneme /r/ is attested to surface as a voiceless [r̥] before /p/ and /k/ and as a retroflex sibilant, [ʂ][56], before /t/. Oftedal (1956) also reports, that "labial, dental and velar nasals can as completely voiceless before stops" (Oftedal 1956: 137, Gillies 1993: 163), which is the same process as we see in (Southern) Icelandic as in *henti* [hɛn̥tɪ] 'threw (1/3.SG)'. In Northern Saami, the same phenomenon occurs: if a sonorant stands in the place where preaspiration would surface, it is (at least) devoiced, like in *táŋka* ⟦ˈtʰɑːŋŋ.n̊kɑ⟧ 'tank'.[57] Preaspirational devoicing is of course related to postaspirational devoicing, whereby the aspiration phase of postaspirated surfaces as voicelessness in following stops. For languages where the fortis/lenis distinction is purely aspirational, like Danish and Icelandic, it creates phonetic minimal pairs like Dan.[58] *glo* [g̊loːˀ] 'stare' vs. *klo* [g̊l̥oːˀ] 'claw'; and Ice. *glettur* [klɛhtʏr̥] 'tricks' vs. *klettur* [kl̥ɛhtʏr̥] 'cliff'.

The feature [+spread glottis] associated with Icelandic preaspiration is even so forceful that it fricativizes preceding stops, which turns /p k/ into [f x]:

[55] In Icelandic a preceding long vowel prevents preaspiration to surface so that syllables like *[V:ʰC] do not occur, e.g. *bátur* [pauːtʏr̥] 'boat'; this is not the case in Faeroese, where *bátur* 'boat' in some dialects is pronounced with a preaspirated stop, [pɔuːʰtʊɹ] (Árnason 2013).
[56] Phonetically closely related to the retroflex Faeroese allophone [ɻ̊] in *koyrt*.
[57] (Baal *&* al. 2012) and Sámi giellatekno, University of Tromsø, http://giellatekno.uit.no,
[58] I follow Grønnum's (2005: 106) narrow transcription and discussion that Danish stops are all lenis, distinguished phonetically by aspiration (or affrication, most people's standard pronunciation for alveolar stops): /p t k b d g/ → [p̥ʰ t̥ˢ k̥ʰ p̥ t̥ k̥].

5) djúp [tju:**p**] ‘deep (FEM)’ → djúpt [dju**f**t] ‘deep (NEUT)’
6) tæk [t^{h}aɻ:**k**] ‘acceptable (FEM)’ → tækt [t^{h}ăɻ**x**t] ‘acceptable (NEUT)’.

In Acazulco Otomí, preaspiration is “lost” as soon as anything other than a vowel or another stop /T$_2$/,[59] that can be preaspirated under the right circumstances, is found before the stop /T/. Thus, in [biˈmp**ɛnt.k**i.ga] ‘you sent me (sth)’ with the structure /VCTT/, no preaspiration is to be found. However, in our recorded material, sonorants preceding fortis stops are apparently, at least partially, devoiced. In the word *jortomo* ‘mayordomo’, the /ɾ/ several times has unvoiced noise during its articulation, a feature that could not come from the Spanish origins of this loanword. This proposes a possible optional devoicing of sonorant consonants in the position /VR$T/ and /RT$/,[60] as discussed above in other languages that have preaspiration. Yet, further acoustic studies will have to determine whether devoicing happens systematically in other similar cases.

In the examples from Huautla Mazatec above, which is closely related to the Otomian languages, we saw how preaspirated stops occurred in initial position. These data are crucial for the interpretation of present day preaspirated stops in Otomian languages. Palancar (2013), who describes a system of similar preaspiration in the northeastern Otomí variant of San Ildefonso Tultepec, Querétaro, argues that preaspiration of modern Otomian languages is a reflex of an old fortis/lenis distinction in Old Otomí, in which fortis stops, /^{h}p ^{h}t ^{h}k/, were distinguished from lenis, /p t k/, in terms of preaspiration. The distinction was still present when a Colonial grammar was written by Pedro de Cárceres in 1580. Cárceres (1907 [1580]) describes that the preaspirated phonemes were always unvoiced, whereas the tenuis phonemes have voiced allophones, particularly intervocalically.

