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Aspects of the Phonology and Morphology of Zenzontepec Chatino, a Zapotecan Language of Oaxaca, Mexico

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Aspects of the Phonology and Morphology of Zenzontepec Chatino, a Zapotecan Language of Oaxaca, Mexico

by

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To my mother and father,

Stephanie and Larry Campbell

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Nɨjnīʔ n-tyāá=ą̄ʔ jiʔį̄=wą

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Aspects of the Phonology and Morphology of Zenzontepec Chatino, a Zapotecan Language of Oaxaca, Mexico

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This dissertation is an analysis of aspects of the phonology and morphology of Zenzontepec Chatino (ISO 639-3: czn), a Zapotecan (Otomanguean) language spoken in a remote area of Oaxaca, Mexico (16°32"N, 97°30"W). There are an estimated 8,000 speakers of the language, but its vitality is weakening due to accelerating shift to Spanish.

The phonological analysis begins with the segmental inventory. After that, the autosegmental contrasts are treated, with the highlight being the tone system. The tone bearing unit is the mora, which may bear high tone /H/, mid tone /M/, or no tone Ø. In tone systems with a three-way contrast, the unspecified category is usually the mid-level one. Therefore, Zenzontepec Chatino is typologically unusual in this respect. Special chapters are devoted to phonotactics and phonological processes, including a play language of "speaking backwards" that sheds light on crucial phonological questions, such as the status of glottalization and the limits of prosodic domains. There are also

chapters on special topics in phonology: regional variation, Spanish loanwords, and sound symbolism.

Another chapter bridges the phonology and the morphology, defining and comparing the phonological word versus the grammatical word, and outlining the basic morphological building blocks: roots, affixes, clitics, and particles. After that, lexeme classes are defined using morphosyntactic criteria, providing a syntactic sketch of the language. The language is strongly head-marking with somewhat agglutinating and synthetic morphology. Another chapter gives an overview of verbal morphology, which is the locus of most of the language's morphology.

The dissertation is the beginning of a full descriptive grammar and is part of a larger project to document Zenzontepec Chatino, complementing a dictionary and a documentary text corpus recorded in the community with native speakers. The theoretical approach is one in which the language is explored as much as possible on its own terms using naturalistic textual data supplemented by lexicographic and elicited material. The analysis is not bound by any formal framework, but it is informed by socio-cultural and diachronic considerations. It is situated in a typological perspective to offer more of a contribution to the scientific understanding of the structure of human language.

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Abbreviations

ADJZ	adjectivizer
BS	Base
CAUS	Causative
CL	Classifier
COND	Conditional Mood
CONJ	conjunction
CPL	Completive Aspect
DEF	Definite article
DIST	Distal demonstrative
EXCL	exclusive
F	feminine
HAB	Habitual Aspect
HUM	human
HYP	Hypothetical Mood
IMM	Immediate Tense
IMP	Imperative Mood
INCL	inclusive
INDEF	Indefinite Article
ITER	Iterative
ITRN	Intransitivizer
LOC	location
M	masculine
NBS	Non-base
NEG	Negative
NMZ	nominalizer

NSBJ	Non-subject marker
NSPC	Non-specific pronoun
NVIS	Non-visible
POSS	possessed
POT	Potential Mood
PRF	Perfect
PRG	Progressive Aspect
PROX	Proximal demonstrative
REL	relativizer
RSP	Respectful
STAT	Stative Aspect
TPLZ	topicalizer
TRN	Transitivizer
VOC	vocative

Chapter 1

Introduction

1.1. About this work and its goals

This work is a description and analysis of aspects of the phonology and morphology of the Zenzontepec Chatino language (ISO 639-3 code: czn), an indigenous language belonging to the Otomanguean linguistic stock and spoken in a remote, mountainous area of southwestern Oaxaca State, Mexico. The work is part of a broader documentation of the language, a Boasian trilogy of grammar, lexicon, and texts. These chapters represent the first parts of a descriptive grammar that, when completed, will cover (to some degree) all areas of the language's structure.

One focus of the work is to describe the structure of utterances produced by native speakers of Zenzontepec Chatino, covering the fine details of the mechanics of the language, while highlighting broader generalizations about those details. Other foci are to describe how speakers use their language in an array of different contexts to express

themselves and communicate with one another and to explain how the language encodes speakers' knowledge about the world as a product of their history and culture, both as Chatinos and as Mesoamericans.

Due to several factors it is not feasible to exhaustively explain all aspects of the structure of a human language: the overwhelming complexity of any natural human language; inevitable limitations in the data employed; and the fact that the object of study is not clearly delimitable since linguistic knowledge and practice varies from person to person, village to village, and through time. Therefore, achieving a complete description of the structure of the language is not a goal of this work. A more realistic goal is to provide a contribution that captures the essence of parts of the language and that will be useful to several audiences. Those audiences include linguists carrying out work on genetically-related languages or other Mesoamerican languages, typologists investigating language from a cross-linguistic perspective, anthropologists, and historians of the region. In this form, the grammatical description will likely be of little direct use to most members of the Zenzontepec community due to its technical nature and the fact that it is written in English. However, the findings of this research feed into the ongoing production of material that is written in Chatino and/or Spanish and that is geared more toward native speaker and community educator audiences (§1.4.5), most of whom speak Spanish (§1.2.3.2).

1.1.1. Theoretical framework and assumptions

The grammatical description and analysis presented here are data-driven and not bound by any particular formal framework. It is written in basic descriptive linguistic terms (Payne 1997, Shopen 2007, Dixon 2010, Haspelmath 2010). This approach is chosen so that it will be maximally stable and transparent through time and also minimally influenced by aprioristic notions of what the language should be like or what categories it should contain. Since defining "basic" terminology is not straightforward itself (see discussion in Haspelmath 2010), care is taken to define terminology as it is introduced. Where possible, terminology from basic typological and descriptive linguistics is used for labeling grammatical categories in Zenzontepec Chatino. However, the categories specific to Zenzontepec Chatino do not necessarily exactly match standard cross-linguistic notions of the categories. Therefore, Zenzontepec Chatino-specific categories, such as "Potential Mood" or "Causative Auxiliary", are defined on language internal grounds and capitalized in the text so that they will not be confused with the more general cross-linguistic concepts. This comparative, typological orientation is adopted to inform the analysis and to connect it to, and hopefully expand, the larger extant body of scientific knowledge about the structure of human languages more generally.

Very little in the analysis of the language is taken for granted, and the description is built from the ground up in order to best capture the essence of the language on its own terms, even if that approach is a bit idealistic and not entirely achievable. There is careful argumentation for each step of the analysis and detailed internal cross-referencing to

other sections and data that are relevant or foundational to a point under discussion. Another important characteristic of this work is the inclusion of extensive data to support the analysis, which at the same time constitutes a more thorough language documentation.

I am a historical linguist, and there is a significant amount of diachronic analysis in this work. Sections that pertain to diachronic, as opposed to synchronic, analysis are titled or indicated as such. Explaining aspects of the language's structure from a historical perspective provides a window onto how that structure came about, and Blevins (2004) shows how cross-linguistically recurrent sound patterns arise from common types of sound change. Diachronic considerations also help to understand why certain irregularities exist in a language. There are fossilizations in language structure, and since languages are dynamic, some transitional patterns and variations around them are often encountered. Diachronic perspectives enrich the explanation of such irregularities (see Epps 2008: 171-172 for eloquent discussion and references on this). Finally, diachronic accompaniments to the analysis also afford the opportunity to contribute to a broader understanding of other, related languages.

Finally, my analytic tendencies in phonology are such that I am willing to take a more abstract perspective on the nature of underlying phonological representations in order to attain a more concise and elegant description of the phonological structure. However, I only do this where there is some independent phonological or morpho-phonological evidence to support it.

1.1.2. Brief outline of the rest of this work

The remainder of this introductory chapter is divided into five sections. The Zenzontepec people and some basic genetic and sociolinguistic information about the language are introduced in §1.2. A typological sketch of the language's structure is found in §1.3. After that, a summary of previous research on Chatino languages is given in §1.4, in roughly chronological order. That is followed by an account of the research that directly led to the creation of this work (§1.5). Finally, the orthographies and conventions for representing linguistic data and examples are explained in §1.6.

The description of the Zenzontepec Chatino language begins in Chapter 2, which deals with the segmental inventory, which consists of consonants and vowels. Chapter 3 presents the non-segmental, or autosegmental, contrasts in the language, which include vowel nasality, vowel length, and tone. Chapter 4 is an analysis of the phonotactic patterns, and Chapter 5 deals with phonological processes. The next three chapters present special topics in Zenzontepec Chatino phonology: regional phonological variation within the language (Chapter 6), the phonology of Spanish loanwords (Chapter 7), and sound symbolism (Chapter 8). Chapter 9 is brief and summarizes the basic, native phonological system and how it differs from the loanword and sound symbolic sub-systems. Chapter 10 bridges from the phonology to the morphology by defining the formal elements that combine to build larger grammatical units, and how they interface with the prosodic phonology. Chapter 11 defines and presents the lexeme classes, based on morphosyntactic criteria, providing at the same time a brief sketch of the morphosyntax of Zenzontepec Chatino.

1.2. The language and its speakers

This section provides an overview of the Zenzontepec Chatino language and the people who speak it. The external (genetic) relations of the Chatino language group are reported in §1.2.1, and the basic internal classification of Chatino is outlined in §1.2.2. Geographic and sociolinguistic aspects of the Zenzontepec region, the language, and its use are summarized in §1.2.3.

1.2.1. Genetic affiliation of Chatino

Chatino is a cluster of language varieties of the Pacific slope region in the southern Sierra Madre mountain range in the state of Oaxaca, Mexico. Chatino is undisputedly coordinate with Zapotec in the Zapotecan language family (Mechling 1912, Boas 1913, Kaufman 1987) of the Otomanguean stock. Rensch (1966) considered Zapotecan to be one of seven primary branches of Otomanguean, but he did not propose any higher-level subgrouping. According to Kaufman (1987; 2006), the Zapotecan family is coordinate with the Mazatecan family in the Zapotecan-Mazatecan branch of the Eastern division of the Otomanguean stock. Kaufman's high-level phylogeny within Otomanguean is based on comparative phonology (1983) and morphology (1987), but it remains preliminary since some of the higher groupings are based on only a few shared innovations. Nevertheless, Kaufman's work represents the currently most reliable and advanced picture of Otomanguean internal classification.

1.2.2. Internal classification of Chatino

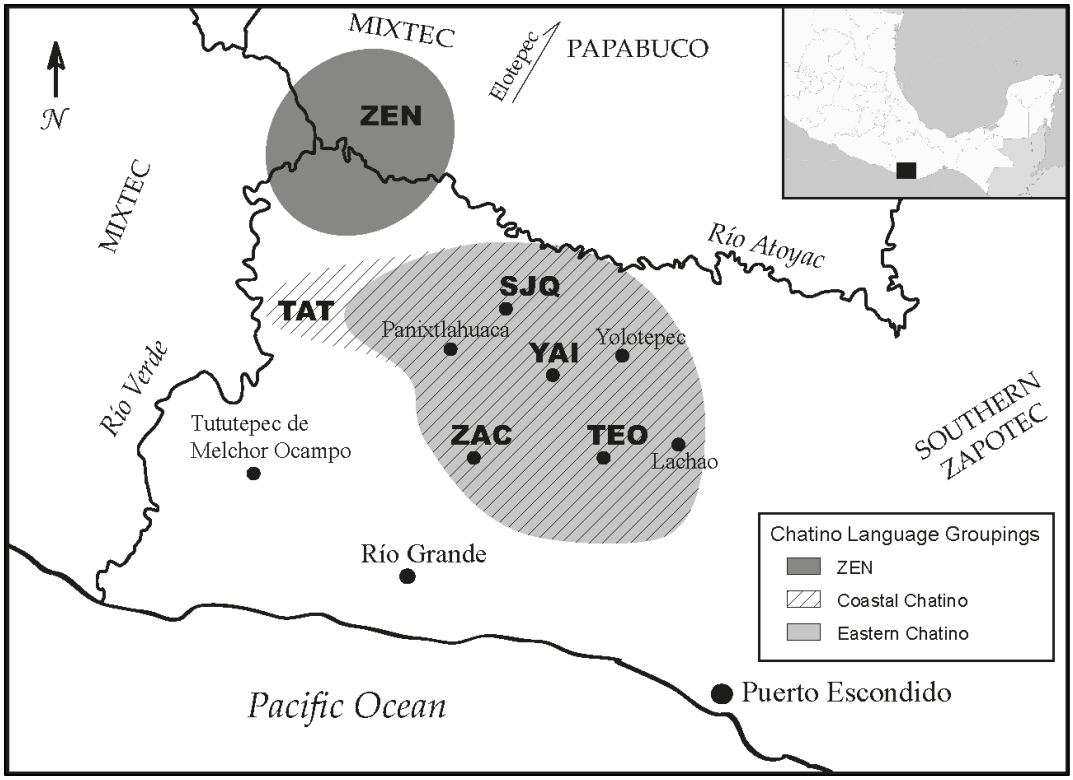
Boas (1913) reported that there were three distinct Chatino varieties: (i) Zenzontepec (including Santa Maria Tlapanalquiahuitl and San Jacinto Tlacotepec), (ii) Tataltepec de Valdés, and (iii) a dialect complex including 17 villages (now referred to as Eastern Chatino). His groupings were not based on any comparative linguistic evidence but rather on the intuitions and experience of a single native speaker of some Chatino variety belonging to the Eastern Chatino dialect complex (Campbell 2013a). Later, Upson and Longacre (1965) reconstructed 251 proto-Chatino lexemes using data from Boas' three groups, but they did not propose any subgrouping among the three nor did they attempt to show that Boas' dialect complex was a valid subgroup.[1] This basic internal classification of Chatino remained unproven until very recently. Using the comparative method to identify shared innovations among Chatino varieties, Campbell (2013a) establishes not only that Boas' dialect complex, Eastern Chatino, is in fact a valid genetic unit but also that it forms a higher-level subgroup with Tataltepec: referred to as Coastal Chatino. That is to say that Zenzontepec Chatino is the most linguistically divergent Chatino variety, and therefore, the earliest detectable split of some group of people from the ancient proto-Chatino community was what initiated the linguistic differentiation from which modern Zenzontepec Chatino has developed.

Ethnologue (Lewis et al. 2013) lists six Chatino languages, Zenzontepec, Tataltepec, and four others that would fall within Eastern Chatino: Zacatepec, Nopala,

[1] Upson & Longacre (1965) also included data from the Papabuco language of San Juan Elotepec in their reconstruction of proto-Chatino. Papabuco is a subgroup of Zapotec and is not part of Chatino.

Eastern Highland, and Western Highland. It is likely that Eastern Chatino does in fact contain some finer subgroups, but none have yet been established confidently using the comparative method. Ethnologue's Nopala, Eastern Highland, and Western Highland groupings are based on unscientific mutual intelligibility estimates and the subjective expert impressions of one of the missionary linguists of the Summer Institute of Linguistics (SIL) (Egland 1983). These methods provide valuable sociolinguistic information, but they do not qualify as satisfactory evidence for subgrouping.

Map 1 shows the location and subgrouping of Chatino languages (from Campbell 2013a), where the abbreviated Chatino community/language-variety names are as follows: ZEN = Santa Cruz Zenzontepec, TAT = Tataltepec de Valdés, ZAC = San Marcos Zacatepec, SJQ = San Juan Quiahije, YAI = Santiago Yaitepec, and TEO = Santa Lucía Teotepec.



Map 1. Location and subgrouping of Chatino languages (Campbell 2013a)

1.2.3. The region and language: geographical and sociolinguistic basics

Not only is Zenzontepec Chatino the linguistically most divergent Chatino language but it is also the geographical outlier. It is further from the Pacific coast than all of the other Coastal Chatino, languages, which lie to the south and southeast of Zenzontepec. North, west, and southwest of the Zenzontepec area are Coastal Mixtec villages (Josserand 1982); to the northeast and east are Papabuco Zapotec communities (see Map 1). The Zenzontepec region lies at the confluence of the *Río Atoyac* and the *Río Verde*. It includes some 30 villages and their associated hamlets sprinkled over a fairly large area with relatively little internal linguistic differentiation. This distribution

suggests a fairly recent expansion of the language since most rural and comparably rugged areas of similar size in Oaxaca show considerably greater dialectal or language diversification.

1.2.3.1. Dialects of Zenzontepec Chatino

Even though Zenzontepec Chatino shows relatively little dialectal diversity for a Oaxacan language spoken in so large an area, there are three identifiable, though fully mutually intelligible, dialects that together make up the Zenzontepec Chatino language: (i) the Santa María Tlapanalquiahuitl dialect, which I sometimes refer to simply as Santa María; (ii) the San Jacinto Tlacotepec dialect, henceforth referred to as Tlacotepec; and (iii) what I will call the Core Zenzontepec dialect, the one that includes all of the Chatino-speaking villages in the municipality of Zenzontepec, excluding Santa María. The phonological differences so far identified among the three dialects and within the Core Zenzontepec dialect are presented in Chapter 6. Here and throughout this work I will be speaking about the whole Zenzontepec Chatino language or the Core Zenzontepec dialect, unless otherwise specified.

The Santa María dialect is restricted to the village of Santa María proper, and Core Zenzontepec is spoken in all of its satellite hamlets and *ranchos*. Santa María lies south of the Río Atoyac on the road that connects Zenzontepec with Tataltepec de Valdés further to the south. Santa María used to belong politically to the municipality of Tataltepec, in the district of Juquila, but now it is incorporated into the municipality of Santa Cruz Zenzontepec (district of Sola de Vega) to which it is linguistically and

geographically closer. People in the region are well aware that there are linguistic differences between Santa María and Core Zenzontepec, but no one claims that the differences pose any challenge to communication. The vitality of the language in Santa María is fairly high.

Tlacotepec is its own municipality north of the Atoyac River and to the east of Santa Cruz Zenzontepec. Upson and Longacre (1965) reported that Chatino was already extinct in Tlacotepec almost 50 years ago, but when I asked people in the Core Zenzontepec region about it, some claimed that a couple of speakers still remained in Tlacotepec. During a short visit and documentation event there in 2010, I met two speakers and learned from them that there were still at least 16 speakers, all of whom are more than around 60 years of age. The data from the dialect of Tlacotepec is still fairly limited, but it appears to differ phonologically and lexically from Core Zenzontepec a little more than does Santa María.

1.2.3.2. Language vitality and threats to it

Despite having enjoyed a fairly recent expansion, the area in which Zenzontepec Chatino is spoken is now receding as some communities on the periphery have shifted almost entirely to Spanish. The Zenzontepec area is also thinning from within due to spreading pockets of language shift in most communities. Figure 1 lists the main communities in the Core Zenzontepec area, divided into three columns based on fairly crude estimates of language vitality that were offered by knowledgeable community members. There are twelve communities listed in the first column where primarily

Chatino is spoken, and the native language use there can be considered fairly robust. In those areas, Chatino is used in most social contexts except for church and school, where Spanish reigns.

Primarily Chatino	**In advanced shift**	**Spanish only**
San Pedro del Río	Santa Cruz	Los Pozuelos
San José	La Aurora	El Portillo
El Carrizal	El Cucharal	Piedra de Letra
San Isidro		Agua Ceniza
El Limoncillo		Llano del Temblor
Quinicuena		Santa María Siempreviva
La Soledad Cofradía		La Paz
Piedra Grande		La Huichicata
La Palma		Mano del Señor
La Concha		Rancho Nuevo
La Conchita		Piedra Móvil
Rancho Viejo		Cinco Cerros

Figure 1. Estimated language vitality of Core Zenzontepec communities

There are three communities, including the municipal seat Santa Cruz, where Chatino is still spoken but most people do not speak it regularly if at all, preferring Spanish. Within two generations, the language will almost certainly be no longer spoken in homes in those three villages, and several or many of the villages in the first column will likely be in further stages of shift. Finally, there are twelve villages listed in the right column where only Spanish is spoken, except maybe by a few people. This third column includes a mix of communities of two types. One type consists of villages such as Piedra de Letra and El Portillo, where Chatino was traditionally spoken but has been lost

through shift to Spanish. The other type includes communities like Mano del Señor (‘Hand of the Lord’) that were founded by in-migrating Spanish-speaking mestizos.

Most Zenzontepec Chatino speakers are bilingual, and even in villages where the language is most vital, such as San Pedro del Río (first column), some language shift is apparent. For example, while one hears even young children speaking Chatino to one another in secluded peripheral neighborhoods of San Pedro, in the central neighborhoods many speak mostly Spanish in public, even if they are bilingual. According to the 2010 census by the Mexican National Institute of Statistics and Geography (INEGI 2010), the municipality of Zenzontepec has 16,773 inhabitants, of which 11,132 speak the indigenous language. My own estimate based on detailed conversations with knowledgeable speakers is that there are at best 8,000 speakers of Zenzontepec Chatino, one quarter of whom might be monolingual. This estimate is consistent with that of Ethnologue (Lewis et al. 2013). Even though a conservative estimate such as 8,000 speakers may seem encouraging compared to the degree of endangerment faced by Tataltepec Chatino, Zacatepec Chatino, and many other indigenous languages around the world, Zenzontepec Chatino is moderately to highly endangered due to the accelerating shift to Spanish.

There are several interrelated factors responsible for the increasing endangerment of the language, and what follows here is a very simplified snapshot of the situation. Zenzontepec is one of the most isolated and poor areas of Oaxaca. It is hot and dry, with few and limited natural resources. Traditionally, the people were largely self-sufficient swidden agriculturalists, but the land is relatively infertile so a great deal of effort and

some luck are needed in order to have a plentiful harvest. Continuing soil erosion, fed by advancing deforestation, is exacerbating this already unstable situation.

The population is growing, despite massive outward migration placing more strain on the limited resources. People are relying more and more heavily on imported foodstuffs, which require spendable cash. As the focus on money increases, more and more citizens refuse to participate in the unpaid traditional community work projects (*tequio*), which in turn contributes to lower local agricultural yields and decreasing unity within the community. The poverty and lack of resources in Zenzontepec leads to migration for work to coastal coffee plantations (Hernández-Díaz 1987), other areas of Mexico, and the United States. Spanish is viewed as necessary for success in migratory work, and people view English as a more valuable language than Chatino for economic reasons. Due to these economic pressures, many families choose to speak only Spanish to their children in the home.

The shift to Spanish accelerates, because if any Chatino speaker marries a Spanish dominant person, then Spanish will be the language of that new household and its children, almost without exception. Activities in the schools are carried out almost entirely in Spanish, and most of the teachers come from other areas of Oaxaca. They may speak an indigenous language, but it is usually not Zenzontepec Chatino, and some do not share an appreciation for the cultural value of indigenous languages. Furthermore, as already discussed, some of the communities in the municipality of Zenzontepec have almost completely mestizo populations. Some of these folks have little concern for traditional Chatino language or cultural identity. They have their say in local politics, and

some view Chatino as either a hindrance to the economic development of the region or as the root cause of the perpetually depressed local economy. If things continue on the current trend, then the outlook for Zenzontepec Chatino is fairly grim, as it is for many indigenous or minority languages around the world.

1.3. Typological profile of Zenzontepec Chatino

Zenzontepec Chatino shares many of the typical traits of Mesoamerican languages (Campbell et al. 1986), having a distinction between alienably and inalienably possessed nouns (§11.2.1), inclusive versus exclusive first person plural pronouns, relational nouns derived from body part terms to convey spatial relations (§11.2.2), a vigesimal numeral system, a lack of plural marking on nouns, verbal aspect instead of tense, zero copula, and a lack of a basic verb meaning 'to have'.

Phonologically, Zenzontepec Chatino is like other Otomanguean languages in being tonal, and it is like most Otomanguean languages in having contrastive vowel nasality (§3.1) and some type of laryngealization. All laryngealization is analyzed here as arising from underlying glottal consonants (§2.1.6), and not from phonologically "checked" or "rearticulated" laryngealized vowels, which occur in Zapotec languages. The tone system is a register system (Pike 1948), that has many of the features common in African-style tone languages (Hyman 2010). The tone bearing unit is the mora, and there are two phonological tones, /H/ and /M/, which contrast with an unspecified lower-pitched category Ø. This tone inventory is unusual for a privative system in not having its mid-level tone be the unspecified one (§3.3.2).

The morphology of Zenzontepec Chatino is strongly head-marking and somewhat synthetic, especially in the verb. It is mildly agglutinating, but with some fusion, again especially in verbs, which can be quite complex both morphologically and prosodically. Verbs obligatorily inflect for aspect or mood, and tense-like meanings are only marked via certain non-obligatory particles. There are highly complex verbal inflectional classes, according to how verbs inflect for the basic aspect/mood categories. Aspect/mood inflection is realized both by segmental prefixes (Campbell 2011a) and independent and unpredictable tone changes on verb stems (2013b).

The syntax is fairly rigidly head-initial and makes much use of juxtaposition in its constructions, such as in inalienable possession (§11.2.1); adjectival (§11.3), nominal (§11.2), and quantificational predicates (§11.4); and in some cases coordination and clause linking as well. The basic constituent order is VSO, which is typical but not universal of Otomanguean languages. There is a sub-class of verbs that function as existential predicates that also denote position and/or possession (§11.1.3). The alignment is accusative, at least in the case of pronouns, but the language shows shades of agentive alignment as well. There is a notion of subject in the language: A and S arguments, but not O, share the property of being the only arguments that can encliticize to predicates when they are pronominal. Pronominal participants of all other roles may only attach to relational nouns or other grammatical elements.

Information structure is richly expressed and nuanced in the grammar. There are post-nominal demonstratives that in discourse often reduce to enclitics consisting of either tone or glottalization. The pronominal and demonstrative systems are both

elaborated, and they intersect in the 3rd person. There are also pre-nominal Indefinite and Definite articles, the latter of which may co-occur with the demonstratives. The grammatical element *ji?ɻ̄* that flags possessor nouns in alienable possession constructions (§11.2.1) also flags objects if they are topical (Dalrymple & Nikolaeva 2011), and it also flags nouns that are beneficiaries, maleficiaries, and even locations if they are topical (Campbell in press). There is a frequently-occurring particle in discourse that topicalizes (in some cases multiple) constituents in a clause.

Finally, Zenzontepec Chatino is important for historical linguistic work because it is one of the two phonologically and morphologically most conservative Chatino varieties, the other being that of San Marcos Zacatepec (Villard 2008). Moreover, Otomanguean is the deepest and most diverse linguistic stock in Mesoamerica, perhaps being on the order of Sino-Tibetan or Indo-European in terms of time depth, but it remains probably the least understood of all of the Mesoamerican stocks.

1.4. Previous research on Chatino languages

This section gives a fairly detailed account of the history of documentation and research on Chatino languages. It is broken up into five sub-sections according to partly overlapping temporal and/or organizational phases of work by different groups: the earliest extant works roughly from 1880 to 1935 (§1.4.1); work done by missionary linguists from the Summer Institute of Linguistics from 1951 through 2004 (§1.4.2); a first stage of lexicographic work on the Project for the Documentation of the Languages of Mesoamerica (PDLMA) beginning in 1995 (§1.4.3); the Chatino Language

Documentation (CLDP) beginning in 2003 (§1.4.4), and literacy work done by community members within Zenzontepec, beginning in 1994 (§1.4.5). My own fieldwork that is the basis for this grammatical description was carried out in collaboration with the PDLMA, the CLDP, and the community work, and it is detailed separately in (§1.5).

1.4.1. Earliest works: up to 1935

The Spanish friars of the early colonial period created a significant body of grammatical and lexicographic work on indigenous Mexican languages. Unfortunately, no such writing about any Chatino language has survived, if ever there was any. The earliest Chatino data that exists is likely to be found in the language surveys of the 1880s and 1890s directed by Antonio Peñafiel, which according to Mechling (1912) include vocabulary lists from Zenzontepec, Santa María, San Juan Quiahije, Santa Cruz Tepenixtlahuaca, and San Juan Lachao. In another early work, Belmar (1902) states, but does not demonstrate, that Chatino shares a common origin with Zapotec. He provides a fairly large set of poorly transcribed data from an unidentified but clearly Eastern Chatino variety. He also includes a smaller but significant set of parallel vocabulary lists from five communities: Juquila (Chatino); Zenzontepec; Teojomulco, which appears to be an otherwise unattested variety of Chatino even more divergent than Zenzontepec Chatino; Tututepec (Mixtec); and San Gabriel Mixtepec. Belmar's data show that the San Gabriel Mixtepec data is clearly Zapotec even though Boas (1913) later claimed that it was a Chatino community.

Mechling (1912: 651-52) presents about 40 Chatino words from Peñafiel's data that appear to be from Zenzontepec since he cites *choo* 'rain', reflecting the sound change **ky* > *ch* restricted to Zenzontepec Chatino (Campbell 2013a). Mechling provides parallel data from Zapotec (unidentified variety) and Soltec, and he considers the similarities to be sufficient proof that Chatino, Soltec, and Zapotec make up the "Zapotec stock". The statement is not incorrect, terminological matters aside, but the now extinct Soltec language was actually the most divergent type of Zapotec (Smith Stark 2007) and Zapotec and Chatino are the sole primary branches of the Zapotecan language family. See Smith Stark (2007) for a summary of the other early speculative statements about the affiliations of Zapotec with Chatino and other Oaxacan languages.

Boas (1913) agrees that Chatino is "a remote branch of the Zapotecan family", but he does not mention any regular sound correspondences to demonstrate the relationship and only lists parallel Chatino and Zapotec independent pronoun paradigms, which do show striking similarities. He provides data from an unspecified variety of Chatino that Campbell (2013a) demonstrates to be part of Eastern Chatino. Boas outlines some basics of Chatino sounds and grammar, giving examples of person inflection on inalienably possessed nouns, adjectival predicates, and verbs. He then gives examples of alienable possession of nouns and shows that alienable possessors are flagged the same way as are objects of transitive verbs. Next, he illustrates aspect inflection on verbs, though he calls it tense, and ends with a list of some 150 words and a short text.

De Angulo (1925) mentions shared typological features that might reflect Chatino being related to Zapotec, Mixtec, Cuicatec, Mazatec, Chocho, and Chinantec, all now

considered Otomanguean languages. He then (de Angulo 1926) suggests that Chatino is related to Zapotec, Mixtec to Cuicatec, and Mazatec to Chocho, groupings which correspond respectively to the Zapotecan, Mixtecan, and Mazatecan (aka Popolocan) subfamilies of Otomanguean recognized today (Kaufman 1987). He too does not show any sound correspondences and notes that the similarities may be due to areal factors. He is the first to state that Chatino verbs inflect for aspect instead of tense. Later, de Angulo and Freeland (1935) conclude that the similarities between these higher level groups are not due to inheritance but rather areal convergence towards the Zapotec type.

1.4.2. Work by missionary linguists: 1951-2004

The next phase of work on Chatino was carried out by a series of missionaries from the Summer Institute of Linguistics (SIL), associated with the Wycliffe Bible Translators. The first publication from this group was a short dictionary of the Nopala variety by McKaughan and McKaughan (1951). Shortly thereafter, the McKaughans apparently relocated to the village of Santiago Yaitepec, where much of the following SIL Chatino work would be done, starting with H. McKaughan's (1954) description of the Yaitepec Chatino phonemic inventory and phonotactics. Jessamine and Billy Upson took over proselytizing duties in Yaitepec around that time, and Leslie and Kitty Pride spent some time there before moving on to Tataltepec. Several more publications on Yaitepec Chatino came out of this period. Using 20 Chatino riddles, J. Upson (1956) presents a basic morphosyntactic analysis, which she later develops further (1960) by defining word classes and discussing compounding, person inflection, noun possession,

and verbal "tense" (aspect) inflection. K. Pride (1961) describes the Yaitepec Chatino numeral system, a richly complex area in all Chatino languages, where the main base is 20, but the numerals 5, 10, and 15 function as secondary bases. Next, K. Pride (1965) produced a detailed book on Yaitepec Chatino syntax, but unfortunately it is couched in Kenneth L. Pike's tagmemic model of discourse and is now quite opaque to anyone unfamiliar with that dated formalism. L. Pride (1963) describes Yaitepec Chatino lexical tones, verbal tonology, and tone sandhi, giving us the first serious attempt to account for the complex phonetics and phonology of tone in a Chatino language. He is the first of the SIL group to recognize that Chatino has aspect instead of tense. His study of tone is complemented by J. Upson's (1968) discussion of the interaction between phonemic vowel length and tone.

Billy Upson visited Tataltepec in 1960 and Zenzontepec in 1960 and 1963, gathering some lexical data on those varieties. With this and the body of then extant work on Yaitepec Chatino, B. Upson and Robert Longacre (1965) reconstructed 251 proto-Chatino lexemes, equipped with data from Boas' three reported groupings. This was a major contribution and the first work in which the comparative method was applied to Chatino languages. They mistakenly included data from the Papabuco Zapotec spoken in San Juan Elotepec quite distantly removed to the northeast, but nevertheless, their proto-Chatino reconstructions are fairly accurate. They did not address the subgrouping of the three genuine Chatino varieties, nor did they provide any evidence that Boas' "first dialect" was a valid grouping since Yaitepec Chatino was the only Eastern Chatino

variety considered. Uspon and Longacre's (1965) paper was the first since Mechling's (1912) to include any data from Zenzontepec Chatino.

After living in Santiago Yaitepec for a while, Kitty and Leslie Pride relocated to Tataltepec. They produced a small bilingual dictionary (Pride & Pride 1970), a significant contribution since there was no known earlier data from Tataltepec Chatino aside from Upson and Longacre's. Their only other works on Tataltepec Chatino are K. Pride's (1971) unpublished manuscript on verb stems and L. Pride's (1984) tone paper. The most recent Chatino publication from the SIL group is Pride and Pride's (2004) dictionary of Panixtlahuaca (Eastern) Chatino, which consists of more than 3,000 entries and includes a thumbnail grammatical sketch by K. Pride (2004).

1.4.3. First stage of PDLMA lexicographic work: 1995-2000

The next phase of research on Chatino involved Yaitepec Chatino and Zenzontepec Chatino and began in 1995 on the Project for the Documentation of the Languages of Mesoamerica (PDLMA) directed by the prominent Mesoamericanists Terrence Kaufman (University of Pittsburgh), John Justeson (SUNY Albany), and more recently also Roberto Zavala (CIESAS-Sureste, Chiapas, Mexico). The PDLMA's primary aim is to create large dictionaries of indigenous Mesoamerican languages of Mexico in order to reconstruct their ancestral protolanguages. The reconstructions are then used to draw inferences about Mesoamerican prehistory and advance the decipherment of ancient Mesoamerican writing systems, which in turn can shed more light on linguistic and cultural prehistory. Jeffrey Rasch began compiling a dictionary of

Yaitepec Chatino on the PDLMA in 1996. In his dissertation Rasch (2002) focused on morphology and syntax, including only a sketch of Yaitepec Chatino phonology. It remains one of the most detailed synchronic descriptions of any Chatino language.

Troi Carleton initiated the Zenzontepec Chatino lexical database on the PDLMA in 1995. Her work on the language continued through 2000 and led to several publications: two conference papers dealing with the structure of narratives (Carleton 1997, 1998), a description of the pronominal system (Carleton and Waksler 2000), an article in which the word *jiʔɻ̄* is argued, unconvincingly, to be a marker of focus (Carleton and Waksler 2002), and a manuscript offering an account of how topic is marked in Zenzontepec Chatino morphosyntax. Since then, Dalrymple & Nikolaeva (2011) have revisited Carleton & Waksler's (2000; 2002) data and concluded, correctly in the opinion of this author, that the word *jiʔɻ̄* does not mark focus but rather flags objects that are secondary topics.[2] Around the time that Carleton was documenting Zenzontepec Chatino, Weiss (1998) carried out a study on Zenzontepec Chatino traditional medicine and compared it to Chinese medicine. That work has ethnographic value, but the linguistic material in it is sparse and inconsistently transcribed.

In the summer of 2007, I took over the compilation of the Zenzontepec Chatino lexical database on the PDLMA. That was the beginning of the research that led to the writing of the present work, the trajectory of which will be described in more detail shortly below in §1.5.

[2] While I agree with Dalrymple & Nikolaeva's (2011) analysis of *jiʔɻ̄* in transitive clauses, I do not agree with their conclusions about its use in ditransitive constructions (2011: 177-170), which in fairness were perhaps hindered by the small amount of data at their disposal.

1.4.4. Chatino Language Documentation Project: 2003-present

Another initiative of linguistic research on Chatino began in 2003 when Emiliana Cruz, a native speaker of San Juan Quiahije (Eastern) Chatino, enrolled as a graduate student in anthropology at the University of Texas at Austin (UT) through the Center for Indigenous Languages of Latin America (CILLA) directed by Nora England, along with Anthony Woodbury, Joel Sherzer, and others. Emiliana's sister, Hilaria Cruz, also a native speaker of San Juan Quiahije Chatino speaker, joined the UT linguistics department through CILLA in 2004. Under the supervision of Anthony Woodbury, the Cruz sisters formed the Chatino Language Documentation Project (CLDP). The initial focus of the CLDP was to describe the phonology and grammar of San Juan Quiahije Chatino, but soon the project expanded to include other graduate students and other varieties of Chatino: Stéphanie Villard working on Zacatepec (Eastern) Chatino; Adam Hammick focusing on Chatino language pedagogy; Justin McIntosh working on Santa Lucía Teotepec (Eastern) Chatino; Ryan Sullivant working on Tataltepec Chatino; and me, focusing on Zenzontepec Chatino and comparative Chatino and Zapotecan studies. The CLDP joined efforts with Jeff Rasch and the late great Mesoamericanist Thomas Smith Stark and secured funding from the Endangered Languages Documentation Programme (ELDP) at SOAS in London, England, to document several Chatino varieties.

The CLDP research first focused on San Juan Quiahije Chatino phonemics (Cruz 2004) and then a large proportion of the work focused on tone, leading to several publications on the description of tone in San Juan Quiahije Chatino (Cruz, E. and Woodbury 2006; Cruz, E. 2011), Zacatepec Chatino (Cruz, H. and Woodbury 2006;

Villard 2008a), Teotepec Chatino (McIntosh 2010), and Tataltepec Chatino (Sullivant and Woodbury 2012). The work of H. Cruz (2009; 2014) has focused on ritual speech and poetics in San Juan Quiahije. Several grammar topics have been investigated in San Juan Quiahije Chatino, such as noun possession (Cruz, E. 2008) and complementation (Smith Stark et al. 2008). Verbal aspect inflection, arguably the most morphologically complex area of Chatino grammar, was described for Zenzontepec Chatino by Campbell (2009, 2011), drawing on Kaufman's (1987, 1993) seminal work on Zapotec verb classes. Similar studies were carried out on Zacatepec Chatino (Villard 2010) and Tataltepec Chatino (Sullivant 2011). Grammatical sketches have been written for Zacatepec Chatino (Villard 2008b) and Teotepec Chatino (McIntosh 2011), and dissertations by the same authors, on the same Chatino varieties, are forthcoming, as well as a dissertation on Tataltepec Chatino grammar by John Ryan Sullivant. A numeral classifier in Tataltepec Chatino has been described (Sullivant 2012), and postural verbs (§11.1.3) have been compared in Teotepec Chatino and Zacatepec Chatino (McIntosh & Villard 2012).

Historical linguistic work by CLDP members includes a reconstruction of proto-Chatino numerals (Campbell and Cruz 2010), an unpublished preliminary reconstruction of proto-Chatino tone (Campbell and Woodbury 2010), and most recently an account of Chatino subgrouping (Campbell 2013a). There are other CLDP conference presentations and manuscripts completed or in progress that can be found and downloaded on the CLDP website (http://sites.google.com/site/lenguachatino/). For reasons of space this brief account only includes works that are published, unless noted otherwise.

1.4.5. Community-based literacy program: 1994-present

As can be seen in the history of Chatino language research just outlined, native speaker linguists played no visible role until the CLDP phase. However, outside of the CLDP there is some history of native Chatino speakers developing Spanish-based orthographies for their languages. In the mid 1990s, Alfonso Merino Pérez, a native Chatino speaker and teacher from the village of Santa Cruz Zenzontepec, along with other local teachers, introduced a practical orthography for writing Zenzontepec Chatino in the community. They created pedagogical materials for use in bilingual elementary school education, and these were published by the Mexican *Secretaría de Educación Pública* (SEP) (Merino 1994*a*, 1994*b*; Juárez Martínez and Hernández López 1997). These materials are still in use to a limited extent in the schools and are widely available in the region. They are full of culturally relevant subject matter and attractive photographs and illustrations, but unfortunately the Chatino writing in them is fairly inconsistent.

Work is currently in progress towards developing a series of books for adult Chatino literacy under the auspices of the *Instituto Nacional para la Educación de Adultos* (INEA), which is part of the SEP. Merino Pérez is again the main author and translator, and the books are being edited by me for accuracy and consistency. The local practical orthography is used in these materials, and for the first time, tone is represented.

1.5. Research and data that this work is based on: 2007-2013

The data used in this grammatical description are from my own field work in Mexico from 2007 to 2013 and are of three types: recorded spoken texts, lexicography, and elicitation. I begin with a discussion of the lexicographic data (§1.5.1), since my earliest research on the language was in that domain, and then I provide an account of the creation of the textual documentary corpus in §1.5.2.

1.5.1. Lexicography

The lexicographic data are from my work as a research linguist on the PDLMA, where I took over the Zenzontepec Chatino lexical database initiated by Carleton (1995-2000). I refined and expanded the database over three summer field seasons (2007-09) and one short season (2010). The majority of the lexical data in the database was elicited from or offered by Tranquilino Cavero Ramírez, a native speaker of the Core Zenzontepec Chatino dialect from the village of San Pedro del Río. The database has been partially corroborated and expanded using data from recorded texts of about 15 other speakers. At this time, the database contains some 9,000 lexical entries. A bilingual Chatino-Spanish dictionary of about 6,300 entries based on the lexical database is now in press (Campbell & Carleton in press), to be published by INALI (Mexican National Institute of Indigenous Languages).

The lexical database is divided into several semantic and grammatical domains. It currently contains about 1,700 verbs, each inflected for the four primary aspect/mood categories; 1,000 plant names and related terms; 700 animal names; 370 personal names;

350 toponyms and geographic terms; 325 sickness and traditional medicine terms; 325 sound symbolic expressions; and 115 kinship related lexemes. The entries include phonemic representation, representation in the local orthography, morpheme-by-morpheme gloss of the lemma, word class, senses and sub-senses in Spanish and English, example sentences, cross references, derivationally related forms, etymological information, regional variant pronunciations, and cultural notes.

1.5.2. The text corpus

The texts used in this description come from a collection of about 20 hours of audio (and some video) recordings captured in contexts that were as natural as possible. Special effort was put forth to involve men and women speakers from various age groups, different areas of the Zenzontepec region, and a range of professions and lifestyles. The corpus consists of texts of diverse genres: folk tales; dialogue; indigenous beliefs and cosmology; historical narrative; personal narrative; advice-giving, social commentary, and discussion and description of crafts, local geography, traditional plant medicine, farming, food preparation, and the traditional political system, which is a typical Mesoamerican cargo system (Foster 1967 and Dewalt 1975). There are also several metadocumentary texts in which Tranquilino Cavero Ramírez recounts the lexicographic work and text work from his perspective.

The texts were primarily recorded in the Zenzontepec Chatino community with support from a two-year graduate student fellowship (IGS0080) from the ELDP at the Hans Rausing Endangered Languages Programme at SOAS, University of London (Dec.

2009 – Jan. 2012). Other texts are from recording sessions during PDLMA summer field seasons and early pilot field trips to the Zenzontepec community with support from Anthony Woodbury's ELDP grant for the CLDP to the University of Texas at Austin (grant MDP0153).