In Newman *&* Weitlaner’s (1950: 7) the reconstructed Proto-Otomí stop phonemes are exclusively distinguished by voicing, */p t k/ vs. */b d g/; however, this does not tell us much about the exact surface distinction at Proto-Otomian times. Bartholomew (1960: 326), however, assumes that */p t k/ vs. */b d g/ were not distinguished in terms of voicing, but, as discussed above, in terms of preaspiration. She argues thus that

[59] Because the sequence /T$_1$T$_1$/ is phonotactically ungrammatical in Acazulco Otomí, a possible second stop before the syllable-final stop must have a different place of articulation.
[60] I have used /R/ for any sonorant consonantal segment.

reconstructed */p t k/ and */b d g/ could have been pronounced [ʰp ʰt ʰk] and [p t k], respectively.

In modern Otomian languages, the preaspiration distinction has been lost initially, but has seemingly survived in internal position, except in Tilapa Otomí, where it has partially survived, and in the eastern Santa Ana Hueytlalpan Otomí, which Palancar (2013: 15) characterizes as a "phonologically conservative dialect of Eastern Otomi."

3.2.2.3. Phonological representation of [hT] in Acazulco Otomí

Preaspiration in Acazulco Otomí never occurs followed by ejective and phonologically voiced[61] stops cf. the examples below:

[ça.di] ~ [ça.ði]	'sun'
[t͡sibi] ~ [t͡siβi]	'light'
[kɨ.t'a]	'5'
[to.k'o]	'who'

At first glance, preaspiration is not found before postaspirated stops either:

[zɛ.pʰɨj]	'hat, sombrero'
[çɨ.kʰa]	'back of the neck'
[zɛ.t͡sʰũni]	'cedar'

Nevertheless, it is soon clear that [h] does occur before postaspirated stops, namely in morphologically complex words, as stated by the following examples:

[di'koh.t͡sʰe.ga]	'I stayed alone'; the enclitic =*t͡sʰɛ* means 'alone'
[mbə**h**.tʰe]	'spring (water source)'; from *pəh-* < *pəhə* 'get out of' and -*tʰe* < *tehe* 'water'

Recall also the numeral pairs in above; let us compare those to the following pair:

[61] As discussed above, voiced stops are optionally—and practically always intervocalically—fricativized.

[jo.ho]	‘2’
[joh.to]	‘7’

Judging from the morphological structure of the example words above, it does not seem like the sound [h] is of the same phonological nature as the assumed preaspiration in the words for ‘6’ and ‘8’ above. Instead, this [h] seems to be phonological since it already exists in the related word for ‘2’, if we suppose that the ‘7’ is derived with a suffix /to/. This suggests that the phonetic sequence [hT] can be analysed as both a single /T/ and as two underlying phonemes /hT/, i.e. that the aspiration phases we encounter above are phonological /h/’s in some of the examples and morphophonologically triggered phonetic preaspiration [ʰ] in other examples.

This assumption that some [h] sounds represent phonemes, /h/, is supported morphophonologically in verb conjugation. When we look at enclitic morphemes, it is soon clear that a number of them starting with stops have more than one allophone, where the onset alternates between voiced an unvoiced. This is the case for the enclitic marking first person plural, *-ga ~ -ka*, for example in Hernández-Green (n.d.), compare the two conjugated forms below:

[dɾaˈʔjo.**ga**]	‘I walk’
[dɾaˈtɔh.**ka**]	‘I fall’

In second and third persons, the conjugated forms are:

[gɾaˈʔjo]	‘thou walkest’
[ɾaˈʔjo]	‘s/he walks’
[dɾaˈtɔgi]	‘thou fallest’
[ɾaˈtɔgi]	‘s/he falls’

In the verb for ‘walk’, nothing happens when we add the person marker, but that is the case in the verb for ‘fall’, which alternates between *tɔgi* when nothings follows and *tɔh* when a marker is added. In Acazulco Otomí, as well as in Tultepec Otomí described by Palancar (2013) for instance, the verbal stem can be said to have a *free* form, the above *tɔgi*, when nothing is attached to it, as well as a *bound* form when something follows it, the form *tɔh* above. By analysing it as a morphophonologically triggered allomorphic change in the grammatical person marker: devoicing of what must an underlying /ga/,

the [h] occurring in the conjugations for first person must be phonological, /h/.[62] In this sense, it is also clear that it must be the stem affecting the grammatical marker morpheme rather than the marker affecting the stem.