There were three primary members of the documentation team responsible for the recording and production of the texts: Tranquilino Cavero Ramírez, Flor Cruz Ortiz, and me. Tranquilino (born 1957) has a profound knowledge of Zenzontepec oral history, folklore, and traditional ways of life. Due to his enthusiasm for sharing this knowledge and his highly-praised oratory skill, he is the speaker of a significant number of the texts. Flor Cruz Ortiz (born 1977) is a native Zenzontepec Chatino speaker from La Aurora, Zenzontepec, and her role in the documentation was primarily as transcriber and translator. She began training for the work in the summer of 2008 on the PDLMA in San Felipe del Agua, Oaxaca. INALI had contracted the PDLMA to design and administer a comprehensive dialect survey of Chatino and Zapotec languages in order to eventually better understand their diversification and geographical distribution. Ms. Cruz Ortiz was one of some 20 young native speakers of different Chatino and Zapotec languages trained in phonetic transcription and the mechanics of the transcription software ELAN. Both Mr. Cavero Ramírez and Ms. Cruz Ortiz played key roles as documenters in their respective areas within the Zenzontepec region, seeking out speaker contributors, holding microphones, and providing dialogic feedback to speakers in some recordings.

1.6. Notes on the presentation of data: orthographies and examples

This section provides a brief outline of the conventions employed in this grammar for representing linguistic data. First, the practical linguistic orthography is discussed (§1.6.1) and then the orthography used in phonetic transcriptions (§1.6.2). After that follows a brief discussion of the local orthography in use in the community of Santa Cruz Zenzontepec and how it differs from the orthography used here (§1.6.3). Table 1 (p.33) lists the basic correspondences between the three orthographies. Finally, notes on the presentation of linguistic examples are provided in §1.6.4.

1.6.1. Practical orthography

The primary orthography employed in this grammar is a practical phonemic orthography according the phonological analysis elaborated and argued for in Chapter 2 through Chapter 5. The conventions of the practical orthography are based on those of the PDLMA, with the IPA symbol <ʔ> representing the glottal stop instead of the numeral <7> and the ogonek <Ɣ> used for vowel nasality. The ogonek is used for vowel nasality in many languages, and since it attaches to the bottom of graphs, instead of above them, it does not crowd the accents that mark tone. The PDLMA orthography includes some conventions that are standard, or at least common, more broadly in Mesoamerica. For example, <x> = [ʃ], <y> = [j], <j> = [h], <ch> = [ʧ], <tz> = [ʦ] and <ty> = [tʲ]. The PDLMA is the project on which the Zenzontepec Chatino lexical database and bilingual Chatino-Spanish dictionary were produced (Campbell & Carleton in press), and those share the same orthography used here.

With the exception of vowel length, each phoneme and contrastive autosegment has a unique orthographic representation and is always represented in the same way, either by a single graph (e.g. <t>, <x>, <ʔ>, <e>), a digraph (e.g. <ch>, <ty>, <tz>, <kw>), or a diacritic that modifies a graph (e.g. < ◌́ >, < ◌̄ >, < ◌ˌ >). Contrastive vowel length is represented by doubling the graph of the relevant vowel. Up through Chapter 5, phonemic forms are presented in plain roman type between slashes (e.g. /chaja/ 'tortilla'). Elsewhere, underlying representations are given in italic type with no surrounding slashes or brackets (e.g. *chaja* 'tortilla'). All linguistic forms presented are phonemic unless otherwise specified or unless they are within square brackets, in which case they are phonetic representations (§1.6.2). See Table 1 in §1.6.3 for a list of graphemes in the practical orthography, and the tables in Chapter 2 for tabular presentations of the segmental and autosegmental inventories (beginning on p.39).

1.6.2. Phonetic orthography

Linguistic representations in square brackets (e.g. [ʧaha] 'tortilla') are broad phonetic transcriptions in the International Phonetic Alphabet (IPA) (International Phonetic Association, 1999). Phonetic forms are provided alongside underlying representations up through Chapter 5 in order to illustrate the relationship between underlying phonological forms and their contextual realizations. This convention allows the analysis to be checked and then either challenged or affirmed independently. After Chapter 5, phonetic representations are provided only where useful for illustrating a point

under discussion. When relevant, periods are used in phonetic transcriptions to mark syllable boundaries.

A few qualifications about phonetic transcriptions must be stated. First of all, tones are always written as they are underlyingly, even in the phonetic representations. Phonetic pitch transcriptions would be tedious and trivial because each tone may be realized at just about any phonetic pitch level, depending on the phonological context. More explicitly stated, though a mora may bear either a high tone, a mid tone, or no tone (by default realized as a relaxed mid to low falling pitch) (§3.3.1), any of these specifications may be realized phonetically at the level of any of the others due to phonological processes involving tone (§3.4.1) and intonational patterns (§3.4.2). Furthermore, writing pitch phonetically would involve using tonal diacritics to specify pitch levels on many moras that carry no lexical tone (§3.3.5).

Secondly, setting aside contrastive vowel nasality, vowels are phonetically nasalized before or after nasal consonants, due to coarticulation. In Zenzontepec Chatino such phonetic vowel nasalization is quite strong following nasal consonants but relatively weak before them. To capture this difference in the phonetic transcriptions, albeit imperfectly, non-contrastive vowel nasalization is transcribed only after nasal consonants.

Finally, the glottal stop consonant may cause neighboring vowels to be realized with creaky voice, and in some cases, such change in phonation type may be the sole realization of the glottal stop. However, the degree of creakiness varies from speaker to speaker and even across tokens within the speech of a single person. Therefore, for

simplicity, the glottal stop is always written as such in phonetic transcriptions. See §2.1.6.2 (and further cross-references there) for summary and discussion of the phonological status of laryngealization.

In sum, tone, vowel nasality, and laryngealization are not represented in narrow phonetic transcription. At the phonetic level, all of these features can take domains bigger than a single segment, and even bigger than a single syllable. Therefore, the phonetic transcriptions provided in this grammar are somewhat idealized. They are focused on segmental phonetics, and should not be taken as fine-grained, narrow transcriptions.

1.6.3. Local orthography

The local practical orthography discussed in §1.4.5 differs from the orthography employed in this grammar in several ways. First of all, it lacks the grapheme <w>, so the phoneme /w/, when realized as [w], is written as <u>, and the phoneme /kw/ [k^w] is written as <ku> instead of <kw>. The palatal fricative is written as <sh> in the local orthography, while it is written as <x> in the linguistic orthography. The alveolar affricate is <ts> in the former but <tz> in the latter. The glottal stop is represented by the apostrophe <’> in the local orthography but <ʔ> in the orthography here. Vowel nasality is marked with dieresis < ¨ > over a vowel in the local orthography but ogonek <˛> under a vowel here. Lastly, mid tone is written with a macron below the vowel, instead of the macron above the vowel graph used here. Overall, these differences are fairly minor, and from a technical linguistic perspective they are insignificant, so long as the conventions of one system or the other are followed with rigid consistency.

A perhaps greater difference between the two orthographies arises in their practice. While the orthography used here may be quite abstract as such, there is typically little to no abstraction in the use of the local orthography. Allophones are usually written as they are pronounced when such sounds are already phonemes or at least familiar from Spanish (e.g. <f> instead of the cluster /jw/ [hɸ] before front vowels [§2.1.5.4]). Nevertheless, in its design the local orthography is quite able to accurately represent the meaningful contrasts in the language. The greatest potential trouble arises from the lack of orthographic <w>, which without a solid understanding of the language's phonotactics may create some confusion.[3] Table 1 presents the basic correspondences between the practical orthography of this grammar, the IPA (the primary allophone of each phoneme), and the local practical orthography.

[3] For example, *kwee?* 'crab' and *kuwe?* 'pig' should be written as <kueeʔ> and <kuueʔ>, respectively, in the local orthography. First of all, the phonotactics only permit vowel sequences across host-clitic boundaries (§5.7). Since the <ee> of <kueeʔ> 'crab' must be interpreted as a long vowel, the single <u> in 'crab' must therefore be interpreted as non-vocalic. Since the consonant /w/ can only occur in consonant clusters where following /ʔ/ or /j/ [h] (§4.1.3.2), the <u> in 'crab' must be part of a single initial segment /kw/. For <kuueʔ> 'pig', again the <e> can only be a vowel. Therefore, the second <u> must be the consonant /w/ and the first <u> must be the vowel /u/.

Table 1. Correspondences between orthographies

Practical linguistic orthography	International Phonetic Alphabet (primary allophone)	Local practical orthography
p	[p]	*p*
b	[β̞]	*b*
m	[m]	*m*
t	[t̪]	*t*
tz	[ʦ]	*ts*
s	[s]	*s*
l	[l̪]	*l*
n	[n̪]	*n*
r	[ɾ]	*r*
ty	[tʲ]	*ty*
ch	[ʧ]	*ch*
x	[ʃ]	*sh*
ly	[lʲ]	*ly*
ny	[nʲ]	*ny*
y	[j]	*y*
ky	[kʲ]	*ky*
k	[k]	*k*
kw	[kʷ]	*ku*
w	[w]	*u*
ʔ	[ʔ]	*’*
j	[h]	*j*
i	[i]	*i*
e	[e]	*e*
a	[a]	*a*
o	[o]	*o*
u	[u]	*u*
V̨	[Ṽ]	*V̈*
VV	[Vː]	*VV*
V̄	[V̄]	*V̲*
V́	[V́]	*V́*

1.6.4. Conventions in representation of linguistic examples

Linguistic examples are numbered and largely follow the Leipzig Glossing Rules (Comrie et al. 2008). Most textual examples consist of three lines. The first line is the Zenzontepec Chatino text in the practical orthography, in italic type, with no surrounding brackets or slashes. Morpheme boundaries are included, according to the following conventions: prefixes (§10.4) are separated from stems by a hyphen <->, enclitics (§10.5) are separated from hosts by an equals sign <=>, component stems in compounds (§10.3) are separated by a plus sign <+>. Since the language has prefixes and enclitics but no suffixes or proclitics, these conventions preclude any ambiguity from arising in the identification of elements as stems, prefixes, or enclitics.

The second line of each example is aligned word by word with the first and provides morpheme-by-morpheme glosses of the material in the first line. See the list of abbreviations (p. xxii) for values of grammatical abbreviations used in glosses. The third line of an example gives an English translation of the example. Translations, as well as glosses of isolated words, in examples or in-line in the text, are given in single quotes. The translations are crafted to best reflect the composition of the Chatino example while conveying its meaning intelligibly, and more or less naturally, in English. Where long examples break over a line, the portion after the break is indented, and the full translation is presented only at the very end.

Certain morphemes that are present at the most abstract level of structure may be significantly phonologically altered, or even deleted through phonological processes. Therefore, when helpful, examples may include an additional line of Chatino text

between the first text line and the morpheme gloss line to illustrate this. This additional line is in plain roman type enclosed in slashes, with morpheme boundaries given. A particularly frequent phonological process is the elision of one of two vowels in hiatus at prefix-stem boundaries (§5.3.1). Since these deleted vowels often have grammatical significance the default practice is to write those vowels, but enclosed in parentheses, in the practical orthographic representation line in standard three-line examples.

Finally, the source of each example is provided next to or beneath the translation line. Examples from elicitation or spontaneously offered by a speaker are labeled as such in square brackets ([elicited] or [offered]). Textual examples are the default, and carry no such tag. For examples from texts or other recordings, the name of the audio file, and the time within it at which the example begins (rounded to the nearest full second after the start of the utterance) are specified in square brackets.

Chapter 2

Segmental inventory

The phonological inventory of Zenzontepec Chatino consists of 21 consonants (Figure 2), 5 vowels (Table 2), and three types of contrastive autosegmental elements: vowel length, vowel nasality, and two tones (Table 3). The language has no contrastive stress, but root-final syllables are prosodically most prominent (§4.2.5). The phonemes in the tables are presented in the practical orthography of this grammar (§1.6.1), followed by their corresponding graphemes in the International Phonetic Alphabet (IPA) where different.

This chapter presents the segmental inventory, and the autosegmental contrastive elements are dealt with in Chapter 3. Each segmental phoneme is discussed in detail, one phoneme at a time. The basic and allophonic realizations of each phoneme are described, and generalizations about their distribution, such as co-occurrence constraints and position in syllables and words, are also noted. In many cases distributional patterns are due to outcomes of earlier sound changes, and these patterns are pointed out where

relevant. The contrastive status of all phonemes is established with minimal or near-minimal pairs. Consonants are presented first (§2.1), followed by vowels (§2.2). The chapter concludes with a summary of the segmental inventory (§2.3).

	Labial	Coronal plain	Coronal pal.	Dorsal pal.	Dorsal plain	Dorsal lab.	Placeless (Glottal)
Plosive	*p*	*t* [t̪]	*ty* [tʲ]	*ky* [kʲ]	*k*	*kw* [kʷ]	*ʔ*
Affricate		*tz* [ʦ]	*ch* [ʧ]				
Fricative		*s*	*x* [ʃ]			Obstruents	*j* [h]
Lateral		*l* [l̪]	*ly* [lʲ]			Sonorants	Glottals
Nasal	*m*	*n* [n̪]	*ny* [nʲ]				
Approximant	*b* [β̞]		*y* [j]			*w*	
Tap		*r* [ɾ]					

Figure 2. Consonant inventory

Table 2. Vowel inventory

	Front	Central	Back
High	*i*		*u*
Mid	*e*		*o*
Low		*a*	

Table 3. Autosegmental inventory

	Orthographic representation	Example
Vowel length	*VV* [V:]	*aa*
Vowel nasality	*V̨* [Ṽ]	*ą*
High tone	*V́*	*á*
Mid tone	*V̄*	*ā*

Looking further ahead, phonotactic patterns are treated directly in Chapter 4, summarizing and cross-referencing back to the relevant sections in this chapter and Chapter 3. The analysis of the phonological inventory is intrinsically bound up with the accompanying phonotactic analysis. That is, analytic decisions in one domain have unavoidable effects in the other. For any language there are multiple possible analyses of its inventory and phonotactics. It is the linguist's job to find the sweet spot at which the two are optimally balanced and then defend the analysis. The optimal balance is achieved when all of the phonological facts are accounted for with the simplest inventory and phonotactics. A crucial part of the overall phonological analysis of Zenzontepec Chatino presented in this grammar is §4.5, where alternative analyses of the inventory and phonotactics are considered and then rejected after they are deemed to be suboptimal. After the phonotactic analysis, Chapter 5 describes and summarizes the phonological processes, with relevant cross-references back to this chapter and Chapter 3.

2.1. Consonants

This section begins with a brief discussion of the consonantal inventory, how it is organized into natural classes, and the relative frequency of occurrence of the various classes (§2.1.1). The phonotactic patterns (Chapter 4) and phonological processes (Chapter 5) involving consonants operate more on place of articulation than on manner of articulation, and therefore, the consonants are presented here in groups according to place of articulation, from the front of the vocal tract to the back, beginning with the bilabials (§2.1.2), followed by the (dento-)alveolars (§2.1.3), the (alveo-)palatals (§2.1.4), the velars (§2.1.5), and finally, the glottals (§2.1.6).

2.1.1. Overview of consonants

The consonantal inventory of Zenzontepec Chatino is given in Figure 2. Voicing is not contrastive. That is, obstruents are underlyingly voiceless, and sonorants are underlyingly voiced. In terms of manner of articulation, the plosive series is the most populated, with eight members: /p, b, t, ty, ky, k, kw, ʔ/. The next most represented series are the fricatives /s, x, j/ and nasals /m, n, ny/, neither of which is nearly as numerous as the plosive series. After that, the affricates /tz, ch/, laterals /l, ly/, and semivowels /y, w/ each consist of two phonemes, and finally, there is the tap /r/. In terms of place of articulation, the most elaborated is the coronals, with two series: the (dento-)alveolars /t, tz, s, l, n, r/ and the (alveo-)palatals /ty, ch, x, ly, ny, y/, each with six phonemes. The next most numerous are the velars, with one palatalized velar /ky/, one plain velar /k/, and two labio-velars /kw, w/. There are three bilabials /p, b, m/ and two glottals /ʔ, j/.

Frequency of occurrence varies among the consonants due in part to historical sound changes and the solidification of new phonemes due to contact with Spanish. The bilabials are a marginal class. They arose in limited contexts in native material, and they occur with greater frequency in Spanish loanwords (§7.2) and sound symbolism (Chapter 8). Of the (dento-)alveolars, /r/ is the only marginal one, having arisen as a sporadic allophone of /t/ (§2.1.3.6) reinforced by Spanish loans (§7.2.7). Of the six (alveo-)palatals, the semivowel /y/ is the oldest and the only one that reconstructs to proto-Chatino. The other non-sibilants /ty/, /ly/, and /ny/ began as allophones of /t/, /l/, /n/, respectively, shortly after or during the late proto-Chatino stage, and the sibilants /ch/ and /x/ arose in part out of allophones of /tz/ and /s/, respectively (Campbell 2013a). Spanish loans and other sporadic creations of the now moderately frequent (alveo-)palatals have solidified their status as phonemes. The palatalized velar /ky/ has been a fairly marginal phoneme since proto-Chatino, though its distribution in the lexicon has shifted (Campbell 2013a: 402-403). Lastly, the plain velar, the labio-velars, and the glottals are old and widespread.

2.1.2. Bilabial consonants

As already mentioned the bilabial consonants /p, b, m/ are marginal phonemes in Zenzontepec Chatino that mostly occur in Spanish loans and sound symbolic forms. Neither Rensch (1966: 21) nor Kaufman (1983: 39) reconstruct **p* or **b* for proto-Otomanguean, and only Kaufman reconstructs **m*. However, Kaufman considers proto-Otomanguean **m* to have merged with **kw* in proto-Zapotecan (1983: 45), with a new

proto-Zapotec(an) **m* arising only later via loanwords from other ancient Mesoamerican languages (1993: 34).

2.1.2.1. Voiceless bilabial plosive /p/

The voiceless bilabial plosive /p/ is realized unaltered as [p] word-initially (1) and post-vocalically (2).

(1)	/**p**achī/	[**p**aʧĩ]	‘fermented pineapple skin drink’	< Sp. *tepache* < Nahua
	/**p**anyō/	[**p**anʲõ]	‘shawl’	< Sp. *paño* ‘cloth’
	/**p**esū/	[**p**esū]	‘peso’	< Sp. *peso* ‘peso’
	/**p**ii/	[**p**ii]	‘female turkey’	(onomatopoeic)
	/**p**iīʔ/	[**p**iīʔ]	‘baby’ (sound symbolic deformation of *kuwīʔ* ‘child’)	
	/**p**intyū/	[**p**inʲdʲū]	‘spotted’	< Sp. *pinto* ‘spotted’
	/**p**orōʔ/	[**p**oɾōʔ]	‘poor, unfortunate one’	< Sp. *pobre* (maybe)
	/**p**unyō/	[**p**unʲõ]	‘handful’	< Sp. *puño* ‘fist’
	/**p**resū/	[**p**ɾesū]	‘prisoner’	< Sp. *preso* ‘imprisoned’

(2)	/lyā**p**í/	[lʲā**p**í]	‘pencil’		< Sp. *lápiz* ‘pencil’
	/ya wa**p**urū/	[ja wa**p**uɾū]	‘eucalyptus tree’	*wapuru*	< Sp. *(Vick’s) VapoRub*
	/sa**p**erū/	[sa**p**eɾū]	‘San Pedro del Río (village)’		< Sp. *San Pedro*
	/sa**p**atū/	[sa**p**atū]	‘shoe’		< Sp. *zapato* ‘shoe’
	/ru**p**erā/	[ɾu**p**erā]	‘crupper’		< Sp. *grupera* ‘crupper’

The plosive /p/ has a voiced allophone [b] immediately following a nasal (3), as all obstruents become voiced after nasal consonants (§5.2.2), which are necessarily homorganic (see §5.2.1 for place of articulation assimilation of nasals). It should be noted that the [b] allophone of /p/ should not be confused with orthographic <b>, which is a sonorant, the voiced bilabial approximant [β̞].

(3)	/m**p**aā/	[m**b**aā]	‘father of one’s godchild’	< Sp. *compadre*
	/m**p**alē/	[m**b**alē]	‘mother of one’s godchild’	< Sp. *comadre*
	/m**p**eleʔ/	[m**b**eleʔ]	‘thick tortilla’ (not a loan from Spanish *memela*[4])	
	/m**p**ii/	[m**b**ii]	‘small toad sp.’	(onomatopoeic)
	/tyem**p**ū/	[tʲem**b**ū]	‘time’	< Sp. *tiempo* ‘time’
	/chí m**p**uruyu/	[ʧi m**b**ɾuju]	‘antlion (spp. of family *Myrmeleontidae*)’	

Some minimal or near-minimal pairs that illustrate the contrastiveness of /p/ are listed in (4).

(4)	/p/ ≠ /t/	/**p**ii/	[**p**ii]	‘female turkey’	/**t**ii/	[**t**ii]	‘clear’
	/p/ ≠ /kw/	/**p**anyō/	[**p**anʲõ]	‘shawl’	/**kw**anyo/	[**k**ʷanʲõ]	‘squirrel’
	/p/ ≠ /w/	/**p**urū/	[**p**ɾū]	‘cigar’	/**w**urū/	[**w**ɾū]	‘donkey’
	/p/ ≠ /b/	/sa**p**atū/	[sa**p**atū]	‘shoe’	/ra**b**atū/	[ɾa**β̞**atū]	‘hook’
	/p/ ≠ /m/	/**p**īyúʔ/	[**p**ījúʔ]	‘baby girl’	/**m**iyū/	[**m**ĩjū]	‘friend of’

One final point about /p/ is that when gathering together all of the relatively few native lexemes in which /p/ precedes a front vowel, it is evident that there is a phonestheme /pV[front]/ meaning ‘small, young, or cherished thing’ (5). I use the term *phonestheme* here to refer to a sub-morphemic sound sequence that has some semantic connotation (see Nuckolls 1999 for discussion) and the particular sounds iconically reflect that meaning.

(5)	/**p**ii/	[**p**ii]	‘female turkey’	/**p**itzu juū/	[**p**ɪtsu huū]	‘quail sp.’
	/**p**iī/	[**p**iī]	‘cute, colorful’	/m**p**eēʔ/	[m**b**eēʔ]	‘calf’
	/m**p**ii/	[m**b**ii]	‘small toad sp.’	/m**p**ichuʔ/	[m**b**iʧuʔ]	‘puppy’
	/**p**iīʔ/	[**p**iīʔ]	‘baby’	/m**p**ilējéʔ/	[m**b**ilʲēhéʔ]	‘snail’
	/**p**īyúʔ/	[**p**ījúʔ]	‘baby girl’	/m**p**irītóʔ/	[m**b**iɾītʲóʔ]	‘flycather (bird)’
	/m**p**iʔ/	[m**b**iʔ]	‘small bird sp.’			

[4] Spanish loanwords almost never have a glottal stop anywhere in them. One exception is the personal name *jwaʔ* ‘Juan’, a regional variant (§6.1). Also, there are no cases in which a bilabial oral stop is inserted next to /m/ in a Spanish loanword (§7.2.1).

The list of lexemes containing /p/ presented here makes up a large proportion of the total found in the lexicon, and nearly all can be attributed to loanwords or sound symbolism (phonesthesia).

2.1.2.2. Voiced bilabial approximant /b/

The voiced bilabial approximant /b/ [β̬] is a rare and originally non-native sound in Zenzontepec Chatino. However, its current contrastiveness with /p/, /w/, and /kw/ in a few possibly native words and some otherwise quite nativized Spanish loanwords necessitates its treatment as a separate phoneme. There is inter-speaker variation in which some speakers have /w/ where others have /b/. For example, the common word *burū* 'donkey' (< Sp. *burro* 'donkey') for some people is *wurū* and for others even *urū*, with no initial consonant. Note that though /w/ is a native sound, the language does not typically tolerate the sequence /wu/ (§2.1.5.4, §4.3.2), and the phonotactics strongly disprefer onsetless syllables (§4.1.3.3) like that of *urū*. The existence of these alternate forms of *burū* that violate other sound patterns in the language attests to the peculiarity of /b/. The phoneme /w/ has an allophone of [β̬] before /i/ (§2.1.5.4; §5.4.1), so /b/ and /w/ are neutralized before /i/.

Some examples of /b/ are listed in (6). The first two, *nkwéʔbē* 'sea shrimp' and *nka-báʔā* 'he blew on it' may be sound symbolic.

(6)	/nkwéʔ**b**ē/	[ŋgʷéʔ**β̬**ē]	'sea shrimp'	
	/nka-**b**áʔā/	[ŋgā**β̬**áʔā]	'blew'	
	/koōʔ a**b**rī/	[koōʔ a**β̬**ɾī]	'April'	< Sp. *abril* 'April'
	/**b**yernē/	[**β̬**jɛrnɛ̃]	'Friday'	< Sp. *viernes* 'Friday'
	/jwe**b**ē/	[hwe**β̬**ē]	'Thursday'	< Sp. *jueves* 'Thursday'

/ú**b**ā/	[ú**β̞**ā]	‘grape’	< Sp. *uva* ‘grape’	
/**b**érū/	[**β̞**érū]	‘watercress’	< Sp. *berro* ‘watercress’	
/**b**entanā/	[**β̞**endanã̄]	‘window’	< Sp. *ventana* ‘window’	
/**b**aretǭ/	[**β̞**ɾetȭ]	‘planting stick’	< Sp. *barretón* ‘planting stick’	

Some minimal and near-minimal pairs that require that /b/ be considered a phoneme are given in (7).

(7)							
	/b/ ≠ /p/	/**b**urū/	[**β̞**ɾū]	‘donkey’	/**p**urū/	[**p**ɾū]	‘cigar’
	/b/ ≠ /kw/	/**b**entanā/	[**β̞**endanã̄]	‘window’	/**kw**entā/	[**kʷ**endā]	‘because’
	/b/ ≠ /w/	/nka-u-**b**áʔā/	[ŋgā**β̞**áʔā]	‘blew’	/nka-u-**w**anā/	[ŋga**w**anã̄]	‘stole’
		/**b**érū/	[**β̞**érū]	‘watercress’	/**w**elaʔ/	[**w**elaʔ]	‘corn husk’
		/nkwéʔ**b**ē/	[ŋgʷéʔ**β̞**ē]	‘sea shrimp’	/ntāʔ**w**é/	[ndāʔ**w**é]	‘black zapote’

2.1.2.3. Voiced bilabial nasal /m/

Like the other bilabials /p/ and /b/, the bilabial nasal /m/ is found in some native lexemes, but it is more common in Spanish loans, some of which are old and otherwise quite nativized. Some examples of likely native vocabulary with word-initial /m/ are in (8), and some Spanish loans with initial /m/ are in (9).

(8)			
	/**m**akǫʔ/	[**m**ãkõʔ]	‘fingerless’
	/**m**eneʔ/	[**m**ẽnẽʔ]	‘handlesss, hornless’
	/**m**anchę/	[**m**ãnʲʤẽ]	‘praying mantis’
	/**m**antzēʔ/	[**m**ãnʣēʔ]	‘tapir’
	/**m**aʔā/	[**m**ãʔã̄]	‘mom of’
	/**m**ini/	[**m**ĩnʲĩ]	‘true’
	/ya **m**ee/	[ja **m**ẽẽ]	‘gumbo-limbo tree (*Bursera simaruba*)’

(9)					
	/**m**achį̄/	[**m**ãʧ̃ĩ̃]	‘monkey’	< Sp. *machín* ‘monkey’	
	/**m**atrū/	[**m**ãtɾū]	‘musician’	< Sp. *maestro* ‘musician’	
	/**m**esā/	[**m**ẽsa]	‘table’	< Sp. *mesa* ‘table’	
	/**m**ankū/	[**m**ãŋgū]	‘mango’	< Sp. *mango* ‘mango’	
	/**m**īlí/	[**m**ĩ̄lʲí]	‘thousand’	< Sp. *mil* ‘thousand’	
	/**m**axi/	[**m**ãʃi]	‘even (if)’	< Sp. *mas si* ‘but if’	
	/**m**atī/	[**m**ãtī]	‘machete’	< Sp. *machete* ‘machete’	

/**m**iyū/	[**m**ĩjū]	‘friend’	<	Sp. *amigo* ‘friend’
/**m**usū/	[**m**ũsū]	‘servant’	<	Sp. *mozo* ‘servant’
/**m**yelkū/	[**m**jelkū]	‘Wednesday’	<	Sp. *miércoles* ‘Wednesday’

Some word-medial (post-vocalic or post-glottal) occurrences of /m/ are shown in (10). Some are native words in which the /m/ arose via nasalization of /w/ before nasal vowels, as in *nkume* ‘ripe’ < proto-Chatino **n-kūwę̄* (cf. Zacatepec Chatino *nguwę̄*). Others are very old (pre-Columbian) loans, like *koʔma* ‘macaw’ (< proto-Mixe-Zoquean **ʔowa* ‘macaw’ [Kaufman & Justeson 2007: 200]), or fairly old, colonial era, loans, such as *majmā* ‘festival steward’ (< Sp. *mayordomo*) and *lometā* ‘bottle’ (< Sp. *limete* ‘vial’).

(10)

/ya su**m**ēʔé/	[ja su**m**ẽʔẽ́]	‘tree species (*Juliana adstringens*)’		
/nku**m**e/	[ŋgu**m**ẽ]	‘ripe’		
/nku-lā+**m**isę̄/	[ŋgulā**m**ĩsẽ̄]	‘rolled (itrn.)’		
/koʔ**m**a/	[koʔ**m**ã]	‘macaw’	<	proto-Mixe-Zoquean **ʔowa*
/tyú+j**m**é/	[tʲúh**m**ẽ́]	‘coccoon’		
/**m**aj**m**ā/	[**m**ãh**m**ã̄]	‘festival steward’	<	Sp. *mayordomo* ‘steward’
/lo**m**etā/	[lo**m**ẽtā]	‘bottle’	<	Sp. *limete* ‘vial’

Finally, there are cases of /m/ preceding /p/, as presented in (3) in §2.1.2.1. Though some of these obviously came from Spanish loans that contained [m], as in *mpaā* ‘father of one’s godchild’ (< Sp. *compadre*) and *tyempū* ‘time’ (< Sp. *tiempo* ‘time’), others are likely cases where an accreted *n-* assimilated in place of articulation to the following /p/, such as *mpichuʔ* ‘puppy’ (see §5.2.1 for nasal assimilation).

Although most cases of /m/ are traceable to loanwords or nasalization of /w/ preceding nasal vowels, there is no doubt about the synchronic status of /m/ as a phoneme, as shown by the (near-)minimal pairs in (11).

(11)	/m/ ≠ /n/	/**m**aʔā/	[**m**ãʔã̄]	‘mom of’	/**n**aʔā/	[**n**ãʔã̄]	‘not anymore’
	/m/ ≠ /kw/	/**m**inōʔ/	[**m**ĩnʲȭʔ]	‘drill bit’	/**kw**inoʔ/	[**kʷ**inʲȭʔ]	‘wart’
	/m/ ≠ /b/	/**m**usū/	[**m**ũsū]	‘servant’	/**b**urū/	[**b**uɾū]	‘donkey’
	/m/ ≠ /p/	/**m**esā/	[**m**ẽsā]	‘table’	/**p**esū/	[**p**esū]	‘peso’
	/m/ ≠ /w/	/**m**aj**m**ā/	[**m**ãh**m**ã̄]	‘festival steward’	/**w**aj**w**a/	[**w**ah**w**a]	‘plank’

2.1.3. (Dento-)alveolar (plain coronal) consonants

The (dento-)alveolar, or plain coronal, series of phonemes consists of the three dento-alveolars /t/, /l/, and /n/, and the three pure alveolars /s/, /tz/, and /r/.

2.1.3.1. Voiceless dento-alveolar plosive /t/

The dento-alveolar plosive is produced with the tip of the tongue on the back of the top front teeth and the blade of the tongue on the alveolar ridge. Examples of /t/ word-initially and post-vocalically are given in the left and right columns of (12), respectively. For some speakers, there is slight coarticulatory palatalization before /i/, but of a considerably lower degree than the allophonic palatalization that all speakers have after /i/ (13).

(12)	/**t**āá/	[**t**āá]	‘will give’	/se**t**a/	[se**t**a]	‘basilisk lizard’
	/**t**ánēʔ/	[**t**ánẽ̄ʔ]	‘cloth’	/n-kā**t**ę́/	[ŋgā**t**ẽ́]	‘white’
	/**t**eę/	[**t**ẽẽ]	‘quiet’	/ká**t**ī/	[ká**t**ī]	‘seven’
	/**t**elā/	[**t**elā]	‘night’	/ju**t**i/	[hu**t**i]	‘father of’
	/**t**íi/	[**t**íi]	‘ten	/kw-e**t**ǫ/	[kʷe**t**õ]	‘bee’
	/**t**ijyą/	[**t**ihjã]	‘bone’	/ki-u-**t**ūkwá/	[ku**t**ūkʷá]	‘will plant (corn)’
	/**t**ójō/	[**t**óhō]	‘squash vine’	/le**t**ɾā/	[le**t**ɾā]	‘letter (alphabet)’
	/**t**úkwa/	[**t**úkʷa]	‘two’	/nka-ū-**t**úwe/	[ŋgā**t**úwe]	‘cut into pieces’

The dento-alveolars /t/, /l/, and /n/ have palatalized allophones [tʲ], [lʲ], and [nʲ] after /i/ (see §5.1.1), a change that began as far back as proto-Chatino (Campbell 2013a)

but can be seen as still active in Zenzontepec Chatino in verbal aspect inflection. The palatalized allophones are produced with the blade of the tongue in a slightly post-alveolar position with the tip of the tongue lowered and not in contact with the teeth. Examples of /t/ realized as its palatalized allophone [tʲ] are given in (13). Note that there is now a separate phoneme /tʲ/ as well (§2.1.4.1), which is neutralized with /t/ after /i/.

(13)	/li**t**a/	[li**tʲ**a]	‘dried ear of corn’
	/ki**t**ē/	[ki**tʲ**ē]	‘pine’
	/kw-i**t**ę̀ʔ/	[kʷi**tʲ**ę̀ʔ]	‘louse’
	/wi**t**i/	[β̥i**tʲ**i]	‘dry’
	/nka-xi**t**i/	[ŋgaʃi**tʲ**i]	‘laughed’
	/ti**t**ǭ/	[ti**tʲ**õ̃]	‘several’
	/kasi**t**ū/	[kasi**tʲ**ū]	‘small earthenware jar’ < Sp. *cacito* ‘small pan’
	/nkwi-**t**aa/	[ŋgʷi**tʲ**aa]	‘finished’
	/ki-**t**i**t**a/	[ki**tʲ**i**tʲ**a]	‘will get crushed’

Like other obstruents (§5.2.2), /t/ becomes voiced after a nasal consonant, where it is pronounced as [d] (14).

(14)	/n**t**áā/	[n**d**áā]	‘bean’
	/n**t**akwą/	[n**d**akʷã]	‘sandal’
	/n**t**-eta/	[n**d**eta]	‘waits’
	/n**t**īlú/	[n**d**īlʲú]	‘upside-down’
	/n**t**oo/	[n**d**oo]	‘face of’
	/n**t**-ūrá/	[n**d**ūɾá]	‘hits’
	/n-**t**a+n**t**oo/	[n**d**an**d**oo]	‘bears with’
	/san**t**arū/	[san**d**aɾū]	‘soldier’ < Sp. *soldado* ‘soldier’
	/kwen**t**ū/	[kʷen**d**ū]	‘story’ < Sp. *cuento* ‘story’

Minimal pairs that demonstrate that /t/ is a phoneme distinct from /ty, s, ch, tz, l, n, r/ are listed in (15).

(15)	/t/ ≠ /ty/	/**t**āá/	[**t**āá]	‘will give’	/**ty**āá/	[**tʲ**āá]	‘will hand in (trn.)’
	/t/ ≠ /s/	/**t**oǭ/	[**t**õõ]	‘knot’	/**s**oǭ/	[**s**õõ]	‘trunk of’, ‘base of’

/t/ ≠ /ch/	/**t**ii/	[**t**ii]	‘clear’	/**ch**ii/	[**ʧ**ii]	‘gentleman’
/t/ ≠ /tz/	/**t**áą̄/	[**t**ą̌ą̃]	‘valley’	/**tz**áą̄/	[**ts**ą̌ą̃]	‘day’
/t/ ≠ /l/	/ke**t**ā/	[kʲe**t**ā]	‘flour’	/ke**l**ā/	[kʲe**l**ā]	‘river’
/t/ ≠ /n/	/**t**āáʔ/	[**t**āáʔ]	‘torn’	/**n**āáʔ/	[**n**ą̃ą̃ʔ]	1SG
/t/ ≠ /r/	/kū**t**á/	[kū**t**á]	‘hunting (n.)’	/ki-ū**r**á/	[kū**ɾ**á]	‘will hit’

2.1.3.2. Voiceless alveolar affricate /tz/

The voiceless alveolar affricate /tz/ is a unitary consonant phoneme. If it were a cluster of /t/ followed by /s/, then we’d expect to find many other combinations of plosive followed by fricative, unless of course one were willing to concede a needless complication in the phonotactic analysis to avoid that issue. See §4.5 for more focused discussion of the interplay between inventory and phonotactics and arriving at the optimal analysis of the two together. Word-initial examples of /tz/ are in the left column of (16), and word-medial examples are in the right column. Aside from a few cases of sound symbolism (§8.2), the affricate /tz/ does not occur before /i/ because Zenzontepec Chatino underwent an earlier sound change in which proto-Chatino sibilants **tz* and **s* palatalized to /ch/ and /x/, respectively, where immediately preceding /i/ (Campbell 2013a: 405).

(16)

/**tz**aka/	[**ts**aka]	‘one’	/ī**tz**áʔ/	[ī**ts**áʔ]	‘word’
/**tz**áʔ jnyá/	[**ts**áʔ hnʲą̃]	‘Chatino’	/**tz**ē**tz**éʔ/	[**ts**ē**ts**éʔ]	‘messy’, ‘spiny’
/**tz**eʔna/	[**ts**eʔnã]	‘cheap’	/i**tz**ǫʔ/	[i**ts**õʔ]	‘back of’
/**tz**oʔō/	[**ts**oʔō]	‘good’	/kē**tz**úʔ/	[kʲē**ts**úʔ]	‘pimple’
/**tz**úna/	[**ts**únã]	‘three’	/k-u-a**tz**u/	[ku**ts**u]	‘will pop (trn.)’

The voiced allophone of /tz/ after nasals is [d͡z], as demonstrated in (17). The fricative /s/ has the same realization after nasals (§5.2.2), so /tz/ and /s/ are neutralized in that environment.

(17) /n**tz**átę̨/ [n**dz**átę̃] ‘hog plum’ /man**tz**eʔ/ [mãn**dz**eʔ] ‘tapir’
/n**tz**eę̨/ [n**dz**ę̃ę̃] ‘citrus fruit’ /tzēn**tz**éʔ/ [ʦēn**dz**éʔ] ‘thin (of cloth)’
/n**tz**ukwāʔ/ [n**dz**uk^{w}āʔ] ‘shelled corn’ /ten**tz**ū/ [ten**dz**ū] ‘goat’ < Sp. < Nahua

Minimal and near-minimal pairs that illustrate the contrastiveness of /tz/ with the phonemes /t/, /ty/, /s/, and /ch/ are laid out in (18).

(18) /tz/ ≠ /t/ /ku**tz**a/ [ku**ts**a] ‘difficult’ /ku**t**a/ [ku**t**a] ‘planted crops’
/tz/ ≠ /ty/ /**tz**ēkwą́/ [**ts**ēk^{w}ą́] ‘coast’ /**ty**ékwą̄/ [**tʲ**ék^{w}ã̄] ‘needle’
/tz/ ≠ /s/ /**tz**eeʔ/ [**ts**eeʔ] ‘lizard sp.’ /**s**eeʔ/ [**s**eeʔ] ‘saliva of’
/tz/ ≠ /ch/ /**tz**oʔō/ [**ts**oʔō] ‘good’ /**ch**oʔo/ [**ʧ**oʔo] ‘lime(stone)’

2.1.3.3. Voiceless alveolar fricative /s/

The voiceless alveolar fricative is a native and common sound in Zenzontepec Chatino. Some word-initial and word-medial instances are given in (19), in the left and right columns, respectively.

(19) /**s**-ateʔ/ [**s**ateʔ] ‘clothes of’ /nku-**s**ą̄ą́/ [ŋgu**s**ã̃ã̄] ‘fell’
/**s**elū/ [**s**elū] ‘hat of’ < Sp. /ya ntā**s**éʔ/ [ja ndā**s**éʔ] ‘tree sp. *Anacardiaceae*’
/**s**eę̨/ [**s**ę̃ę̃] ‘wide’ /kwi-**s**ē/ [k^{w}i**s**ē] ‘evil spirit’
/**s**oʔni/ [**s**oʔnĩ] ‘conch’ /kū-**s**ǫ́/ [kū**s**ǭ́] ‘dispute’
/**s**úkwa/ [**s**úk^{w}a] ‘six’ /lu**s**u/ [lu**s**u] ‘beard of’

As mentioned in relation to /tz/, proto-Chatino *s palatalized before /i/ in Zenzontepec Chatino, becoming /x/ ([ʃ]), so /s/ is generally not found preceding /i/. A few exceptional cases exist, including one verb (*k-asiya* ‘will be lying down’) and a few toponyms that appear to be native, which may contain old, eroded forms of the verb *-asiya* ‘be lying down’. The rest are loanwords from Spanish (20).

(20) /k-a**si**ya/ [ka**si**ja] ‘will be lying down on ground’
/nātéʔ **si**ya/ [nãtẽ́ʔ **si**ja] ‘El Portillo, village’

/**si** yuu/	[**si** juu]	‘El Carrizal, village’
/ka**si**tū/	[ka**si**tʲ̈ū]	‘small earthenware jar’ < Sp. *ca**ci**to* ‘small pan’
/koōʔ **sī**rú/	[koōʔ **sī**rú]	‘May’ *koōʔ* ‘month’ + *sīrú* ‘Isidro’ < Sp. (*San*) ***Isi**dro*
/kuru**sī**/	[kuri**sī**]	‘cross’ < Sp. *cru**z*** ‘cross’
/**si**ntīkú/	[**si**ndīkú]	‘public minister’ < Sp. ***sí**ndico* ‘minister’
/**si**ntyū/	[**si**nʲd̈ʲū]	‘San Jacinto Tlacotepec, village’ < Sp. *Jac**i**nto*

There are not many identifiable cases of /s/ voiced to [dz] following a nasal that would be distinguishable from cases of post-nasal underlying /tz/, but postural verbs with the Stative prefix *n-* provide a couple of nice examples (21). Etymologically, *n**tz**ukwāʔ* ‘shelled corn’ originally contained /s/, and not /tz/, as evidenced by the proto-Zapotec cognate **x-okwaʔ* ‘shelled corn’ (21), since proto-Zapotec **x* regularly corresponds to proto-Chatino **s* (Kaufman 1993).

(21)

/n-**s**aʔą/	[n**dz**ãʔã]	‘is attached/written’
/n-**s**ukwā/	[n**dz**ukʷā]	‘is lying down (not on ground)’

A few somewhat nativized Spanish loanwords allow clusters of /s/ (or /x/) followed by a plosive or semivowel (see also §7.3.4), as exemplified in (22).

(22)

/li**sty**ǭ/	[li**st**ʲd̈õ̃]	‘ribbon’	< Sp. *li**st**ón* ‘ribbon’
/wi**sk**ā/	[βi̤**sk**ā]	‘minister’	< Sp. *fi**sc**al* ‘minister’
/**skw**elā/	[**sk**ʷelā]	‘school’	< Sp. ***escu**ela* ‘school’
/pala**sy**ū/	[pala**sj**ū]	‘palace’	< Sp. *pala**ci**o* ‘palace’
/jachā **sw**elā/	[haʧã **sw**elā]	‘type of axe’	< Sp. *hacha a**zu**ela* ‘adze’

To conclude the discussion of the phoneme /s/, a few minimal and near-minimal pairs that demonstrate its distinctiveness are presented in (23).