This analysis shows that we must thus account for two different phonological analyses of the phonetic string [hT]: one, which consists phonologically of two segments, /hT/, and another, which is analysed as a single stop /T/ getting preaspiration on the surface, as stated above. By convention and phonological clarity, I will transcribe a phonological /h/ as [h] and preaspiration as [ʰ].

The analysis above leads to the assumption that the phonetic sequence [VT], i.e. a non-initial tenuis stop without preaspiration, does not occur in Acazulco Otomí. That is, however, not the case. Consider some of the examples from above that have the phonological conditions in the beginning of the words for preaspiration to occur, /VT$/:

[diˈpɔ**h**p.ki]	'I like (sth)'
[diˈko**h**.t͡sʰe.ga]	'I stayed alone'; the enclitic *=t͡sʰɛ* means 'alone'
[ɾaˈtɔgi]	's/he falls'

Preaspiration does not occur here. To eliminate these exceptions we must come up with a set of rules for the application of preaspiration. As we have seen above, a phase of this kind of aspiration occurs with a syllable-final tenuis stop [hT$]:[63]

[gɨˈʔɘ**h**.ka]	'I shall hear'

Alternatively, it occurs as a syllable's coda itself with the triggering stop being in the following syllable [h$T], as in the example below:

[diˈpɔ**h**p.ki]	'I like (sth)'

[62] It should be noted that free verb stem does not always end in [-h]; it is, however, the only coda that is important for the analysis the distribution of preaspiration.

Hernández-Green (n.d.) and Palancar (2009) both describe how the *formative* (original Spa. *formativo*), which is the last syllable of the verbal stem, will change in different conjugations. In many cases, a morpheme consisting of /i/ will simply disappear when something follows, whereas in other cases—in both varieties—the formatives will change drastically, i.e. we see alternations like *-t͡sʼi ~ -ʃ* and *-pʰV ~ -∅*.

[63] For the sake of clarity, I use the dollar sign, $, here for a syllable boundary. In the rest of the examples, I have used a full stop, which is standard IPA practice.

From these examples, we see that preaspiration as stress interact: Preaspiration has to occur in the stressed syllable of a word. If the syllable is not stressed, preaspiration will not occur.[64]

In Acazulco Otomí, there seem to be a couple of exceptions to the rule when one looks through wordlists. In these cases, the "exceptions" can easily be explained as it turns out that they are often morphologically complex. One example that I had trouble understanding was the word for 'clothes', *zɛtu*. From the discussions above, this word should normally have a preaspirated [ʰt]. However, it turns out that the word is built up of two old morphemes, namely *zɛ* 'old; useless' and *duʰtu* 'cloth(es)' (Hernández-Green, personal communication).

3.3. Orthography

An orthography is a crucial factor in the revitalization process of an endangered language and for its possibilities to survive. In many places around the world, the presence of proves to be one of the most important things for a language to survive. Through documentation and revitalization projects around the world, linguists have designed orthographies for many indigenous languages, often based on the dominating orthography of the country or most widely spread language in the area. Hence, we see Cyrillic alphabets for indigenous languages of Russia and Latin-based orthographies for lots of indigenous languages of the Americas where English, Spanish and Portuguese dominate, even though the complex sound systems of some of these languages often do not exactly fit optimally into an alphabet, which was originally used to write Latin.[65] In other cases, new ways to write languages are designed from scratch, known examples being the syllabaries for Cherokee and the Canadian Aboriginal syllabics, used to write all Cree languages, Inuktitut as well as several other Canadian languages.[66]

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[64] Would that have been the case, we would have had forms like *[diʰˈpɔʰp.ki]. As discussed above, this is actually the case in modern Tilapa Otomí, which has preserved the old fortis/lenis distinction. As a result well-formed words in Tilapa Otomí can be [gɨʰˈtɔgi] (Palancar 2012).
[65] Many orthographies are more or less uses of phonetic transcription systems, e.g. the American Phonetic Alphabet. An example is a sentence from the very complex looking orthography for the language Nootka spoken on south-western Vancouver Island, Canada: *ʔUḥukʷaḥ tupaati ƛ̓iʕašaqtu ƛ̓iisʔapuʔis qʷayaċiik.*
[66] Short examples are:
Cherokee: **ᏑᏂᎬᏮᎾ, ᎠᎯᏯ ᎢᏴ ᏥᎩ ᏣᎳᎩ ᎤᏪᏅᏒ ᎤᏅᏌ ᏣᎳᎩ, ᎠᎴ ᏣᎳᎩ.**
Cree: ᐁᐧᑲᓂ ᒪᑲ ᐁᒋ ᒪᒥᓀᒥᑐᒋᐠ ᒪᐃᑲᓇ ᓂᐢᑕ ᐊᑎᐧᒪᐠ ᐊᓄᐟ ᑲ ᑭᒍᑲᐠ᙮

For Acazulco Otomí, a practical orthography has been proposed by Pharao Hansen & Hernández-Green (2010). Here I present the vowel and consonant charts with the sound written out in this orthography.

oral monophthongs			*nasal monophthongs*			*oral diphthongs*			*nasal diphthongs*		
i	u̱	u	ï		ü		u̱i				üi
e	o̱	o					o̱i				
e̱	a	a̱	ë	ä	ö	e̱i	ai	a̱i	ëi	äi	öi

Table 10 — Orthographical representations of monophthongs and diphthongs in Acazulco Otomí

manner of articulation	*phonation type*	labial	dental	alveolar	alveolo(palatal)	velar	labiovelar	glottal
STOPS	tenuis/fortis	p	t	ts	tx	k	kw	'
	glottalized	p	t'	ts'	tx'	k'	k'w	
	(post)aspirated	ph	th	tsh	txh	k^h	khw	
	preaspirated	hp	ht	hts	htx	hk	hkw	
	voiced/lenis	b	d	z	ž	g	gw	
FRICATIVES				s	x			h
NASALS	plain	m		n		n		
	glottalized	'mb		'nd		'ng		
	aspirated	hm		hn				
LIQUIDS	lateral			l				
	tap			r				
	trill			rr				
APPROXIMANTS	plain				y		w	
	glottalized				'y		'w	
	aspirated				hy		hw	
	affricated				ý			

Table 11 — Orthographical representations of consonants in Acazulco Otomí

Nasal vowels are marked with a diæresis, ‹V̈›, which at first can be tricky with a Eurocentric eye. Vowels not found in Spanish, [ɛ ɨ ɘ ɔ], are all marked with a macron diacritic below, ‹V̱›. This is a very consistent system; in some varieties, nasality is only marked on some of the vowels—due to the fact that some vowels are indistinguishable in terms of the presence of nasality—and vowels which do not occur in Spanish are written in a

wide selection of ways: /ɛ/ as ‹e̯ ɛ›, /ɨ/ as ‹u̯ ʉ›, /ɘ/ as ‹o̯ ø › and /ɔ/ as ‹a̯ ä ö› (Chávez & Murray 2001). Varieties that use the acute accent for marking vowels, which do not occur in Spanish, use, if marked at all, an ogonek [̨] to indicate nasality: /ĩ/ as ‹į›, /ɛ̃/ as ‹ę ɛ̨›, /ã/ as ‹ą›, and /ũ/ as ‹ų›.

The off-glide in diphthongs are marked with the vowel ‹i›, and not with the letter, which represents the palatal glide [j], ‹y›. Phonologically, the letter ‹i› can thus both be vocalic or semi-vocalic. Nasal vowels are only marked for nasalization on the nucleus, ‹Vi›.

The Latin letters ‹c f j q v› are not used. Other Otomí varieties use the letters ‹f j› for the fricatives [ɸ/f] and [x] based on their phonetic value in Spanish; there are even some, where the letter ‹j› represents the original /kʰ/, for example used by Palancar for Tultepec Otomí (2009). The only allophone that has its own character is [d͡ʒ], which only occurs after /n/. Pharao Hansen & Hernández-Green (2010) use the letter *y* with acute accent, ‹ý›, which shows it relation to the underlying form /j/ it comes from.

The "Spanish" [r], phonologically /ɾɾ/ as stated above, is often transcribed /r̃/ in Hispanic linguistics. For Acazulco Otomí, the phonological representation ‹rr› has been proposed for the small number of words in which it occurs.

The orthography is shallow: the spelling-sound correspondence is high, and it writes out sounds that are not necessarily phonetic, such as [p'], hence we do not have to know that /mˀm/ surfaces as [mp'] when reading a text aloud.