(23)

/s/ ≠ /x/	/**s**aaʔ/	[**s**aaʔ]	‘parrot sp.’	/**x**aaʔ/	[**ʃ**aaʔ] ‘other’
/s/ ≠ /tz/	/kwe-ā**s**úʔ/	[kʷēsúʔ]	‘little brother’	/kē**tz**úʔ/	[kʲē**ts**úʔ] ‘pimple’
/s/ ≠ /ch/	/**s**aʔne/	[**s**aʔnẽ]	‘long ago’	/**ch**aʔne/	[**ʧ**aʔnẽ] ‘will multiply’

/s/ ≠ /t/	/**s**eę/	[**s**ẽẽ]	‘wide’	/**t**eę/	[**t**ẽẽ]	‘quiet’
/s/ ≠ /j/	/**s**uti/	[**s**uti]	‘priest’	/**j**uti/	[**h**uti]	‘father of’

2.1.3.4. Voiced dento-alveolar lateral /l/

Some word-initial examples of the dento-alveolar lateral /l/ are listed in the left column of (24), and some post-vocalic examples are in the right column.

(24)

/**l**ātzá/	[**l**ātsá]	‘early morning’	/kā**l**á/	[kā**l**á]	‘twenty’
/**l**etzę/	[**l**etsẽ]	‘announcement’	/nka-tyé**l**ē/	[ŋgatʲé**l**ē]	‘yanked’
/**l**ísū/	[**l**ísū]	‘vulture’	/ntzū**l**íʔ/	[ndzū**l**íʔ]	‘swing (n.)’
/**l**ōʔó/	[**l**ōʔó]	‘fence’	/tē**l**ó/	[tē**l**ó]	‘skirt’
/**l**uʔwe/	[**l**uʔwe]	‘wing of’	/su**l**u/	[su**l**u]	‘cactus spine’

The dento-alveolar lateral may occur in a cluster following /j/, as in the examples in (25). Unlike other sonorants, the laterals /l/ and /ly/ (and the tap /r/) tend to not follow /ʔ/. The laterals do not occur in that environment because a change occurred in proto-Chatino in which obstruents and /l/ were elided when following /ʔ/ (§4.1.3.2) (Campbell 2011b). However, one case of /l/ after /ʔ/ is in the lexeme *jniʔ+**l**ā* ‘son-in-law’ (26). This is a compound that either was formed after the loss of laterals following glottal stop, or, if it is older, perhaps it avoided the change since most phonological processes do not apply across stem boundaries in compounds (§10.3).

(25)

/j**l**ákū/	[h**l**ákū]	‘stomach (organ)’
/j**l**eʔ/	[h**l**eʔ]	‘tortilla of’
/j**l**íʔyā/	[h**l**íʔjā]	‘Templo Viejo (neighborhood)’
/lējl**í**/	[lēhl**í**]	‘circular’

(26)

/jniʔ+**l**ā/	[hniʔ**l**ā]	‘son-in-law’

Like /t/ and /n/, /l/ has a palatalized allophone [lʲ] after /i/ (§5.1.1). Therefore /l/ and /ly/ are neutralized in that environment, and such cases are treated as underlying /l/.

(27)	/ki-**l**aʔa/	[ki**l**ʲaʔa]	‘will break (itrn.)’
	/nti-**l**ákwi/	[ndì**l**ʲákʷi]	‘boils (itrn.)’
	/m**p**ilējéʔ/	[m**b**ilʲēhéʔ]	‘snail’
	/ki**l**ituʔ/	[ki**l**ʲitʲuʔ]	‘navel of’
	/ntī**l**ú/	[ndī**l**ʲú]	‘upside-down’

Minimal, or near-minimal, pairs that demonstrate /l/ as a phoneme in contrast with /ly/, /r/, /n/, /t/, and /y/ are listed in (28).

(28)	/l/ ≠ /ly/	/**l**akwa/	[**l**akʷa]	‘how many?’	/**ly**akwa/	[**l**ʲakʷa]	‘level (adj.)’
	/l/ ≠ /r/	/**l**eta/	[**l**eta]	‘path’	/**r**etā/	[**ɾ**etā]	‘hauling line’[5]
	/l/ ≠ /n/	/**l**aa/	[**l**aa]	‘church’	/**n**aa/	[**n**ãã]	1PL.INCL
	/l/ ≠ /t/	/kwe-ū**l**á/	[kʷēlá]	‘dancer’	/kwē**t**á/	[kʷē**t**á]	‘chipped (a.)’
	/l/ ≠ /y/	/**l**-alaʔ/	[**l**alaʔ]	‘is holding’	/**y**-alaʔ/	[**y**alaʔ]	‘held’

2.1.3.5. Voiced dento-alveolar nasal /n/

The dento-alveolar nasal /n/ is one of the most frequently occurring consonants. Some examples of /n/ not in clusters in word-initial and post-vocalic positions are given in the left and right columns of (29), respectively.

(29)	/**n**a**n**ēʔ/	[**n**ã**n**ẽʔ]	‘belly of’	/k-wa**n**ā/	[kʷa**n**ã]	‘thief’
	/**n**eyā/	[**n**ẽjā]	‘fanega’ < Sp. *fanega*	/te**n**e/	[te**n**ẽ]	‘blood’
	/**n**ikwą/	[**n**ĩkʷã]	‘hot, dry season’	/jlya**n**ī/	[hlʲa**n**ĩ]	‘name of’
	/**n**iī/	[**n**ĩĩ]	‘now’	/cha**n**o/	[ʧa**n**õ]	‘will remain’
	/**n**uʔu/	[**n**ũʔũ]	2SG	/tu**n**u/	[tu**n**ũ]	‘large’

[5] *retā* is a borrowing of Spanish *reata* ‘rope’, used for hauling with animals.

Like other sonorant consonants, /n/ may occur in clusters following a glottal consonant (§4.1.3.2). The examples in (30) show /n/ after the glottal fricative /j/ (left column) and after the glottal stop /ʔ/ (right column).

(30)	/nku-j**n**á/	[ŋgūh**n**ǎ]	‘fled’	/tzúʔ**n**ā/	[ʦúʔ**n**ã]	‘scarce’
	/j**n**ēʔ/	[h**n**ɛ̃ʔ]	‘dog’	/keʔ**n**ā/	[kʲeʔ**n**ã]	‘plate’
	/j**n**iʔ/	[h**n**ĩʔ]	‘child of’	/ʔ**n**e/	[ʔ**n**ẽ]	‘will do’
	/j**n**oʔ/	[h**n**õʔ]	‘eight’	/nka-ʔ**n**i/	[ŋgaʔ**n**ĩ]	‘beat (trn.)’

The nasal /n/ may also occur as the first consonant in a cluster where the following consonant is an obstruent (§4.1.3.2). In such cases, the nasal assimilates in place of articulation to the following obstruent (§5.2.1). Some examples of /n/ before obstruents are provided in (31), with word-initial cases in the left column and some of the rarer, word-medial cases in the right column.

(31)	/**n**teʔya/	[**n**deʔja]	‘tooth of’	/ka**n**tū/	[ka**n**dū]	‘broth’ < Sp. *caldo*
	/**n**-tyúʔu/	[**n**ʲdʲúʔu]	‘leaves (itrn.)’	/ti**n**tye/	[ti**n**ʲdʲe]	‘strange taste’
	/**n**chīʔyú/	[**n**ʲʤīʔjú]	‘fruit’	/kyá**n**chę/	[kʲá**n**ʲʤɛ̃]	‘queen leafcutter ant’
	/**n**k-y-akę̄/	[**ŋ**ʲ**g**ʲakʲɛ̃]	‘burned (itrn.)’	/te**n**tzū/	[te**n**ʣū]	‘goat’ < Sp. < Nahua
	/**n**kātá/	[**ŋg**ātá]	‘black’	/xī**n**ką́ʔ/	[ʃĩ**ŋg**ɛ̃ʔ]	‘mucus of’
	/**n**kwīxí/	[**ŋg**ʷĩʃĩ]	‘tomato’	/lyú**n**kwi/	[lʲú**ŋg**ʷi]	‘firefly’

As mentioned already with respect to /t/ and /l/, /n/ palatalizes after /i/, and it is neutralized with /ny/ in that environment.

(32)	/chi**n**i/	[ʧi**n**ʲĩ]	‘smoke’
	/kwi**n**oʔ/	[kʷi**n**ʲõʔ]	‘wart’
	/kwi-**n**atę̄/	[kʷi**n**ʲãtɛ̃]	‘mosquito’
	/ki-**n**uʔu/	[ki**n**ʲũʔũ]	‘will break down (itrn.)’
	/nti-**n**āá/	[ndi**n**ʲɛ̃ǎ]	‘(land) gets cleared’

Note that /n/ still palatalizes even if a glottal stop separates it from the palatalizing /i/ (33). The verb *nti-ʔ**n**i* [ndiʔ**nʲ**ĩ] ‘beats (trn.)’ shows that the /i/ may be in a prefix. However, the palatalization does not occur if the would-be palatalizing /i/ is across a clitic boundary or in a separate stem in a compound, which is one of the factors considered in defining the phonological word (§10.2.1). For more on palatalization of /n/, see §5.1.1.

(33)	/kiʔ**n**a/	[kiʔ**nʲ**ã]	‘bed’
	/kiʔ**n**i/	[kiʔ**nʲ**ĩ]	‘deep’
	/nti-ʔ**n**i/	[ndiʔ**nʲ**ĩ]	‘beats (trn.)’
	/tíʔ**n**u/	[tíʔ**nʲ**ũ]	‘fifteen’

Since /j/ and /ʔ/ pattern together phonologically in many respects, such as in their distribution in consonant clusters (§4.1.3.2), their behavior in translaryngeal vowel harmony (§4.3.5; §5.5.1), and their role in vowel nasality spreading (§5.5.3), one might expect /i/ to palatalize /n/ even with intervening /j/, but that is not the case (34). The historical explanation here is that clusters of /j/ followed by a sonorant arose via elision of non-prominent high vowels before /n/ or /l/ (§4.1.4.2), and in some cases the lost vowel was /u/ and not the palatalizing /i/. For example, the verb *nti-jnā* ‘flees’ in (34) is cognate to Zacatepec Chatino *ndi-xonà`*, which illustrates that the lost vowel in Zenzontepec Chatino was the high back vowel originally.

(34)	/nti-j**n**aʔ/	[ndih**n**ãʔ]	‘defecates’
	/nti-j**n**ā/	[kih**n**ã̃]	‘flees’

To wrap up the discussion of /n/, some minimal and near-minimal pairs showing that it is a separate phoneme from /ny/, /l/, /r/, /t/, and /y/ are given in (35).

(35)	/n/ ≠ /ny/	/**n**ātę́ʔ/	[**n**ãtɛ̃ʔ]	‘flat land’	/**ny**atę̄/	[**nʲ**ãtɛ̃]	‘person’
	/n/ ≠ /l/	/**n**uʔu/	[**n**ũʔũ]	2SG	/**l**uʔu/	[**l**uʔu]	‘alive’
	/n/ ≠ /r/	/nti-u**n**ā/	[ndu**n**ã]	‘cries’	/nti-ū**r**á/	[ndū**r**á]	‘hits’
	/n/ ≠ /t/	/ki**n**ī/	[ki**nʲ**ĩ]	‘bird’	/ki**t**ī/	[ki**tʲ**ī]	‘paper’
	/n/ ≠ /y/	/kw-eʔ**n**a/	[kʷeʔ**n**ã]	‘cayman’	/kw-eʔ**y**a/	[kʷeʔ**y**a]	‘eagle’

2.1.3.6. Voiced alveolar tap /r/

The alveolar tap /r/ is a fairly marginal phoneme. Like the other relatively recent additions to the Zenzontepec Chatino segmental inventory (i.e. the bilabials), it occurs mostly in Spanish loanwords and sound symbolic material, factors which likely contributed to its incorporation into the phonological inventory. Also, /t/ may be realized as [ɾ] in fast speech, particularly in stem initial position after a morpheme boundary (§5.4.2), and a handful of apparently native lexemes have lexicalized with /r/ in that position. Examples of the latter are in (36).

(36)	/ki-ū**r**á/	[kū**ɾ**á]	‘will hit’	< folk etym? *kūtá* ‘hunt (n.), hunting (n.)’
	/nku-**r**utu/	[ŋgu**ɾ**utu]	‘rolled up (cylindrical) (adj.)’	< maybe CPL of lost verb
	/k-e+**r**ūkwá/	[kʲe**ɾ**ūkʷá]	‘will arrest’	< auxiliary with *-tūkwá* ‘put in’
	/nka-u-**r**oǫ/	[ŋga**ɾ**õõ]	‘rubbed’	< previously from *-u-toǫ*?
	/=**r**i/	[**ɾ**i]	‘only’ (enclitic)	
	/=**r**úʔ/	[**ɾ**úʔ]	‘more’ (enclitic)	
	/=**r**īké/	[**ɾ**īkʲé]	‘chest, heart’ (enclitic)	

Some sound symbolic examples with /r/ are listed in (37). They are names of birds or other small creatures (see §8.1.2 for more on this).

(37)	/kú**r**ū/	[kú**ɾ**ū]	‘ground dove’
	/mpi**r**ītóʔ/	[mbi**ɾ**ītʲóʔ]	‘flycather (bird)’
	/tí **r**ūwíʔ/	[tí **ɾ**ūwíʔ]	‘bird sp.’
	/tyo**r**ęʔ jii/	[tʲo**ɾ**ẽʔ hii]	‘red-billed bird sp.’
	/ku**r**unkuʔ/	[ku**ɾ**uŋguʔ]	‘edible crayfish sp.’
	/chí mpu**r**uyu/	[ʧĩ mbu**ɾ**uju]	‘antlion (family *Myrmeleontidae spp.*)’

Some quite nativized Spanish loanwords containing /r/ are listed in (38). In these, /r/ may occur word-initially, intervocalically, or in consonant clusters with sonorants or obstruents. In clusters, /r/ may be the first or second consonant (see §7.2.7 and §7.3.4 for more on /r/ in loanwords).

(38)	/**r**etā/	[**ɾ**etā]	‘hauling line’	< Sp. *reata*	‘rope for hauling (n.)’
	/**r**umusā/	[**ɾ**umũsā]	‘breakfast’	< Sp. *almuerzo*	‘lunch’
	/**r**uwā/	[**ɾ**uwā]	‘arroba, 12 kgs’	< Sp. *arroba*	‘25 lb. (measure)’
	/li**r**ā/	[li**ɾ**ā]	‘pound (measure)’	< Sp. *libra*	‘pound (measure)’
	/nkajna**r**ā/	[ŋgahnã**ɾ**ā]	‘pomegranate’	< Sp. *granada*	‘pomegranate’
	/se**r**lī/	[se**ɾ**lī]	‘traditional pants’	< Sp. *zaragüelles*	‘big white pants’
	/nka**r**nī/	[ŋga**ɾ**nĩ̃]	‘pouch-belt’	< Sp. *garniel*	‘pouch, pouch-belt’
	/ma**r**tē/	[mã**ɾ**tē]	‘Tuesday’	< Sp. *martes*	‘Tuesday’
	/liw**r**ū/	[liw**ɾ**ū]	‘book’	< Sp. *libro*	‘book’
	/t**r**iwū/	[t**ɾ**iwū]	‘stirrup’	< Sp. *estribo*	‘stirrup’

A few minimal and near-minimal pairs that demonstrate the status of /r/ as a phoneme are given in (39).

(39)	/r/ ≠ /t/	/se**r**ā/	[se**ɾ**ā]	‘silk’ < Sp. *seda*	/se**t**a/	[se**t**a]	‘basilisk lizard’
	/r/ ≠ /l/	/**r**eē/	[**ɾ**eē]	‘king’ < Sp. *rey*	/**l**éē/	[**l**éē]	‘strong’
	/r/ ≠ /n/	/kú**r**ū/	[kú**ɾ**ū]	‘dove’	/ku**n**u/	[ku**n**ũ]	‘small bit’
	/r/ ≠ /ty/	/**r**eē/	[**ɾ**eē]	‘king’ < Sp. *rey*	/**ty**ee/	[**tʲ**ee]	‘will be hanging’
	/r/ ≠ /ch/	/ma**r**ū/	[mã**ɾ**ū]	‘mallet’ < Sp. *marro*	/ma**ch**ū/	[mãʧ̃ū]	‘young mule’ < Sp.

2.1.4. (Alveo-)Palatal, or palatal(ized) coronal, consonants

The (alveo-)palatal consonant series consists of the three palatalized alveolars /ty/, /ly/, and /ny/, which began as allophones of /t/, /l/, and /n/, respectively (Campbell 2013a: 403); the two sibilants /ch/ and /x/, which arose from palatalized allophones of /tz/ and /s/, respectively (Campbell 2013a: 405); and the palatal semivowel /y/.

2.1.4.1. Voiceless palatalized alveolar plosive /ty/

The voiceless palatalized alveolar plosive phoneme /ty/ is pronounced with the blade of the tongue in a slightly post-alveolar position and the tongue tip not in contact with the upper teeth. It began as an allophone of /t/ after /i/, during or around the time of proto-Chatino. At some point in time, this allophone phonologized due to the loss of some of the conditioning vowels and some Spanish loans. Some word-initial examples are listed in (40).

(40)	/**ty**ākwę́/	[**tʲ**āk^{w}ẽ́]	‘road’
	/**ty**anā/	[**tʲ**anã̄]	‘opposite-sex sibling of’
	/**ty**eę̱ʔ/	[**tʲ**ẽẽ̱ʔ]	‘root of’
	/**ty**ékǫ̱ʔ/	[**tʲ**ékõ̱ʔ]	‘wren species (probably *Pheugopedius pleurostictus*)’
	/**ty**empū/	[**tʲ**embū]	‘time’ < Sp. *tiempo* ‘time’
	/**ty**oǫ̱/	[**tʲ**õõ̱]	‘will be standing’
	/**ty**újwi/	[**tʲ**úhɸi]	‘hearthstone’

Like other obstruents, /ty/ has a voiced allophone, [d^{j}], after a nasal consonant, as seen in the examples in (41), which include some loanwords.

(41)	/n**ty**āké/	[n^{j}**dʲ**āk^{j}é]	‘neighborhood in village of Cofradía Dos’
	/kwi-n**ty**eʔ/	[k^{w}in^{j}**dʲ**eʔ]	‘queen ant or termite’
	/n**ty**ōsé/	[n^{j}**dʲ**ōsé]	‘god’ < Sp. *dios* ‘god’
	/n**ty**uu/	[n^{j}**dʲ**uu]	‘species of motmot bird (*Momotus mexicanus*)’
	/pin**ty**ū/	[pin^{j}**dʲ**ū]	‘spotted’ < Sp. *pinto* ‘spotted’

The phoneme /ty/ occurs in initial position of most /t/-initial intransitive verb stems when inflected for Potential Mood, as in the left portion of (42), which at an earlier stage of the language would have been marked by the Potential Mood prefix *ki-* still

found with many other verbs (Campbell 2011a). Habitual aspect is marked on these verbs by the same palatalization, but with an accompanying preposed /n/ (42).

(42)

Potential mood form			Habitual aspect form			Stem
/**ty**aʔą/	[**tʲ**ãʔã]	‘will walk’	/n**ty**aʔą/	[n**ʲdʲ**ãʔã]	‘walks’	/-**t**aʔą/
/**ty**ákwi/	[**tʲ**ákʷi]	‘will fly’	/n**ty**ákwi/	[n**ʲdʲ**ákʷi]	‘flies’	/-**t**ákwi/
/**ty**ejẽ/	[**tʲ**ẽjẽ̃]	‘will pass’	/n**ty**ejẽ/	[n**ʲdʲ**ẽjẽ̃]	‘passes’	/-**t**ejẽ/
/**ty**oǫ/	[**tʲ**õõ]	‘will be standing’	/n**ty**oǫ/	[n**ʲdʲ**õõ]	‘stands’	/-**t**oǫ/
/**ty**úʔu/	[**tʲ**úʔu]	‘will leave’	/n**ty**úʔu/	[n**ʲdʲ**úʔu]	‘leaves’	/-**t**úʔu/

Some minimal and near-minimal pairs involving /ty/ are provided in (43). None of these currently have a preceding palatalizing /i/ that would allow them to be posited as underlying /t/.

(43)

/ty/ ≠ /t/	/**ty**oǫ/	[**tʲ**õõ]	‘will be standing’	/**t**oǫ/	[**t**õõ]	‘knot’
/ty/ ≠ /x/	/**ty**eęʔ/	[**tʲ**ẽẽʔ]	‘root of’	/**x**eęʔ/	[**ʃ**ẽẽʔ]	‘nose of’
/ty/ ≠ /ch/	/**ty**ukwa/	[**tʲ**uk**ʷ**a]	‘the two’	/**ch**ukwa/	[**ʧ**uk**ʷ**a]	‘three-sided’
/ty/ ≠ /tz/	/**ty**áą/	[**tʲ**ãã]	‘throat of’	/**tz**áą/	[**ʦ**ãã]	‘day’
/ty/ ≠ /r/	/**ty**ówā/	[**tʲ**ówā]	‘Cristóbal’ < Sp.	/**r**úwā/	[**ɾ**úwā]	‘crane’ < Sp.

2.1.4.2. Voiceless alveo-palatal affricate /ch/

The voiceless alveo-palatal affricate /ch/ is a phoneme that was not present in proto-Chatino but is now a basic consonant of Zenzontepec Chatino. It arose via at least two changes: **ky > ch* (unconditioned) and **tz > ch / __ i* (Campbell 2013a). It has been reinforced as a phoneme by loanwords from Spanish and now occurs with moderate to high frequency. A few examples of word-initial /ch/ are in the left column of (44), and some post-vocalic examples are in the right column.

(44)

/**ch**aja /	[**ʧ**aha]	‘tortilla’	/nka**ch**a jwiī/	[ŋga**ʧ**a hɸiī]	‘millipede’
/**ch**inaʔ/	[**ʧ**in**ʲ**ãʔ]	‘tortilla basket’	/ki**ch**i/	[ki**ʧ**i]	‘quern’

/**ch**oʔo/	[**ʧ**oʔo]	‘lime(stone)’	/nká**ch**ī/	[ŋgá**ʧ**ī]	‘yellow’
/**ch**una/	[**ʧ**unã]	‘the three’	/ku**ch**uʔ/	[ku**ʧ**uʔ]	‘castrated’

As expected, the affricate /ch/ has a voiced allophone of [ʤ] after a nasal consonant, as exemplified in (45).

(45)

/n**ch**iʔna/	[nʲʤiʔnʲã]	‘lips of’
/n**ch**īʔyú/	[nʲʤīʔjú]	‘fruit’
/man**ch**ę/	[mãnʲʤẽ]	‘praying mantis’
/n-**ch**-akę/	[nʲʤakʲẽ]	‘gets burned (itrn.)’
/n**ch**-oō/	[nʲʤoō]	‘is grinding’
/n**ch**una/	[nʲʤunã]	‘third (ord. num.)’

Similarly to /ty/, the phoneme /ch/ occurs in special fusional inflectional forms of a particular class of verbs in Potential Mood and Habitual Aspect (Campbell 2011a). Verbs whose stems begin in /y/ inflect for Potential Mood by changing that /y/ to /ch/, and they inflect for Habitual Aspect by the same change plus a pre-posed /n/. A few examples are provided here in (46).

(46)

Potential Mood form			Habitual Aspect form			Stem
/**ch**ākąʔ/	[**ʧ**āką̃ʔ]	‘will get tied’	/n**ch**ākąʔ/	[nʲʤāką̃ʔ]	‘gets tied’	/-**y**ākąʔ/
/**ch**asu/	[**ʧ**asu]	‘will be paid for’	/n**ch**asu/	[nʲʤasu]	‘gets paid for’	/-**y**asu/
/**ch**atę/	[**ʧ**atẽ]	‘will get washed’	/n**ch**atę/	[nʲʤatẽ]	‘gets washed’	/-**y**atę/
/**ch**ó+tiį/	[**ʧ**ótĩĩ]	‘will sneeze’	/n**ch**ó-tiį/	[nʲʤótĩĩ]	‘sneezes’	/-**y**ó+tiį/
/**ch**uʔū/	[**ʧ**uʔū]	‘will take root’	/n**ch**uʔū/	[nʲʤuʔū]	‘takes root’	/-**y**uʔū/

Finally, (near-)minimal pair evidence for the status of /ch/ as a distinct phoneme is provided in (47).

(47)

/ch/ ≠ /ty/	/**ch**aʔą/	[**ʧ**ãʔã]	‘will wash’	/**ty**aʔą/	[**ʧ**ʲãʔã]	‘will walk’
/ch/ ≠ /ky/	/**ch**oōʔ/	[**ʧ**oōʔ]	‘maguey’	/**ky**ooʔ/	[**k**ʲooʔ]	‘monster fish’
/ch/ ≠ /tz/	/**ch**oʔo/	[**ʧ**oʔo]	‘lime(stone)’	/**tz**oʔō/	[**ʦ**oʔō]	‘good’
/ch/ ≠ /x/	/kw-i**ch**ī/	[kʷi**ʧ**ī]	‘rabbit’	/kwi**x**ī/	[kʷi**ʃ**ī]	‘sour-ripe’

/ch/ ≠ /t/	/**ch**aja /	[**ʧ**aha]	‘tortilla’	/**t**aja/	[**t**aha]	‘lazy’
/ch/ ≠ /y/	/**ch**oo/	[**ʧ**oo]	‘rain’	/**y**oo/	[**j**oo]	‘oven’

2.1.4.3. Voiceless alveo-palatal fricative /x/

The voiceless alveo-palatal fricative /x/ arose from an allophone of **s* before the vowel /i/, via the same palatalization change undergone by **tz* (§2.1.3.2). Some of the conditioning vowels have disappeared or changed since then, and some other occurrences of /x/ are found in Spanish loanwords. Initial (left column) and post-vocalic (right column) examples of /x/ are given in (48).

(48)						
	/**x**íī/	[**ʃ**íī]	‘light’	/tza**x**ī/	[ʦa**ʃ**ī]	‘a little’
	/**x**ikǫ̨/	[**ʃ**ikõ]	‘arm of’	/kwi-lī**x**í/	[**ʃ**kʷilʲī**ʃ**í]	‘butterfly’
	/**x**ikwi/	[**ʃ**ikʷi]	‘smooth’	/loni**x**ę̄/	[loni**ʃ**ẽ]	‘Monday’ < Sp. *lunes*
	/**x**aloʔ/	[**ʃ**aloʔ]	‘spoon’	/ké**x**ę̄/	[kʲé**ʃ**ẽ]	‘pink’
	/**x**etąʔ/	[**ʃ**etãʔ]	‘nose of’	/nka-**x**áʔā/	[ŋga**ʃ**áʔā]	‘screamed’
	/**x**ónkōʔ/	[**ʃ**óŋgōʔ]	‘see-saw’	/to**x**uʔ/	[to**ʃ**uʔ]	‘buttocks of’

One would expect that /x/ would neutralize with /ch/ and be pronounced as [ʤ] after a nasal consonant, just as /s/ and /tz/ neutralize as [ʣ] after a nasal (§5.2.2). However, there are no identified cases that would unambiguously stem from underlying /x/ rather than /ch/.

A few somewhat nativized Spanish loans have /x/ in a medial cluster preceding the plosive /ty/ (49). The phonotactics of fully native material prohibit such clusters (§4.1.3.2), but the phonotactics of loanword phonology permit them (§7.3.4).

(49)	/ma**x**tyī/	[ma**ʃ**tʲī]	‘machete’ (var. of *matī*)	< Sp. *machete*
	/mi**x**tyu/	[mi**ʃ**tʲu]	‘domestic cat’	of disputed origin[6]
	/kixę̄ʔ pa**x**tyō/	[kiʃ̃ẽʔ pa**ʃ**tʲō]	‘herb sp. *Scrophulariaceae*’	< Sp. *pastor* ‘herder’

Minimal and near-minimal pairs illustrating the distinctiveness of /x/ in native vocabulary are shown in (50).

(50)	/x/ ≠ /s/	/**x**eę/	[**ʃ**ẽẽ]	‘dinner’	/**s**eę/	[**s**ẽẽ]	‘wide’
	/x/ ≠ /ch/	/ntá**x**ī/	[ndá**ʃ**ī]	‘pubic hair of’	/nta**ch**i/	[nta**ʧ**ī]	‘nance fruit’
	/x/ ≠ /tz/	/ku-**x**ę/	[ku**ʃ**ẽ]	‘afternoon (adj.)’	/k-u**tz**ę/	[ku**ts**ẽ]	‘will be afraid’
	/x/ ≠ /y/	/**x**ūʔwé/	[**ʃ**ūʔwé]	‘leftovers’	/**y**ūʔwé/	[**j**ūʔwé]	‘piece’, ‘chip’
	/x/ ≠ /ty/	/**x**āá/	[**ʃ**āá]	‘Ixtayutla (top.)’	/**ty**āá/	[**t**ʲāá]	‘will turn in’
	/x/ ≠ /j/	/**x**aaʔ/	[**ʃ**aaʔ]	‘another’	/**j**aaʔ/	[**h**aaʔ]	‘sleeping mat’

2.1.4.4. Voiced palatalized alveolar lateral /ly/

As mentioned during the discussion of /l/ in §2.1.3.4, proto-Chatino **l* had a palatalized allophone [lʲ] after **i*, which is now phonologized as the phoneme /ly/. Some cases of word-initial /ly/ are in the left column of (51), and post-vocalic, medial cases are in the right column.

(51)	/**ly**akwā/	[**l**ʲak^{w}ā]	‘why?’	/pā**ly**á/	[pā**l**ʲá]	‘shovel’ < Sp. *pala*
	/**ly**ātá/	[**l**ʲātá]	‘ditch (n.)’	/nka-**ly**a/	[ŋga**l**ʲa]	‘farted’
	/**ly**oʔō/	[**l**ʲoʔō]	‘chicken’	/nte-**ly**ā/	[nde**l**ʲā]	‘is watering’
	/**ly**ūúʔ/	[**l**ʲūúʔ]	‘maiden’	/nte-**ly**ēʔé/	[nde**l**ʲēʔé]	‘is licking’
	/**ly**ukēʔę́/	[**l**ʲuk^{j}ēʔé]	‘fly (n.)’	/nte-i-**ly**uʔū/	[nde**l**ʲuʔū]	‘is reshowing’

Though one of the two types of consonant clusters permitted by the native phonotactics of Zenzontepec Chatino is a glottal consonant followed by a sonorant

[6] According to Kiddle (1964), this word is from Spanish *micito*. Kaufman (p.c.) says that it is from Nahua /mis-to:n-tli/ ‘useless bobcat’.

(§4.1.3.2), as mentioned earlier, glottal stop was lost in proto-Chatino before obstruents and **l*. As a result of this change, there are now very few cases of glottal stop followed by a lateral consonant and no documented cases of /ʔ/ followed by /ly/ in particular. However, a few handfuls of words do contain /ly/ following the glottal fricative /j/ (52).

(52)	/j**ly**aāʔ/	[h**lʲ**aāʔ]	‘cotton’	/kwe-j**ly**ā/	[k^{w}eh**lʲ**ā]	‘intestinal parasite’
	/j**ly**ālá/	[h**lʲ**ālá]	‘harmful’	/maj**ly**ā/	[mah**lʲ**ā]	‘almud (~4kg measure)’[7]
	/j**ly**ekwā/	[h**lʲ**ek^{w}ā]	‘hoe’	/nte-j**ly**á/	[ndēh**lʲ**á]	‘is spreading (trn.)’
	/j-**ly**ū/	[h**lʲ**ū]	‘big’	/cha+j**ly**ā/	[chah**lʲ**ā]	‘bread’

A selection of (near-)minimal pairs showing /ly/ as a distinctive sound is arranged in (53).

(53)	/ly/ ≠ /l/	/**ly**oʔo/	[**lʲ**oʔo]	‘spouse of’	/**l**óʔō/	[**l**óʔō]	‘with’
	/ly/ ≠ /ny/	/j**ly**á/	[h**lʲ**á]	‘lunch’	/j**ny**á/	[h**nʲ**ã́]	‘work’
	/ly/ ≠ /ty/	/**ly**ūkwá/	[**lʲ**ūk^{w}á]	‘broom’	/**ty**ūkwá/	[**tʲ**ūk^{w}á]	‘will be sitting’
	/ly/ ≠ /y/	/**ly**áā/	[**lʲ**áā]	‘opossum’	/**y**áā/	[**j**áā]	‘nopal cactus’
	/ly/ ≠ /r/	/**ly**eē/	[**lʲ**eē]	‘Feliciano’	/**r**eē/	[**ɾ**eē]	‘king’
	/ly/ ≠ /x/	/**ly**ālá/	[**lʲ**ālá]	‘fast’	/**x**ālá/	[**ʃ**ālá]	‘dream of’

2.1.4.5. Voiced palatalized alveolar nasal /ny/

Parallel to the palatalized alveolar lateral /ly/ and plosive /ty/, the palatalized nasal /ny/ began as an allophone of dento-alveolar **n* following **i* in proto-Chatino. Like the others, /ny/ phonologized due to the loss or change of some of the conditioning vowels. Its distribution grew due to the incorporation of loanwords from Spanish and at least one Mixtec loanword: *kwanyo* ‘squirrel’ < Coastal Mixtec (Campbell 2013a: 414-415). The

[7] Although *majlyā* translates as ‘almud’, the word is actually a borrowing of Spanish *maquila*, another now fairly archaic unit of dry volumetric measure, ultimately of Arabic origin like *almud*.

nasal /ny/ precedes the vowel /a/ in the majority of the clearly native lexemes that contain it, though it is not expected that that environment was crucial in its conditioning. Some examples of /ny/ are in (54).

(54)	/**ny**axęʔ/	[**nʲ**ãʃẽʔ]	‘angry’	/nku-**ny**axęʔ/	[ŋgu**nʲ**ąʃẽʔ]	‘got angry’
	/**ny**aʔne/	[**nʲ**ãʔnẽ]	‘animal’	/lūtí nkwá**ny**ō/	[ŋg^{w}á**nʲ**õ]	‘vine (*Cissus sp.*)’
	/**ny**ájā/	[**nʲ**ǎjã]	‘year’	/kwa**ny**o/	[k^{w}a**nʲ**õ]	‘squirrel’ < Mixtec

Unlike other non-lateral sonorants, the nasal phoneme /ny/ happens to not occur after /ʔ/. Phonetic [n^{j}] is found in that environment, but those cases still have the palatalizing /i/ preceding the /ʔ/, so they are treated as underlying /n/. The lack of /ʔny/ clusters is partly due to the distribution of /ʔ/, which is only scarcely found word-initially (§2.1.6.2; §4.1.3.1). On the other hand, the glottal fricative /j/ does occur frequently word-initially, and clusters of /j/ preceding /ny/ are fairly common (55).

(55)	/j**ny**áʔā/	[h**nʲ**ǎʔã]	‘bad’	/kāj**ny**á/	[kāh**nʲ**ǎ]	‘short’
	/j**ny**aa/	[h**nʲ**ãã]	‘very spicy hot’	/ya ntaj**ny**aʔ/	[ja ndaj**nʲ**ãʔ]	‘tree sp.’
	/j**ny**áʔ/	[h**nʲ**ǎʔ]	‘chili pepper’	/nku-j**ny**āʔ/	[ŋguh**nʲ**ãʔ]	‘got liquefied’

Several minimal and near-minimal pairs illustrating /ny/ as a phoneme are provided in (56).

(56)	/ny/ ≠ /n/	/nku-j**ny**á/	[ŋgūh**nʲ**ǎ]	‘quaked’	/nku-j**n**á/	[ŋgūh**n**ǎ]	‘fled’
	/ny/ ≠ /ly/	/j**ny**a/	[h**nʲ**ã]	‘griddle’	/j**ly**ā/	[h**lʲ**ā]	‘early’
	/ny/ ≠ /y/	/nte-j**ny**ā/	[ndeh**nʲ**ã]	‘is making’	/nte-j**y**ā/	[ndeh**j**ā]	‘is playing’
	/ny/ ≠ /m/	/**ny**áʔa/	[**nʲ**ǎʔã]	‘mother of’	/**m**áʔa/	[**m**ǎʔã]	‘strong lady’
	/ny/ ≠ /ty/	/**ny**aʔa/	[**nʲ**ãʔã]	‘will see’	/**ty**aʔą/	[**tʲ**ãʔã]	‘will walk’

2.1.4.6. Voiced palatal semivowel /y/

The palatal semivowel /y/ is a native and frequently occurring sonorant consonant. It does not occur before /i/, just as the semivowel /w/ does not precede its partner vowel /u/ (§2.1.5.4; §4.3.2). Examples of word-initial /y/ are in the left column of (57), and post-vocalic examples are in the right column.

(57)	/**y**ane/	[**j**anẽ]	‘neck of’	/ka**y**a/	[ka**j**a]	‘weak’, ‘cowardly’
	/**y**atzą?/	[**j**atsã?]	‘corn silk’	/xī**y**á?/	[ʃĩ**j**á?]	‘small’
	/**y**awe?/	[**j**awe?]	‘curse’	/ti**y**e?/	[ti**j**e?]	‘sour’
	/**y**oo/	[**j**oo]	‘oven’	/nte**y**-oō/	[nde**j**oō]	‘is grinding’
	/**y**-o?ō/	[**j**o?ō]	‘drank’	/kw-i**y**u?/	[kʷi**j**u?]	‘spider’
	/**y**ūkų́?/	[**j**ūkṹ?]	‘winding (a.)’	/tze**y**u?/	[ʦe**j**u?]	‘hummingbird’

Like other (non-lateral) sonorants, /y/ occurs in consonant clusters following glottal consonants. In (58), examples of /y/ after /j/ are provided on the left, and examples of /y/ following /?/ are on the right.

(58)	/j**y**ánā/	[h**j**ánã̄]	‘a year ago’	/nt-u?**y**ā/	[ndu?**j**ā]	‘buys’
	/líj**y**ā/	[líh**j**ā]	‘sugarcane’	/kw-ē?**y**á/	[kʷē?**j**á]	‘pocket gopher’
	/kwi-j**y**ā/	[kʷih**j**ā]	‘toy’	/nti-?**y**ó/	[ndī?**j**ó]	‘drinks’
	/kwi-tij**y**uū/	[kʷitʲih**j**uū]	‘comet’	/se?**y**u/	[se?**j**u]	‘uncle of’
	/tij**y**u?/	[tih**j**u?]	‘far away’	/kí?**y**ū/	[kí?**j**ū]	‘male’

In a couple of day names borrowed from Spanish, /y/ occurs in clusters following /b/ or /m/ (59). These loanwords are somewhat nativized, with *myelkū* ‘Wednesday’ being quite modified from its Spanish source *miércoles*. However, they are both doubly odd for having not one but two non-native consonant clusters each (§7.3.4).

(59)	/b**y**ernē/	[β**j**ernẽ̄]	‘Friday’ > Sp. *viernes* ‘Friday’
	/m**y**elkū/	[m**j**elkū]	‘Wednesday’ > Sp. *miércoles* ‘Wednesday’

Before nasal vowels, /y/ often nasalizes and may be pronounced as [nʲ], which was probably part of a broader earlier change in which **l* > *n* / __ Ɣ and **w* > *m* / __ Ɣ also. However, the change of /y/ to /ny/ is not completely regular, and there is inter-speaker and even intra-speaker variation on this point (60). Note that the process may operate even if the /y/ is in a separate syllable from the nasal vowel and even separated from it by an obstruent, as in *yaką* 'ear of' in (60).

(60) /**y**aą/ [**j**ãã] ~ [**n**ʲãã] 'sweat bath'
/**y**aką/ [**j**ãkã] ~ [**n**ʲãkã] 'ear of'

Minimal and near-minimal pairs that support the treatment of /y/ as a phoneme are laid out in (61).

(61)

/y/ ≠ /ch/	/**y**aāʔ/	[**j**aāʔ]	'hand of'	/**ch**aāʔ/	[**ʧ**aāʔ]	'will be made'
/y/ ≠ /x/	/**y**alā/	[**j**alā]	'score (20)'	/**x**ālá/	[**ʃ**ālá]	'dream of'
/y/ ≠ /ly/	/**y**akwaʔ/	[**j**akʷaʔ]	'bunch (fruit)'	/**ly**akwa/	[**lʲ**akʷa]	'level (adj.)'
/y/ ≠ /ny/	/**y**áʔā/	[**j**áʔā]	'raw'	/**ny**áʔa/	[**n**ʲãʔã]	'mother of'
/y/ ≠ /ky/	/**y**úkwāʔ/	[**j**úkʷāʔ]	'marsh'	/**ky**ukwāʔ/	[**k**ʲukʷāʔ]	'leafcutter ant'
/y/ ≠ /w/	/**y**aka/	[**j**aka]	'tree', 'wood'	/**w**akā/	[**w**akā]	'cow'
/y/ ≠ Ø	/ka**y**a/	[ka**j**a]	'cowardly'	/kāá/	[kāá]	'nine'

2.1.5. Velar (dorsal) consonants

There are four velar consonants: the marginal but native palatalized velar /ky/, the plain plosive /k/, the frequently occurring labialized velar /kw/, and the labio-velar semivowel /w/.

2.1.5.1. Voiceless palatalized velar plosive /ky/

The voiceless palatalized velar plosive /ky/ is a fairly uncommon phoneme. Proto-Chatino had a similarly uncommon phoneme **ky* that changed to *ch* at some point in Zenzontepec Chatino before the current phoneme /ky/ emerged (Campbell 2013a). The new phoneme is not found in non-initial syllables. It does occur word-initially (62) and in the Completive Aspect forms of *y*-initial verbs (63), where the stem /y/ becomes /ky/ and is then voiced because it is preceded by /n/.

(62)	/**ky**aʔā/	[**kʲ**aʔā]	‘ascent’
	/**ky**ākā́/	[**kʲ**ākā́]	‘crow’
	/**ky**úkwę/	[**kʲ**úkʷẽ]	‘damsel bug’
	/**ky**ūntíʔ/	[**kʲ**ūndíʔ]	‘beetle sp.’

(63)	/n**k-y**āáʔ/	[ŋʲgʲāáʔ]	‘was built’
	/n**k-y**akwa/	[ŋʲgʲakwa]	‘wove’
	/n**k-y**ó+keę/	[ŋʲgʲókʲẽẽ]	‘swelled up’
	/n**k-y**uwi/	[ŋʲgʲuwi]	‘flashed’

The plain velar /k/ (§2.1.5.2) has a palatalized allophone [kʲ] before /e/, and non-palatalized [k] never occurs before that vowel. Therefore, /ky/ and /k/ are neutralized before /e/, and all such cases are treated as underlying /k/.

One must consider whether the phoneme /ky/ would be better treated as a consonant cluster of /k/ followed by /y/, especially given its limited distribution and occurrence in special fusional inflection. However, such a move would require a concomitant complication of the otherwise very simple native phonotactics governing consonant clusters (§4.1.3). In terms of the phonological system as a whole, that analysis would carry a greater overall cost than the mere inclusion of /ky/ in the segmental

inventory (see more on this in §4.5.2). With the treatment of /ky/ as a unitary palatalized velar segment, some minimal pairs can serve to demonstrate its contrastiveness (64).

(64)	/ky/ ≠ /k/	/**ky**ālá/	[**kʲ**ālá]	‘dream’	/**k**ālá/	[**k**ālá]	‘twenty’
	/ky/ ≠ /y/	/**ky**ooʔ/	[**kʲ**ooʔ]	‘monster fish’	/**y**oōʔ/	[**j**oōʔ]	‘ugly’
	/ky/ ≠ /ch/	/**ky**aʔa/	[**kʲ**aʔa]	‘guilt’	/**ch**aʔa/	[**ʧ**aʔa]	‘heavy rain’
	/ky/ ≠ /kw/	/**ky**aʔa/	[**kʲ**aʔa]	‘stubble field’	/**kw**aʔą/	[**kʷ**ãʔã]	2PL
	/ky/ ≠ /ty/	/**ky**unuʔ/	[**kʲ**unũʔ]	‘herb spp.’	/**ty**unu/	[**tʲ**unũ]	‘will grow’

2.1.5.2. Voiceless plain velar plosive /k/

The voiceless plain velar plosive /k/ is a frequently occurring consonant. Some word-initial and word-medial examples are in (65), in the left and right columns, respectively.