In Table 11 above, I have used the letter *saltillo* to represent the glottal stop phoneme as well as phonological glottalization. Phonetically is hence represents both [ʔ] and ejective stops. According to The Summer Institute of Linguistics, the saltillo is "a (usually enlarged) straight single quote or dotless exclamation point (ˈ), often used in practical orthographies to represent a glottal stop [ʔ]." The saltillo has both a capital and a lower-case shape, shown here enlarged, used with me letter ‹m›:

ˈM ˈm

The letter saltillo has its own Unicode Code Point (capital: U+78B; lower-case: U+A78C). An apostrophe is technically classified as punctuation, and can cause problems in asso-

ciation with handling data, whereas saltillo is technically an independent letter. However, it is not available on (Hispanic American) Spanish keyboards, so in terms of access and typability for normal use, an apostrophe seems to be the easiest way of writing it. Conversely, it must be the best choice for publications written in the language, such as teaching material, possible signage etc.

The letter ‹h› has its own value [h] as well as functioning as a modifier for phonological aspiration. Aspirate stops are written with a subsequent ‹h›, aspirated nasals and approximants are written with a ‹h› before the modified sound, e.g. ‹hm› and ‹hy› denoting [m̥] and [ç].

A háček is used for the sound [ʒ], ‹ž›. It shows its relation to the letter ‹z›: if ‹z› is a result of mutation from ‹ts›, then ‹h› comes from ‹tx›.

The alphabet in its full form is shown below:

**Aa Ää Ą̱ą̱ Bb Dd Ee Ëë Ę̱ę̱ Gg Hh Ii Ïï Kk Ll Mm Nn Oo Öö Ǫ̱ǫ̱ Pp Rr Ss Tt Uu Üü Ww Xx Yy Ýý Zz Žž '' **

It is graphemic in the way that it alphabetizes according to the grapheme rather than to the underlying phonemes, i.e. the phoneme /ʧ/ does not have its own letter, but must be made from ‹t› and ‹x›, which represent [t] and [ʃ], respectively. The same thing is true for English: /ʧ/ is written ‹ch›, but does not get its own place in the alphabet. Until not many years ago, the Spanish ‹ch› and ‹ll› were considered separate letters.

In complex glottalized sounds, like [kʷʾ], the orthography follows the underlying phonological structure, /kˀw/, representing it as ‹k'w›. Here

3.3.1.. Representing preaspiration

Based on the complexity of the rules for preaspiration in Acazulco Otomí, distinguishing orthographically between phonological /h/ and phonetic preaspiration [ʰ] would be a hard task for non-linguists and not advisable if the goal is that the orthography be used for everyday purposes and be fairly easy to learn. The question is then whether to not represent it or write an orthographical ‹h› for every instance of phonetic [h] heard, not considering phonological aspects. So far, the latter has been done for Acazulco Otomí, and that seems like the most straightforward and logical way to do it. At this

point, I am not sure about how well the speakers are aware of the preaspiration they pronounce. However, Palancar (2013) mentions, that in 1999, the Commission for the Indigenous peoples of Querétaro, which is a body in charge of designing an orthography for the varieties of Querétaro Otomí, rules against giving a written representation instances of [h] in words of a certain structure, under the assumption that its occurrence is predictable from the phonetics of the syllabic structure of such words. Hence, words like

’bɇpo	⟦ʔbɛ**h**.po⟧	‘sister-in-law’
dutu	⟦du**h**.tu⟧	‘clothes’
dá tsǫka	⟦da.t͡sə**h**.ka⟧	‘I arrived (there) myself’

were written without an orthographical ‹h›, as can be seen in the examples above. However, this quote does not say anything about how instances of [h] is represented in the same position as in these examples, but when it is not preaspiration but comes from an actually underlying phonological /h/. If such ‹h›’s are not written, we would need to for an orthographical rule that would prevent a phonological /h/ to be written when it appeared in the environments where preaspiration appears, even in obviously closely related words like *joho* /joho/ ‹yoho› ‘2’ and the derived *jo^{h}to* /johto/ ‹yoto› ‘7’. Therefore, the most logical thing to do without any further studies, is always to write an ‹h› wherever there is an instance of aspiration, independent of phonological analysis.