(65)	/**k**ākwá/	[**k**āk^{w}á]	‘near’	/lā**k**á/	[lā**k**á]	‘yesterday’
	/**k**atī/	[**k**atī]	‘fussy’	/xi**k**aʔ/	[ʃi**k**aʔ]	‘gourd’
	/**k**iiʔ/	[**k**iiʔ]	‘fuego’	/la-**k**iʔi/	[la**k**iʔi]	‘toasted (adj.)’
	/**k**itząʔ/	[**k**itsãʔ]	‘hair’	/sá**k**ōʔ/	[sá**k**ōʔ]	‘egret’
	/**k**oo/	[**k**oo]	‘cloud’	/nti**k**ǫ/	[ndi**k**ǫ]	‘dragonfly’
	/**k**u-asūʔ/	[**k**usūʔ]	‘elder (adj.)’	/xi-**k**u**k**uʔ/	[ʃi**k**u**k**uʔ]	‘elbow of’
	/**k**-u-luu/	[**k**uluu]	‘will dig up’	/y-a**k**u/	[ja**k**u]	‘ate’

The plosive /k/ has a palatalized allophone [k^{j}] before the mid front vowel /e/ (66), and therefore /k/ and /ky/ are neutralized in that environment.

(66)	/**k**ee/	[**kʲ**ee]	‘stone’	/tī**k**é/	[tī**kʲ**é]	‘chest of’
	/**k**ejẹ/	[**kʲ**ẽhẽ]	‘skin’	/kwī**k**éʔ/	[k^{w}ī**kʲ**éʔ]	‘purple-blue’
	/**k**étą/	[**kʲ**étã]	‘hammock’	/tyá**k**ēʔ/	[tʲá**kʲ**eʔ]	‘small woodpecker’
	/**k**etǫʔ/	[**kʲ**etõʔ]	‘pot’	/nch-u-ā**k**éʔ/	[nʲʤū**kʲ**éʔ]	‘is cooking (trn.)’

As expected, /k/ has a voiced allophone [g] after nasal consonants (67), and finally, minimal and near-minimal pairs for /k/ are given in (68).

(67)

/n-**k**aʔa/	[ŋgaʔa]	‘green’	/xīn**k**ą́ʔ/	[ʃĩŋgɐ̃́ʔ]	‘mucus of’
/n**k**inaʔ/	[ŋginʲãʔ]	‘wax’	/kin**k**uʔ/	[kiŋguʔ]	‘crooked’
/n**k**oǫ/	[ŋgõõ]	‘turtle’	/sūn**k**ǫ́/	[sūŋgɔ̃́]	‘stem (of fruit)’
/n**k**unuʔ/	[ŋgunũʔ]	‘worm’	/xi-n**k**īlá/	[ʃĩŋgīlʲá]	‘stinger of’

(68)

/k/ ≠ /ky/	/**k**ukwaʔ/	[**k**ukʷaʔ]	‘dew’	/**ky**ukwāʔ/	[**k**ʲukʷāʔ]	‘leafcutter ant’
/k/ ≠ /kw/	/**k**āchíʔ/	[**k**āʧĩʔ]	‘hidden’	/**k-w**āchíʔ/	[**k**ʷāʧĩʔ	‘iguana’
/k/ ≠ /w/	/**k**itza/	[**k**itsa]	‘sick’	/**w**itza/	[**β̞**itsa]	‘day after tomorrow’
/k/ ≠ /ch/	/**k**ojo/	[**k**oho]	‘taco	/**ch**ojo/	[**ʧ**oho]	‘squash’
/k/ ≠ /t/	/**k**itzę/	[**k**itsẽ]	‘village’	/**t**itzę/	[**t**itsẽ]	‘unpleasant’

2.1.5.3. Voiceless labio-velar plosive /kw/

The voiceless labio-velar plosive is a widespread and native phoneme. It is considered a unitary segment rather than a cluster of /k/ followed by /w/. If it were a cluster, we would expect to find some clusters such as *tw*, *sw*, *chw*, *tzw*, and other sequences of obstruent followed by semivowel in the native sound system. Any such clusters that exist are rare and demonstrably loanwords (§7.3.4). Therefore, an analysis of /kw/ as a cluster would complicate the generalizations about the phonotactics of the language (see §4.1.3.2 for clusters and §4.5 for discussion of competing analyses of segmental inventory versus phonotactics).

In native vocabulary, labio-velars (/kw/ and /w/) do not precede rounded vowels (/o/ and /u/) (§4.3.2), and in the case of /kw/ there are no exceptions, not even among loanwords. Some examples of /kw/ word-initially (left column) and word-medially (right column) are given in (69).

(69)

/kw-a**kw**iʔ/	[**k**ʷa**k**ʷiʔ]	‘chatterbox’	/sú**kw**a/	[sú**k**ʷa]	‘six’
/kwatę/	[**k**ʷatę]	‘ridge’	/ke**kw**ā/	[kʲe**k**ʷā]	‘crumbling’
/kwénāʔ/	[**k**ʷénɐ̃́ʔ]	‘meat’	/na**kw**ę/	[nã**k**ʷẽ]	‘said’
/kw-eeʔ/	[**k**ʷeeʔ]	‘crab’	/ku**kw**ęʔ/	[ku**k**ʷẽʔ]	‘armadillo’

/kw-íī/	[**k**^{w}íī]	‘morning star’	/ti**kw**iʔ/	[ti**k**^{w}iʔ]	‘awake’
/**kw**ītéʔ/	[**k**^{w}ītʲéʔ]	‘blind’	/ku**kw**i/	[ku**k**^{w}i]	‘new’

After a nasal consonant, /kw/ becomes voiced and is realized as [g^{w}], as shown in the examples in (70).

(70)

/n**kw**alaʔ/	[ŋg^{w}alaʔ]	‘full of debris’	/xī-n**kw**éē/	[ʃĩŋg^{w}éē]	‘jaw of’
/n**kw**ekwą/	[ŋg^{w}ek^{w}ã]	‘nail’	/lyún**kw**i/	[lʲúŋg^{w}i]	‘firefly’
/n**kw**īíʔ	[ŋg^{w}īíʔ]	‘ring’	/n**kw**i-tyána/	[ŋg^{w}itʲánã]	‘searched for’

Some minimal and near-minimal pairs involving /kw/ are listed in (71), showing that it contrasts with /k/, /w/, /p/, and /ky/.

(71)

/kw/≠/k/	/kulá**kw**ā/	[kulá**k**^{w}ā]	‘harvest’	/kulá**k**ā/	[kulá**k**ā]	‘opening axis’
/kw/≠/w/	/**kw**-ela/	[**k**^{w}ela]	‘fish’	/**w**elaʔ/	[**w**elaʔ]	‘corn husk’
/kw/≠/p/	/**kw**esu/	[**k**^{w}esu]	‘small bump’	/**p**esū/	[**p**esū]	‘peso’
/kw/≠/ky/	/**kw**aą/	[**k**^{w}ãã]	‘fever’	/**ky**aą/	[**k**^{ʲ}ãã]	‘come here!’

2.1.5.4. Voiced labio-velar semivowel /w/

The voiced labio-velar semivowel is a common segment, and it is probably the consonant with the most complicated allophony. As just mentioned, labio-velars do not occur before rounded vowels (/o/ or /u/) in the native lexicon. Before the vowels /a/ or /e/, it is realized as [w], as shown in (72), where the left column contains word-initial examples, and the right column shows word-medial, post-vocalic examples.

(72)

/**w**ājwáʔ/	[**w**ājwáʔ]	‘hollow’	/la**w**āʔá/	[la**w**āʔá]	‘occasionally’
/**w**ala/	[**w**ala]	‘where?’	/nta**w**ā/	[nda**w**ā]	‘scarecrow’
/**w**elaʔ/	[**w**elaʔ]	‘corn husk’	/su**w**e/	[su**w**e]	‘egg’
/**w**eē yaāʔ/	[**w**eē jaāʔ]	‘level (tool)’	/la**w**e/	[la**w**e]	‘among’

The semivowel /w/ has an allophone of [β̪] in most cases in which it precedes the high front vowel /i/ (73) (§5.4.1). In that environment /w/ is neutralized with /b/. These cases of [β̪] are nevertheless written as <w> since they are treated as underlying /w/. The de-velarization of /w/ before /i/ is blocked if the semivowel is root-medial and preceded by /u/. In those cases, /w/ is realized as [w], as in the examples in (74).

(73)	/**w**ílā/	[**β̪**ílʲā]	‘not yet’	/kī**w**í/	[kī**β̪**í]	‘tarantula’
	/**w**isāʔ/	[**β̪**isāʔ]	‘therefore’	/nká**w**īʔ/	[ŋgá**β̪**īʔ]	‘dark’
	/**w**iʔyu/	[**β̪**iʔju]	‘three days ahead’	/kwe-**w**īʔ/	[kʷe**β̪**īʔ]	‘plague’

(74)	/ki chu**w**ī/	[ki ʧu**w**ī]	‘large basket’	/ku**w**īʔ/	[ku**w**īʔ]	‘young child’
	/nk-y-ū**w**íʔ/	[ŋʲgʲū**w**íʔ]	‘went out/off’	/ntu**w**i/	[ndu**w**i]	‘shiny’

At prefix-stem boundaries, i.e. non-root-internally, /w/ preceding /i/ and following /u/ is again realized as [β̪]. These cases are all in initial position of verb stems, preceded by either the Causative prefix *u-* (Campbell in press) or the Completive Aspect prefix *nku-*. A few examples of this are in (75).

(75)	/nti-u-wii/	[ndu**β̪**ii]	‘cleans (trn.)’
	/nku-wīʔí/	[ŋgu**β̪**īʔí]	‘became skinny’
	/nku-witi/	[ŋgu**β̪**itʲi]	‘dried (itrn.)’

The fact that de-velarization of /w/ is only blocked if preceded by root-internal /u/ would raise a problem for any practical orthography that does not represent prefix boundaries. In such an orthography, one might have to just write the sound as <b>. A view of the interface of phonology and morphology like that of Lexical Phonology (Kiparsky 1982) permits /uwi/ sequences to behave differently root-internally than they

do across morphological boundaries in word formation, as lexical phonological rules may apply at each derivational stage.

Like other sonorants, /w/ can occur as the second consonant in bi-consonantal clusters where the first consonant is a glottal (/ʔ/ or /j/). In the left column of (76) are some examples of /w/ after the glottal fricative /j/. If the following vowel is /a/, the /w/ is realized as [w], as expected. If /w/ follows /j/ but precedes a front vowel (/i/ or /e/), then it is realized as [ɸ]. Examples of /w/ after the glottal stop are given in the right column of (76). Note that in *kūʔwí* 'drunk', the last item in the right column, the /w/ is realized as [w] before /i/ because the vowel /u/ is in the preceding syllable, despite the intervening glottal stop.

(76)	/**w**aj**w**a/	[**w**ah**w**a]	'plank'	/tuʔ**w**a/	[tuʔ**w**a]	'mouth of'
	/j**w**aā/	[h**w**aā]	'Juan' < Sp.	/jaʔ**w**a/	[haʔ**w**a]	'granary'
	/kaj**w**ē/	[kah**ɸ**ē]	'coffee' < Sp.	/ntāʔ**w**é/	[ndāʔ**w**é]	'black zapote'
	/j**w**iī/	[h**ɸ**iī]	'whistle'	/nch-uʔ**w**e/	[nʲʤuʔ**w**e]	'is drying up'
	/nti-uj**w**iʔ/	[nduh**ɸ**iʔ]	'sells'	/kūʔ**w**í/	[kūʔ**w**í]	'drunk'

Minimal and near-minimal pairs that illustrate that /w/ is a phoneme in contrast with /kw/, /k/, /y/, /b/, and /m/, are listed in (77).

(77)	/w/ ≠ /kw/	/la**w**a/	[la**w**a]	'lizard sp.'	/la**kw**a/	[la**kʷ**a]	'how many?'
	/w/ ≠ /k/	/su**w**a/	[su**w**a]	'vagina of'	/su**k**ā/	[su**k**ā]	'sugar' < Sp.
	/w/ ≠ /y/	/**w**aʔā/	[**w**aʔā]	'Madras thorn'	/**y**áʔā/	[**j**áʔā]	'raw'
	/w/ ≠ /b/	/jlyaʔ**w**ē/	[hlʲaʔ**w**ē]	'half'	/nkwéʔ**b**ē/	[ŋgʷéʔ**β̞**ē]	'sea shrimp'
	/w/ ≠ /m/	/nku**w**e/	[ŋgu**w**e]	'ground (adj.)'	/nku**m**e/	[ŋgu**m**ẽ]	'ripe'
	/w/ ≠ Ø	/la**w**a/	[la**w**a]	'lizard sp.'	/laa/	[laa]	'church'

2.1.6. Glottal consonants

The series of glottal consonants has two members: the glottal stop /ʔ/ and the glottal fricative /j/ [h]. The glottal stop is discussed first in §2.1.6.1. Its phonological status is a question that requires careful consideration. Some of the facts of its distribution and behavior suggest that it is a vocalic feature, while other facts suggest that it is a consonant. However, the evidence in favor of a consonantal analysis is more compelling, and that is the analysis adopted here (§2.1.6.2). After that, the glottal fricative is treated in §2.1.6.3.

2.1.6.1. Glottal stop /ʔ/

The glottal stop /ʔ/ has a unique distribution as a consonant. Despite having some distributional and behavioral traits of an autosegmental feature, it is best treated as a consonant and not a feature of the syllable nucleus (§2.1.6.2). It is the only consonant that is rare word-initially relative to its overall frequency. The only documented lexemes that begin with /ʔ/ are listed in (78).

(78)	/**ʔ**ne/	[**ʔ**nẽ]	‘does’, ‘will do’
	/**ʔ**ā/	[**ʔ**ā]	question particle
	/**ʔ**a akwāʔ/	[**ʔ**aak^{w}āʔ]	‘when?’
	/**ʔ**ō/	[**ʔ**ō]	‘or’ < Sp. *o* ‘or’

The glottal stop occurs intervocalically where the surrounding vowels are of the same quality, as in the examples in the left column of (79). A sound change of translaryngeal vowel harmony took place in proto-Chatino (Campbell 2013a), and a restriction against unlike vowels across glottal consonants within a root is still in effect in

Zenzontepec Chatino. This restriction is perhaps even extending in its application (§4.3.5). In the right hand column of (79) are examples of word-medial /ʔ/ as the first consonant of a glottal plus sonorant cluster (see §4.1.3.2 for more on clusters). As already mentioned, proto-Chatino **ʔ* was deleted before obstruents and **l*, so there are no cases of /ʔ/ before obstruents or laterals within a single phonological word.

(79)	/taʔa/	[taʔa]	'festival'	/koʔma/	[koʔmã]	'macaw'
	/keʔę̄/	[kʲẽʔẽ̄]	'excrement'	/kwaʔne/	[kʷaʔnẽ]	'shade'
	/tiʔī/	[tiʔī]	'breath of'	/luʔwe/	[luʔwe]	'wing'
	/nkoʔo/	[ŋgoʔo]	'banana'	/teʔyū/	[teʔjū]	'naked'
	/ki-xūʔú/	[kiʃūʔú]	'will be cut'	/kiʔni/	[kiʔnʲi]	'deep'

Finally, /ʔ/ occurs word-finally, and it is the only consonant permitted to do so. Word-final glottal stop is the only coda consonant allowed in the language. Any glottals in medial clusters are syllabified in the onset of the following syllable, even as part of an onset cluster, rather than in the coda of the previous syllable (see §4.1.3.2 for syllabification). A few examples of word-final glottal stop are given in (80).

(80)	/nti-etzāʔ/	[ndetsāʔ]	'informs'	/latīʔ/	[latīʔ]	'living core of'
	/níkąʔ/	[nĩkãʔ]	'gem'	/koōʔ/	[koōʔ]	'moon'
	/xikęʔ/	[ʃikʲẽʔ]	'leg of'	/kw-esǫʔ/	[kʷesõʔ]	'termite'
	/kwi-teeʔ/	[kʷitʲeeʔ]	'ant'	/teluʔ/	[teluʔ]	'soon'
	/nku-kītéʔ/	[ŋgukītʲẽʔ]	'snapped (itrn.)'	/kwíyūʔ/	[kʷíjūʔ]	'top (toy)'

With the treatment of /ʔ/ as a segmental phoneme, the minimal pairs in (81) serve to demonstrate its contrastiveness.

(81)	/ʔ/ ≠ /j/	/ʔne/	[ʔnẽ]	'will do'	/jne/	[jnẽ]	'finger of'
		/choʔo/	[ʧoʔo]	'lime(stone)'	/chojo/	[ʧoho]	'squash'
	/ʔ/ ≠ /k/	/yáʔā/	[jáʔā]	'raw'	/yaka/	[yaka]	'sugar' < Sp.
	/ʔ/ ≠ /t/	/chaʔą/	[ʧãʔã]	'will wash'	/chatą/	[ʧatã]	'will be peeled'

/ʔ/ ≠ /kw/	/la**ʔ**a/	[la**ʔ**a]	‘broken’	/la**kw**a/	[la**k**ʷa]	‘how many?’
/ʔ/ ≠ Ø	/cho**ʔ**o/	[ʧo**ʔ**o]	‘lime(stone)’	/choo/	[ʧoo]	‘rain’
	/kii**ʔ**/	[kii**ʔ**]	‘fire’	/kii/	[kii]	‘reed’

2.1.6.2. On the phonological status of glottalization

The distribution of /ʔ/ just exemplified in §2.1.6.1 is quite exceptional for a consonant. First of all, though /ʔ/ occurs very frequently overall, it occurs only rarely in word-initial position, which is not the case for any other consonant (see §4.1.3.1 for discussion of simple onsets). Even the rare words that do begin in /ʔ/ (78) can occur in utterance-initial position. Secondly, when it occurs intervocalically, the surrounding vowels must always be of the same quality if they are within the same root (§4.3.5). This might suggest that cases of intervocalic /ʔ/ are merely long laryngealized vowels. Finally, it is the only consonant permitted in coda position (§4.1.2). These distributional facts would seem to make a fairly strong argument against a segmental analysis of /ʔ/. In some cases, glottalization is realized as creaky voice on vowels, and this diffuse realization could suggest that it is a feature of vowels and not consonantal. This creakiness is most common on the vowel /a/ and at relatively low fundamental frequency. Nevertheless, the creaky realization is not consistent and is quite variable.

Aside from the distributional evidence just summarized, there is also evidence from phonological processes that would support a non-segmental treatment of /ʔ/. First, the coronal consonants /t/, /l/, and /n/ palatalize after the vowel /i/, even if there is an intervening glottal stop (§5.1.1). Next, vowel nasality will spread from a final syllable to a penultimate syllable if they are only separated by /ʔ/, or /j/ (§3.1; §5.5.3). The transparency of the glottal stop to these phonological processes involving vowels would

support treating it as a vocalic feature. Nevertheless, it will now be argued that /ʔ/ is not a vocalic feature but rather a consonant.

In spite of the evidence in favor of a suprasegmental analysis of /ʔ/, the evidence in favor of a segmental analysis is even stronger. First of all, though /ʔ/ is rare word-initially, it does occur in that position, as shown by the forms in (78) in §2.1.6.1. Secondly, CVʔV words are made up of two separate rhythmic pieces. In intentionally slow speech, speakers may pause between the CV and ʔV portions. For example, the spectrogram in Figure 3 shows two elicited utterances of *nyāʔā* 'your mother' spoken slowly. In both cases the glottal stop closure is of significant duration and vowel creakiness is minimal. The closure in the second case is very long, at about 295 milliseconds. If /ʔ/ were a vocalic feature, then sequences of VʔV would comprise a single syllable nucleus.

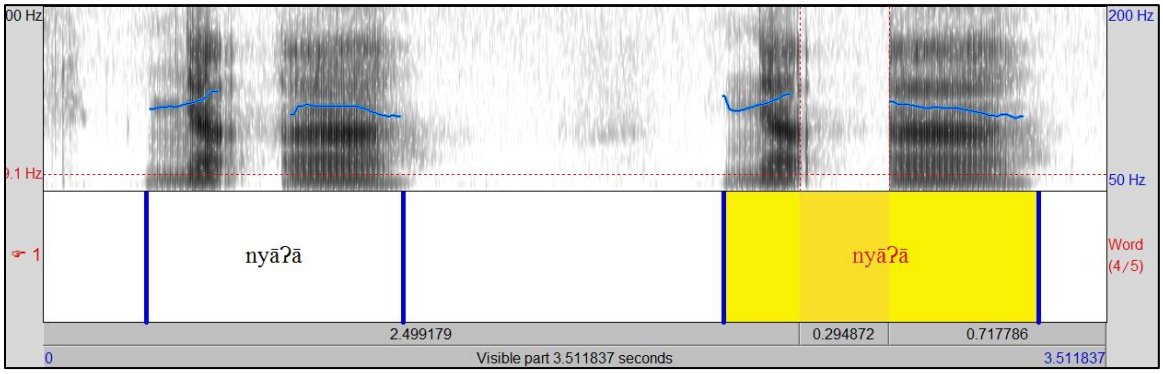


Figure 3. Two utterances of *nyāʔā* 'your mother' in slow speech

Other phonotactic patterns and phonological processes provide additional evidence that /ʔ/ is a consonant. First of all, there is a strong preference for syllables to

have onsets that is only violated by a few native lexemes (§4.1.3.3).[8] Varying word-initial epenthesis of /ʔ/, /y/, or /j/ frequently occurs on those forms as a repair strategy to fulfill the onset preference (§4.1.3.3). If /ʔ/ were not a segment, then it would not be a candidate for this epenthesis.

Additionally, though glottal stop is unlike other consonants because it may occur in coda position, it does so only in word-final position. If it is word-medial, it always syllabifies in the onset of the following syllable, even if the result is a complex onset (§4.1.3.2). The glottal stop can only be the first consonant of these complex onsets, and it is always followed by a sonorant. When separated from the vowel of its syllable by an intervening sonorant, treating the glottal stop as a vocalic feature is untenable.

The syllabification of post-vocalic glottals into complex onsets instead of codas is at first apparent in how native speakers break words into syllables in slow speech. However, even stronger evidence comes from a ludling, a play language, in which speakers move the first syllable of a word to the end of the word (see §5.9 for more detailed discussion of this language game). In this *reversed speech* game, medial glottals remain with the following vowel, along with an intervening sonorant consonant, if present, as illustrated by the examples in (82).

[8] These exceptional cases can be traced to chance outcomes of historical processes (§4.1.4.1).

(82)	Normal speech		Reversed speech		Gloss
	/tzo**ʔō**/	[ʦo.**ʔō**]	***ʔó**tzo*	[**ʔó.**ʦo]	‘good’
	/nko**ʔo**/	[ŋgo.**ʔo**]	***ʔó**nko*	[**ʔó**.ŋgo]	‘banana’
	/kw-e**ʔę**/	[kʷe.**ʔẽ**]	***ʔé**kwę*	[**ʔé**.kʷẽ]	‘air’
	/n-tya**ʔą**/	[nʲdʲã.**ʔã]**	***ʔá**ntyą*	[**ʔá**.nʲdʲã]	‘goes around’
	/kí**ʔyū**/	[kí.**ʔjū**]	***ʔyú**ki*	[**ʔjú**.ki]	‘male (a.)’
	/kā**ʔyú**/	[kā.**ʔjú**]	***ʔyú**ka*	[**ʔjú**.ka]	‘five’
	/sū**ʔwá**/	[sū.**ʔwá**]	***ʔwá**.su*	[**ʔwá**.su]	‘cargo of’

Crucially with respect to the phonological status of /ʔ/, words of the shape CVʔV undergo the process. For example, the word *tzoʔō* ‘good’ (82) becomes *ʔótzo* in reversed speech, proving that the *ʔō* portion is a syllable, and therefore, the glottal stop is an onset consonant and not a feature of a long vowel. Word games like this are known to provide valuable insight into phonological patterns (Hombert 1986), and this is taken as strong evidence that glottal stop is a consonant in Zenzontepec Chatino. Also, the examples in (82) demonstrate that the language prefers complex onsets to coda glottal stops, or else a word such as *kíʔyū* ‘male’ would come out reversed as *yúkiʔ** instead of the attested *ʔyúki*.

Monosyllabic words, whether monomoraic or bimoraic, by default should not be able to undergo the process of initial syllable movement in reversed speech since there would be no other syllable after which to place the initial syllable. However, if a speaker insists on modifying a monosyllabic word, it can be forced to undergo the process by inserting a glottal stop and then transposing the newly created initial syllable (83). This would not be a possibility if (C)CVʔV sequences were monosyllabic.

(83)	Normal speech		Reversed speech	Gloss
	ntáā	→	***ʔá**nta*	‘beans’
	choo	→	***ʔó**cho*	‘rain’

Another type of evidence in favor of a segmental analysis of /ʔ/ comes from the distribution and behavior of the glottal fricative /j/. The two glottal consonants pattern very similarly in the language, and therefore, they form a natural class. First of all, one of only two permitted types of consonant clusters in the language consists of a glottal consonant, /ʔ/ or /j/, followed by a sonorant (§4.1.3.2). Secondly, a sound change of translaryngeal vowel harmony occurred across both glottal consonants (§5.5.1) and remains an active root-internal constraint in the language (§4.3.5). Furthermore, nasality spreads across syllables separated by either glottal consonant. Therefore, treating /ʔ/ as a feature of the nucleus would squander these generalizations made available by treating it as a consonant in a natural class with /j/.

Finally, treating /ʔ/ as a consonant allows for a phonological analysis consisting of 30 contrastive elements (21 consonants, 5 vowels, 2 tones, vowel length, and vowel nasality) and two permitted types of consonant clusters (glottal+sonorant and nasal+obstruent). A vowel feature analysis would allow for one less consonant phoneme in the inventory, but it would require one of two concomitant complications to the inventory: either (i) five additional laryngealized vowel phonemes (/aʔa/, /eʔe/, etcetera) or (ii) two types of contrastive vowel laryngealization (Vʔ and VʔV). In addition to this, the vowel feature analysis would still require two permitted, but less general, consonant cluster types (/j/ + sonorant, and nasal + obstruent) and perhaps even the introduction of a whole series of pre-glottalized sonorant phonemes to handle the word-initial glottal plus sonorant clusters. Therefore, the consonant analysis allows for the simplest and most elegant phonological system overall. See §4.5 for more general discussion of the

interplay between phonological inventory and phonotactics and arriving at an optimal phonological analysis.

A summary of the evidence that /ʔ/ is a suprasegmental feature is given on the left hand side of Table 4, and the stronger evidence in favor of the alternative, consonantal analysis of glottalization is listed on the right hand side.

Table 4. Consonant versus suprasegmental evidence for /ʔ/

Evidence for /ʔ/ as suprasegmental	Evidence for /ʔ/ as consonant
may be realized as creaky voice	creaky realization is optional and variable
only coda consonant permitted	speakers may pause medially in CVʔV
rare word-initially	may occur word-initially
translaryngeal vowel harmony	syllabifies in onset if possible (ludling)
/t/, /l/, /n/ palatalization not blocked	patterns with /j/ in several ways
allows nasality spreading	inserted to meet onset preference
	results in smaller inventory

Though the weight of the varied evidence just detailed and summarized in Table 4 points to /ʔ/ being a segment, it is clearly a consonant that behaves in some ways like a suprasegmental feature.

Though the details may vary between Chatino varieties, in no variety has a convincing case been made for a non-segmental analysis of /ʔ/. Zapotec languages, on the other hand, are nearly all described as having some suprasegmental vowel laryngealization of one or multiple types. For example, Yalálag Northern (Villa Alta)

Zapotec (Avelino Becerra 2004: 75-77, 105-107) has a full series of laryngealized vowels ($V^{ʔ}V$) and a glottal stop consonant that only occurs word-finally. In Coateco Southern Zapotec (Beam de Azcona 2004: 108-115), glottalization interacts with tone and vowel length, and there is even a distinctive glottal tone category. Some varieties of Central Zapotec, such as San Pablo Güilá Zapotec (Arellanes Arellanes 2009), are analyzed as having two degrees of contrastive laryngealization, weak and strong. Others such as San Baltasar Chichicapan Zapotec (Smith Stark 2002) have three types of contrastive laryngealization: hard checked (Vʔ), soft checked (VV'), and broken (V'V). In Juchitán (Isthmus) Central Zapotec (Pérez Báez and Kaufman 2012: 11) vowels with rearticulated laryngeal vowels change to simple glottalized vowels via some morphological processes, apparently due to interaction with tone and word shape. In Chatino, glottal stop does not interact with tone beyond phonetic coarticulatory effects.

Though some cases of Chatino glottal stop correspond to glottal stop or laryngealization fairly clearly in Zapotec, it is one of the areas of proto-Zapotecan historical phonology with the most remaining questions to be answered. Nevertheless, the facts of /ʔ/ in Zenzontepec Chatino detailed here show how glottal stop and suprasegmental laryngealization could be connected diachronically since there is some dual behavior synchronically.

2.1.6.3. Voiceless glottal fricative /j/

As just discussed in §2.1.6.2, the voiceless glottal fricative /j/ patterns phonologically with /ʔ/ in many respects. One salient difference between the two is that

/j/ is significantly more common than /ʔ/ in word-initial position. Some examples of initial /j/ are in the left column of (84), and intervocalic examples are in the right column, where the surrounding vowels must be identical. That is, translaryngeal vowel harmony operates around /j/ within roots, just as it does around /ʔ/.

(84)

/**j**akwa/	[**h**ak^{w}a]	‘four’	/kwa**j**aʔ/	[k^{w}a**h**aʔ]	‘partly flattened’
/**j**ēlé/	[**h**ēlé]	‘angel’ < Sp. *ángel*	/te**j**eʔ/	[te**h**eʔ]	‘salt’
/**j**īí/	[**h**íí]	‘gray’	/kw-ī**j**í/	[k^{w}ī**h**í]	‘skunk’
/**j**oʔō/	[**h**oʔō]	‘sacred’	/y-o**j**oʔ/	[jo**h**oʔ]	‘stung’
/**j**ūkwę́ʔ/	[**h**ūk^{w}ẽ́ʔ]	‘soft’	/tó**j**ō/	[tó**h**ō]	‘squash vine’
/**j**úų̄/	[**h**ǔ̃ū̃]	‘rope’	/**j**u**j**ulī/	[**h**u**h**ulī]	‘sesame’ < Sp. *ajonjolí*

Examples of /j/ as C_1 of consonant clusters are provided in (85), word-initially (left column) and word-medially (right column).

(85)

/**j**-lakwi/	[**h**lak^{w}i]	‘downhill’	/lēj**l**í/	[lē**h**lí]	‘circular’
/**j**nyaʔa/	[**h**n^{j}ãʔã]	‘craving (n.)’	/kwi-**j**nyaʔ/	[k^{w}i**h**n^{j}ãʔ]	‘mouse’
/**j**nii/	[**h**nĩĩ]	‘music’	/nku-tye**j**nā/	[ŋgut^{j}e**h**nã̃]	‘began’
/**j**yánā/	[**h**jánã̃]	‘one year ago’	/kwi**j**yuʔ/	[k^{w}i**h**juʔ]	‘undeveloped’
/**j**wentē/	[**h**ɸendē]	‘bridge’ < Sp. *puente*	/nku-a**j**wi/	[ŋgu**h**ɸi]	‘died’

Some minimal and near-minimal pairs involving /j/ are listed in (86), where it is shown to contrast with /ʔ/, /x/, /s/, /ch/, /tz/, and Ø.

(86)

/j/ ≠ /ʔ/	/nte**j**yā/	[nte**h**jā]	‘is playing’	/nte**ʔ**ya/	[nde**ʔ**ya]	‘tooth of’
/j/ ≠ /x/	/ti**j**i/	[ti**h**i]	‘hard’	/ti**x**i/	[ti**ʃ**i]	‘sweet’
/j/ ≠ /s/	/nka-**j**úʔū/	[ŋga**h**úʔū]	‘felt ashamed’	/nka-**s**uʔū/	[ŋga**s**uʔū]	‘showed’
/j/ ≠ /ch/	/**j**ii/	[**h**ii]	‘ash’	/**ch**ii/	[**ʧ**ii]	‘gentleman’
/j/ ≠ /tz/	/**j**oʔō/	[**h**oʔō]	‘sacred’	/**tz**oʔō/	[**ʦ**oʔō]	‘good’
/j/ ≠ Ø	/cho**j**o/	[ʧo**h**o]	‘squash’	/choo/	[ʧoo]	‘rain’

2.2. Vowels

The vowel phonemes of Zenzontepec Chatino are presented in Table 5, repeated here from Table 2 (page 39) for convenience. There are five basic vowel qualities: /i, e, a, o, u/. They are monophthongal, spread maximally around the vowel space, and more or less the same as the five vowels of Spanish. Rather than considering long vowels, nasal vowels, and long nasal vowels as additional sets of separate vowels, vowel length and nasality are analyzed here as contrastive autosegmental features with their own distributions and phonological behavior. They are discussed in Chapter 3.

Table 5. Vowel phonemes

	Front	Central	Back
High	*i*		*u*
Mid	*e*		*o*
Low		*a*	

2.2.1. High front unrounded vowel /i/

The high front unrounded vowel /i/ is realized as [i], the close front unrounded vowel of the IPA. Its distribution is only minimally restricted. It is exemplified in a representative range of environments in (87). In the left column are examples of /i/ in monosyllabic words of a variety of shapes: a monomoraic particle; enclitics; and bimoraic monosyllables with various combinations of vowel length, nasality, and final

glottal stop. Examples of /i/ in a range of contexts in polysyllabic forms are in the right column of (87). Those environments include penultimate and final syllables of roots with and without following glottal stop; final syllables in combination with nasality and vowel length; and finally, in an antepenultimate syllable prefix.

(87)	/x**ī**/	[ʃ**ĩ**]	locative nominalizer	/l**i**sū/	[l**i**sū]	‘avocado’
	/=n**i**ʔ/	[n**ĩ**ʔ]	3SG.RSP	/kw-**i**ʔyū/	[kʷ**i**ʔjū]	‘flea’
	/=r**i**/	[ɾ**i**]	‘only’	/ntak**i**/	[ndak**i**]	‘nettle’
	/t**i**i/	[t**i**i]	‘clear’	/j**i**ʔ**ḭ̄**/	[h**ĩ**ʔ**ĩ̄**]	NSBJ marker
	/k**ī**ḭ́/	[k**ĩ̄**ĩ́]	‘open (adj.)’	/kw-**i**tīʔ/	[kʷ**i**tʲ**ī**ʔ]	‘frog’
	/x**i**iʔ/	[ʃ**i**iʔ]	‘side of’	/ya k**i**j**ḭ̄**ʔ/	[ja k**ĩ**h**ĩ̄**ʔ]	‘herb sp.’
	/nkw**ī**íʔ/	[ŋgʷ**ī**íʔ]	‘ring’	/nte-jn**i**i/	[ndehn**ĩ**ĩ]	‘is growing’
	/mp**i**i/	[mb**i**i]	‘small toad sp.’	/kwi-tuluʔ/	[kʷ**i**tʲuluʔ]	‘cockroach’

Aside from the minor co-occurrence limitations of /i/ due to earlier sound changes (e.g. it rarely follows /tz/ because **tz* > *ch* / __ *i*), there are two other limitations to the distribution of /i/. First, it does not occur after /y/ or /ky/, just as /u/ and /o/ do not follow /w/ or /kw/ (§4.3.2). The second type of restriction in the distribution of /i/ is that with nasality it is nearly neutralized with /e/, being realized as, or having changed to, [ę] in most cases. This is best viewed as a sound change that has not fully run its course. Some cases of nasal /i/ have become nasal /e/ but still betray their former status as /i/ because they previously conditioned palatalization of preceding sibilants (/s/ or /tz/). For example *kixę̄ʔ* ‘herb’ must have previously been **kixįʔ* or else the sibilant would not have palatalized. Note that Kaufman (1993) reconstructs **kiʔxxiʔ* ‘herb’ for proto-Zapotec, which reflects the vowel /i/. The example *ya kijḭ̄ʔ* ‘herb sp.’ in (87) presents an exception to the lowering of nasal /i/. If it were in fact now nasal /e/, the /k/ would be phonetically palatalized, because /k/ palatalizes before /e/ (§2.1.5.2). Since it is not palatalized, the

vowel must be nasal /i/. As a final note, there is considerable inter-speaker variation in the realization of nasal front vowels. Some speakers tend more toward [ẽ], while other speakers produce a vowel closer to [ĩ]. The vowel tends to be realized higher if occurring with high tone, as opposed to mid or no tone, but tone level is not a robust determiner of nasal vowel height. Minimal and near-minimal pairs contrasting /i/ with the other vowels are set up in (88).

(88)	/i/ ≠ /e/	/ki**t**ī/	[ki**t**ʲī]	‘paper’	/ki**t**ē/	[ki**t**ʲē]	‘pine’
	/i/ ≠ /a/	/lil**a**/	[lilʲ**a**]	‘straight’	/lil**i**/	[lilʲ**i**]	‘slimy’
	/i/ ≠ /o/	/nt-**i**i/	[nd**i**i]	‘wants’	/nt**o**o/	[nd**o**o]	‘face of’
	/i/ ≠ /u/	/t**i**tzę/	[t**i**tsẽ]	‘unpleasant’	/t-**u**tzę/	[t**u**tsẽ]	‘afraid’

2.2.2. Mid front unrounded vowel /e/

The mid front unrounded vowel /e/ is pronounced as the close-mid front unrounded vowel [e] of the IPA. It is exemplified in a broad array of environments in (89), just as was done for /i/ in §2.2.1. Among Chatino languages, Zenzontepec Chatino is unique in preserving /e/ in non-final syllables, as all other varieties of Chatino have deleted or shifted non-final /e/ (Campbell 2013a: 406-407).

(89)	/l**ē**ʔ/	[l**ē**ʔ]	‘then’, ‘after that’	/k**e**su/	[kʲ**e**su]	‘net’
	/nt**ē**/	[nd**ē**]	‘this’	/kw-**ē**ʔyá/	[kʷ**ē**ʔjá]	‘pocket gopher’
	/k**e**ē/	[kʲ**e**ē]	‘flower’	/jūt**é**/	[hūt**é**]	‘pine pitch’
	/l**é**ē/	[l**é**ē]	‘strong’	/sat**ę**/	[sat**ẽ**]	‘branch of’
	/s**e**ę/	[s**ẽ**ẽ]	‘wide’	/kw-**e**ʔ**ę**/	[kʷ**ẽ**ʔ**ẽ**]	‘wind’
	/kw-**e**ę̄/	[kʷ**ẽ**ẽ̃]	‘bat’	/tan**ē**ʔ/	[tan**ẽ**ʔ]	‘on credit’
	/mp**e**ēʔ/	[mb**e**ēʔ]	‘calf (animal)’	/kūt**ę́**ʔ/	[kūt**ẽ́**ʔ]	‘spindle’
	/ty**e**ęʔ/	[tʲ**ẽ**ẽʔ]	‘root of’	/nt**e**-lukwā/	[nd**e**lukʷā]	‘is sweeping’

Minimal pairs that show that /e/ contrasts with the other four vowels are in (90).

(90)	/e/≠/i/	/kw-**e**eʔ/	[kʷ**e**eʔ]	‘crab’	/kw-**i**iʔ/	[kʷ**i**iʔ]	‘oriole sp.’
		/nti-uw**e**/	[nduw**e**]	‘gets ground’	/nt-uw**i**/	[nduw**i**]	‘shiny’
	/e/≠/a/	/sat**e**ʔ/	[sat**e**ʔ]	‘clothes of’	/sat**a**ʔ/	[sat**a**ʔ]	‘dwarf’
	/e/≠/o/	/k**e**e/	[kʲ**e**e]	‘stone’	/k**o**o/	[k**o**o]	‘cloud’
	/e/≠/u/	/kut**e**ʔ/	[kut**e**ʔ]	‘female (of animal)’	/kut**u**ʔ/	[kut**u**ʔ]	‘clumsy’

2.2.3. Low central unrounded vowel /a/

The low central unrounded vowel /a/ is unrestricted in its distribution. Aside from participating in vowel hiatus resolution (§5.3.1) and fusion (§5.7) in inflection, /a/ is phonologically inert in that it undergoes no allophonic change (in Core Zenzontepec) nor does it condition any phonological processes involving other sounds. The examples in (91) present /a/ in a wide range of word shapes and phonetic environments like those used to demonstrate /i/ and /e/ above, including monosyllabic particles, enclitics, nasality, vowel length, either syllable in disyllabic forms, and antepenultimate syllables.

(91)	/t**a**/	[t**a**]	PRF	/k**a**tę̄/	[k**a**tẽ̄]	‘colorless’
	/ch**á**ʔ/	[ʧ**á**ʔ]	‘uphill’	/s**á**ʔ**ā**/	[s**á**ʔ**ā**]	‘lover of’
	/w**á**/	[w**á**]	DIST	/nch-ūl**á**/	[nʲʤūl**á**]	‘is singing’
	/k**ā**á/	[k**ā**á]	‘nine’	/tikw**ą**/	[tikʷ**ã**]	‘badly’, ‘rudely’
	/t**a**ą/	[t**ã**ã]	‘fat’	/līy**á**ʔ/	[līj**á**ʔ]	‘farming plot’
	/kw-**a**aʔ/	[kʷ**a**aʔ]	‘bear (n.)’	/nyak**ą**ʔ/	[nʲak**ã**ʔ]	‘stuttering (adj.)’
	/nch-**a**a/	[nʲʤ**a**a]	‘is going’	/nk**a**-sukwi/	[ŋg**a**sukʷi]	‘sucked’

Minimal pairs that illustrate the status of /a/ as distinct from /i/, /e/, /o/, and /u/ are provided in (92).

(92)	/a/≠/i/	/kiʔn**a**/	[kiʔnʲ**ã**]	‘bed’	/kiʔn**i**/	[kiʔnʲ**ĩ**]	‘deep’
		/t**a**ʔ**a**/	[t**a**ʔ**a**]	‘festival’	/t**i**ʔ**i**/	[t**i**ʔ**i**]	‘poor’
	/a/≠/e/	/kwén**ā**ʔ/	[kʷén**ã**ʔ]	‘meat’	/kwén**ē**ʔ/	[kʷén**ẽ**ʔ]	‘very young’
	/a/≠/o/	/kul**a**/	[kul**a**]	‘elder’	/kul**o**/	[kul**o**]	‘first’
	/a/≠/u/	/l**a**ʔ**a**/	[l**a**ʔ**a**]	‘broken’	/l**u**ʔ**u**/	[l**u**ʔ**u**]	‘alive’

2.2.4. Mid back rounded vowel /o/

The mid back rounded vowel /o/ has a restricted distribution. It does not follow /w/ or /kw/ (§4.3.2). It is never found in antepenultimate syllables and only rarely occurs in penultimate syllables of the phonological word (see §10.2.1). Some examples of /o/ in its common contexts are provided in (93).