References

Andrews, Henrietta. 1949. Phonemes and Morphophonemes of Temoayan Otomi. *International Journal of American Linguistics*, vol. 15, No. 4 (October, 1949), pp. 213–222.

Árnason, Kristján. 2005. *Hljóð.* Íslensk tunga I. Co-author: Jörgen Pind. Reykjavík: Almenna bókfélagið.

Árnason, Kristján. 2011. *The Phonology of Icelandic and Faroese.* Oxford: Oxford University Press.

Baal, Berit A.B.; Odden, David & Rice, Curtoris. 2012. An analysis of North Saami gradation. *Phonology* 29, pp. 165–212.

Bartholomew, Doris. 1960. Some revisions of Proto-Otomi consonants. *International Journal of American Linguistics*, vol. 26, No. 4 (October, 1960), pp. 317–329.

Bartholomew, Doris. 1968. Concerning the Elimination of Nasalized Vowels in Mezquital Otomi. *International Journal of American Linguistics*, vol. 34, No. 3 (July, 1968), pp. 215–217.

Bernard, Russell H. 1967. The Vowels of Mezquital Otomi. *International Journal of American Linguistics*, vol. 33, No. 3 (July, 1967), pp. 247–248.

Blight, Richard C. & Pike, Eunice V. 1976. The Phonology of Tenango Otomi. *International Journal of American Linguistics*, vol. 42, No. 1 (January, 1976), pp. 51–57.

Borgstrøm, Carl Hj. 1974. On the influence of Norse on Scottish Gaelic. Preaspiration of stops and pitch patterns. *Lochlann. A Review of Celtic Studies* VI: 91–93.

Butragueño, Pedro. 2004. *Cambio Lingüístico, Métodos y Problemas.* Mexico City: COLMEX.

Canales, Berna L.V. 2008. *Obsolescencia dialectal y evolución de la lengua: la variación fonológica del otomí de San Pedro Atlapulco* (Master's thesis). Tlalpan, Mexico City: Escuela Nacional de Antropología e Historia.

Cárceres, Fray Pedro de. 1907 [1580]. Arte de la Lengua Othomi. Edited by Nicolás León. *Boletín del Instituto Bibliográfico Mexicano* 6, pp. 38–155.

Chávez, Evaristo Bernabé & Murray, Nancy L. 2001. *Notas históricas sobre las variaciones de los alfabetos otomíes.* Ixmiquilpan, Hidalgo: Centro Lingüístico Manuel Gamio.

Clayton, Ian D. 2010. *On the natural history of preaspirated stops* (Ph.D. dissertation). Boise, Idaho: Boise State University

Cruz, Luis H; Torquemada, Moisés V. & Crawford, Donaldo S. (eds.). 2010. *Diccionario del hñähñu (otomí): Valle del Mezquital, Hidalgo.* Number 45 in Vocabularios Indígenas. Tlalpan, Mexico City: Instituto Lingüístico de Verano.

Chávez, Evaristo B. & Murray, Nancy L. 2001. *Notas históricas sobre las variaciones de los alfabetos otomíes.* Ixmiquilpan, Hidalgo: Centro Lingüístico Manuel Gamio.

Dryer, Matthew S. & Haspelmath, Martin (eds.). 2013. *The World Atlas of Language Structures Online*. Leipzig: Max Planck Institute for Evolutionary Anthropology.

Esling, John H; Fraser, Katherine E. & Harris, Jimmy G. 2005. Glottal stop, glottalized resonants, and pharyngeals: A reinterpretation with evidence from a laryngoscopic study of Nuuchahnulth (Nootka). *Journal of Phonetics*, vol. 33 (2005), pp. 383–410.

Evans, Nicholas. 2010. *Dying Words. Endangered Languages and What They Have to Tell Us*. Hoboten: Wiley-Blackwell.

Feist, Timothy. 2010. *A Grammar of Skolt Saami* (Ph.D. dissertation). Manchester: School of Languages, Linguistics and Cultures, University of Manchester.

Figueroa-Sosa, Sandra. 2012. *El pasado otomí de la Sierra de las Cruces: Su representación en voces de San Jerónimo Acazulco, Estado de México* (Master's thesis). Mexico City: Instituto de Investigaciones Antropológicas, Universidad Nacionl Autónoma de México.