(93)	/l**ō**/	[l**ō**]	‘when’	/kul**o**/	[kul**o**]	‘first’
	/tz**ǫ**ʔ/	[ʦ**ǫ**ʔ]	‘behind’	/kētǫ́/	[kētǫ̃́]	‘weapon’
	/l**ō**ʔ/	[l**ō**ʔ]	‘all the time’	/xal**o**ʔ/	[ʃal**o**ʔ]	‘spoon’
	/l**o**o/	[l**o**o]	‘dress (n.)’	/nkwi-s**ó**ʔ/	[ŋgʷīs**ó**ʔ]	‘picked it up
	/ty**o**ǫ/	[tʲ**õ**õ]	‘will defend’	/ntitz**ǫ**ʔ/	[ndiʦ**õ**ʔ]	‘corn at flower stage’
	/ch**o**ōʔ/	[ch**o**ōʔ]	‘maguey’	/ntákǭʔ/	[ndákȭʔ]	‘fist’

Of all of the vowels, /o/ is the least frequently found in penultimate syllables. Some cases of penultimate /o/ are the result of translaryngeal vowel harmony (§5.5.1), where a final syllable /o/ has been copied to the penultimate syllable, as in (94).

(94)	/nk**o**ʔo/	[ŋg**o**ʔo]	‘banana’	/k**o**jo/	[k**o**ho]	‘elf owl’
	/ly**o**ʔo/	[lʲ**o**ʔo]	‘spouse of’	/y-**o**joʔ/	[**j**ohoʔ]	‘stung’
	/l**ō**ʔó/	[l**ō**ʔó]	‘fence’	/ch**o**jo/	[ʧ**o**ho]	‘squash’
	/nch-**o**ʔō/	[nʲʤ**o**ʔō]	‘is drinking’	/t**ó**jō/	[t**ó**hō]	‘squash vine’
	/nti-tz**o**ʔo/	[ndiʦ**o**ʔo]	‘gets high’	/xi-k**ó**jōʔ/	[ʃīk**ó**hōʔ]	‘shoot of (n.)’
	/kwa-k**o**ʔo/	[kʷak**o**ʔo]	‘corn weevil’			

The infrequency of /o/ in penultimate syllables is probably due to a very old change where /o/ merged with /u/ in non-final syllables. No known Chatino language significantly contrasts /o/ and /u/ outside of root-final syllables. The picture of /o/ and /u/ is not all clear in Zapotec either, so the pattern is possibly as old as proto-Zapotecan or earlier. Currently, most cases of /o/ in non-final syllables that are not the result of

translaryngeal vowel harmony are identifiable as compounds, loanwords, or sound symbolic material (95). Nevertheless, a few others appear to be native words so far not analyzable as compounds or loanwords (96).

(95)	/t**o**+xuʔ/	[t**o**ʃuʔ]	'buttock of' < *to* 'edge' + *xiyuʔ* 'genitals'
	/l**o**+xę̄ʔ/	[l**o**ʃ̃ẽʔ]	'wild area', 'forest' < *lo* 'at' + *kixę̄ʔ* 'herb', 'wild'
	/t**o**+ti/	[t**o**ti]	'dwelling place of' < *to* 'edge' + *liti* 'house'
	/nk-y**ó**+kwijiʔ/	[ŋʲgʲ**ó**kʷihiʔ]	'will hiccup' < *yó* 'go up' + *kwijiʔ* 'hiccup'
	/n-t**ō**+nēʔé/	[nd**ō**nẽʔẽ́]	'is gathered together' < *tō* 'be inside' + *nēʔé* 'throw'
	/k**o**ʔma/	[k**o**ʔmã]	'macaw' < proto-Mixe-Zoquean **ʔowa*
	/t**o**rō/	[t**o**ɾō]	'bull' < Sp. *toro* 'bull'
	/nk**o**lō/	[ŋg**o**lō]	'turkey' (onomatopoeic)
	/ty**o**rę̄ʔ jii/	[tʲ**o**ɾẽʔ hii]	'red-billed bird species' (likely sound symbolic)

(96)	/k**ō**tzá/	[k**ō**tsá]	'three days away (before or after)'
	/k**ō**ʔyú/	[k**ō**ʔjú]	'four days from today'
	/s**o**ʔni/	[s**o**ʔnĩ]	'conch' (no known Chatino cognates, Mixe-Zoquean loan?)[9]
	/ntz**ō**tyú/	[nd͡z**ō**tʲú]	'Santiago Jamiltepec (village)' (likely an old compound)

Minimal pairs contrasting /o/ with the other four vowels are listed in (97).

(97)	/o/≠/i/	/ch**o**o/	[ʧ**o**o]	'rain'	/ch**i**i/	[ʧ**i**i]	'gentlemen'
	/o/≠/e/	/k**o**ǫ/	[k**õ**õ]	'tuber'	/k**e**ę/	[k**ẽ**ẽ]	'swelling (n.)'
	/o/≠/a/	/kwē-l**ó**/	[kʷēl**ó**]	'current (n.)'	/kwe-ūl**á**/	[kʷēl**á**]	'dancer'
		/ch**o**ʔ**o**/	[ʧ**o**ʔ**o**]	'lime(stone)'	/ch**a**ʔ**a**/	[ʧ**a**ʔ**a**]	'heavy rain'
	/o/≠/u/	/y**o**o/	[j**o**o]	'oven'	/y**u**u/	[j**u**u]	'dirt'

2.2.5. High back rounded vowel /u/

The high back rounded vowel /u/ is pronounced as the close back rounded vowel [u] of the IPA. Like /o/, it does not occur following /w/ or /kw/ in native material (§2.2.4;

[9] Kaufman & Justeson (2007: 197) reconstruct proto-Zoque **soki?* 'snail', and Elson (1992: 581) reconstructs proto-Zoque **nɨ* 'water'. Zenzontepec Chatino *soʔni* 'water' may be borrowed from an old Zoque or Mixe-Zoque compound meaning 'water snail'. Juliette Blevins (p.c.) suggested this.

§4.3.2). Also, parallel to nasal /i/ nearly merging with /e/, /u/ has largely merged with /o/ in nasality contexts, and there are no minimal pairs that would contrast the two in that environment (§3.1). However, though the back rounded nasal vowel is realized as [õ] in most lexemes, in others it is consistently realized as [ũ] (§3.1). There is some cross-speaker variation on this point. In the end, the vowel height is not fully predictable, so the phonemic representation follows the phonetic facts strictly. Some examples of /u/ in varied contexts are given in (98).

(98)	/n**u**/	[n**ũ**]	nominalizer	/l**ú**kwī/	[l**ú**kʷī]	‘mezcal (liquor)’
	/tz**ū**ʔ/	[ʦ**ū**ʔ]	‘across’	/k**u**ʔnā/	[k**u**ʔnã̄]	‘rich’
	/=r**ú**ʔ/	[ɾ**ú**ʔ]	‘more’	/kek**u**/	[kʲek**u**]	‘comb’
	/y**ú**ū/	[j**ú**ū]	‘cliff’	/tīk**ų́**/	[tīk**ṹ**]	‘fetid’
	/j**ú**ų̄/	[h**ṹ**ũ̄]	‘rope’	/nták**ū**ʔ/	[ndák**ū**ʔ]	‘roadrunner’
	/ty**u**uʔ/	[tʲ**u**uʔ]	‘will cough’	/ki-tzūk**ų́**ʔ/	[kiʦūk**ṹ**ʔ]	‘will fold’

Pure minimal pairs contrasting /u/ with the other four basic vowels are presented in (99).

(99)	/u/≠/i/	/k**u**tza/	[k**u**ʦa]	‘difficult’	/k**i**tza/	[k**i**ʦa]	‘sick’
	/u/≠/e/	/nti-**u**ne/	[nd**u**nẽ]	‘digs’	/nti-**e**ne/	[nd**e**nẽ]	‘is heard’
	/u/≠/a/	/nka-u-l**u**kwā/	[ŋgal**u**kʷā]	‘swept’	/nka-u-l**a**kwā/	[ŋgal**a**kʷā]	‘counted’
	/u/≠/o/	/k**u**uʔ/	[k**u**uʔ]	‘dirty’	/k**o**oʔ/	[k**o**oʔ]	‘charcoal’

2.3. Summary

This chapter has presented the segmental phonemes of Zenzontepec Chatino, describing their basic phonetic realization, their allophones, their distributional patterns, and notes about their historical development. The contrastive status of each has been established by minimal and near-minimal pairs. The phonotactic patterns are consolidated

and addressed in depth in Chapter 4, and phonological processes are re-treated and generalized in Chapter 5. The focus here has been on the nature and behavior of the segments in the basic, native phonological system. However, there is some regional variation in the segmental phonology, and this is taken up in Chapter 6. Also, segmental sound patterns differ somewhat in the alternate but overlapping phonologies of loanwords (Chapter 7) and sound symbolism (Chapter 8). The next chapter (Chapter 3) presents the autosegmental elements, which operate largely independently from the segments presented here.

Chapter 3

Autosegmental inventory

There are three types of contrastive autosegmental elements in Zenzontepec Chatino, and each will be described in detail in this chapter: vowel nasality (§3.1), vowel length (§3.2), and tone (§3.3). By autosegmental elements I mean elements that are contrastive in the language and that phonologically co-occur with vowels, or syllabic nuclei, but phonetically occur not only on those vowels but over spans of several, or even many, segments. Though phonological processes are addressed specifically in Chapter 5, those that involve tone are presented in a special section in this chapter (§3.4). The reason for this is that phonological processes are useful for portraying the nature and contrastiveness of the lexical tone specifications that a mora may bear. The mora (Hyman 1985) is a unit of weight in the syllable rime, where a short vowel consists of one mora and a long vowel consists of two moras. The distributional facts about suprasegmentals are treated throughout this chapter, and they are summarized in parts of Chapter 4, which deals directly with phonotactics.

3.1. Vowel nasality /Ɣ/

Vowel nasality is contrastive in Zenzontepec Chatino, but only in the final mora of the phonological word. The true minimal pairs in (100) illustrate the contrastiveness of nasality. Each pair includes one word with vowel nasality and another word without nasality that is otherwise identical. The minimal pairs in (100) are limited to /a/, /e/, and /o/, due to the relative scarcity of nasal /i/ and /u/. Nevertheless, some near-minimal pairs reflecting the contrastiveness of nasality with /i/ and /u/ are given in (101).

(100)	/ą/≠/a/	/kwa**ą**/	[kʷã**ã**]	‘fever’	/kwa**a**/	[kʷa**a**]	1PL.EXCL
		/x-ik**ą**ʔ/	[ʃik**ãʔ**]	‘brilliance of’	/xik**a**ʔ/	[ʃik**a**ʔ]	‘gourd’
		/ch-at**ą**/	[ʧat**ã**]	‘will get peeled’	/chat**a**/	[ʧat**a**]	‘will plant’
		/lyakw**ą**/	[lʲakʷ**ã**]	‘blessed’	/lyakw**ā**/	[lʲakʷ**ā**]	‘why?’
	/ę/≠/e/	/ke**ę**/	[kẽ**ẽ**]	‘swelling (n.)’	/ke**e**/	[ke**e**]	‘stone’
		/kitz**ę**/	[kitsẽ]	‘village’	/kitz**e**/	[kitsẽ]	‘maguey fiber’
		/kwej**ę**/	[kʷẽh**ẽ**]	‘bag’	/kwej**e**/	[kʷeh**e**]	‘goosefoot (herb)’
		/tyeʔ**ę**/	[tʲẽʔ**ẽ**]	‘will be located’	/tyeʔ**e**/	[tʲeʔ**e**]	‘inner wood’
	/ǫ/≠/o/	/ko**ǫ**/	[kõ**õ**]	‘tuber’	/ko**o**/	[ko**o**]	‘cloud’
		/nto**ǫ**/	[ndõ**õ**]	‘is standing’	/nto**o**/	[ndo**o**]	‘face of’
		/k-ōʔ**ǫ́**/	[kõʔ**ṍ**]	‘will pound’	/k-ōʔ**ó**/	[kōʔ**ó**]	‘will drink’

(101)	/į/ ≠/i/	/jiʔ**į̄**/	[hĩʔ**ĩ̄**]	NSBJ marker	/tiʔ**ī**/	[tiʔ**ī**]	‘smell’
		/ya k**i**jɨʔ/	[ja k**ĩ**hɨ̃ʔ]	‘herb sp.’	/+kwijɨʔ/	[kʷihɨ̄ʔ]	‘hiccup’
	/ų/≠/u/	/kūk**ú**/	[kūk**ṹ**]	‘mottled owl’	/suk**u**/	[suk**u**]	‘small fish’
		/jú**ų̄**/	[hṹ**ũ̄**]	‘rope’	/yú**ū**/	[jú**ū**]	‘cliff’

The minimal triplets in (102) demonstrate the very clear contrast between /a/, /e/, and /o/ in vowel nasality.

(102)	/ą/ ≠ /ę/ ≠ /ǫ/	/taą/	[tãã]	‘fat (n.)’	/teę/	[tẽẽ]	‘quiet’	/toǫ/	[tõõ]	‘knot’
		/kaą/	[kãã]	‘penis’	/keę/	[kʲẽẽ]	‘swelling’	/koǫ/	[kõõ]	‘tuber’

All vowels are phonetically nasalized following nasal consonants, as illustrated in the examples in (103) (and all of the phonetic transcriptions presented thus far). Therefore, oral vowels and nasal vowels are neutralized after nasal consonants. For the sake of simplicity, vowels are always treated as underlyingly non-nasal after nasal consonants, since their nasalization is automatic in that environment.[10]

(103)	/nanaʔ/	[n**ã**n**ã**ʔ]	'thick (liquid)'	/níkąʔ/	[n**ĩ́**k**ã̃**ʔ]	'gem'
	/kw-énā/	[k^{w}én**ã̃**]	'snake'	/nk-y-ánō/	[ŋ^{j}g^{j}án**õ̃**]	'stayed'
	/sēné/	[sēn**ẽ́**]	'toad'	/tíʔnu/	[tíʔn^{j}**ũ̃**]	'fifteen'

Contrastive vowel nasality phonetically spreads from final moras to tautosyllabic penultimate moras due to coarticulation (104).

(104)	/kwa**ą**/	[k^{w}**ãã̃**]	'high'	/ni-ka**ą**/	[nĩk**ãã**]	'penis of'
	/kwe**ę**/	[k^{w}**ẽẽ**]	'noise'	/ki-te**ę**/	[kit^{j}**ẽẽ**]	'will haul'
	/kī**į́**/	[k**ĩĩ́**]	'open (adj.)'	/nkū-kī**į́**/	[ŋgukī**ĩĩ́**]	'opened (itrn.)'
	/so**ǫ**/	[s**õõ**]	'trunk of', 'base of'	/nku-to**ǫ**/	[ŋgut**õõ**]	'was standing'
	/jú**ų̄**/	[h**ų́ų̃**]	'rope'	/nti-ju**ų**/	[ndih**ũũ**]	'spins (thread)'

Nasality also spreads from final syllables to penultimate syllables within roots if only a glottal consonant intervenes, as illustrated in (105) (see also §5.5.3).

(105)	/ntająʔ/	[nt**ã**h**ã̃**ʔ]	'fan (n.)'	/jāʔą́/	[h**ã̃**ʔ**ã̃́**]	'wants'
	/tejẽʔ/	[t**ẽ**h**ẽ̃**ʔ]	'sticky'	/teʔę/	[t**ẽ**ʔ**ẽ̃**]	'heavy'
	/kejẹ/	[k^{j}**ẽ**h**ẽ̃**]	'skin'	/jiʔį̄/	[h**ĩ**ʔ**ĩ̃**]	NSBJ marker
	/ya kijī̤ʔ/	[ja k**ĩ**h**ĩ̃**ʔ]	'herb sp.'	/koʔǭ/	[k**õ**ʔ**õ̃**]	'deaf'

[10] It should be noted that this is not the case for all varieties of Chatino. In Zacatepec Eastern Chatino, the quality of most vowels is altered by phonemic nasalization (Villard 2008b) but not by phonetic coarticulatory nasalization after nasal consonants. Therefore vowel nasality maintains its contrastiveness after nasal consonants in that variety, and Zenzontepec Chatino presumable lost the contrast in that environment.

Phonetic nasalization following nasal consonants also spreads (forward) across glottal consonants (106).

(106)	/nyáʔa/	[nʲ**ã̃ʔã**]	‘mother of’	/niʔi/	[n**ĩ̃ʔĩ**]	‘house
	/nka-nēʔé/	[ŋgān**ẽ̃ʔẽ́**]	‘threw’	/nyájā/	[nʲ**ã́hã̃**]	‘year’

Even though clitics are separate phonological words from their hosts (§10.5), nasality in an enclitic will spread to its host if no consonant intervenes or if only a glottal consonant intervenes. Some examples of this are shown in (107), where uninflected (or third person zero-marked) forms without nasality are on the left and the corresponding 1SG or 1PL.INCL forms, with nasality in enclitics, are on the right. In some cases, the vowel quality is a fusion of the quality of the host vowel and the quality of the enclitic vowel (§5.7).

(107)	/kwi-tiʔ/	[kʷitʲiʔ]	‘brother of male’	/kwi-tiʔ=ą̄ʔ/	[kʷitʲ**ẽ̃**ʔẽ̃ʔ]	‘my brother’
	/y-akwiʔ/	[jakʷiʔ]	‘spoke’	/y-akwiʔ=ą̄ʔ/	[jakʷ**ẽ̃**ʔẽ̃ʔ]	‘I spoke’
	/luʔu/	[luʔu]	‘alive’	/luʔu=ą̄ʔ /	[l**õ̃**ʔ**õ̃**õ̃ʔ]	‘I’m alive’
	/taja/	[taha]	‘lazy’	/taja=ą̄ʔ /	[t**ã̃**h**ã̃**ã̃ʔ]	‘I’m lazy’
	/tyáʔā/	[tʲáʔā]	‘relative of’	/tyáʔā=ą/	[tʲ**ã́**ʔ**ã̃**ã̃]	‘our relative’
	/ki-lyēʔé/	[kīlʲēʔé]	‘will lick’	/ki-lyēʔé=ą/	[kīlʲ**ẽ̃**ʔ**ẽ́**ẽ̃]	‘we will lick’
	/kojō/	[kohō]	‘lame’	/kojō=ą/	[k**õ̃**h**õ̃**õ̃]	‘we are lame’

Likewise, nasality in the final mora of a host, whether underlying or merely phonetic, will spread to a following enclitic that is not underlyingly nasal, even across glottal consonants. This is shown using the 3PL/NSPC enclitic *=ūʔ* in (108), where hosts without vowel nasality are on the left and hosts with nasality, which spreads, are on the right.

(108)	/y-aku=ūʔ/	[jakuūʔ]	‘they ate’	/nakwę=ūʔ/	[nakʷẽ**ũ̃**ʔ]	‘they said’
	/y-oʔō=ūʔ/	[joʔōúʔ]	‘they’re drinking’	/ʔne=ūʔ/	[ʔnẽ**ũ̃**ʔ]	‘they’re doing’
	/juti=ūʔ/	[hutiūʔ]	‘their father’	/nyáʔa=ūʔ/	[nʲã̌**ʔãũ̃**ʔ]	‘their mother’
	/tyáʔā =ūʔ/	[tʲáʔāūʔ]	‘their relative’	/itzǫʔ=ūʔ/	[itsõʔ**ũ̃**ʔ]	‘their backs’

It appears that there is a change in progress in which nasal high vowels are being lowered to mid vowels. The lexemes in (109) reflect this. Those on the left have non-palatalized sibilants /s/ and /tz/ preceding /ę/, and those on the right have palatalized sibilants /x/ and /ch/ preceding /ę/. As mentioned in §2.1.3.2 and §2.1.3.3, sibilants palatalized before /i/ but not before /e/. The majority of cases of palatalized sibilants can be traced to one of three sources: the result of this palatalization change, loanwords, or sound symbolic material. Since the lexemes on the right in (109) are unlikely to be loanwords or sound symbolic forms, they must have previously contained nasal /i/, which would have conditioned the sibilant palatalization even though the vowel is now lowered to /e/.

(109)	/kitzę/	[kitsẽ]	‘village’	/kwi**chę**/	[kʷiʧẽ]	‘quail’
	/seę/	[sẽẽ]	‘wide’	/**xeę**/	[ʃẽẽ]	‘dinner’
	/nte-sę/	[ndesẽ]	‘is getting wrapped	/nte-**xę**/	[ndeʃẽ]	‘is getting late’
	/yusę/	[jusẽ]	‘sand’	/ki**xę̄**ʔ	[kiʃ̃ẽʔ]	‘herb’

In spite of the merging of high and mid vowels under nasality that appears to be in progress (see also §2.2.1 for /i/ and §2.2.5 for /u/), a minimal contrast remains between high vowels and their corresponding mid vowels when nasal. Nevertheless, nasality is now fairly rare with the high vowels /i/ and /u/. That is, /i/ and /e/ are only marginally distinct under nasality, and the same is true for /u/ and /o/, but crucially, neither pair can be shown to be contrastive using minimal pairs. A few lexemes are consistently

pronounced with [į] or [ų] (e.g. *ya kijį̄ʔ* ‘herb *sp*.’, *júų̄* ‘rope’, and *kūkų́* ‘mottled owl’). Since such high-vowel qualities can not be predicted on other phonetic or phonological grounds, vowel quality must be specified lexically for all five vowels under nasality. The pairs of words in (110) illustrate the marginal but real contrastiveness of high versus mid vowels when nasal.

(110)	/į/ ≠ /ę/	/jiʔ**į̄**/	[hĩʔ**ĩ̄**]	NSBJ marker	/keʔ**ę̄**/	[kʲẽʔ**ẽ̄**]	‘excrement’
		/ya kij**į̄**ʔ/	[ja kĩh**ĩ̄**ʔ]	‘herb sp.’	/tej**ę̄**ʔ/	[tẽj**ẽ̄**ʔ]	‘sticky’
	/ų/≠ /ǫ/	/kūk**ų́**/	[kūk**ů́**]	‘mottled owl’	/kētǫ́/	[kʲētṍ]	‘weapon’
		/jú**ų̄**/	[hů**ų̃**]	‘rope’	/toǫ/	[tõ**ǫ̃**]	‘knot’

3.2. Vowel length /VV/

Proto-Chatino monosyllabic content words were realized phonetically long, due likely to a bimoraicity requirement in which phonological words made up of single content-word lexemes were required to be at least bimoraic. On the other hand, monosyllabic function words were likely realized monomoraically, since that is the case in Zenzontepec Chatino and seemingly also in Zacatepec Eastern Chatino. Despite the presence of long versus short monosyllables, vowel length was not distinctive in Proto-Chatino because it was predictable based on word class. Contrastive vowel length has come about in Zenzontepec Chatino due to some sporadic clippings of words and a sound change in which non-final syllables consisting of a simple coronal obstruent followed by a high vowel have reduced to /j/. Such recently monosyllabified words are monomoraic, making vowel length limitedly contrastive among content words. The result is that vowel length is contrastive in Zenzontepec Chatino, but only marginally so due to the limited

number of monomoraic content words. Nevertheless, the importance of vowel length is not marginal with respect to tone patterns, since tone is mora-linked. Vowel length is restricted to final syllables of the phonological word. Some examples of long vowels are given in (111), with monosyllabic forms on the left and disyllabic forms on the right.

(111)	/xíī/	[ʃíī]	‘light’	/nte-nīí/	[ndenĩ̃ĩ́]	‘is confessing’
	/piī/	[piī]	‘cute, colorful’	/la-wíī/	[laβ̰íī]	‘clean’
	/jnii/	[hnĩĩ]	‘music’	/nka-u-kīį́/	[ŋgakĩ̃ĩ́]	‘opened’
	/see/	[see]	‘quietly’	/kwi-seeʔ/	[kʷiseeʔ]	‘raccoon’
	/ntzeēʔ/	[ndzeēʔ]	‘tantrum having’	/nti-u-teę/	[ndutẽẽ]	‘hauls
	/kweę́/	[kwẽẽ̃]	‘right side’	/kwi-teeʔ/	[kʷitʲeeʔ]	‘ant’
	/laa/	[laa]	‘church’	/kwe-taa/	[kʷetaa]	‘Mixtec’
	/naa/	[nãã]	‘name’	/nku-láā/	[ŋguláā]	‘got loose’
	/māáʔ/	[mãã́ʔ]	‘foul-colored’	/ki-sāą́/	[kisãã́]	‘will fall over’
	/nkoǫ/	[ŋgõõ]	‘turtle’	/nti-u-lōó/	[ndulōó]	‘takes out’
	/tuuʔ/	[tuuʔ]	‘cough (n.)’	/nku-toǫ/	[ndetõõ]	‘was standing’
	/ntúūʔ/	[ndúūʔ]	‘fishing basket’	/nka-suuʔ/	[ŋgasuuʔ]	‘urinated’
	/ruū/	[ɾuū]	‘rice’ < Sp. *arroz*	/nti-luu/	[ndilʲuu]	‘gets dug’

There are a few minimal and near-minimal pairs that serve to demonstrate the contrastiveness of vowel length (112). It should be noted that function words and particles are still much more frequently monomoraic than are content words, as they were apparently exempt from the bimoraic constraint that was earlier in effect. The pairs in (112) are therefore restricted to free-standing content words, but more could be offered if function words were considered.

(112)	/j-lyaʔ/	[hlʲaʔ]	‘cold’	/jlyaaʔ/	[hlʲaaʔ]	‘bitter’
	/jlyā/	[hlʲā]	‘morning’	/jlyaāʔ/	[hlʲaāʔ]	‘cotton’
	/jnya/	[hnʲã]	‘griddle’	/j-nyaa/	[hnʲãã]	‘very spicy hot’
	/jlyū/	[hlʲū]	‘big’	/lyūúʔ/	[lʲūúʔ]	‘maiden’
	/ke/	[kʲe]	‘head of’	/kee/	[kʲee]	‘stone’
	/tzáʔ/	[tsáʔ]	‘issue’	/tzáą́/	[tsãã́]	‘day’

/nkātá/	[ŋgātá]	‘black’	/nka-tāá/	[ŋgātāá]	‘gave’
/kitę/	[kitʲẽ]	‘feather’	/ki-teę/	[kitʲẽẽ]	‘will carry’

3.3. Tone /V̄/, /V́/

Beginning with Pride’s (1963) early work on Yaitepec Chatino, tone has been the focus of a large proportion of recent and current research on Chatino languages (see §1.4.4). However, tone in Zenzontepec Chatino has only very recently received attention, and this section represents the first full account of it in written form. Zenzontepec Chatino has two tones: high tone *V́*, and mid tone *V̄*. The tone bearing unit (TBU) is the mora, but not every mora carries lexical tone. Therefore, there is in effect a three-way tonal contrast on the mora: high tone *V́*, mid tone *V̄*, and no tone *V*.

The acoustic realization of lexical tone is the pitch, or fundamental frequency (f_0), of the vowel on which the tone is realized. Pitch levels for tones vary considerably across speakers and even within the speech of a single speaker, depending on context and style. In connected speech, a tone’s phonetic shape may depend on the phonological structure of the form bearing it, phonological processes (§3.4), and coarticulatory effects from other tones. Once all of these factors have had their effect, a mora’s phonetic pitch might have only a very abstract relationship to its underlying tonal specification. Furthermore, each of the three tonal specifications has its own unique behavior in context, so the difference among them has as much to do with their behavior as it does their default phonetic realizations.

Since the phonological behavior of tone in context is so crucial to understanding the basic, underlying, nature of tone itself, tonal phonology is presented in the next

section of this chapter (§3.4) instead of along with the other phonological processes in Chapter 5. Throughout the present section, several questions should arise for the reader, such as “What is actually meant by no lexical tone?”, “Why are some mid tones realized so phonetically low?”, and “Why are so many toneless syllables realized as phonetically high?” These issues become clear during the discussion and demonstration of phonological processes of tone in §3.4 and they are summarized in §3.4.4. Therefore, it is requested that the reader suspend the doubt and judgment that arise during this section until after reading §3.4. It may prove helpful to reread the current section (§3.3) after doing so.

The discussion of the tonal analysis here will proceed as follows. First, tone on monomoraic forms is presented (§3.3.1). This demonstrates the basic tonal elements in the language, the high tone and the mid tone, which contrast with the lack of tone. After that, the basic tone combination patterns in bimoraic forms (§3.3.3) and trimoraic forms (§3.3.4) are discussed, followed by a summary of their distributional patterns and relative frequencies (§3.3.5). Finally, the section ends with a treatment of tone patterns in compounds and clitics, which differ from the basic tone combination patterns (§3.3.6).

3.3.1. Tone on monomoraic forms

The simplest view of the three-way tonal contrast is offered by monomoraic roots of lexical classes that may stand alone as independent phonological words (e.g. noun, adjective, or quantifier). The single mora of each of these words may carry maximally

one of the two lexical tones or no tone at all. Some examples of minimal and near-minimal pairs that illustrate the tonal contrasts are in (113).

(113)							
	/V/ ≠ /V̄/	/jne/	[hnẽ]	'finger of'	/jnē/	[hnẽ]	'money'
		/jlyaʔ/	[hlʲaʔ]	'cold'	/jlyā/	[hlʲā]	'saddle' < Sp. *silla*
	/V/ ≠ /V́/	/jnya/	[hnʲã]	'griddle'	/jnyá/	[hnʲã́]	'work'
		/jlyaʔ/	[hlʲaʔ]	'flavorless'	/jnyáʔ/	[hnʲã́ʔ]	'spicy hot'
	/V̄/ ≠ /V́/	/jlyā/	[hlʲā]	'morning'	/jlyá/	[hlʲá]	'lunch'
		/jlyā/	[hlʲā]	'plentiful'	/jlyá/	[hlʲá]	'fast (adj.)'
		/jnēʔ/	[hnẽʔ]	'dog'	/jnéʔ/	[hnẽʔ]	'spool (measure)'

A selection of other monomoraic content words showing the three-way tone specification contrast is listed in (114).[11]

(114)	No tone		Mid tone		High tone	
	/jleʔ/	'tortilla of'	/jlyū/	'big'	/tzáʔ/	'issue'
	/jniʔ/	'offspring of'			/jnyáʔ/	'chili pepper'
	/jnoʔ/	'eight'				

Particles and enclitics provide numerous other examples of monomoraic items that bear the basic tonal contrasts (115).

(115)	No tone		Mid tone		High tone	
	/tzǫʔ/	'behind'	/tzūʔ/	'towards'	/jlí/	'around'
	/na/	DEF	/nī/	'not even'	/ná/	NEG
	/ti/	'only'	/tī/	TPLZ	/tíʔ/	Proximal temp av.
	/lo/	'at'	/lēʔ/	'then'	/=rúʔ/	'more'
	/to/	'edge of'	/lōʔ/	'all the time'	/wá/	DIST
	/wiʔ/	NVIS (dem.)	/wī/	'and'	/=V́/	DIST
	/nu/	NMZ	/xī/	NMZ.LOC		
	/tya/	'towards'	/tyāʔ/	'since'		

[11] Verbs are not as useful at this point because they must be inflected for aspect, and though they may be monosyllabic, there are no monomoraic inflected verbs that would comprise a phonological word.

/tza/	INDEF	/ntē/	PROX
/la/	‘up to’	/=ūʔ/	3NSPC/PL
/ta/	PRF	/=ą̄ʔ/	1SG
/tu/	HYP	/=chūʔ/	3SG.F
/chu/	NMZ.HUM	/nīʔ/	‘inside’
/=ya/	1PL.EXCL	/jā/	CONJ
/=yu/	3SG.M	/lō/	‘like so’
/=wą/	2PL	/ʔā/	question particle
/=ri/	‘only’		
/=niʔ/	3SG.RSP		

Averaged f_0 pitch shapes for the high tone (H), mid tone (M), and no tone (Ø) on isolated monomoraic words spoken by one 50 year old male speaker from San Pedro del Río are in the chart in Figure 4, adapted from Woodbury (2012). Each averaged pitch track is based on seven to nine total tokens of four or five lexemes. For each token, the f_0 value is measured in Hertz at eleven equidistant intervals over the duration of the vowel. For each tone, the f_0 values of all tokens are averaged (y-axis of Figure 4) at each interval (x-axis).[12]

[12] Thanks sincerely to John Kingston for sharing his Praat script for measuring pitch at intervals and to Tony Woodbury for sharing the charts.

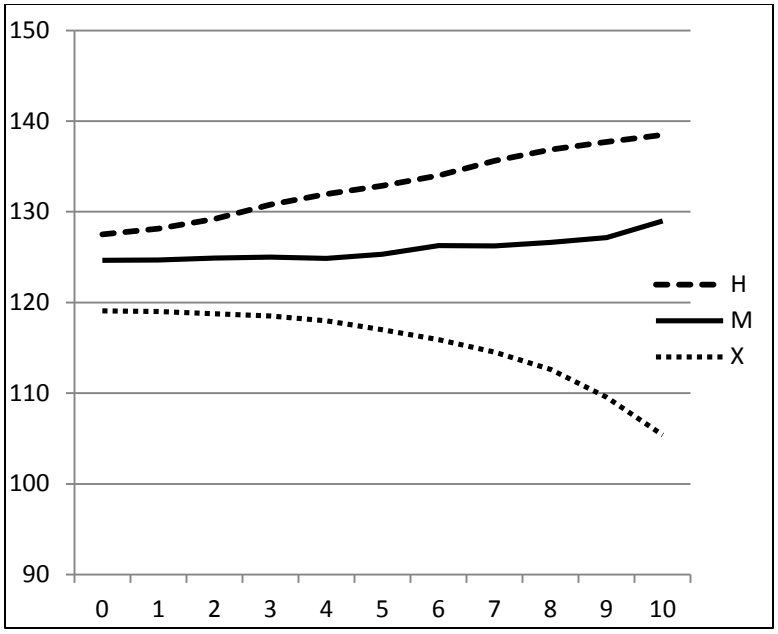


Figure 4. Average f_0 (Hz) of tones on monomoraic words (Woodbury 2012)

On monomoraic words, tones are realized at a higher fundamental frequency than they typically are within a polymoraic word. As shown in Figure 4, on average, the high tone in monomoraic words rises from just under 130 Hz to just below 140 Hz for this speaker. The mid tone is more level but rises slightly from about 125 Hz to just under 130 Hz. Finally, monomoraic words with no lexical tone fall from an initial pitch of about 119 Hz to about 105 Hz, on average, for this speaker.

For those forms that may be inflected for person, second person singular inflection is marked purely by tone change on the base form (third person). If a monomoraic stem carries the H or Ø tone specification, its 2SG inflected form will have the M tone, for example *jne* 'his/her finger' becomes *jnē* 'your finger'. If the simple stem

has lexical M tone, then its 2SG inflected form will carry H tone, for example *jlyū* 'he/she is big' yields *jlyú* 'you are big'.

3.3.2. The tone inventory in typological perspective

The Zenzontepec Chatino /H/ vs. /M/ vs. Ø is unusual in that the unspecified category is not M. The system nearly fits what Hyman (2009, 2012) calls a two-height, equipollent, privative system, but neither Yip (2002: 26) nor Hyman (2012) mention that a two-height privative tone system might have any category other than M as its unspecified category. Among his universals of tone, Maddieson (1978: 341) concludes that "Phonetically central tones are unmarked[.] Extreme tones are highly marked." The Zenzontepec Chatino /H/ vs. /M/ vs. Ø system, therefore, is an exception to the typology of tone systems, and as far I can find in the literature, only Leggbo (an Upper Cross Niger-Congo language) has been analyzed as having the same inventory (Paster 2003).

3.3.3. Basic tone combination patterns: tone on bimoraic forms

Bimoraic words are of two types: monosyllabic forms with long vowels, and disyllabic forms with two heterosyllabic short vowels. In terms of tone, the two types can be handled together because the TBU is the mora and tone patterns are therefore not dependent upon syllable count.

As discussed in §3.2 and §4.1.4.2, vowel length is contrastive due to some relatively recent changes through which some previously disyllabic forms have reduced and become monosyllabic and monomoraic. However, those changes have affected only

a small number of words, and the majority of monosyllabic content words have remained bimoraic. Since the TBU in Zenzontepec Chatino is the mora, each mora of a bimoraic word may bear (or lack) a tone. Given the three-way tonal specification contrast per mora (*V́*, *V̄*, *V*; or H, M, Ø, respectively), there are nine logically possible tone patterns for a bimoraic form, as listed in (116). However, only five of them are found on phonological words that are not stems inflected for second person singular person: ØØ, ØM, MH, HØ, and HM. These will be referred to as the five basic tone patterns. Two of the four remaining possible tone patterns are encountered exclusively in 2SG inflected forms: ØH, and MM, and conversely, second person forms are always and only realized with one of those two patterns. The MØ pattern does not occur, and the remaining logically possible pattern, HH, does not occur either, which calls to mind the Obligatory Contour Principle (Leben 1973), but its non-occurrence may be due to H tone culminativity.[13]

(116)

Basic tone patterns	2SG tone patterns	Does not occur
ØØ	ØH	MØ
ØM	MM	HH
MH		
HØ		
HM		

Examples of monosyllabic (left column) and disyllabic (right column) content words carrying each of the five basic tone patterns are given in the following sets: ØØ (117), ØM (118), MH (119), HØ (120), and HM (121). Note that the forms in the data

[13] Note that the MM pattern would also appear to violate the OCP. It is only realized phonetically as such where each M falls on a separate syllable. On long syllables there is a phonetic dissimilation where the first M is realized phonetically higher than the second tautosyllabic M. This perhaps reflects another OCP sensitivity.

here may contain prefixal material, which sometimes is archaic and now fossilized and sometimes is synchronically active. Crucially, affixes (but not clitics) are part of the same phonological word (§10.2.1) as their stem. They do not transparently contribute their own lexical tone to that domain, and if they did carry a tone at some earlier time, or at some more abstract level, the realization is nevertheless one of the five basic tone patterns found on simplex forms. Therefore, the basic tone patterns are more or less independent of affixal morphology, though a few further minor details need to be considered when looking at forms of greater than two moras (§3.3.4). Compounds and sequences of word plus enclitic(s) need not obey these patterns and restrictions (see §3.3.6), as such combinations comprise more than one phonological word (§10.3).[14] Phonetic representations are omitted here since they do not finely capture suprasegmental features, as explained in §1.6.2.

(117) Examples of **ØØ** basic tone pattern

/pii/	‘female turkey’	/kwe-uluʔ/	‘chunk’, ‘roundish piece’
/kw-eeʔ/	‘crab’	/jneʔe/	‘scorpion’
/taaʔ/	‘cigarette’	/chaja/	‘tortilla’
/choo/	‘rain’	/nk-yatę/	‘slept’
/tyuuʔ/	‘will cough’	/lutzeʔ/	‘tongue of’
/kiiʔ/	‘fire’	/nti-ala/	‘gets born’
/xeęʔ/	‘nose of’	/seʔę/	‘place’
/laa/	‘church’	/yaʔwe/	‘game’
/soǫ/	‘base of’	/tisǫʔ/	‘tasty’
/yuu/	‘earth’	/k-uti/	‘will bark’

[14] Though the basic tone patterns presented here are one of the factors used to define the phonological word (in §10.2.1), there are many other independent pieces of phonological evidence that combine with the tonal evidence in support of that analysis.

(118) Examples of **ØM** basic tone pattern

/kiī/	‘grass’	/kitī/	‘paper’
/keē/	‘flower’	/kw-etāʔ/	‘fox’
/kwaą̄/	‘high’	/l-akę̄/	‘burnt’
/nch-oō/	‘is grinding’	/nkolō/	‘turkey’
/jwiī/	‘whistle’	/xiʔnā/	‘clay pottery’
/treę̄/	‘train’ < Sp. *tren*	/nte-jyā/	‘is playing’
/yaāʔ/	‘hand of’	/ch-achīʔ/	‘will shrink’
/choōʔ/	‘maguey’	/joʔō/	‘sacred’
/ruū/	‘rice’ < Sp. *arroz*	/kutzą̄/	‘little while ago’

(119) Examples of **MH** basic tone pattern

/nkwīíʔ/	‘ring’	/nkātę́/	‘white’
/tēę́ʔ/	‘wrinkly’	/kētá/	‘edible leafy green’
/nkāą́/	‘coconut’	/lyātá/	‘ditch’
/k-ōó/	‘will grind’	/lōʔó/	‘fence’
/lyūúʔ/	‘maiden’	/mītą́ʔ/	‘support post’
/jīí/	‘gray’	/kw-ītzúʔ/	‘coati’
/chāá/	‘will catch up to’	/ntāwíʔ/	‘having color’
/lūú/	‘rock shelter’	/nku-ākwí/	‘composted’

(120) Examples of **HØ** basic tone pattern

/tíi/	‘ten’	/tíʔnu/	‘fifteen’
/tyáą/	‘throat of’	/nyátę/	‘nest of’
		/túʔwa/	‘forty’
		/nkwítzą/	‘child’
		/ch-áku/	‘will get eaten’
		/tyújwi/	‘hearthstone’

(121) Examples of **HM** basic tone pattern

/xíī/	‘light’	/kéxę̄/	‘pink’
/léē/	‘strong’	/kw-énā/	‘snake’
/kwáā/	‘grave (n.)’	/tánēʔ/	‘cloth’
/kóō/	‘grain weevil’	/lóʔō/	‘with’
/yúū/	‘cliff’	/súkwā/	‘prepared food’
/kw-íī/	‘morning star’	/lísū/	‘vulture’
/tzáą̄/	‘day’	/n-tákwī/	‘is hanging’

/ntúūʔ/	‘fishing basket’	/nk-yúkwą̄/	‘sprained’
/júų̄/	‘rope’	/tíkǭʔ/	‘dangerous’

As stated above, second person singular dependent pronoun inflection is realized by tone change only, resulting in two tone patterns unique to second person inflection: ØH and MM. Parallel to the pattern in monomoraic forms, if an uninflected stem has the ØM tone pattern, then the second person singular inflected form will carry the ØH pattern. Examples of this are listed in (122), where uninflected base forms (ØM) are on the left, and their corresponding 2SG forms with the ØH tone pattern are on the right.

(122) ØM basic tone pattern (left) → **ØH** 2SG tone pattern (right)

/mpa**ā**/	‘father of godchild of’	→	/mpa**á**/	‘father of your godchild’
/ya**ā**ʔ/	‘hand of’	→	/ya**á**ʔ/	‘your hand’
/y-o**ō**/	‘ground (v.)’	→	/y-o**ó**/	‘you ground’
/nch-ujw**ī**ʔ/	‘is selling’	→	/nch-ujw**í**ʔ/	‘you are selling’
/ch-ak**ę̄**/	‘will get burned’	→	/ch-ak**ę́**/	‘you will get burned’
/nkw-etz**ā**ʔ/	‘informed (v.)’	→	/nkw-etz**á**ʔ/	‘you informed’
/xik**ǭ**/	‘arm of’	→	/xik**ǫ́**/	‘your arm’
/teʔy**ū**/	‘naked’	→	/teʔy**ú**/	‘you are naked’

If the uninflected stem bears any of the other basic tone patterns (ØØ, MH, HØ, HM) the second person form will have the MM tone pattern (123). These facts resist being straightforwardly cast in terms of the composition of a single second person tonal element with the various stem tone patterns, but in functional terms the system is quite elegant, providing clear pitch contrast between second person singular and third person forms, with only two rules accounting for all of the 2SG inflections.

(123) Examples of **MM** 2SG tone pattern

/nti-ii/	‘feels’	ØØ	→	MM	/nti-īī/	‘you feel’

/ntoo/	‘face of’	ØØ	→	MM	/ntōō/	‘your face’
/tyuuʔ/	‘will cough’	ØØ	→	MM	/tyūūʔ/	‘you will cough’
/tuʔwa/	‘mouth of’	ØØ	→	MM	/tūʔwā/	‘your mouth’
/k-ōó/	‘will grind’	MH	→	MM	/k-ōō/	‘you will grind’
/xi-ītzáʔ/	‘language of’	MH	→	MM	/xi-ītzāʔ/	‘your language’
/sūtę́ʔ/	‘knee of’	MH	→	MM	/sūtę̄ʔ/	‘your knee’
/tyáą/	‘throat of’	HØ	→	MM	/tyāą̄/	‘your throat’
/tyána/	‘will search for’	HØ	→	MM	/tyānā/	‘you will search for’
/nyáʔa/	‘mother of’	HØ	→	MM	/nyāʔā/	‘your mother’
/léē/	‘strong’	HM	→	MM	/lēē/	‘you are strong’
/jlákū/	‘your stomach’	HM	→	MM	/jlākū/	‘your stomach’
/nk-y-ánō/	‘stayed’	HM	→	MM	/nk-y-ānō/	‘you stayed’

Averaged phonetic realizations of the five basic tone patterns and the two second person tone patterns on bimoraic monosyllabic words for the same 50 year-old male native speaker from San Pedro del Río are plotted in Figure 5 and Figure 6 (adapted from Woodbury 2012). Again, the fundamental frequency during vowels was measured at eleven equidistant intervals for three to seven total tokens from at least two example words for each tone pattern. Figure 5 shows the pitch tracks for the ØØ, ØM, and MH basic tone patterns, which correspond to the Ø, M, and H patterns on monomoraic forms, and Figure 6 shows the tracks for the HØ and HM basic tone patterns and the MM and ØH 2SG inflected tone patterns.

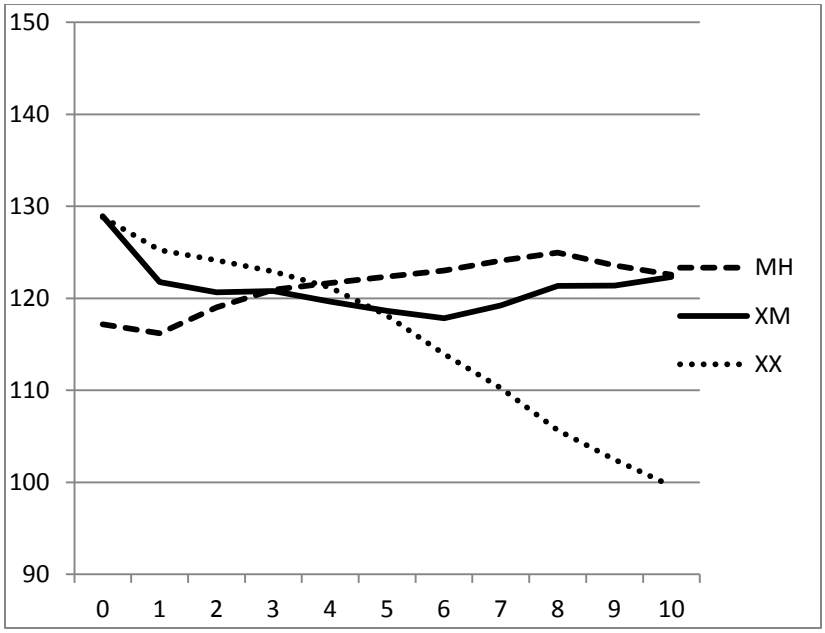


Figure 5. Averaged f_0 (Hz) on bimoraic monosyllables: ØØ, ØM, MH patterns

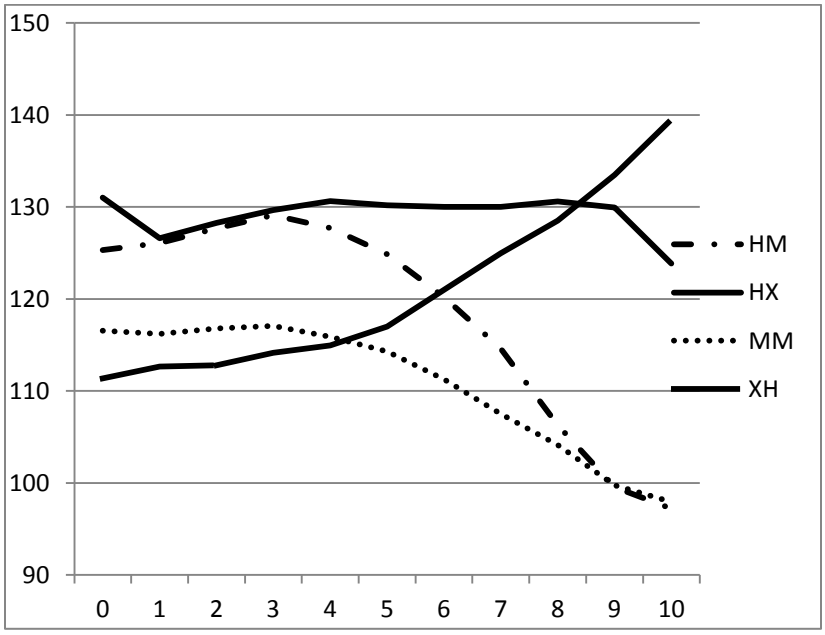


Figure 6. Averaged f_0 (Hz) on bimoraic monosyllables: HØ, HM, MM, ØH patterns

In Figure 6 one can see the H tone target that is shared by the first moras of the HM and HØ patterns (the two highest tracks straight above the number 3 on the x-axis). Now, comparing the MH pattern with the HØ pattern, the former begins at an average frequency about 10 Hz lower than the latter. The MH trajectory slowly rises, approaching that of the HØ, which remains fairly level. The descent at the end of the HØ tone is an effect of the isolation context of the utterances. As demonstrated later in §3.4, the pitch of a HØ tonal sequence is [HH], and its high pitch level will extend through any following toneless moras, even over strings of many forms. The ØM pattern begins and ends at a mid level, lilting slightly in the middle. Though it is always relatively close to the MH pattern, the ØM track lacks the slight continuous rise that is the hallmark of the MH pattern on monosyllabic forms. The ØØ (toneless) pattern begins at a mid-high level and steadily declines over the course of the vowel. This is a relaxed declination unguided by any pitch targets. The HM pattern falls a similar amount but differs from the ØØ pattern by first ascending to the H target on the first mora. It then drops sharply due to a phonological process whereby a M tone (and also a H tone for that matter) is downstepped by a preceding H tone, as exemplified in detail in §3.4. The ØH second person tone ascends rapidly during the second mora to a relatively very high height like the simple H tone on monomoraic forms. The MM second person tone shows phonetic mutual dissimilation of the two tautosyllabic mid tones, and is realized as a high to low contour, somewhere between the shapes of the unmarked ØØ pattern and the HM pattern.

Finally, the f_0 trajectories of the five basic tone patterns on disyllabic forms are plotted in Figure 7 and Figure 8 (also adapted from Woodbury 2012). Though the pitch

shapes do not drastically differ from their bimoraic monosyllabic counterparts in Figure 5 and Figure 6, syllable count does have some phonetic effect on them. One such difference is that the M targets of the MH and ØM tone patterns are realized at lower f_0 levels in disyllabic forms than in monosyllabic forms. This is likely due to the slight insulation from coarticulatory effects afforded by the separate syllables. On the other hand, the pitch of the M target in the HM pattern is consistently very low, irrespective of syllable count, because the preceding H causes it to downstep to what is in effect a lower limit (§3.4.1). The toneless first syllable of the second person ØH tone pattern declines like other toneless moras. The effect is more apparent in disyllabic words than in monosyllables, and it is followed by the sharp rise characteristic of ascent to a H tone within a single mora. The MM second person tone remains high-mid, avoiding the phonetic dissimilation of the two M tones found in monosyllabic forms. It is phonetically most similar to the HØ pattern, but crucially it does not spread into subsequent toneless moras like the H tone does (3.4.1).

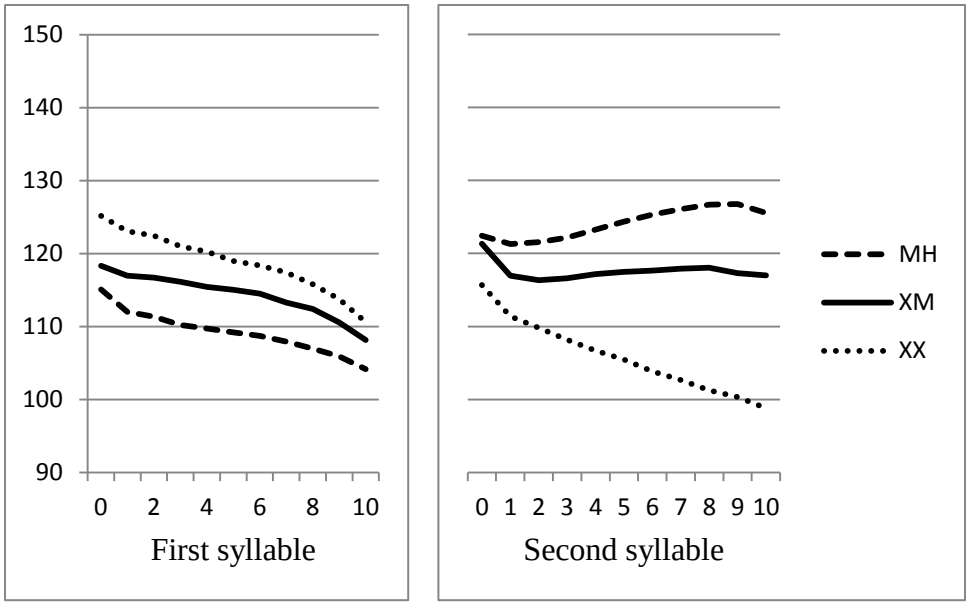


Figure 7. Averaged f_0 (Hz) on bimoraic disyllables: ØØ, ØM, MH patterns

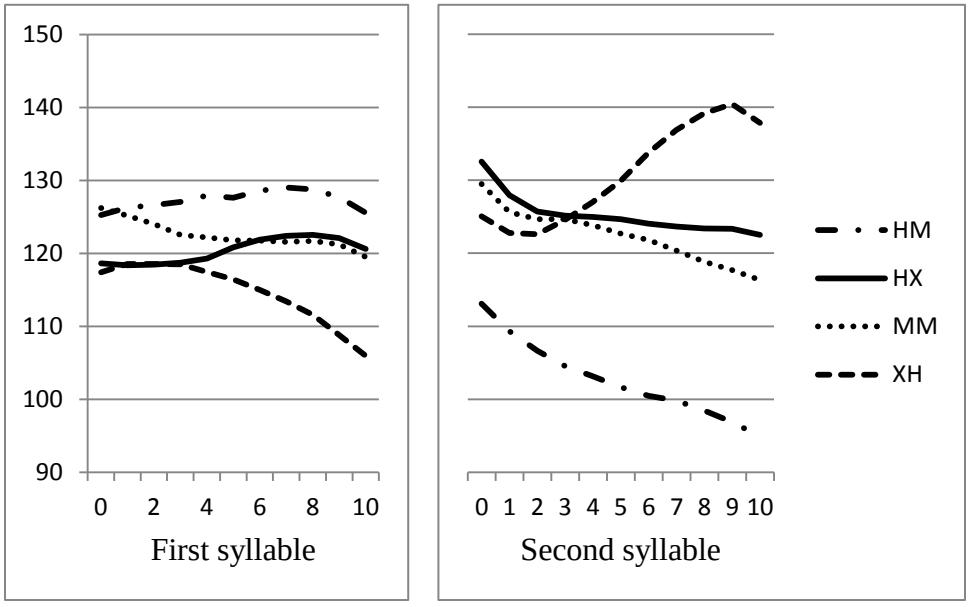


Figure 8. Averaged f_0 (Hz) on bimoraic disyllables: HØ, HM, MM, ØH patterns

In §3.3.1, (near-)minimal pairs were provided that demonstrate the contrastiveness of the three possible mora-level lexical tone specifications (M, H, and Ø). Since the number of monomoraic words in the language is fairly limited, not very many purely tonal minimal pairs exist. However, due to the much greater number of bimoraic words in the language, quite a few word pairs that differ solely in their bimoraic basic tonal patterns have been identified. Though the members of these pairs are segmentally identical, many of them serve only as near-minimal pairs, and not true minimal pairs, because they differ in their tonal specifications on each of their two moras. Nevertheless, they provide a thorough exemplification of the contrastiveness of tone in the language more generally.

The tonally contrasting pairs presented below exclude the 2SG tone patterns, since examples of those can be trivially created in huge numbers since tone alone marks that inflectional category. Nevertheless, many such examples are already listed above in (122) and (123). Verbs are largely excluded in the pairs below in order to illustrate the tone pattern contrasts with forms that are as morphologically simple as possible. To begin, the toneless ØØ pattern is shown to contrast with the ØM basic tone pattern (124), the MH basic tone pattern (125), the HØ pattern (126), and the HM pattern (127).

(124) **ØØ ≠ ØM**

/kee/	‘stone’	/keē/	‘flower’
/kii/	‘reed’	/kiī/	‘grass’
/pii/	‘female turkey’	/piī/	‘cute’
/kweę/	‘noise’	/kw-eę̄/	‘bat’
/kwaą/	‘fever’	/kwaą̄/	‘sky’
/choo/	‘rain’	/choō/	‘friend (voc.)’
/yoo/	‘oven’	/y-oō/	‘ground (trn.)’
/kooʔ/	‘charcoal’	/koōʔ/	‘moon’

/kela/	‘corn plant’	/kelā/	‘river’
/keta/	‘tobacco’	/ketā/	‘flour’
/kwana/	‘mirror’	/k-wanā/	‘thief’
/kwi-tiʔ/	‘brother of (male ego)’	/kw-itīʔ/	‘frog’
/kiyaʔ/	‘foot of’	/kiyāʔ/	‘payment’
/kyaʔa/	‘guilt’	/kyaʔā/	‘ascent’
/lyoʔo/	‘spouse of’	/lyoʔō/	‘chicken’
/nkuti/	‘seed’	/nkutī/	‘waste (n.)’
/lyakwa/	‘level’	/lyakwā/	‘why?’
/kojo/	‘taco’	/kojō/	‘lame’ < Sp. *cojo*
/seʔę/	‘place (n.)’	/s-eʔē/	‘excrement of’
/tiʔi/	‘poor’	/tiʔī/	‘flavor’

(125) **ØØ ≠ MH**

/taaʔ/	‘cigarette’	/tāáʔ/	‘torn’
/jii/	‘ash’	/jīí/	‘gray’
/kw-eyaʔ/	‘mushroom’	/kwēyáʔ/	‘measurement’
/kuta/	‘planted crops’	/kūtá/	‘hunting (n.)’
/keta/	‘tobacco’	/kētá/	‘edible greens’
/kukwaʔ/	‘dew’	/kūkwáʔ/	‘house-maid’
/kw-itęʔ/	‘louse’	/kwītéʔ/	‘blind’
/kw-eʔya/	‘eagle’	/kw-ēʔyá/	‘pocket gopher’
/kw-ela/	‘fish’	/kwē-lá/	‘dancer’

(126) **ØØ ≠ HØ**

/tii/	‘clear’	/tíi/	‘ten’
/tuʔwa/	‘mouth of’	/túʔwa/	‘forty’
/nyaʔa/	‘will see’	/nyáʔa/	‘mother of’
/tyakwi/	‘will be hanging’	/tyákwi/	‘will fly’
/chata/	‘will plant’	/ch-áta/	‘will get crushed’
/tyukwa/	‘the two’	/tyúkwa/	‘will be replanted’

(127) **ØØ ≠ HM**

/koo/	‘cloud’	/kóō/	‘grain weevil’
/taą/	‘grease’	/táą̄/	‘valley
/yuu/	‘earth’	/yúū/	‘cliff’
/lati/	‘two days earlier’	/látī/	‘thin’
/lita/	‘ear of corn’	/lítā/	‘blister’
/keku/	‘comb’	/kékū/	‘water place’
/jata/	‘armspan’	/játā/	‘sweat of’
/jnyaʔa/	‘truly’	/jnyáʔā/	‘bad’
/nkaʔa/	‘green’	/nkáʔā/	‘red’

/kwaʔą/	2PL	/kwáʔą́/	‘landslide’
/kwiʔya/	‘alone’	/kwíʔyā/	‘fun (n.)’
/kw-iyuʔ/	‘spider’	/kwíyūʔ/	‘top (spinning toy)’

The next three sets of examples demonstrate the contrast between words carrying the ØM basic tone pattern and the remaining tone patterns: the MH basic tone pattern (128), the HØ basic tone pattern (129), and the HM basic tone pattern (130). Each set has fewer examples than those above since none involve the highly frequent ØØ pattern (§3.3.5).

(128) **ØM ≠ MH**

/kw-ichī/	‘rabbit’	/kw-īchí/	‘large wild feline’
/ketā/	‘flour’	/kētá/	‘edible greens’
/nkatā/	‘dark-skinned person’	/nkātá/	‘black’
/tzetzēʔ/	‘Santiago Amoltepec’	/tzētzéʔ/	‘messy’
/nk-yatę́/	‘got washed’	/nk-y-ātę́/	‘entered’

(129) **ØM ≠ HØ**

/maʔā/	‘mom’	/máʔa/	‘strong woman’
/nyatę́/	‘person’	/nyátę́/	‘nest of’
/tyanā/	‘cross-sex sibling of’	/tyána/	‘will search for’
/sukwā/	‘will lie down’	/súkwa/	‘six’

(130) **ØM ≠ HM**

/lisū/	‘avocado’	/lísū/	‘vulture’
/kwitī/	‘evil’	/kwítī/	‘medicine’
/tanēʔ/	‘on credit’	/tánēʔ/	‘cloth’
/nk-y-ajā/	‘found (v.)’	/nk-y-ájā/	‘got holes’

At this point, there only remain two basic tonal patterns that have not yet been shown to contrast with the MH basic tone pattern: the HØ tone pattern (131) and the HM pattern (132).

(131) **MH ≠ HØ**

/nk-y-ālá/	‘got liquefied’	/nk-y-ála/	‘became full (moon)’
/tyūkwá/	‘will be sitting’	/tyúkwa/	‘will be replanted’

(132) **MH ≠ HM**

/yāná/	‘corn cob’	/yánā/	‘copal incense’
/lōʔó/	‘fence’	/lóʔō/	‘with’
/tī-kwí/	‘smelling of wood rot’	/tíkwī/	‘steep’
/n-tāá/	‘gives’	/ntáā/	‘bean’
/nk-yūkwą́/	‘shivered’	/nk-yúkwą̄/	‘sprained’

Finally, all that remains to be presented are examples that highlight the distinctiveness between the HØ and HM basic tone patterns, and a couple of such examples are provided in (133).

(133) **HØ ≠ HM**

/súkwa/	‘six’	/súkwā/	‘prepared food (n.)’
/nk-yáʔą̄/	‘washed (v.)’	/nk-yáʔą/	‘got accustomed’

3.3.4. Tone patterns on trimoraic forms

Roots consisting of more than two moras, or more than two syllables, are fairly rare compared to bimoraic forms. Most cases of trimoraic or trisyllabic phonological words are polymorphemic, containing a prefix or two, some of which are now fossilized. Again, prefixes do not transparently or regularly contribute tone to the phonological word that includes them, and tone possibilities are fairly limited on antepenultimate moras or syllables. On the other edge of the phonological word, final syllables are the most prominent in that they have the greatest degree of contrastive vowel qualities (all five vowels), and vowel length and nasality are restricted to them (§4.2.5). Tone pattern distinctiveness is also greatest towards the end of the phonological word. Considering the

tone patterns aligned with their final two moras, trimoraic or trisyllabic forms may be more or less straightforwardly grouped with the corresponding bimoraic tone patterns. Examples of trimoraic forms of the (Ø)ØØ and (Ø)ØM tone patterns are presented in (134) and (135), respectively. In both cases the antepenultimate mora is always toneless.

(134) Examples of **ØØ** basic tone pattern in trimoraic forms

/la-kiʔi/	‘toasted’	/kwi-seeʔ/	‘raccoon’
/lasasa/	‘quickly’	/kwi-tuluʔ/	‘cockroach’
/la-nuʔu/	‘broken’	/kwe-taka/	‘blister beetle’
/kenaʔa	‘many’	/xi-kukuʔ/	‘elbow of’
/ketzaʔą/	‘full’	/xi-ntakwą/	‘sandal of’
/ku-tana/	‘maternal life creation’	/nti-linto/	‘goes to waste’
/ti-kalaʔ/	‘cool’	/nkay-aku/	‘ate’
/ti-saʔą/	‘contagious’	/k-u-s-uweʔ/	‘will scrape’
/nchuluwa/	‘soursop’	/nte-y-atiʔ/	‘is getting untied’

(135) Examples of **ØM** basic tone pattern in trimoraic forms

/kwi-tzaā/	‘happiness’	/nkajnarā/	‘pomegranate’	< Sp. *granada*
/kwi-tzetzēʔ/	‘pine cone’	/tuminkū/	‘Sunday’	< Sp. *domingo*
/kwi-natę̄/	‘mosquito’	/xi-kwi-jyā/	‘toy of’	
/kwi-tusūʔ/	‘Pleiades’	/nku-lakwā/	‘was counted’	
/kurunkūʔ/	‘edible crayfish’	/nte-s-atę̄/	‘is putting in’	
/ti-katzǭ/	‘warm’	/k-u-saāʔ/	‘will tear (trn.)’	

On trimoraic forms with the MH tone pattern on the final two moras, the antepenultimate mora may have either no tone or M tone, but never H tone. Words based on noun roots have no tone (Ø) on the antepenultimate mora, as in the left column of

(136), and forms whose root is verbal have the M tone on the antepenultimate mora, as in the right column of (136).[15]

(136) Examples of **MH** basic tone pattern in trimoraic forms

/nkwi-lūlú/	‘tadpole’	/kwī-tzāʔą́/	‘sorcerer’
/kwi-līxí/	‘butterfly’	/tātīyá/	‘every’
/kwi-tīʔyú/	‘lightning’	/lā-xūʔú/	‘type (n.)’
/likīséʔ/	‘bladder’	/lā-nāʔá/	‘loose’
/kisōʔná/	‘master of’	/lā-kītzę́/	‘staggered (adj.)’
/mpirītóʔ/	‘flycather (bird)’	/ntē-tētzá/	‘is distributing’
/xi-nkīlá/	‘stinger of’	/nkā-lōó/	‘took out’

If a trimoraic form bears the HØ tone pattern on its final two moras, then the antepenultimate mora always bears the M tone (137). In this sense it appears similar to the MH pattern, just shifted one mora earlier.

(137) Examples of **HØ** basic tone pattern in trimoraic forms

/lā-túwe/	‘chopped up’	/kū-náʔa/	‘female’
/lā-kúti/	‘soft’	/nkū-túʔu/	‘left (v.)’
/nti-ū-níkwę/	‘shakes (trn.)’	/ntē-tákwi/	‘is flying’
/ntē-yáʔą/	‘is getting accustomed’	/nka-ū-t-ísę/	‘wrapped around (trn.)’

Trimoraic forms with the HM tone pattern on their final two moras show a pattern almost the opposite that of those with the MH basic tone pattern. If the stem is a verb, there is no tone on the antepenultimate mora, as shown in the left column of (138); if the stem is not a verb, then there is M tone on the antepenultimate mora, as in the right column of (138). It is interesting to highlight that with trimoraic MH forms, the

[15] I thank Tony Woodbury for pointing this out.

antepenultimate mora tone can be predicted based on the grammatical class of the root, while for the trimoraic HM forms, the antepenultimate mora tone is predicted by the grammatical class of the derived and/or inflected stem.

(138) Examples of **HM** basic tone pattern in trimoraic forms

/nka-xáʔā/	‘shouted’	/kwī-nákwę̄/	‘image’
/nka-júų̄/	‘spun (thread)’	/nkwī-tí-tzūʔ/	‘pineapple’
/nka-súkwāʔ/	‘shelled (trn.)’	/kwē-nátą̄ʔ/	‘great owl’
/nku-látī/	‘became thin’	/kwē-ntzáką̄/	‘owl sp.’
/nku-káʔnē/	‘got beaten’	/xī-nkwéē/	‘jaw of’
/nka-wíī/	‘cleaned’	/lā-wíī/	‘clean (adj.)’

Just as in bimoraic forms, if a basic stem has the ØM tone pattern on the final two moras, then its 2SG inflected form will have the ØH tone pattern on the final two moras. These trimoraic forms with the ØH second person tone pattern never have any lexical tone on the antepenultimate mora. Some examples are provided in (139). This fact ties into what we see with the ØØ and ØM basic tone patterns on trimoraic forms. Without exception, if the penultimate mora of a trimoraic word has no tone, then its antepenultimate mora will have no tone.

(139) Trimoraic forms with ØM tone pattern (left) → **ØH** 2SG tone pattern (right)

/xi-kiy**ā**ʔ/	‘pay of’	→	/xi-kiy**á**ʔ/	‘your pay’
/xi-kwent**ā**/	‘for part of’	→	/xi-kwent**á**/	‘for your part’
/kwi-la**ā**/	‘brother-in-law of’	→	/kwi-la**á**/	‘your brother-in-law’
/nti-u-kit**ę̄**ʔ/	‘snaps (trn.)’	→	/nti-u-kit**ę́**ʔ/	‘you snap (trn.)’
/nte-u-wan**ā**/	‘is stealing’	→	/nte-u-wan**á**/	‘you are stealing’
/nkay-akw**ę̄**/	‘vomited’	→	/nkay-akw**ę́**/	‘you vomited’
/ki-u-kach**ī**ʔ/	‘will hide (trn.)	→	/ki-u-kach**í**ʔ/	‘you will hide (trn.)’
/nku-jiʔ**į̄**/	‘was turn of’	→	/nku-jiʔ**į́**/	‘was your turn’
/nti-u-sa**ā**ʔ/	‘tears (trn.)’	→	/nti-u-sa**á**ʔ/	‘you tear (trn.)’

Again, parallel to what is found in bimoraic forms (§3.3.3), if an uninflected trimoraic stem has any tone pattern other than the ØM pattern on the final two moras, then the 2SG inflected form will have the corresponding MM tone pattern. There is always an additional M tone on the antepenultimate mora. Most apparent exceptions are identifiable as compounds. That is, the second person MM tone fills M tones onto all moras within the inflected phonological word. The inflected phonological word is always the final phonological word of the entire stem, which may be the basic root, the final stem of a compound, or the final enclitic attached to the basic or compound stem. As was seen in bimoraic monosyllabic forms with the MM tone pattern (Figure 6), two tautosyllabic M tones on trimoraic disyllables such as *xīnkwēē* 'your jaw' phonetically dissimilate from one another, with the first one being raised and the second one lowered. Examples of trimoraic forms with the MM 2SG tone pattern are listed in (140).

(140) Trimoraic forms with **MM** 2SG tone pattern

/kilituʔ/	'navel of'	(Ø)ØØ	→	(M)MM	/kīlītūʔ/	'your navel'
/xi-kukuʔ/	'elbow of'	(Ø)ØØ	→	(M)MM	/xī-kūkūʔ/	'your elbow'
/tiyaa/	'will arrive'	(Ø)ØØ	→	(M)MM	/tīyāā/	'you will arrive'
/nkā-tūsúʔ/	'grabbed'	(M)MH	→	(M)MM	/nkā-tūsūʔ/	'you grabbed'
/nkā-tāá/	'gave'	(M)MH	→	(M)MM	/nkā-tāā/	'you gave'
/nkā-nītzáʔ/	'asked'	(M)MH	→	(M)MM	/nkā-nītzāʔ/	'you asked'
/ntē-tákwi/	'is flying'	(M)HØ	→	(M)MM	/ntē-tākwī/	'you are flying'
/nkū-túʔu/	'left (v.)'	(M)HØ	→	(M)MM	/nkū-tūʔū/	'you left'
/xī-nkwéē/	'jaw of'	(M)HM	→	(M)MM	/xī-nkwēē/	'your jaw'
/nku-líjī/	'got lost'	(Ø)HM	→	(M)MM	/nkū-lījī/	'you got lost'

3.3.5. Summary of basic tone patterns and their frequency

Averaged pitch tracks were presented for all of the basic tone specifications and tone combination patterns found on simplex or prefixed forms for each of the three primary word shapes: monomoraic monosyllables (§3.3.1, Figure 4), bimoraic monosyllables (§3.3.3, Figure 5 and Figure 6), and bimoraic disyllables (§3.3.3, Figure 7 and Figure 8). Trimoraic forms fairly closely fit the patterns of bimoraic forms (§3.3.4), and they were collapsed with them for the purposes of general discussion. As apparent in the pitch tracks for all three primary word shapes, forms with no lexical tone (Ø or ØØ) steadily decline in pitch over the course of the vowel(s). However, the short duration of the monomoraic forms (Figure 4) only permits the declining pitch trajectory to reach about 105 Hz on average. In bimoraic forms, the decline continues a little further, to just below 100 Hz.

M and H tones on monomoraic forms (Figure 4) are realized about 10 Hz higher on average than the corresponding final targets of the disyllabic ØM and MH patterns (Figure 7) for this speaker. This appears to be a strictly phonetic effect that is perhaps due to the durational compression particular to monomoraic forms. Such compression triggers a concomitant jump in the pitch, as if the tone target were squeezed out of a narrow space, overshooting its target as a result. This is corroborated by independent evidence from the ØH tone pattern unique to 2SG pronominally inflected forms, where the H tone is also realized at 10 Hz higher, on average, following the toneless (and usually phonetically low-pitched) first syllable (Figure 6 and Figure 8). That is, the entire ascent

towards the H target in such 2SG forms occurs within that final mora that bears it.[16] The exaggeration of M and H tone targets in monomoraic forms is directed upwards for both tones because their targets are both higher than the lower frequencies towards which the pitch gravitates due to the general unmarked (toneless) declination pattern (see §3.4.2 for declination).

Frequency of occurrence varies considerably among the five basic bimoraic tone patterns and the three tonal specifications for monomoraic words. For a rough measure, the number of times that each basic tone pattern occurs in the Swadesh and Leipzig-Jakarta (Tadmor 2009: 69-71) 100-word lists is tallied in Table 6. These lists are designed to provide a notion of basic vocabulary that should be found in all, or almost all, languages of the world. As such, this vocabulary is considered to be more resistant to replacement through borrowing in language contact situations than other, less basic, vocabulary.

[16] The fact that the elevated H tone in monomoraic and 2SG inflected forms is the same underlying phonological element as the non-elevated H tone elsewhere is illustrated by its unique behavior in context (i.e. high tone spreading §Part I3.4.1, see particularly Figure 16 in §Part I3.4.3).

Table 6. Frequency of occurrence of basic tone patterns in basic vocabulary

Tone pattern	Swadesh list	Leipzig-Jakarta list
Ø	1	3
M	2	2
H	2	1
ØØ	60	60
ØM	15	14
MH	12	13
HØ	3	1
HM	5	6
	100	100

First of all, the basic vocabulary lists reflect the relative scarcity of monomoraic forms (~6%) compared to polymoraic ones (~94%). What is most striking from the lists is that an average of 62% of the sampled words in Zenzontepec Chatino have either the Ø or ØØ tone patterns. In other words, 62% of basic vocabulary terms (according to these standard lists) carry no lexical tone. The ØØ bimoraic pattern is by far the most common, being found on 60% of the words on each list. The next most common patterns are ØM (~14%) and MH (~13%), followed by HM (~6%). The HØ tone is quite rare in this basic vocabulary, and it is likewise rare throughout the lexicon, as seen in the gap in the examples back in (120). However, it should be noted that the HØ pattern is found mostly on numerals and verb roots, both of which are underrepresented in the 100-word lists. In any case, numerals are particularly susceptible to analogical contamination, and verb roots must be inflected using aspect or mood prefixes that may have altered the stem

tones through time.[17] Therefore, it may be the case that the HØ tone pattern is fairly rare because it is an innovated one. A final point worth making is that these lists somewhat underestimate the frequency of the ØM tone pattern in the broader lexicon. That tone pattern is the one assigned to the majority of Spanish loanwords (§7.1), which happen to be entirely absent in the basic vocabulary sample for Zenzontepec Chatino, just as the word lists were crafted to do.

The upshot of this distribution of the tone patterns is that the toneless categories are the default pattern in the language, not only because they are unspecified for tone, but also because they are the most frequent in the lexicon by a considerable margin. A striking fact about Zenzontepec Chatino is that it is a tone language in which a majority of its lexemes are actually toneless.

3.3.6. Non-basic tone patterns: compounds and clitic boundaries

Tone patterns on compounds deviate from the basic and second person tone patterns described above. A few examples are listed below in (141). These non-basic tone patterns in compounds are one of the many criteria used to establish the fact that each stem of a compound constitutes a phonological word of its own (§10.3). With respect to tone patterns in compounds, anything goes as long as each component stem bears one of the basic tone patterns.

[17] Additionally, it should be noted that a verb's tone may vary depending on which aspect it is inflected for (Campbell 2013b).

(141) Non-basic tone patterns in compounds

/lí+tyúu/	H+HØ	‘adobe’
/n-kā+jlyaʔ/	M+Ø	‘became cold’
/nkw-ē+tyukwā/	M+ØM	‘sat down’
/tyá+lakwi/	H+ØØ	‘will head downhill’
/n-tyá+sukwā/	H+ØM	‘reaches an amount’
/tyúʔu+jná/	HØ+H	‘will run’
/n-tyúʔ+nya/	H+Ø	‘molts’
/tyá+líjī/	H+HM	‘will go missing’

Enclitics are unlike prefixes in that they bear their own tone independently of the tone pattern carried by their host. As with separate stems in compounds, each enclitic forms a phonological word of its own (§10.5). Therefore, across clitic boundaries, any imaginable tone sequence may occur (142), as long as both the host and the clitic each bear one of the basic tone patterns.

(142) Non-basic tone patterns across clitic boundaries

/tātīyá=ūʔ/	(M)MH=M	‘all of them’
/nkwítzą=V́/	HØ=H	‘those children’
/tyúʔu=ą̄ʔ/	HØ=M	‘I will leave.’
/jnyáʔā=wą/	HM=Ø	‘You (pl.) are bad.’
/xikǭ=ya/	ØM=Ø	‘our (excl.) arms’
/kāʔyú=ri/	MH=Ø	‘only five’
/y-oó=rúʔ/	ØH=H	‘you ground also’
/jlyū=yu/	M=Ø	‘He is big.’
/tejeʔ=V́/	ØØ=H	‘that salt’

3.4. Tone in context: tone realization, interaction, and diagnostics

In this section, the tone analysis presented in §3.3 will be supported via examination of tone behavior in larger contexts. The truly toneless character of the Ø tone specification is illustrated by the fact that it is transparent to a process in which high

tone spreads through toneless moras, and also by the fact that its relaxed mid-to-low falling pitch matches the default intonational pattern in the language. Furthermore, the unspecified, toneless, category is phonologically inert, not triggering any phonological process, while both the /H/ and the /M/ are phonologically active and do trigger phonological processes (see Myers 1998; Hyman 2012: 3).

3.4.1. Phonology of tone: overview

The elegant simplicity of the Zenzontepec Chatino tonological system can be clearly demonstrated in the interactions of tones in context, either within a single form or across strings of words. The phonological interaction of lexical tones forces them to reveal their true colors, even in cases where their pitch realizations might otherwise significantly obscure their underlying nature. Each moraic tone specification (H, M, Ø) has a unique phonological behavior, and once these facts are understood, they can be reciprocally exploited as diagnostics for determining the identity and location of tones, or their absence. There are three phonological processes that operate in the tonal system.

Phonological processes involving tone

1. **High Tone Spreading** – The pitch of a high tone will continue through any following moras that do not carry any tone of their own. This spreading H will stop when it comes into contact with another H or M tone or at the end of an intonational phrase, after which it will reset. M tones do not spread.

2. **Downstep** – Any H or M tone will be downstepped if a spreading H tone bumps into it. Even though lowered to near the default pitch of the M tone, a downstepped $^{\downarrow}$H tone behaves as /H/ (and thus remains H phonologically), as it will spread according to process 1 above. A downstepped $^{\downarrow}$M is realized as phonetically very low, but it remains /M/, as it will cause M tone transformation via process 3 below.
3. **Mid tone transformation at clitic boundary** – A lexical M tone on a monomoraic enclitic will become /H/ (phonologically as well as phonetically) if the enclitic's host bears the M or ØM tone pattern. The resulting tone is a true /H/ tone that will spread until blocked, according to process 1. The final, downstepped $^{\downarrow}$M tone on a form carrying the HM pattern will not trigger transformation on an enclitic M tone.

These three tonological processes will be demonstrated in §3.4.3 using examples and spectrograms of mostly naturalistic speech from the text corpus. Before that, a brief discussion of intonational declination is necessary (§3.4.2), as it needs to be taken into consideration while interpreting pitch realizations in connected speech.

3.4.2. Declination

Apart from the phonological processes involving tone just listed, intonation has some effect on the fundamental frequency of a speech signal, including the surface pitch realization of tones. The default intonational pattern in Zenzontepec Chatino is one in

which the f_0 of the speech signal decreases over strings of forms within an intonational phrase, what Cohen & ‘t Hart (1967) famously called “declination” in Dutch. Declination is now viewed as a cross-linguistically common phenomenon. It is clearest in Zenzontepec Chatino across strings of forms lacking lexical tone, because without any pitch targets, the only factor affecting the f_0 trajectory is intonation. Due to the high frequency of toneless forms in the lexicon (§3.3.5), such toneless strings are not rare. The completely toneless independent clause (and complete utterance) in (143) is from a folk tale, and its spectrogram with pitch track is given in Figure 9. Just as demonstrated earlier for the ØØ basic tone pattern (§3.3.3), the pitch begins at a mid-high level, in this case 124 Hz, and decreases gradually to the natural lower limit, which for this male speaker is about 91 Hz. Since no lexical tones come along in this utterance to provide any pitch targets, once the pitch reaches the low area, it remains there. The apparent rise in pitch in the final word *niʔi* ‘house’ is an effect of the glottal stop, and the pitch does not actually rise there. Since the declination is sustained over the course of the utterance, the final word *niʔi* is acoustically very weak, and its nearly voiceless vowels barely register in the spectrogram.

(143) *nte-taʔą=yu* *laja* *niʔi*
PRG-go.around=3SG.M among house
‘He walked around in the street.’ [juan oso 0:13]

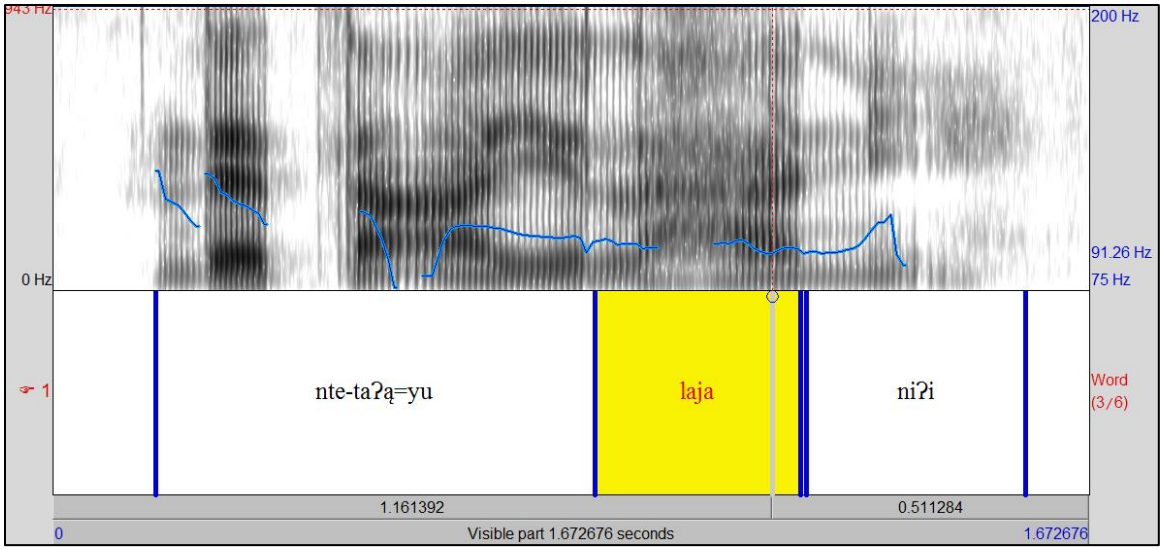


Figure 9. Declination throughout a toneless utterance

As mentioned earlier, lexical tones will pull the pitch up, away from this declination line, towards either a H or M tone target. Nevertheless, even in strings with various tone targets, H or M tones later in an intonational phrase will have a lower average pitch than like tones near the beginning of a sequence. This pattern might seem to fit what Hombert (1974) calls *downdrift*, but that term is often used for a specific, phonological, lowering effect that low tones have on immediately following high tones, which is not prevalent in Zenzontepec Chatino. Ladd (1984: 53-54) defines declination as "the gradual decline in the phonetic frame of reference", which is "a kind of gradually changing backdrop to local f_0 events" (see also Connell & Ladd 1990). Crucially, this notion of declination admits tone into the pattern, as seen in Zenzontepec Chatino. Therefore, *declination* will here refer to the intonational downtrend irrespective of tones, while *downstep* will refer to the lowering of any H or M tone caused by a spreading H

that precedes it. Downstep is local and phonological, declination is intonational (and perhaps phonetically based), and the term *downdrift* will be avoided here. A final point about declination is that other, mostly pragmatic, intonational patterns, such as for emphasis or excitement, may also affect tonal pitch realization. In sum, in order to understand the nature and behavior of tone in Zenzontepec Chatino, one needs to control for declination, and this will be done in the following spectrographic examples.

3.4.3. Spectrographic presentation of tones in context

In this section, H tone spreading, H and M tone downstep, and M tone transformation will all be shown using spectrograms from elicited or naturalistic speech of the same adult male whose speech was used in previous examples and the averaged pitch tracks in §3.3. Autosegmental phonological representations (Goldsmith 1976) are also given since they are a good tool for representing tonal phenomena visually.

3.4.3.1. High tone spreading

Earlier, in (§3.4.1), high tone spreading was defined as a phonological process in which the pitch of a high tone will continue through any following moras that do not carry any tone of their own. A spreading H will stop when it comes into contact with another tone (H or M), or at the end of an intonational phrase, after which it will reset. M tones do not spread.

High tone spreading is clearly demonstrated with sequences of a few phonological words in isolation in which a H tone precedes some toneless moras. For example, the

lexeme *chojo nkwila* ‘chilacayote squash’ is made up of two toneless roots. Being toneless, its basic phonetic pitch realization is that of unhindered declination, as shown by the pitch track in the left portion of the spectrogram in Figure 10. In the right portion of the spectrogram, the same lexeme is preceded by the numeral *túkwa* ‘two’, which bears the HØ tone pattern. Therefore, the sequence *túkwa chojo nkwila* ‘two chilacayote squashes’ has the overall underlying tone pattern /HØ ØØ ØØ/. The maximum measured pitch in this elicited example is about 137 Hz, right on the first syllable of the numeral, the mora that bears the H tone. After that, high pitch is found on the following, toneless, syllable of the numeral and throughout both of the following toneless disyllabic words that make up the compound noun. The pitch slightly lowers in this case during and after the numeral, but it quickly plateaus at a still high level. This contrasts with the steady and significant declination in the case on the left without the preceding numeral.

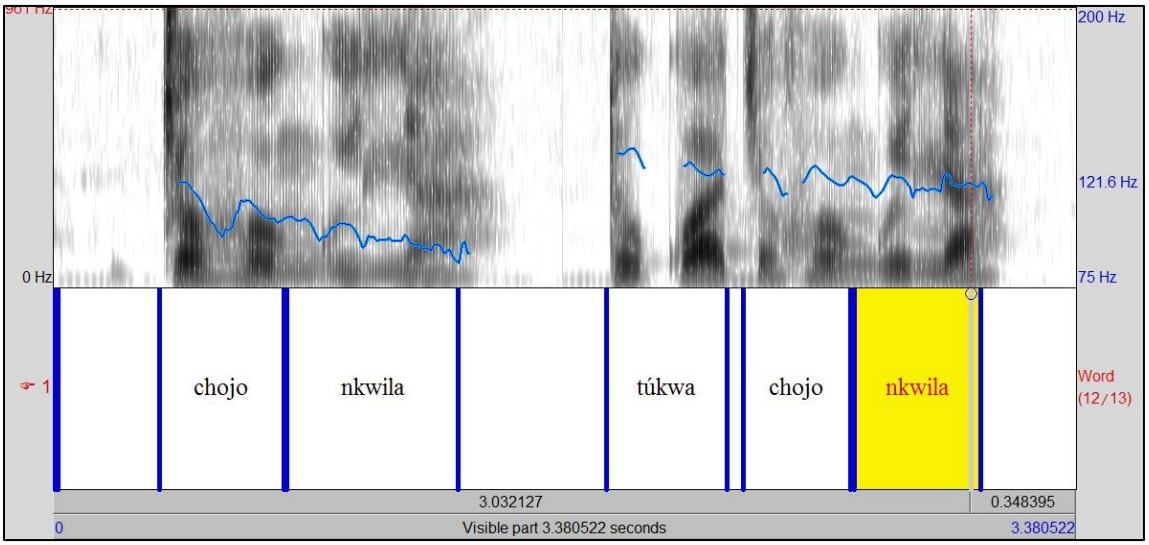


Figure 10. High tone spreading

The two utterances are shown in (144) in autosegmental phonology notation, where the initial H tone is seen spreading to all of the toneless moras that follow it.