Gillies, William. 1993. Scottish Gaelic. In M.J. Ball (ed.) *The Celtic Languages*, pp. 145–227. London: Routledge.

Goldsmith, John. 1976. *Autosegmental Phonology* (Ph.D. dissertation). Cambridge: Massachusetts Institute of Technology.

Gordon, Matthew. n.d. *Balto-Fennic-Sámi Consonant Gradation as Fortition*. Los Angeles, UCLA: Unpublished.

Grønnum, Nina. 2005. *Fonetik og Fonologi. Almen og dansk*. Copenhagen: Akademisk Forlag.

Hamp, Eric P. 1951. Morphophonemes of the Keltic Mutations. *Language*, vol. 27 (July – September 1951), pp. 230–247.

Hansson, Gunnar Ó. 1997. *Aldur og útbreiðsla aðblásturs í tungumálum norðvestur Evrópu* (Master's thesis). Reykjavík: Háskóli Íslands.

Helgason, Pétur. 2002. *Preaspiration in the Nordic Languages: Synchronic and Diachronic and Diachronic Aspects* (Ph.D. dissertation). Stockholm: Institutionen för lingvistik, Stockholms universitet.

Hernández-Green, Néstor. n.d. *Morfosintaxis verbal en otomí de Acazulco* (Ph.D. dissertation). Unfinished draft. Mexico City: Centro de Investigación y Estudios Superiores en Antropología Social (CIESAS).

Instituto Nacional de Lenguas Indígenas (INLI). 2008. *CATÁLOGO de las Lenguas Indígenas Nacionales: Variantes Lingüísticas de México con sus autodenominaciones y referencias geoestadísticas.*

Instituto Lingüístico de Verano en México (INVM). 2002. *Glosario Electrónico de Términos Lingüísticos*. Retrieved 3 November, 2013, from http://www-01.sil.org/mexico/ling/glosario/E005ae-Glosario.htm.

Ladefoged, Peter & Maddieson, Ian. 1996. *The Sounds of the World's Languages*. Oxford: Blackwell.

Lastra, Yolanda. 2001. *Unidad y diversidad de la lengua: Relatos otomíes*. Mexico City: Instituto de Investigaciones Antropológicas, Universidad Nacional Autónoma de México.

Lastra, Yolanda. 2006. *Los otomíes – Su lengua y su historia*. Mexico City: Instituto de Investigaciones Antropológicas, Universidad Nacional Autónoma de México.

Lastra, Yolanda. 2010. Diversidad lingüística: variación dialectal actual. Rebeca Barriga and Pedro Martín Butragueño (eds). *Historia Sociolingüística de México*. Vol. 2. Mexico City: El Colegio de México, pp. 841–880.

Lewis, M. Paul; Simons, Gary F. & Fennig, Charles D. (eds.). 2013. Ethnologue: Languages of the World, Seventeenth Edition. Dallas, Texas: SIL International. Online version: http://www.ethnologue.com.

Morris, Jonathan. 2010. Phonetic variation in Northern Welsh: preaspiration. In Miriam Meyerhoff, Chie Adachi, Agata Daleszynska & Anna Strychartz (eds.). *Proceedings of the Second Summer School of Sociolinguistics, The University of Edinburgh 2010*, http://www.lel.ed.ac.uk/sssocio/proceedings/Jon.pdf.

Neve & Molina, Luis de. 1767. *Reglas de orthographia, diccionario, y arte del idioma othomi*.

Newman, Paul & Ratliff, Martha. (eds.). 2001. *Linguistic Fieldwork*. Cambridge: Cambridge University Press.

Newman, Stanley & Weitlaner, Robert. 1950. Central Otomian I: Proto-Otomi Reconstructions. *International Journal of American Linguistics*, vol. 16, No. 1 (January, 1950), pp. 1–19.

Oftedal, Magne. 1956. The Gaelic of Leurbost, Isle of Lewis. *Norsk tidsskrift for sprogvidenskap* Suppl. Bind.

Palancar, Enrique L. 2009. *Gramática y textos del hñöñhö: Otomí de San Ildefonso Tultepec, Querétaro* (Volume I: Gramática). Mexico City: Plaza y Valdés and Universidad Autónoma de Querétaro.

Palancar, Enrique L. 2013. Preaspiration in Northern Otomi: A Relic of an Old fortis/lenis Contrast. *Base articulatoire arrière. Backing and Backness* (December 2013), pp. 205–220.