(144) *chojo nkwila* *túkwa chojo nkwila*

Ø Ø H Ø Ø

3.4.3.2. Mid and High Tone downstep

A spreading high tone like that seen in Figure 10 will continue either until the end of its intonational phrase or until it comes into contact with another tone. When it bumps into another tone, that tone will be downstepped. H tones are downstepped to a mid level, but remain phonologically /H/, because they too will spread. M tones are downstepped to a low pitch level, but they remain true M tones, since they will trigger mid tone transformation (§3.4.3.3). The naturalistic phrase from a folk tale in (145), and shown in the spectrogram in Figure 11, illustrates M tone downstep. The final H tone on the predicate *n-kā+tāk**á*** 'there was' spreads through the following toneless numeral *tzaka* 'one' and the first mora of *nyatę̄* person, finally downstepping the M tone on the final mora to a very low pitch of about 95 Hz.

(145) a. *n-kā+tāká* *tzaka* *nyatę̄*
CPL-become-exist one person
'There was a person.' [cotita 0:19]

b. *n-kā+tāká tzaka nyatę̄*

M MH ↓M

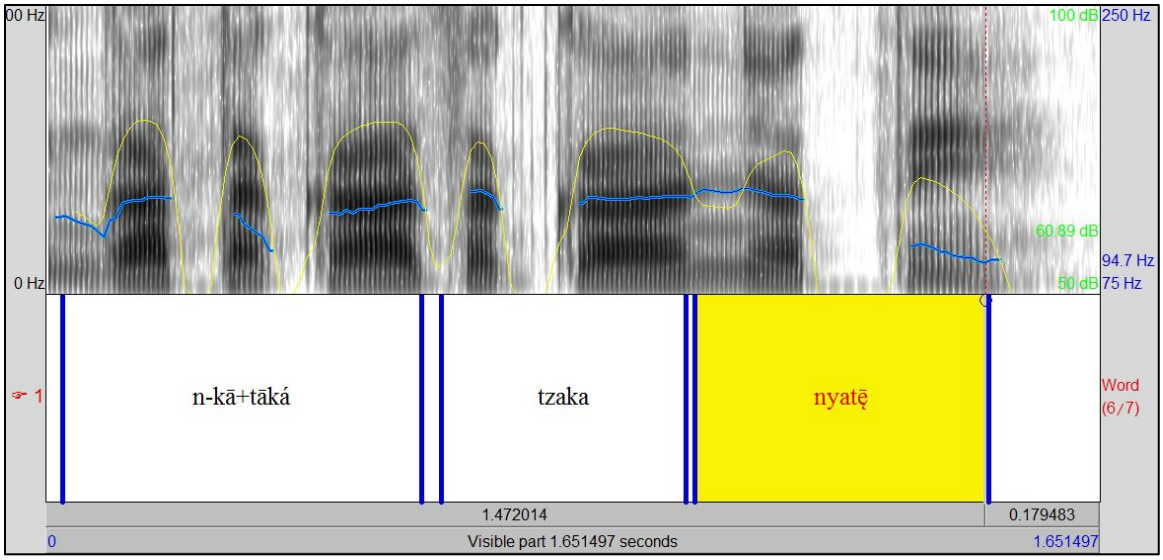


Figure 11. Mid tone downstep

Recall from §3.3.3 that the M tone in an isolated form with the ØM tone pattern, such as *nyatę̄* 'person', when not downstepped, will have a final pitch of about 118 Hz, on average for this speaker. The following textual example illustrates the word *nyatę̄* 'person' without downstep of its mid tone (146). The example has the same structure and meaning as the previous one. The only difference is that the existential predicate in this case is the toneless *nk-y-uʔu* 'there was' instead of the tone-laden existential predicate *n-kā+tāká* 'there was' in (145) that has a final high tone poised for spreading. In the spectrogram for this example in Figure 12 the pitch track shows declination from mid to low pitch until the final mora of the utterance. This is expected as there are no lexical tones before the final mora. On the final mora of *nyatę̄* 'person', we see the pitch ascend to the mid tone target. It reaches only about 113 Hz in this case since it is at the end of the clause, before a pause.

(146) a. *nk-y-uʔu* *tzaka* *nyatę̄*
CPL-ITRN-be.inside one person
'There was a person.' [ketu kela7 china7 0:43]

b. *nk-y-uʔu tzaka nyatę̄*
M

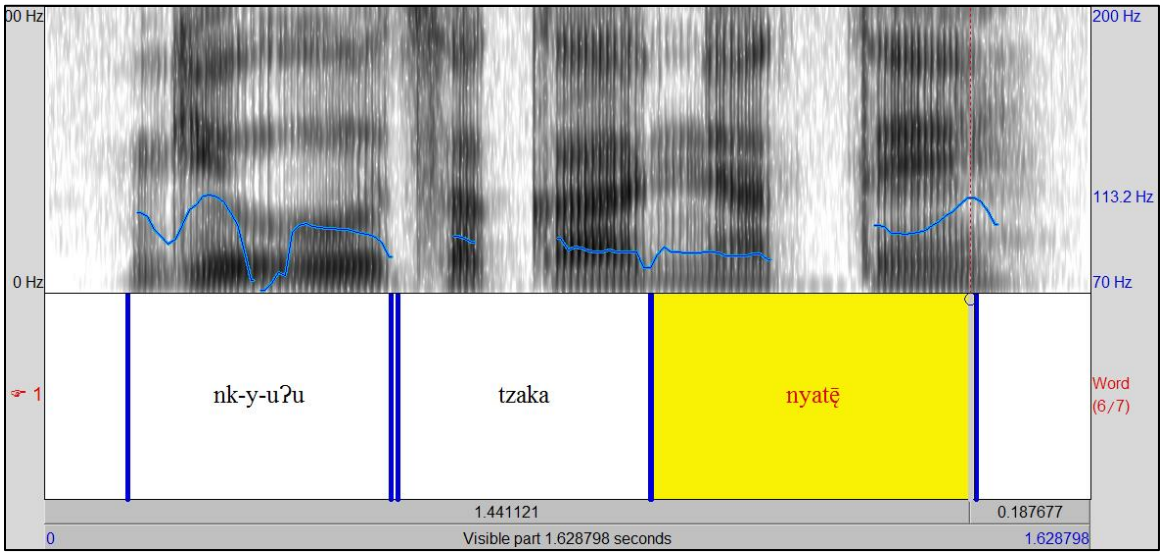


Figure 12. No downstep: M tone preceded by toneless moras

High tone downstep is shown in the utterance in (147) from a traditional folk tale narrative. As seen in the spectrogram in Figure 13, the H tone on the existential predicate *tāká* spreads through the toneless *liya* 'time' and bumps into the Negative particle *ná*, whose high tone downsteps and in turn spreads through the toneless predicate *nti-ʔe choo* 'rains'. The pitch track is broken and obscured due to the creak caused by the glottal stop in the middle of the verb *nti-ʔe*, but the pitch trajectory is nevertheless maintained. In this case, the downstepped and spreading H tone of the negation particle recovers to a pitch

on the word *choo* ‘rain’ that approaches the maximum pitch attained on the first spreading H tone. General declination should cause the second H to reach a lower maximum, but the speaker places some emphasis on *choo* ‘rain’ in this instance, raising the pitch of that word a bit above the expected level. Finally, the M tone of the utterance-final discourse particle *nī* is downstepped by the second spreading H tone.

(147) a. *tāká liya ná nti-ʔe choo nī*
exist time NEG HAB-go.down rain now
‘There are times it doesn’t rain.’ [kūnáʔa kusūʔ 6:11]

b. *tāká liya ná nti-ʔe choo nī*
MH ↓H ↓M

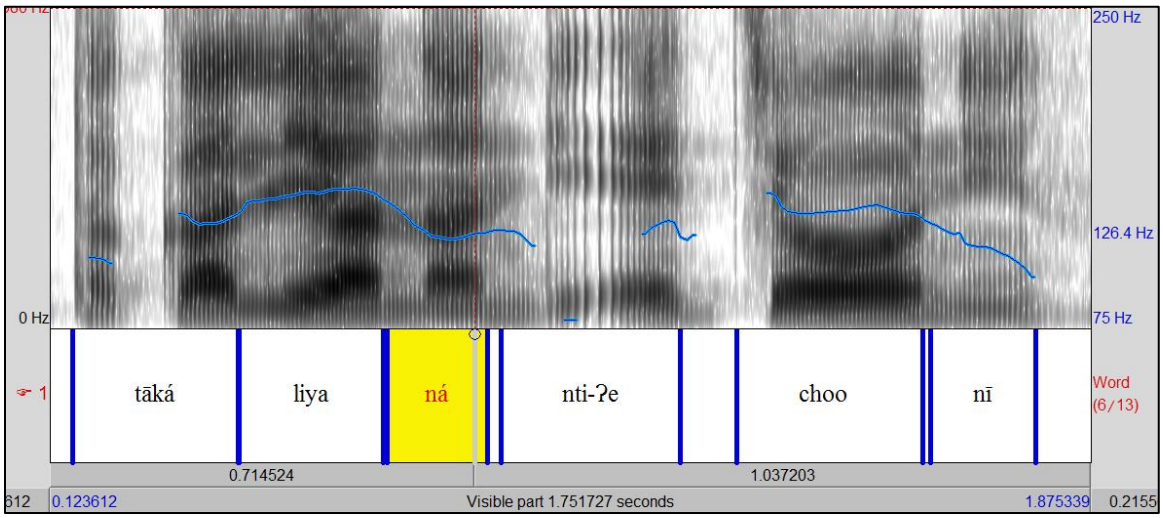


Figure 13. High tone downstep

Downstep is iterative. That is, it can apply in a phrase as many times as the tones in the phrase trigger it. The utterance from a folk tale in (148) has three instances of

downstep. Looking at the spectrogram in Figure 14, the first word, *chúʔ* ‘wrinkled’, bears a single H tone. This high tone downsteps the following M, and effectively the following MH sequence, on *tēę́ʔ* ‘wrinkly’. The H tone on the final mora of *tēę́ʔ* ‘wrinkly’ in turn downsteps the MH tone sequence on *māáʔ*. Since these words are monosyllabic forms in running speech, they have little space to realize their targets and thus show very little M to H contour. Also, the shortness of the forms gives little chance for the H tones to rise back up significantly. The now in effect double downstepped final H tone on *māáʔ* ‘foul-colored’ is realized at a quite low pitch for a H tone. Even after a significant pause, it spreads through the toneless verb *nt-ii* and the toneless noun *ntoo* ‘face’, finally downstepping the M tone on the first singular personal pronoun enclitic *=q̄ʔ* at the very end of the utterance. What appear to be sharp word-final pitch descents are merely effects of the word-final glottal stops.

(148) a. *chúʔ* *tēę́ʔ* *māáʔ* *nt-ii* *ntoo=q̄ʔ*
wrinkled wrinkly foul-colored HAB-feel face=1SG
‘My face feels wrinkled, wrinkly, and foul-colored.’ [nkoon lisu 3:03]

b. *chúʔ* *tēę́ʔ* *māáʔ* *nt-ii* *ntoo=q̄ʔ*
H ↓MH ↓MH ↓M

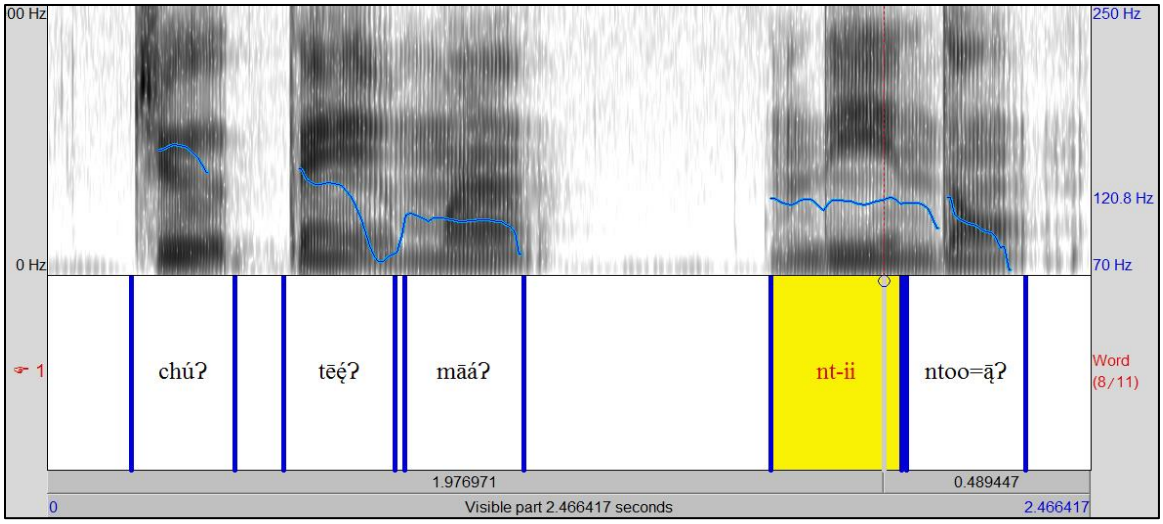


Figure 14. Iterated downstep

An example of high tone spreading reset by an intonational phrase boundary is in the utterance in (149). In the spectrogram in Figure 15, the final H tone on *kisō?ná* 'master' can be seen spreading through the toneless first person plural inclusive enclitic *=na* and downstepping the clause-final existential predicate *tāká*. That predicate carries a final H tone that if unchecked should spread through the following toneless conjunction *maxi* 'even if', the verb and subject *k-ii=ą* 'we think', and the adverb *laa?*. However, a new intonational phrase begins with the conjunction, so tonal effects are reset. Instead of the high tone spreading, the pitch declines steadily beginning with the conjunction *maxi*, and continuing through the adverb *laa?*. The pitch only rises again due to the mid tones on the final form *nyā?ā* 'you see'.

(149) a. *jā kisō?ná=na tāká maxi k-ii=ą laa? nyā?ā*
CONJ master=1PL.INCL exist[.3] even.if POT-feel.1PL.INCL like.so see.2SG
'We have our master, even if we think that way, you see.' [la familia 9:36]

b. *jā kisōʔná=na tāká*] *maxi k-ii=ą laaʔ nyāʔā*

M M H ↓M H] MM

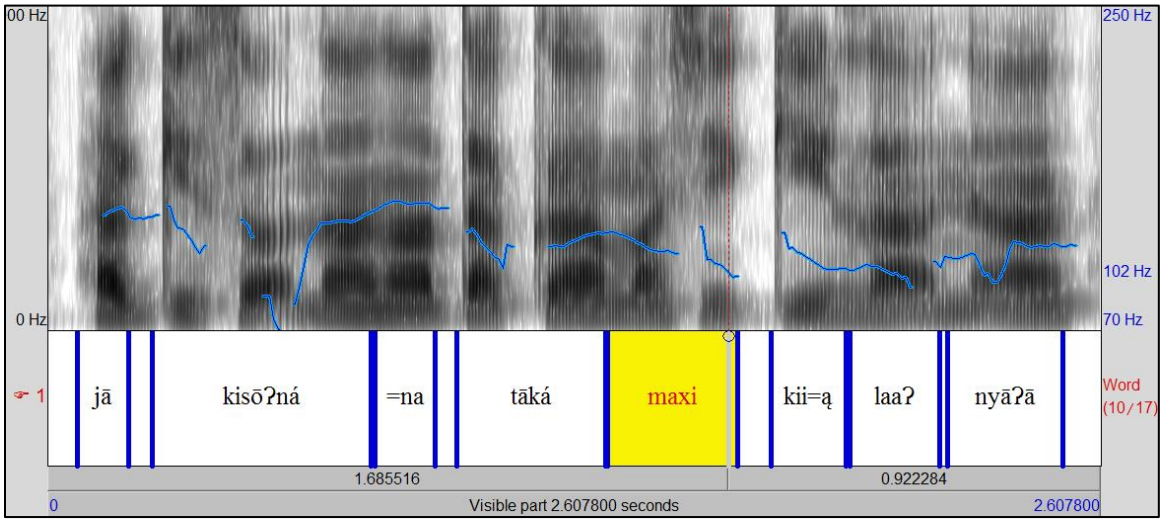


Figure 15. Intonational phrase boundary

3.4.3.3. Mid tone transformation at clitic boundary

Mid tone transformation is a process by which a /M/ tone on a monomoraic enclitic is transformed into a /H/ tone. This occurs only when the clitic's host bears only a single M tone on its final mora (i.e. the ØM basic tone pattern or monomoraic M pattern). This phonological change is demonstrated by the example in (150), which contains two occurrences of the third person plural enclitic *=ūʔ*, which bears M tone. The first occurrence of the enclitic *=ūʔ* is hosted by the enclitic *=rīké* 'chest', which is part of the first verb. As apparent in the spectrogram in Figure 16, the final H tone on *=rīké* downsteps the M tone of the pronominal enclitic *=ūʔ*, which is why the pitch dives so drastically at the end of the first verb. The second instance of the enclitic *=ūʔ* is hosted

by the second verb, *nka-jnyā* ‘made’. Since this host carries the ØM tone pattern, the enclitic’s M tone transforms, becoming /H/, which then spreads through the toneless form *yaą* ‘sweat bath’ at the end of the example.

(150) a. *lēʔ nk-yala=rīké=ūʔ nka-jnyā=**úʔ** yaą*
then CPL-fill=chest=3PL CPL-make=**3PL** sweat.bath
‘They made a plan and built a sweat bath.’ [ni7 rosa 2:24]

b. *lēʔ nk-yala=rīké=ūʔ nka-jnyā=**úʔ** yaą*
M MH ↓M M M H

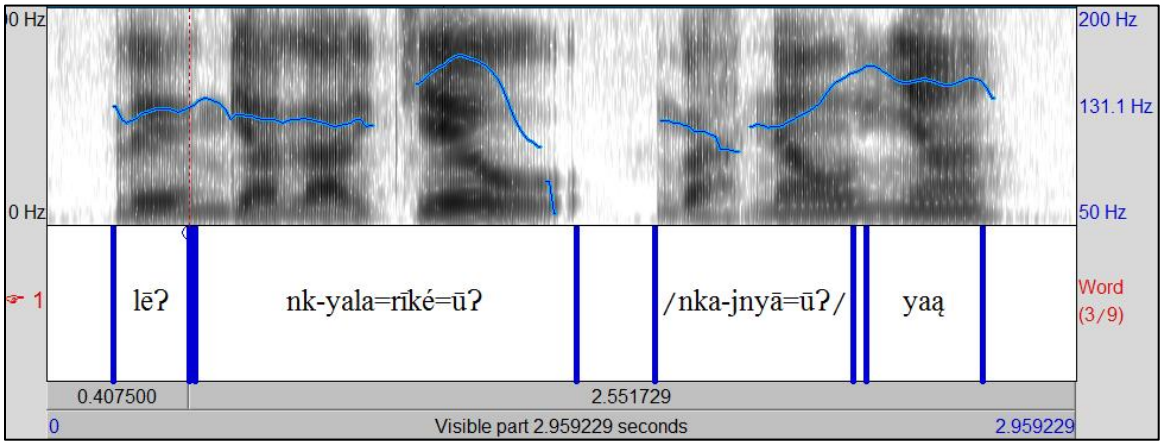


Figure 16. Mid tone transformation

Mid tone transformation is restricted to host-clitic boundaries. It does not occur between prefixes and stems, nor does it occur between two separate words or between two components of a compound. For example, if mid tone transformation occurred between the two components of a compound, then the compound verb *nk-ā+jlyū* ‘became big’ would be *nk-ā+jly**ú****, with the M tone of the adjective *jlyū* ‘big’ transformed into a

high tone. An inventory of the identified monomoraic mid-tone bearing enclitics in the language is provided in (151). There are few of them, but they occur frequently.

(151) =*ūʔ* 3PL/3NSPC
=*q̄ʔ* 1SG
=*chūʔ* 3SG.F
=*tīʔ* 'living core'

3.4.4. The abstract nature of the phonetic realization of tone

As presented above, there are three phonological processes that involve tone in Zenzontepec Chatino: high tone spreading (§3.4.3.1), M and H tone downstep (§3.4.3.2), and M tone transformation at clitic boundary (§3.4.3.3). Because of the nature of these processes, the phonetic realization of tone is often very different from its underlying specification. For example, a toneless mora is by default realized with a relaxed declination from mid to low pitch. However, the f_0 of a lexically toneless mora will be high if a spreading H tone passes through it. It may be at a mid-level pitch if it is near the beginning of an utterance or if a downstepped H tone happens to be spreading through it.

M tone is by default realized at a mid-level pitch. However, it will surface at a low pitch if it is downstepped by a spreading H tone. That same M tone might be transformed into a high tone and be realized at a high f_0 if it is associated with a clitic and has undergone mid tone transformation. Finally, a lexical H tone is by default realized at a high fundamental frequency, but it may surface at a mid-level pitch if downstepped, or even at a phonetically low pitch if it follows a string of iterated downstepped H tones. Therefore, since any tone specification may be realized at the default pitch level of any of the other tone specifications, the connection between phonological tones and their

phonetic realizations is abstract. The phonetic realization of tone has as much to do with context as with its default pitch.

3.4.5. Tonal phonology as diagnostic

Even though the connection between the default pitch level of a tone and its phonetic realization in Zenzontepec Chatino is highly variable and abstract, an understanding of the phonological processes provides a very powerful tool for the researcher, the language learner, and likely the casual speaker in context. One can quickly determine the lexical tone pattern of a form by using the phonological processes as diagnostics. If a tone spreads, then it is a /H/ tone. Any moras that permit a spreading H tone to pass through them do not bear any lexical tone. If a tone is downstepped by a spreading H tone and in turn spreads itself, then it is /H/, even though not realized at a high pitch. If a tone on a mora is downstepped but does not in turn spread through a following form that is known to be toneless, then one can be certain that the downstepped tone was, and still is, phonologically /M/. Finally, if a tone on a mora triggers mid tone transformation, or if it undergoes mid tone transformation and becomes /H/, then that tone must be /M/ underlyingly.

These diagnostics are easy to use in elicitation. Since numerals precede nouns, in order to test the tone of noun, one only needs to place numerals bearing differing tones before that noun. The numerals *túkwa* ‘two’, *tzúna* ‘three’, and *kāʔyú* ‘five’ are just a few that provide a high tone whose spreading, or lack thereof, can be observed. If the noun bears the ØØ tone pattern, it will be realized as phonetically [HH]. This is what was done

for *chojo nkwila* ‘chilacayote squash’ in Figure 10 in §3.4.3.1. If the noun bears the ØM tone pattern, it will be realized phonetically as [HL] because the high tone will spread through the first, toneless mora and then downstep the /M/ tone to [L]. This was seen on the noun *nyatę̄* ‘person’ in Figure 11 in §3.4.3.2.

Since adjectives follow the nouns that they modify, in order to test the lexical tone of an adjective, one can simply place it after a noun known to end with a high tone that will spread. Or, if one knows that an adjective has the ØØ tone pattern or the ØM tone pattern, one can place it after a noun to test if the noun has a final H tone that will spread. Since the negation particle *ná* bears a high tone and always precedes its predicate, one can diagnose the tone pattern of an adjective used predicatively, or any verb, by negating it and seeing if and how the H tone spreads through it (as seen in Figure 13 in §3.4.3.2). One can test if a verb, adjective, or numeral has the ØM tone pattern by encliticizing to it one of the monomoraic mid-tone bearing pronouns (151) to see if mid tone transformation occurs.

Chapter 4

Phonotactics

As presented in Chapter 2 and Chapter 3, the phonological inventory of Zenzontepec Chatino consists of consonants, vowels, vowel nasality, vowel length, and tone. The phonotactics are the principles upon which these contrastive elements are organized and combined to constitute larger phonological units in the language: syllables and phonological words. The phonotactic patterns include the positioning of phonemes and contrastive autosegmental elements within the larger phonological units and the constraints and tendencies in their co-occurrence. Though many phonotactic facts were mentioned during the discussion of the individual phonemes in Chapter 2 and Chapter 3, the purpose of the present chapter is to gather those facts together with any other patterns not yet mentioned and present them in a maximally generalized way. From this, definitions of the syllable and the phonological word begin to take more defined shape. Other evidence for determining the nature of the larger phonological constituents comes from domains of phonological processes, which are treated in Chapter 5.

This chapter begins with a description of the syllable (§4.1), which includes discussion of consonant clusters and a section on the diachronic development of the syllable structure. Following that is a detailed treatment of the phonotactic structure of the phonological word (§4.2). Phoneme co-occurrence constraints are discussed in §4.3, which are contrasted with other co-occurrence patterns (§4.4), which do not appear to be motivated by restrictions on co-occurrence per se, but are merely results of earlier sound changes. Finally, and crucially, the phonotactic analysis must be balanced with the inventory analysis so as to provide the most generalized, natural, and accurate treatment of both. Therefore, the phonological analysis presented here is compared with realistic alternative analyses, which are judged to be sub-optimal and are therefore rejected (§4.5).

4.1. Syllables and their structure

Blevins (1995: 207) defines the syllable as "the phonological unit which organizes segmental melodies in terms of sonority", with "each sonority peak defining a unique syllable". She argues for the phonological constituency of the syllable by pointing out how certain sound patterns in specific languages are most easily generalized with reference to it. Distributional facts may be dependent upon it, and it may be the domain, or target, of certain phonological processes.

All of these characteristics are present in Zenzontepec Chatino. First of all, some of the phonotactic patterns in the language are best expressed with reference to the syllable. For example, the vowel /o/ is prohibited in the antepenultimate syllable of the phonological word, it is dispreferred and rare in penultimate syllables, and it freely

occurs only in word-final syllables (§2.2.4; §4.2.3). Contrastive vowel nasality (§3.1; §4.2.2) and vowel length (§3.2; §4.2.2) are likewise restricted to final syllables. The overall sequencing patterns of sounds in the language is best explained with reference to the basic structure of the syllable, that is, the nucleus (§4.1.1), the coda (§4.1.2), and the onset (§4.1.3). As for phonological processes in Zenzontepec Chatino, most of them refer to the phonological word as their domain of application. However, one process whose domain is the syllable is the phonetic dissimilation of two M tones only if they are tautosyllabic (§3.3.3). Aside from this, tone is orthogonal to syllables since its domain is the mora, but tone does show some word-level phonotactic patterns (see §3.3 and §4.2.4). A phonological operation that targets syllables is the play language *nch-akwiʔ tzūʔ ntīlú* 'reversed speech'. In reversed speech, the initial syllable of a phonological word is transposed to the end of the phonological word (§5.9). In sum, there is much evidence for the syllable as a phonological constituent in Zenzontepec Chatino.

The description of the syllable in Zenzontepec Chatino in the remainder of this section proceeds as follows. First, the syllable nucleus is analyzed (§4.1.1), followed by the coda consonant /ʔ/ (§4.1.2), onsets and consonant clusters (§4.1.3), and finally, a look at syllables from a diachronic viewpoint (§4.1.4).

4.1.1. The syllable nucleus

Zenzontepec Chatino only permits vowels to function as syllable nuclei. That is, there are no syllabic consonants in the language. A syllable nucleus may have one or two moras. It consists of one of the five vowels (i, e, a, o, u), with or without vowel length

and with or without nasality. Though vowel quality, length, and nasality are independent of the syllable per se, they are dependent upon where the syllable is situated within the phonological word (see §4.2 for word-level phonotactics). Lastly, word-final glottal stop is not part of the nucleus but rather falls into coda position (§2.1.6.1; §2.1.6.2; §4.1.2). Examples of syllable nuclei of the various shapes are presented in the following sets: monomoraic non-nasal (152), monomoraic nasal (153), bimoraic non-nasal (154), and bimoraic nasal (155). Note that phonetic nasalization of vowels occurs after nasal consonants and therefore may occur in forms with no contrastive nasality (see also §3.1).

(152)	/ti/	[t**i**]	‘only’	/kw-etu/	[kʷ**e**.t**u**]	‘chicken’
	/jnēʔ/	[hn**ẽ**ʔ]	‘dog’	/kinī/	[k**i**.nʲ**ī**]	‘bird’
	/jlyá/	[hlʲ**á**]	‘lunch’	/jā/	[h**ā**]	conjunction
	/lō/	[l**ō**]	‘like so’	/sákōʔ/	[s**á**.k**ō**ʔ]	‘egret’

(153)	/jiʔį̄/	[hĩ.ʔ**ĩ**]	NSBJ marker	/kūkų́/	[kū.k**ų́**]	‘mottled owl’
	/kitę/	[ki.tʲ**ẽ**]	‘feather	/títẽ́/	[tí.tʲ**ẽ́**]	‘messy’
	/kīkwą́/	[kī.kʷ**ą́**]	‘metal’	/jutąʔ/	[hu.t**ãʔ**]	‘branch of’
	/tzǫʔ/	[ʦ**õ**ʔ]	‘behind’	/xikǭ/	[ʃi.k**õ**]	‘arm of’

(154)	/tii/	[t**ii**]	‘clear’	/jīí/	[h**īí**]	‘gray’
	/seeʔ/	[s**ee**ʔ]	‘saliva’	/kwi-teeʔ/	[kʷi.tʲ**ee**ʔ]	‘ant’
	/nte-láā/	[nde.l**áā**]	‘is taking’	/koōʔ/	[k**oō**ʔ]	‘moon’
	/jaaʔ/	[h**aa**ʔ]	‘sleeping mat’	/tyūú/	[tʲ**ūú**]	‘Pedro’

(155)	/kīį́/	[k**ĩ́**]	‘open’	/nkāą́/	[ŋg**ã́**]	‘coconut’
	/xēę̄ʔ/	[ʃ**ẽ̄**ʔ]	‘your nose’	/ki-sāą́/	[kī.s**ã́**]	‘will fall over’
	/ki-u-teę/	[ku.t**ẽ̄**]	‘will carry’	/soǫ/	[s**õ̃**]	‘base of’
	/tzáą̄/	[ʦ**ã́**]	‘day’	/júų̄/	[h**ų́ų̃**]	‘rope’

4.1.2. The coda consonant /ʔ/

The only consonant permitted in coda position is /ʔ/. This of course raises the question of the phonological status of /ʔ/ and whether it might be better treated as a feature of the syllable nucleus instead of a consonant. Though some facts would support such an analysis, the case in favor of considering /ʔ/ a consonant in all environments is stronger than the case for treating it as a feature of the nucleus (see §2.1.6.2). Some examples of words with coda glottal stop are in (156).

(156)	/ti-ākéʔ/	[tī.kʲéʔ]	'hot'	/tyuuʔ/	[tʲuuʔ]	'will cough'
	/kiyaʔ/	[ki.jaʔ]	'foot of'	/kwénēʔ/	[kʷé.nɛ̃ʔ]	'very young'
	/kuchinaʔ/	[ku.ʧi.nʲãʔ]	'foam'	/kwe-wīʔ/	[kʷe.βɪ̰ʔ]	'plague'
	/jnoʔ/	[jnõʔ]	'eight'	/la-atzaʔ/	[la.ʦaʔ]	'wet'
	/kichiʔ/	[ki.ʧiʔ]	'bald'	/tíʔ/	[tíʔ]	prox. temp. av.
	/nanēʔ/	[nã.nɛ̃ʔ]	'belly of'	/lákwiʔ/	[lá.kʷiʔ]	'oneself'
	/kooʔ/	[kooʔ]	'charcoal'	/xónkōʔ/	[ʃó.ŋgōʔ]	'see-saw'
	/kwēkúʔ/	[kʷē.kúʔ]	'incomplete'	/nch-asūʔ/	[nʲʤa.sūʔ]	'is aging'

In cases where glottal stop could syllabify either in the coda of one syllable or the onset of a following syllable, it will syllabify in the onset of the latter, even if the result is a complex onset, as in the examples in (157) (see more discussion in §4.1.3.2). Therefore, coda /ʔ/ occurs word-finally only, where it is not able to syllabify in any onset.

(157)	/koʔma/	[ko.ʔmã]	'macaw'
	/nkwéʔbē/	[ŋgʷé.ʔβ̰ē]	'sea shrimp'
	/nyaʔne/	[nʲã.ʔnẽ]	'animal'
	/túʔwa/	[tú.ʔwa]	'forty'
	/teʔyū/	[te.ʔjū]	'naked'

4.1.3. Onsets and consonant clusters

Simple onsets are unrestricted with respect to which consonant they may contain (§4.1.3.1). Complex onsets are permitted, but are subject to narrow constraints in native vocabulary (§4.1.3.2). They maximally contain two consonants, and these are the only consonant clusters permitted by the native phonotactic system. With only very few exceptions, syllables in native material must have onsets (§4.1.3.3).

4.1.3.1. Simple onsets

Syllable onsets are nearly obligatory, and any consonant may occur as a simple onset. Each one of the 21 consonant phonemes is exemplified twice as a simple onset in (158), word-initially on the left and word-medially on the right. The phoneme /ʔ/ is fairly rare word-initially, but it does occur in that environment (see also §2.1.6.1).

(158)

/**p**iīʔ/	[**p**iīʔ]	‘baby’	/lyā**p**í/	[lʲā.**p**í]	‘pencil’
/**b**u.rū/	[**β̤**u.ɾū]	‘donkey’	/jwe**b**ē/	[hwe.**β̤**ē]	‘Thursday’
/**m**ini/	[**m**ĩ.nʲĩ]	‘true’	/nku**m**e/	[ŋgu.**m**ẽ]	‘ripe’
/**t**áą̄/	[**t**ǎ̃ã̄]	‘valley’	/ja**t**a/	[ha.**t**a]	‘sweat of’
/**tz**eeʔ/	[**ts**eeʔ]	‘lizard sp.’	/ti**tz**ę/	[ti.**ts**ẽ]	‘unpleasant’
/**s**eę/	[**s**ẽẽ]	‘wide’	/la**s**u/	[la.**s**u]	‘size’
/**l**oo/	[**l**oo]	‘dress (n.)’	/te**l**uʔ/	[te.**l**uʔ]	‘soon’
/**n**āáʔ/	[**n**ãǎʔ]	1SG	/tā**n**á/	[tā.**n**ǎ]	‘poison’
/**r**uū/	[**ɾ**uū]	‘rice’	/to**r**ō/	[to.**ɾ**ō]	‘bull’
/**ty**áą̄/	[**tʲ**ǎã̄]	‘throat of’	/nte-**ty**āá/	[ndē.**tʲ**āá]	‘is turning in’
/**ch**oōʔ/	[**tʃ**oōʔ]	‘maguey’	/ntí**ch**āʔ/	[ndí.**tʃ**ā̃ʔ]	‘crease’, ‘wrinkle’
/**x**íī/	[**ʃ**íī]	‘light’	/tza**x**ī/	[ʦa.**ʃ**ī]	‘a little’
/**ly**áā/	[**lʲ**áā]	‘opossum’	/pā**ly**á/	[pā.**lʲ**á]	‘shovel’
/**ny**áʔa/	[**nʲ**ǎ.ʔã]	‘mother of’	/kwa**ny**o/	[kʷa.**nʲ**o]	‘squirrel’
/**y**oo/	[**j**oo]	‘oven’	/kwá**y**ēʔ/	[kʷá.**j**ēʔ]	‘puffed up’
/**ky**ālá/	[**kʲ**ā.lá]	‘dream’	/xi**ky**aʔa/	[ʃi.**kʲ**a.ʔa]	‘because of’
/**k**āá/	[**k**āá]	‘nine’	/ya**k**a/	[ja.**k**a]	‘tree’
/**kw**aą̄/	[**kʷ**ãã̄]	‘fever’	/ku**kw**ęʔ/	[ku.**kʷ**ẽʔ]	‘armadillo’
/**w**elaʔ/	[**w**e.laʔ]	‘corn husk’	/su**w**e/	[su.**w**e]	‘egg’

/**ʔ**ā/	[**ʔ**ā]	question particle	/te**ʔ**ę/	[tẽ.**ʔ**ẽ]	‘jug’
/**j**īí/	[**h**īí]	‘gray’	/te**j**eʔ/	[te.**h**eʔ]	‘salt’

4.1.3.2. Consonant clusters: complex onsets

Complex onsets are of two types, and they are the only consonant clusters allowed by the native phonotactics. One type consists of a glottal consonant, /j/ or /ʔ/, followed by a sonorant consonant: /l/, /ly/, /n/, /ny/, /y/, /w/, /m/, or /b/. Note that the bilabial approximant /b/ is rare in clusters since it has only recently emerged out of an allophone of /w/, and the marginal phoneme /r/ is missing in this pattern. The other type of native complex onset consists of a nasal consonant, /n/ or /m/, followed by an obstruent: /p/, /t/, /tz/, /ty/, /ch/, /ky/, /k/, or /kw/. There are no clear synchronic cases of /s/ or /x/ after nasals since they become affricates and neutralize with /tz/ and /ch/, respectively, in that environment.

Complex onset types (i.e. permitted consonant clusters)

1. **G S** where G is a glottal consonant and S is a sonorant consonant
2. **N O** where N is a nasal consonant and O is an obstruent

Examples of GS consonant clusters with /j/ as C_1 are listed in (159), and examples with /ʔ/ as C_1 are given in (160). In both sets, word-initial cases are on the left and non-initial syllable examples are on the right.

(159)

/**jl**eʔ/	[**hl**eʔ]	‘tortilla of’	/lē**jl**í/	[lē.**hl**í]	‘circular’
/**jly**alā/	[**hlʲ**a.lā]	‘a litle early’	/nte-**jly**ā/	[nde.**hlʲ**ā]	‘is slipping’
/**jn**oʔ/	[**hn**õʔ]	‘eight’	/nku-**jn**ii/	[ŋgu.**hn**ĩĩ]	‘grew up’

/**jny**aa/	[**hnʲ**ãã]	‘very spicy hot’	/ntē-**jny**á/	[ndē.**hnʲ**ã́]	‘is quaking’
/**jy**ánā/	[**hj**á.nã̄]	‘one year ago’	/ki-**jy**a/	[ki.**hj**a]	‘will play’
/**jw**iī/	[**hɸ**iī]	‘whistle (n.)’	/nku-a**jw**ī/	[ŋgu.**hɸ**ī]	‘got’
			/tyú+j**m**é/	[tʲú**hm**ẽ́]	‘coccoon’

(160)	/**ʔn**e/	[**ʔn**ẽ]	‘will do’	/sa**ʔn**e/	[sa.**ʔn**ẽ]	‘long ago’
				/kí**ʔy**ū/	[kí.**ʔj**ū]	‘male’
				/kū**ʔw**í/	[kū.**ʔw**í]	‘drunk’
				/ko**ʔm**a/	[ko**ʔm**ã]	‘macaw’
				/nkwé**ʔb**ē/	[ŋgʷé.**ʔβ̞**ē]	‘sea shrimp’

As shown in the examples above in (159), all sonorants besides /r/ and /b/ occur in clusters following /j/. The examples in (160) show that clusters of /ʔ/ plus sonorant exclude /r/ and the laterals /l/ and /ly/. This is summarized in Figure 17. Some historical explanation for these patterns, and their gaps, is given in §4.1.4.

		C_2								
		/l/	/ly/	/n/	/ny/	/y/	/w/	/m/	/b/	/r/
C_1	/j/	/jl/	/jly/	/jn/	/jny/	/jy/	/jw/	/jm/	—	—
	/ʔ/	—	—	/ʔn/	—	/ʔy/	/ʔw/	/ʔm/	/ʔb/	—

Figure 17. Complex onsets: glottal + sonorant (GS)

Examples of NO (nasal plus obstruent) clusters are in (161), again with word-initial cases on the left and non-initial syllable cases on the right. The lack of any word-medial example of /n/ followed by /ky/ is not due to any restriction but rather is just an effect of /ky/ being a fairly rare phoneme (§2.1.5.1).

(161)	/**mp**eleʔ/	[mbe.leʔ]	‘thick tortilla’	/tye**mp**ū/	[tʲe.mbū]	‘time’ < Sp.
	/**nt**áā/	[ndáā]	‘bean’	/kyū**nt**íʔ/	[kʲū.ndíʔ]	‘beetle sp.’
	/**ntz**eę/	[ndʑẽẽ]	‘citrus fruit’	/tzē**ntz**éʔ/	[ʦē.ndʑéʔ]	‘thin (of cloth)’

/**nty**aʔą/	[nʲdʲã.ʔã]	‘goes around’	/kwi-**nty**eʔ/	[kʷi.nʲdʲeʔ]	‘queen ant’
/**nch**una/	[nʲʤu.nã]	‘third (ord. num.)’	/ma**nch**ę/	[mã.nʲʤẽ]	‘praying mantis’
/**nk-y**āáʔ/	[ŋʲgʲāáʔ]	‘was made’	—		
/**nk**oǫ/	[ŋgõõ]	‘turtle’	/su**nk**ą/	[su.ŋgã]	‘insect spp.’
/**nkw**īxí/	[ŋgʷī.ʃí]	‘tomato’	/xī-**nkw**éē/	[ʃī.ŋgʷéē]	‘jaw of’

Figure 18 lists the attested clusters of nasal followed by obstruent. The nasal is always homorganic with the following obstruent (§5.2.1), and the obstruent always assimilates in voicing to the nasal (§5.2.2). Nasal plus obstruent clusters thus provide an example of mutual partial assimilation. The only cases treated as underlying /m/ are those where the nasal precedes /p/. All others are treated as underlying /n/.

		C_2							
		/p/	/t/	/tz/	/ty/	/ch/	/ky/	/k/	/kw/
C_1	/N/	/mp/	/nt/	/ntz/	/nty/	/nch/	/nky/	/nk/	/nkw/

Figure 18. Complex onsets: nasal + obstruent (NO)

4.1.3.3. Onsetless syllables or obligatory onsets?

The minimal syllable in Zenzontepec Chatino consists of a single short vowel with no onset or coda. However, onsetless syllables are dispreferred, and they are quite rare. The few forms that have them are of three types. The first type includes four native nouns that begin with the vowel /i/, listed in (162). Their surface form may be onsetless, or an initial consonant may be inserted, either [j], [ʔ], or [h]. There is some degree of inter-speaker, and even intra-speaker, variation with respect to which consonant is inserted. If not for the variation in inserted consonants, it would be simpler to posit these

words as having an underlying initial consonant that may or may not surface. There is also an onsetless third person plural nominalizer particle *ų́ʔ* (163).

(162)	/ike/	[i.kʲe] ~ [ji.kʲe] ~ [ʔi.kʲe] ~ [hi.kʲe]	‘head of’
	/ītzáʔ/	[ī.ʦáʔ] ~ [jī.ʦáʔ] ~ [ʔī.ʦáʔ]	‘word’, ‘issue’
	/ítā/	[í.tʲā] ~ [jí.tʲā] ~ [ʔí.tʲā]	‘water’
	/itzǫʔ/	[i.ʦõʔ] ~ [ji.ʦõʔ] ~ [ʔi.ʦõʔ]	‘back of’

(163)	/ų́ʔ/	[ṹʔ] ~ [hṹʔ]	NMZ.3PL

Another small set of onsetless forms that show vowel-only syllables are among Spanish loanwords, which may be realized with an inserted initial glottal stop (164). These all share the property of being minimally nativized; that is, they have sound patterns that are not found in native vocabulary.