Pharao Hansen, Magnus & Hernández-Green, Néstor. 2010. *Ndöngǔ yühǔ [earlier editions: Ndöőngüű yühű; Ndöngüű yühű]. Guía de aprendizaje principante del idioma Otomí de San Jerónimo Acazulco, Estado de México*.

Pharao Hansen, Magnus; Hernández-Green, Néstor; Turnbull, Rory & Boeg Thomsen, Ditte. 2013. On authority and Authenticity: Navigating the Micro-politics of Language Revitalization. Presented at the annual meeting of SSILA Boston, Massachusetts, 4 January.

Pharao Hansen, Magnus & Hernández-Green, Néstor. n.d. Unpublished draft for a teaching book and dictionary of Acazulco Otomí: "Otomí de Acazulco: Lecciones, textos, diccionario".

Posti, Lauri. 1954. On the origin of the voiceless vowel in Lapp. *Svenska landsmål och svenskt folkliv* 76–77, pp. 199–209.

Silverman, Daniel. 2003. On the rarity of pre-aspirated stops. *Journal of Linguistics*, vol. 39, No. 3 (November, 2003), pp. 575–598.

Turnbull, Rory. 2011. Towards an understanding of Acazulco Otomí phonology: phonetic evidence. Presented at the OSU Congress on Hispanic and Lusophone Linguistics, 9 April.

Voigtlander, Katherine & Echegoyen, Artemisa. 1979. *Luces contemporáneas del otomí. Gramática del otomí de la Sierra*. Ixmiquilpan, Hidalgo: Centro Lingüístico Manuel Gamio.

Wright Carr, D.C. 2005. Precisiones sobre el término "otomí". *Arqueología mexicana*, vol. 8, No. 73, p. 19.

Appendix 1 – Phonetic transcriptions

Words from Spanish are transcribed according to the local Latin American variant of Spanish, whose most striking difference from Castilian Spanish is the use of *seseo*, i.e. the absence of the voiceless dental fricative [θ], which in all cases is substituted by [s], whereby minimal pairs in Castilian Spanish, *casa* ['kasa] 'house' vs. *caza* ['kaθa] 'hunt' become homophones, ['kasa]; also, the use of *yeísmo* is characteristic, i.e. the delateralization of the Castilian phoneme /ʎ/ to [ʝ], resulting in a merger with the phoneme /ʝ/. Words such as *haya* 'beech tree' and *halla* 's/he finds' become homophones, ['aʝa]. Additionally, the phoneme /x/ is mostly only velar, [x], as opposed to the Castilian uvular fricative [χ]. As an opposition to its mergers, Mexican Spanish has three phonemes that do not exist in Castilian, all originating from Nahuatl, namely the affricates /t͡ɬ/ and /t͡s/ and the alveolopalatal fricative /ʃ/ written ‹tl›, ‹tz›, and ‹x›, respectively. These phonemes are extremely frequent in the many place names of Nahuatl origin, e.g. *Tlalnepantla* [t͡ɬalneˈpant͡ɬa], *Tepotzotlán* [tepot͡soˈt͡ɬan], *Huixquilucan* [wiʃkiˈlukan], *Ixhuatlán* [iʃ.waˈt͡ɬan], or in the local street food *tlacoyo* [t͡ɬaˈkoʝo] which is one of many words that have come to Mexican Spanish from Nahuatl, and also in the name of the language itself, Spa. *náhuatl* ['nawat͡ɬ].

The [a] used in the thesis is a low central vowel, [ä],—or [ɑ̈] or [ɐ̟] for that matter—like in Acazulco Otomí *ts'awa* [t͡sˀäwä] 'doll', Spa. ***c*asa** ['käsä] 'house', Ice. ***þ*akk*a*** ['θähkä] 'thank', or Dan. ***l*ang** [läŋˀ] 'long', here all transcribed narrowly. The sound has no official symbol in IPA[67], although it is common typologically. It is common to simply write [a] when only one sound in the language characterized as an "a" and no confusion will occur. I follow this convention.

[67] In 2011, the IPA voted against adopting the symbol ‹ᴀ› (a small capital A) for this sound. It is unofficially used by many Sinologists. Source: http://www.langsci.ucl.ac.uk/ipa/news/news201112.html.