(164)	/i/	[i] ~ [ʔi]	‘and’	<	Sp. *y* ‘and’
	/enchújwē/	[enʲʤúhɸ̪ē] ~ [ʔenʲʤúhɸ̪ē]	‘plug’	<	Sp. *enchufe* ‘plug’
	/asta ná/	[asta nã̂] ~ [ʔasta nã̂]	‘almost not’	<	Sp. *hasta* ‘up to’ + NEG
	/úbā/	[ú.β̪ā] ~ [ʔú.β̪ā]	‘grape’	<	Sp. *uva* ‘grape’
	/orō/	[o.ɾō] ~ [ʔo.ɾō]	‘gold’	<	Sp. *oro* ‘gold’

Finally, some bound morphemes make up the third type of lexically onsetless forms. However, though they have no initial consonant underlyingly, they rarely begin a syllable, so they only rarely provide examples of onsetless surface forms. Many verb roots and some noun roots have onsetless initial syllables lexically, but these must have prefixes and therefore always end up beginning in a consonant. Enclitics may also be lexically vowel-initial (165). If their host is vowel-final, the initial vowel of the clitic may fuse with the final vowel of its host or may remain in hiatus. Clitic boundaries are the only environment in which vowel hiatus is tolerated. If they encliticize to a form that

ends with glottal stop, then the glottal stop syllabifies in the onset of the syllable containing the enclitic.[18] Of the onsetless enclitics, only the third person Non-specific/plural pronoun *=ūʔ* may serve as an onsetless syllable (§5.7).

(165) /=ą/ 1PL.INCL dependent pronoun
/=ą̄ʔ/ 1SG dependent pronoun
/=Vʔ/ NVIS
/=V́/ DIST
/=ūʔ/ 3NSPC/PL dependent pronoun

Of the different types of onsetless forms mentioned here, the most interesting is the small set of native free forms that may actually occur without any initial consonant. Consideration of historical processes that may have produced them is given in §4.1.4.1. Loanwords, on the other hand, are not expected to perfectly fit the native phonotactics, unless they are old and highly nativized (§7.3.2). As for the onsetless verb roots, noun roots, and enclitics, they never produce onsetless syllables at the surface level. So in sum, despite the existence of the few forms that may actually occur without onsets, there is undoubtedly a strong preference for onsets in the language. This is reflected both by the fact that all of the syllables in the language, besides these few, have onsets, and even the few exceptions show varied consonant epenthesis as a repair strategy at the phonetic level.

[18] In rapid speech, a glottal-final host and glottal-final enclitic may fuse into one long creaky syllable.

4.1.4. Diachronic perspectives on syllable structure

Two points are addressed in this brief section. First, though onsetless free forms are quite rare, some more or less natural changes have brought about the few that exist (§4.1.4.1). Second, as discussed in §4.1.3.2, consonant clusters are fairly restricted in Zenzontepec Chatino. Nevertheless, they are less restricted now than they likely were at an earlier stage of the language, as some recent changes have conspired to expand the range of permitted consonant clusters (§4.1.4.2).

4.1.4.1. Historical discussion of onsetless words

The four onsetless /i/-initial native words from (162) are repeated below in (166) alongside their reconstructed proto-Zapotec cognates (Kaufman 1993) at the far right.

(166)	/ike/	[i.kʲe] ~ [ji.kʲe] ~ [ʔi.kʲe] ~ [hi.kʲe]	‘head of’	**yekkek* ‘head’
	/ītzáʔ/	[ī.ʦáʔ] ~ [jī.ʦáʔ] ~ [ʔī.ʦáʔ]	‘word’, ‘issue’	**tiiʔtzaʔ* ‘word’
	/ítā/	[í.tʲā] ~ [jí.tʲā] ~ [ʔí.tʲā]	‘water’	**n-issa* ‘water’
	/itzǫʔ/	[i.ʦõʔ] ~ [ji.ʦõʔ] ~ [ʔi.ʦõʔ]	‘back of’	**kkutzuʔ* ‘back of’
				**t-ittzi(k)* ‘back of’

The proto-Zapotec reconstructions help determine what these forms may have been like at an earlier stage of the language. The cognate of *ike* ‘head of’ began with **y* in proto-Zapotec, and probably proto-Zapotecan. The proto-Chatino phonotactics restricted **y* from preceding **i*, and a proto-Chatino sound change elided **y* in most cases before mid vowels **e* and **o* (Campbell 2011b), yielding the now onsetless *ike* ‘head of’. Nevertheless, Yolotepec Eastern Chatino currently has *yike* ‘head’ (Woodbury, p.c.), which perhaps reflects a conservative feature and an exception to the earlier

restriction against /y/ before /i/. Proto-Zapotecan **t* and **tt* unconditionally weakened to proto-Chatino **j* [h], and perhaps the resulting articulatorily weak onset was lost in *ītzáʔ* 'word'. The proto-Chatino word for 'back of' appears to have been in part cognate to the final syllable of Kaufman's proto-Zapotec **kkutzuʔ* 'back of' (Campbell 2013: 404). According to the form in San Marcos Zacatepec Chatino, *tīchǭʔ* 'back of', the proto-Chatino word meaning 'back of' would have been **tìtzụ̀ʔ*. However, the onsetless form in Zenzontepec Chatino suggests perhaps **jìtzụ̀ʔ,* with the same weak onset outcome of an initial **ji* sequence. Finally, proto-Chatino **ʔita* 'water' began with **ʔ* (Upson & Longacre 1965: 319), which was uncommon in root-initial position (Campbell 2013a). It metathesized with the medial **t* in Eastern Chatino and was deleted in Zenzontepec and Tataltepec (Campbell 2013a, see also Upson & Longacre 1965: 315).

Finally, the third person plural nominalizer *ụ́ʔ* now begins in /u/, but it has a variant form with onset [h] (§6.2). Tataltepec Chatino and the Tlacotepec dialect of Zenzontepec Chatino have the cognate forms *ngúʔ* and *nkóʔ*, respectively, which show that the form almost certainly had an onset previously. The vowel-initial form of Core Zenzontepec Chatino was perhaps remodeled on analogy to the corresponding vowel-initial enclitic pronoun *=ūʔ*.

4.1.4.2. The rise of consonant clusters

The oldest current consonant clusters in Zenzontepec Chatino are the clusters of /ʔ/ followed by /n/, /y/, or /w/. These would have been the only common clusters in proto-Chatino, though some N + O clusters were forming and can be reconstructed for

proto-Chatino (Campbell 2013a: 409). In contrast, for proto-Zapotec Kaufman (1993) reconstructs clusters of **ʔ* followed by any consonant, single or geminate, sonorant or obstruent. Such clusters were probably present in proto-Zapotecan as well, and a change occurred later in proto-Chatino in which **ʔ* was deleted before obstruents and **l* (167) (Campbell 2011b).

(167) pCh **ʔ* > Ø / __ $\left\{ \begin{matrix} \text{O} \\ l \end{matrix} \right\}$ (where O = any obstruent)

Clusters involving /j/ plus sonorant in Zenzontepec Chatino are from two sources. Some of those in which /j/ [h] precedes a semivowel arose in proto-Chatino. All varieties of Chatino show the effects of a change in which semivowels were inserted after the glottal fricative **j,* in harmony with a preceding high vowel. This only occurred if the following vowel was peripheral (/a/, /i/, or /u/) and had a backness feature value opposite from that of the first vowel (Campbell 2011b). That is, sequences of **uji* became *ujwi*, and sequences of **ijV* became *ijyV* if *V* was **a* or **u* (168).

(168) Ø > **w* / *u j* __ V[+high, -back]

Ø > **y* / *i j* __ V[+back]

Consonant clusters of /j/ followed by a lateral or nasal are innovations unique to Zenzontepec Chatino. Even though similar clusters occur in other Chatino varieties, they are due to independent innovations. These clusters arose in Zenzontepec Chatino via a very specific change of non-prominent high vowel deletion. Sequences of a simple obstruent (any obstruent other than *tz, ty, ch, ky, kw*) and a high vowel (*u* or *i*) were

reduced to /j/ only where preceding either **n* or **l*, but only if the following vowel was different in quality than the elided high one (169). After the change, the final-syllable vowel remained monomoraic (§3.2). A few examples that illustrate this are in Table 7. The Zenzontepec Chatino forms are listed with their Zacatepec Eastern Chatino cognates, which preserve the reflexes of the high vowels and unaltered consonants. Proto-Chatino reconstructions (Campbell & Cruz 2010; Campbell 2011b; 2013a), and cognate proto-Zapotec reconstructions (Kaufman 1993), if available, are listed in the final two columns. A couple of examples in which $V_1 = V_2$, and therefore the change did not occur, are in the final two lines of Table 7.

(169) $*C_1V_{1[+high]} > j \,/\, \_\_ \begin{Bmatrix} n \\ l \end{Bmatrix} V_2$ (where C_1 is a simple obstruent and $V_2 \neq V_1$)

Table 7. Origin of /j/ plus nasal or lateral clusters

	ZEN	ZAC	pCh	pZp
‘griddle’	***jny****a*	*ndinyą*	****tin****ą*	**tyiʔla*
‘eight’	***jn****oʔ*	*sonǫʔ*	****sun****ǫʔ*	**xonuʔ*
‘offspring of’	***jn****iʔ*	*sinyeʔ*	****sin****eʔ*	**xiʔinne*
‘work’	***jny****á*	*tinyą̌*	****tìn****á*	**tyiiʔna*
‘chili pepper’	***jny****áʔ*	*kinyą̌ʔ*	****kìn****áʔ*	**kiiʔnaʔ*
‘bitter’	***jly****aaʔ*	*lyāāʔ*	****ti-l****āāʔ*	**(na=)llaʔ*
‘big’	***jly****ū*	*tilyō*	****ti-(a)l****ù*	**—**
‘midday meal’	***jly****á*	*tilyă*	****tìl****á*	**—**
‘morning’	***jly****ā*	*tilyā*	****til****à*	**ssila*
‘dog’	***jn****ēʔ*	*xonīʔ*	****xun****èʔ*	**—**
‘cold’	***jly****aʔ*	*tilyaʔ*	****til****aʔ*	**sillaʔ*
‘bird’	***k****i****n****ī*	*kinyī*	**k****i****n****ì***	**kwe=kinni*
‘cactus spine’	***s****u****l****u*	*solo*	**s****u****l****u***	**—**

Due to the specific environment of the change just exemplified requiring the affected sounds to be in non-final syllables, the modern /jS/ clusters are mostly root-initial. Word-medial cases are either verbs inflected with aspect prefixes or nouns that were previously tri-syllabic, or compounds. If the deleted high vowel was **i* and not **u*, then the sonorant nasal or lateral is palatalized as expected (§2.1.3.4, §2.1.3.5, §5.1.1).

To summarize, several historical facts and changes conspired to lead to the current phonotactic pattern permitting GS consonant clusters in Zenzontepec Chatino. It had its roots in proto-Chatino, where **ʔS* clusters were inherited from proto-Zapotecan

and **jY* (where Y = semivowel) clusters had arisen due to harmonic semivowel epenthesis. Finally, the change of simple obstruents plus high vowel to /j/ before /n/ or /l/ set the stage for the more general phonotactic pattern of GS clusters to become firmly entrenched.

As for the NO clusters (nasal + obstruent), they have arisen due to the accretion of /n/ into initial position on various nouns, verbs, and aspect prefixes. Nasal plus obstruent clusters on nouns likely originally came from the pre-nominal Definite article *na* sporadically fusing to some nouns and then phonologically reducing. This nasal accretion began in proto-Chatino, where it only affected a few lexemes, but it has continued independently in all varieties of Chatino since then, sporadically affecting different items in the different varieties (Campbell 2013a: 409). Some verbs inflect for Stative Aspect with a prefix *n-*, cognate to Kaufman's reconstructed proto-Zapotec Stative proclitic **na=*. Some of these inflected Stative verbs are now lexicalized as adjectives, including most of the basic color terms, among others. Finally, all Progressive, Habitual, and Completive Aspect prefixes other than the *y-* allomorph of the Completive prefix had an initial *n* accreted onto them in proto-Chatino, which Kaufman (1993: 78) suggests is from the proto-Otomanguean adverb **na* 'now'.

As mentioned in §4.1.3.2 and again later in §5.2.2, any obstruent with accreted nasal becomes phonetically voiced. The sibilants /s/ and /tz/ neutralize as [dz] after nasals ([nʣ]), while /x/ and /ch/ neutralize as [dʒ] after nasals ([nʲdʒ]). Nasals have accreted onto other sonorant consonants as well, with the following outcomes: *n- + y > ntz* [nʣ], perhaps with some other intermediate step; *n- + w > m*; and *n + l > nt* [nd]. A few

examples of these are in (170). Since the NO clusters arose from nasal consonants of preposed elements accreting onto lexemes, it is not surprising that they are much more common in word-initial position than they are in word-medial position. The majority of word-medial cases likely have some special circumstances behind their development, being old compounds, loan words, or sound symbolic forms.

(170)

n-tz-uʔu	‘exists’, ‘there is’	< *n- y-uʔu*	‘STAT- live, to be put inside’
ntzákwā	‘chayote squash’	< *n- yákwā*	(cf. pZp **yakkwak*)
ntzátę̄	‘hog plum’	< *n- yátę̄*	(cf pZp **yatyi*)
mini	‘true’	< *n- wini*	‘STAT- to be straightened, stretched’
nteʔya	‘tooth’	< *n- leʔya*	(cf. pZp **(l)leʔya*)
ntana	‘soot’	< *n-lana*	(cf. pZp **lana*)

Finally, it must be noted that loanwords from Spanish may contain consonant clusters not permitted by the native phonotactics, even in some loans that otherwise reflect a fairly advanced degree of nativization (§7.3.4). It is possible that the now prolonged and intense contact with Spanish will lead to a larger change in the general phonotactics of the language. However, for now the language remains fairly phonologically conservative, and loanwords that violate the phonotactics are usually easily identifiable as such.

4.2. Phonotactics of the phonological word

Just as some generalizations about phoneme distribution are best made with reference to the syllable as a phonological constituent (§4.1), other phonotactic facts are most succinctly captured with reference to a constituent larger than the syllable: the

phonological word. These larger distributional patterns, along with some evidence from phonological processes and their domains (Chapter 5), are used to define this larger constituent as the phonological word (see summary in §10.2.1). Again, though many of the patterns that will be mentioned here were touched upon in the discussion of individual phonemes in Chapter 2 and Chapter 3, the present section's purpose is to draw these facts together more generally.

First of all, it is appropriate to refer to the word as the domain at the end of which a coda /ʔ/ can occur, since it fails to syllabify into a following onset (§4.2.1). Next, the distributions of vowel nasality and vowel length (§4.2.2), and also the vowel /o/ (§4.2.3), are best defined with reference to position within the phonological word. Additionally, lexical tone distribution and combinations are largely dependent upon position within the word (§4.2.4). Finally, all of these facts plus some others are part of a pattern of final-syllables being more prominent than other syllables within the phonological word (§4.2.5). A few other facts that refer to the phonological word are discussed in later sections. First of all, there is a constraint against two identical glottal consonants occurring within a single phonological word (§4.3.3). Two H tones (§4.3.4) cannot co-occur in a single phonological word either. Also, in the language called *nch-akwiʔ tzūʔ ntīlú* 'speaking backwards' speakers transpose the initial syllable of the phonological word to the end of the phonological word (§5.9).

4.2.1. Coda glottal stop revisited

In §4.1.2 (and §2.1.6.2) it was shown that /ʔ/ is the only consonant that occurs in coda position. However, in word-medial position, it always syllabifies in the onset of the syllable containing the following vowel. Therefore, codas are restricted to word-final position. Though this pattern is best stated with reference to the phonological word, it may simply be just an epiphenomenon of the rules that govern syllable structure and syllabification. A pattern more clearly linked to the phonological word is the constraint against multiple glottal stops within one phonological word (§4.3.3).

4.2.2. Vowel nasality and vowel length restrictions

As pointed out earlier, contrastive vowel nasality (§3.1) and vowel length (§3.2) are restricted to the final syllable of the phonological word.[19] Demonstrating the existence of these constraints is difficult because listing numerous examples that lack non-final vowel nasality or vowel length would only provide trivial negative evidence. Nevertheless, compounds offer a window onto the operation of these constraints. If vowel nasality or vowel length occurs in what appear to be a non-final syllable, then the form in question must be a compound or a sequence of a host and enclitic. Note that each component stem in compounds in Zenzontepec Chatino constitutes its own phonological

[19] Recall that phonemic vowel nasality must be distinguished from merely phonetic vowel nasalization, which is either an effect of a preceding nasal consonant or nasalization spreading leftwards within a word across a glottal consonant (§3.1).

word, so entire compounds do not necessarily fit word-level phonological patterns (§10.3).

Over time compounds may phonologically erode or adjust, adapting to better fit phonological word constraints. They may eventually relexicalize as roots and lose any obvious connection to their history as compounds. A nice example from English is *lord*, which goes back to Old English *hláf+weard* 'male head of household', which was ultimately a compound of *hláf* 'bread' and *weard* 'keeper', as the master of the house was in charge of the food. An example of an English compound of more recent formation is *cupboard*, which is now a single phonological word but whose earlier component parts are semi-recognizable to speakers.[20]

In some Zenzontepec Chatino compounds, original nasality and vowel length are only marginally preserved in non-final position, showing some weakening and variation. For example the lexeme *tzelā yuu* 'world' (171) now usually consists of two phonological words, the first of which used to be two phonological words itself. In proto-Chatino, it was ***kitzę lo yuu*** 'world', literally 'village + (at).face.of + earth'. Kaufman (1993: 57) reconstructs a fully cognate proto-Zapotec form ***keetze lawo yoo*** 'world', so the lexeme is of proto-Zapotecan stock. In modern Zenzontepec Chatino, the first syllable of the first phonological word ***tze****lā* was previously the final syllable of *kitzę* 'village', with nasal vowel. Most speakers now do not have the nasality, but some speakers still pronounce it and are even aware of the etymology.

[20] Anthony Woodbury suggested this example.

(171) /tze+lā yuu/ [ʦ**e**lā juu] ~ [ʦ**ẽ**lā juu] ‘world’ < pCh **kitzę lo yuu* ‘world’
pZp **keetze lawo yoo* ‘world’

Another example of a compound that shows variation in non-final syllable nasality is the verb *-isę+yaāʔ* ‘get mixed’, literally ‘get wrapped around + hand’. The nasality on the final vowel of the verb root *-isę* ‘get wrapped around’ is sometimes still present, but just as often it is omitted, especially in rapid speech. The variant pronunciation may reflect a transition in which the stem is being reanalyzed as a single phonological word, and rapid speech may make it more likely to be parsed as a single phonological word.

(172) /nkw-isę+yaāʔ/ [ŋgʷis**ẽ**jaāʔ] ~ [ŋgʷis**e**jaāʔ] ‘got mixed’

Vowel length restrictedness in non-final syllables is evident in old compound verbs that are on their way to relexicalizing as single roots or perhaps have already done so. One example is the compound verb meaning ‘take’ in (174), which is composed of the verb *-aa* ‘go’ and the relational noun *lóʔō* ‘with’. The compound arose via an applicative verbal valency alternation (Campbell in press)

(173) *y-**a**+lóʔō*
CPL-**go.NBS**+with
‘took’

Auxiliary constructions are compounds phonologically, since the auxiliary is incorporated into the Verbal Template (§12.4.2) but behaves as an independent phonological word. Motion verbs such as *-aa* ‘go (to non-home destination)’, with long vowel, are common auxiliaries. In many instances, especially in rapid or casual speech,

the vowel reduces in length, as in the example in (174). The auxiliary verb's basic form is *tz-aa+* (in Potential Mood), but is here shortened to *tz-a+*. As an independent lexical verb, its full form is *tz-aa* 'will go'.

(174) *tz-**a**+soōʔ=ą̄ʔ* *ya* *n-ch-akę̄*
POT-go.NBS+gather=1SG CL.wood HAB-ITRN-burn
'I'll go gather firewood.' [nkwitzan ti7i 3:31]

The fact that vowel nasality and vowel length in prepounds (initial stems in compounds of two stems) is one of the first steps in phonological reduction of compounds provides some evidence for the constraints on the distribution of these elements within the phonological word. That is, they are the first sign that a compound may be lexicalizing as a single root or that an auxiliary is moving slowly towards affixal status.

4.2.3. Restriction of /o/ outside of word-final syllables

The vowel /o/ is rare in non-final syllables (§2.2.4), never occurring in prefixes or antepenultimate syllables of the phonological word. It occurs only infrequently in penultimate syllables, with most cases being loanwords, sound symbolic forms, or forms showing translaryngeal vowel harmony in which final-syllable /o/ spreads to a penultimate syllable (§5.5.1). Only a few other examples appear to be native forms (175), repeated here from (96), and even these may be old compounds or loans.

(175) /k**ō**tzá/ [k**ō**ʦá] 'three days away (before or after)'
/k**ō**ʔyú/ [k**ō**ʔjú] 'four days from today (after)'

/s**o**ʔni/ [s**o**ʔnĩ] ‘conch’ (no known cognates, possible loan?)
/ntz**ō**tʲú/ [nʣ**ō**tʲú] ‘Santiago Jamiltepec (village)’ (perhaps old compound)

Evidence from Spanish loanwords reflects a preference for the vowel *u* over *o* in Zenzontepec Chatino in non-final syllables, and even in final syllables in some cases (176). See Chapter 7 for detailed discussion of loanword phonology.

(176)

/nty**ū**sé/	[nʲdʲ**ū**sé]	‘god’	< Sp. *dios* ‘god’
/ch**u**rísū/	[ʧ**u**ɾísū]	‘chorizo sausage’	< Sp. *chorizo* ‘chorizo sausage’
/nk**u**wyernō/	[ŋg**u**wjeɾnȭ]	‘government’	< Sp. *gobierno* ‘government’
/**tu**minkū/	[**tu**miŋgū]	‘Sunday’	< Sp. *do**m**ingo* ‘Sunday’
/m**u**sū/	[m**ũ**sū]	‘servant’	< Sp. ***m**ozo* ‘servant’
/tyempū/	[tʲembū]	‘time’	< Sp. *tiem**p**o* ‘time’
/syēnt**ú**/	[sjēnd**ú**]	‘hundred’	< Sp. *ciento* ‘hundred’

4.2.4. Word-level restrictions on tone patterns

The basic lexical tone combination patterns on bimoraic forms were detailed in §3.3.3, and it was shown that they are fairly restricted, with only five of the nine possible combinations occurring on native roots or simplex stems: ØØ, ØM, MH, HØ, and HM. Two of the remaining patterns, ØH and MM, only occur on stems with second person singular pronominal inflection. The other two possible patterns, MØ and HH, are not attested on simplex forms. These patterns also apply to trimoraic forms, with very few added details (§3.3.4). In trimoraic forms, the basic tone patterns align to the final two moras of the word. If the basic tone pattern is MH or HM, then the antepenultimate mora may bear either M tone or no tone. If the final two moras bear either the basic HØ or second person MM tone pattern, then the antepenultimate mora will bear M tone. If the penultimate mora carries no tone (the ØØ, ØM, or ØH tone patterns), then the

antepenultimate mora will have no tone either. Antepenultimate moras within a phonological word never bear H tone.

The strict restriction on antepenultimate mora tone and the largely congruent tone patterns on bimoraic and trimoraic forms show that there are word-level tonal phonotactic constraints. Any cases that deviate from these strict restrictions consist of more than one phonological word, being either compounds or forms with enclitics, as illustrated in §3.3.6. There is another word-level constraint on tone: A single phonological word may have maximally one instance of /H/ tone (§4.3.4).

4.2.5. Final-syllable prominence

In this section it is argued that final syllables of the phonological word are most prominent in terms of showing the maximal degree of phonological contrasts (§4.2.5.1), they tend to have greater phonetic vowel duration than non-final syllables (§4.2.5.2), and excluding a few exceptional cases, their vowels are the most diachronically stable, which means they are the least likely to be syncopated (§4.2.5.3). Finally, a brief comparative look (§4.2.5.4) shows that maximal contrast and stability of final syllables is a pan-Chatino phonotactic pattern.

4.2.5.1. Prominence as maximum phonological contrast

The word-level phonotactic patterns just discussed involving vowel nasality and vowel length (§4.2.2), the vowel /o/ (§4.2.3), and tone combinations (§4.2.4) all share a common thread: phonological contrasts, particularly non-segmental ones, have more

restricted distributions the further one goes from the end of the phonological word. Stated another way, contrast is greatest at the end of the word, either in the final syllable, or on the final two moras in the case of tone. Maximal contrast is one manifestation of a larger pattern of final-syllable prominence.

4.2.5.2. Prominence as longer duration

In addition to displaying the maximal range of contrasts, final-syllables often have a longer average duration than non-final syllables of the same shape. This can be seen in example (177), whose spectrogram is in Figure 19. In each word the final vowel is longer than the penultimate vowel. Note that the first form is a trisyllabic compound verb. Being a compound, it consists of two phonological words, which is why the first vowel is like the final vowel in being longer than the penultimate vowel.

(177) *n-kā+tāká* *tzaka* *kitzę*
CPL-become-exist one village
'There was a village...' [kwitijyuu 0:52]

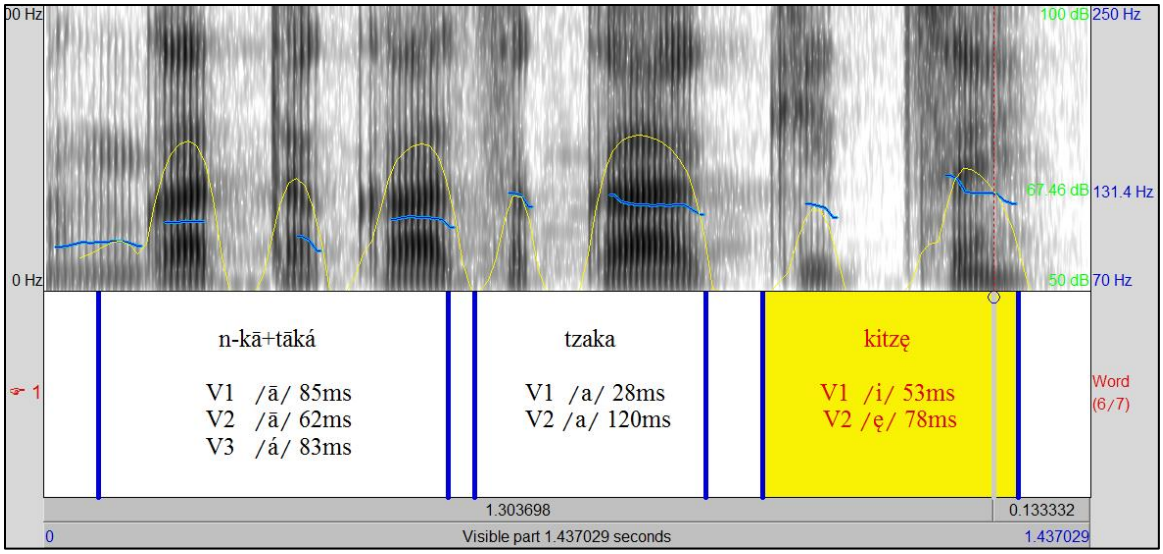


Figure 19. Spectrogram showing longer duration of final syllables (flat tone)

Still looking at the spectrogram in Figure 19, it turns out that there are seven total syllables in the string, and the odd numbered ones (first, third, fifth, last) are not only longer, but also happen to be a little bit louder than the even numbered ones (intensity is shown by the thin oscillating line). Add to this the fact that the last two words happen to be disyllabic, and an example like this might make it appear as if the language had rhythmic stress manifested as duration. However, this is not what is going on. The initial compound verb ends with a high tone that spreads through the final two, toneless, words. Since all of the syllables in the final words carry the same phonetically high pitch, the prominence of final syllables, reflected mainly in length but secondarily in intensity, can be viewed without any confounding tonal effects.

However, tone does influence intensity, and realistically, many examples will show a broader array of the basic tone patterns across the forms. Likewise, many

utterances will contain words of more varied syllable count: disyllabic, monosyllabic, and tri-syllabic, in order of frequency of occurrence. Figure 20 is a spectrogram of the example in (178), and just as in the previous example, final syllables are longer than non-final syllables in all of the polysyllabic forms. However, not all final syllables have greater intensity than non-final syllables. For example, the second word, *nyájā* 'year', has a higher intensity on the first syllable, which is an effect of the high tone that it bears.

(178) *tātīyá nyájā nti-ka kwēyáʔ nteē*
every year HAB-be.done time PROX
'Every year it was done at this time.' [maclovio 0:17]

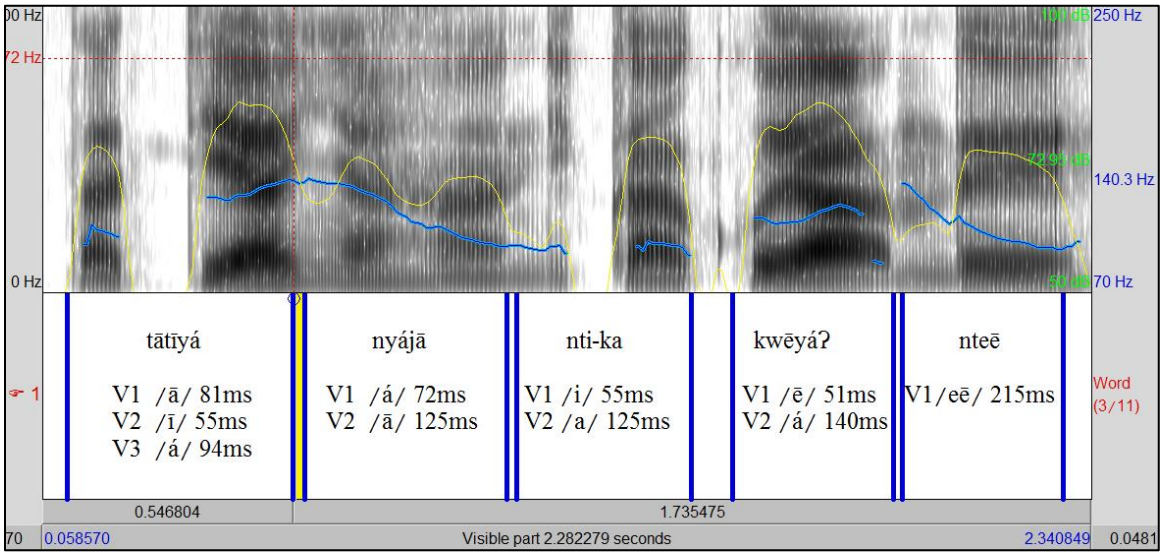


Figure 20. Spectrogram showing final syllable prominence (varying tone)

The previous two examples and their spectrograms illustrate that duration is greater in the final syllable of the phonological word than in the penultimate syllable. Intensity, on the other hand, though slightly increased with syllable prominence, is also

dependent upon tone. Therefore, duration, not intensity, is the primary acoustic expression of syllable prominence.

4.2.5.3. Prominent syllable stability and exceptions

A common type of sound change in Chatino (and Zapotec) languages is reduction or loss of vowels in non-prominent syllables (Campbell 2013a: 401-402). Zenzontepec Chatino is quite phonologically conservative and preserves most vowels, whether they were prominent or not. Nevertheless, there are some cases in which vowels have been lost in the language. Some examples of the vowel loss were given in Table 7 in §4.1.4.2 in order to illustrate the rise of clusters of /j/ followed by /n/ or /l/, where penultimate syllable vowels were elided. Some other examples of monosyllabified roots that preserve only final syllables are given in (179). These examples are mostly a mix of compounds and roots reduced to enclitics via grammaticalization.

(179)	***ti*** *jniʔ*	‘womb’	< *li**ti** jniʔ*	‘home of’ + ‘offspring’
	kitzę ***ti***	‘home village’	< *kitzę* + *li**ti***	‘village’ + ‘home of’
	=tīʔ	‘living core’ (enclitic)	< *la**tīʔ***	‘living core of’
	wá ~ ***kwá***	DIST	< *yā**kwá***	‘there’
	nīʔ	‘inside of’	< *na**nēʔ***	‘belly of’
	=niʔ	3SG.RSP pronoun	< *kwi**niʔ***	‘person’
	*lo+**xę̄ʔ***	‘rural area’	< *lo* + *ki**xę̄ʔ***	‘at’ + ‘wild’

On the other hand, there are some limited cases in which it is actually final syllables that are lost while non-final syllables remain. The identified examples of this are listed in (180). What stands out about all of these cases is that they are in initial position of some larger constituent, either Classifiers in complex lexemes (*ya*), articles (*tza*), nominalizers (*xī*), or prepounds (*to+*, *ju+*, *kwi+*, *cha+*). This is largely in contrast with

the cases in (179), most of which are postpounds or enclitics. It therefore appears that there is some edge effect preserving syllables at the edge of larger constituents even at the expense of prominent syllables. However, that generalization does not account for all of the data since a few cases in (179) maintain final syllables even in initial elements in larger constructions, such as ***ti*** *jniʔ* 'womb' or the relational noun *nīʔ* 'inside of'.

(180)				
	ya	CL.wood	< ***ya****ka*	'tree'
	tza	INDEF	< ***tza****ka*	'one (num.)'
	to	'edge of'	< ***tu****ʔwa*	'mouth', 'edge'
	xī	NMZ.LOC	< ***se****ʔę*	'place'
	ju*+lā*	'father-in-law'	< ***ju****ti*	'father of'
	kwi*+laā*	'brother-in-law'	< ***kwi****tiʔ*	'brother of'
	cha*+jlyā*	'bread'	< ***cha****ja*	'tortilla'

4.2.5.4. Syllable prominence in comparative Chatino perspective

Some type of final syllable prominence is present in all Chatino languages. All varieties of Chatino have contrastive vowel nasality in final syllables only. Other varieties that also preserve vowel length, such as Tataltepec de Valdés Chatino and San Marcos Zacatepec Chatino, have the length contrast only in final syllables of native words, just as in Zenzontepec Chatino. As for the number of vowel contrasts, there are quite a few varieties that have become almost entirely monosyllabic via the loss of all non-final-syllable vowels, such as San Juan Quiahije Chatino and Santa Lucía Teotepec Chatino. These are extreme outcomes of final syllable prominence, where final syllables preserve all five vowels and non-final syllables don't preserve any vowels. According to Rasch (2002: 45-49), the variety of Santiago Yaitepec now has only a two-way contrast of reduced, often voiceless, vowels in non-final syllables. Tataltepec de Valdés Chatino

contrasts all five vowels in final syllables but only three (/i/, /a/, and /u/) in non-final syllables, while San Marcos Zacatepec Chatino has only four vowels in final syllables (Villard 2008b), unconditionally merging /u/ and /o/,[21] and three in non-final syllables, further merging /e/ and /i/ in that environment. In terms of number of vowel contrasts, Zenzontepec Chatino is the most conservative, with five distinct vowels in final syllables and four regularly contrasting in non-final syllables. In sum, Chatino languages fall on a cline with respect to vowel quality contrasts in non-final syllables, from as many as four to as few as zero, as summarized in Table 8.

Table 8. Number of vowel quality contrasts by position in Chatino varieties

Variety	Non-final syll.	Final syll.
Zenzontepec Chatino	4	5
Tataltepec Chatino	3	5
Zacatepec Chatino	3	4
Yaitepec Chatino	2	5
Quiahije Chatino	0	5
Teotepec Chatino	0	5

[21] Woodbury (p.c.) points out one case of /u/ in a final syllable in Zacatepec Chatino: *xŭʔ* 'old person'. This is probably due to dialect borrowing, sound symbolism, or tabooistic deformation, since the term is derogatory in other varieies (San Juan Quiahije).

4.3. Co-occurrence constraints

The previous two sections dealt with the phonotactics of the syllable (§4.1) and the phonological word (§4.2), particularly from the perspective of how the contrastive elements of the language may be positioned within those higher-level phonological constituents. The present section explores the phonotactics from a different, though inter-related, perspective, that of the restrictions on co-occurrence of phonemes. These patterns include constraints on particular phoneme sequences and also culminativity constraints, which prohibit certain phonemes from occurring more than once within a larger phonological constituent. First of all, some such constraints are built into the basic syllable structure (§4.3.1). Second, there are no sequences of *yi** or *wu** (§4.3.2). Third, two identical glottal consonants can not occur within a single phonological word (§4.3.3), and neither can two H tones (§4.3.4). Finally, non-identical vowels can not occur within a root if they are separated by only a glottal consonant (§4.3.5).

4.3.1. Syllable structure as general co-occurrence constraints

The structure of the syllable in Zenzontepec Chatino was presented in §4.1, and syllable phonotactics can be restated in terms of phoneme co-occurrence constraints. The native sound system only permits biconsonantal clusters, which always syllabify in the onset. In other words, in the native phonology there is a constraint against three consonants in sequence. The permitted biconsonantal clusters are of two types: a glottal consonant preceding a sonorant consonant, or a nasal consonant followed by an obstruent (§4.1.3.2). Clusters in loanwords have somewhat looser constraints, as the loanword

phonology tolerates additional sequences, and even a few tri-consonantal clusters (§7.3.4).

Some phoneme co-occurrence constraints are drawn from the principles governing the structure of the syllable nucleus. First of all, a syllable may contain maximally one vowel (§4.1.1), which in word-final position may be long and/or nasal. Where a vowel sequence would arise via some morphological process, it is modified by one of a few strategies. If the vowel hiatus is at the junction of a prefix and a stem, one of the vowels elides (§5.3.1). If the sequence arises at a host-enclitic boundary, the vowels either undergo fusion or remain in heterosyllabic hiatus (§5.7). The obligatoriness of onsets also goes along with this prohibition of vowel sequences. All syllables must have at least a simple onset (§4.1.3.1) save a very few exceptions (§4.1.3.3). Putting these facts all together, the constraint against vowel sequences is quite strong.

4.3.2. Constraint against semivowels and velars before corresponding vowels

The native phonotactics prohibit the labio-velar consonants /kw/ and /w/ from preceding the rounded vowels /u/ and /o/. Similarly, /ky/ and /y/ do not precede /i/, and only rarely occur before /e/ (at least in the core Zenzontepec dialect [§1.2.3.1]). Kaufman (1983: 52) reconstructs these exact patterns for proto-Otomanguean, but for proto-Zapotecan (1993) he does reconstruct some sequences of **w* followed by **o* (e.g. **lawo* 'face') and one case of proto-Zapotec **y* before **i* (**yisa* 'year'). This suggests that though these patterns may have shifted slightly through time, they are nevertheless very old. In Zenzontepec Chatino, the restriction against /kw/ before rounded vowels is

exceptionless, but several cases of /w/ before rounded vowels (181) and one case of /y/ before /i/ (182) are now found, but these are in partly nativized Spanish loans.

(181)	***wu**rū*	[**wu**ɾū]	'donkey'	< Sp. *burro* 'donkey'
	*chi**wū***	[ʧi**wū**]	'goat'	< Sp. *chivo* 'goat'
	*ti**wu**rǭ*	[ti**wu**ɾȭ]	'shark'	< Sp. *tiburón* 'shark'
	*se**wū***	[se**wū**]	'grease'	< Sp. *sebo* 'grease'
	*tri**wū***	[tɾi**wū**]	'stirrup'	< Sp. *estribo* 'stirrup'
	*ya ra**wū***	[ja ɾa**wū**]	'plow'	< 'wood' Classifier + Sp. *arado* 'plow'

(182) *wātá **yiī**r* [wātá **ji**īɾ] 'large cattle variety' (*yiīr* is likely of Spanish origin)

As stated above, cases of /y/ before /e/ are relatively rare, but they are found in some native material (183), as well as a few partly nativized Spanish loans (184).

(183)	*ti**ye**ʔ*	[ti**je**ʔ]	'sour'
	*kwá**yēʔ***	[kʷá**jē**ʔ]	'blown up (w/ smut)'
	*nātę́ʔ wi**ye***	[nātę́ʔ βi̯**je**]	'Ocotlán (village)'
	*nkw-i**yē***	[ŋgʷi**jē**]	'prevailed', 'withstood'
	*nkwi**ye**ʔ*	[ŋgʷi**je**ʔ]	'*Begonia sp.*'

(184)	*b**ye**rnē*	[β**je**ɾnɛ̃]	'Friday'	< Sp. *viernes* 'Friday'
	*m**ye**lkū*	[m**je**lkū]	'Wednesday'	< Sp. *miércoles* 'Wednesday'
	*wa**ye**nā*	[wa**je**nɛ̃̄]	'whale'	< Sp. *ballena* 'whale'
	*s**yē**ntú*	[sjēndú]	'hundred'	< Sp. *ciento* 'hundred'

Finally, though not a strong restriction, the semivowel /y/ shows some dispreference for occurring before /o/ as well. That is, in addition to the constraint against semivowels preceding their corresponding vowels, /y/ is fairly uncommon before /o/. The full inventory of non-loanword lexemes with the sequence /*yo*/ is listed in (185).

(185)	***yoo***	[**joo**]	'oven'
	***yoō**ʔ*	[**joō**ʔ]	'ugly'

y-oō	[**joō**]	‘ground (v. trn.)’
*nti-**yōó***	[ndi**jōó**]	‘grinds’
***y-o**ʔō*	[**jo**ʔō]	‘drank’
*ntī-**ʔyó***	[ndīʔ**jó**]	‘drinks’

The co-occurrence patterns of semivowels and vowels outlined here are summarized in Table 9.

Table 9. Constraints on semivowel/vowel co-occurrence

	__ /i/	__ /e/	__ /a/	__ /o/	__ /u/
/y/	—	few	many	few	many
/w/	many	several	many	—	—

4.3.3. Constraint against multiple like glottal consonants

In Zenzontepec Chatino two identical *glottal* consonants do not occur within a single phonological word, with one exception, the Spanish loanword *jujulī* ‘sesame’ (borrowed from Spanish *ajonjolí*). This constraint does not apply across clitic boundaries, since clitics fall outside of the phonological word. On the other hand, two *unlike* glottal consonants, i.e. one /j/ and one /ʔ/, may occur within a word, as in *joʔō* ‘sacred’ and *jāʔą́* ‘wants’. Rasch (2002: 49-54) notes for Yaitepec Chatino that no consonant, glottal or otherwise, can occur twice within a single phonological word, and there is even a significant restriction against co-occurrence of two consonants of similar place and manner of articulation. In contrast, in Zenzontepec Chatino examples abound of non-glottal consonants occurring more than once within a word (186).

(186)	*la**s**a**s**a*	‘quickly’	***t**-ut**e**ʔ*	‘always hungry’
	***kw**á**kw**ī*	‘guan (bird sp.)’	*nka-**l**ā**l**á*	‘scolded’
	***n**a**n**ēʔ*	‘belly of’	***x**ī**x**í*	‘very thin’
	***tz**ē**tz**éʔ*	‘messy, spiny’	***w**aj**w**a*	‘plank’
	***k**ū**k**á*	‘regrowth’	*ya **kw**é**kw**ę̄ʔ*	‘soapberry tree (*Sapindus saponaria*)’
	***ch**a**ch**īʔ*	‘will shrink’	***r**u**r**ā*	‘rue’ < Sp. *ruda* ‘rue’

4.3.4. Constraint against multiple H tones

As discussed in §3.3.3, sequences of two high tones (HH) are excluded from the basic bimoraic tone patterns found in the language. Furthermore, only one high tone may occur in a single phonological word, even in cases where there are more than two moras to bear tones (§3.3.4). That is, H tone is culminative. Cases where multiple H tones occur in close proximity are either compounds or host-clitic combinations (§3.3.6), which are comprised of more than one phonological word.

4.3.5. Constraint against unlike vowels across glottal consonants

As mentioned in §2.1.6.1 and §2.1.6.3, unlike vowels are prohibited from co-occurring across glottal consonants within a root. This constraint is the result of a translaryngeal vowel harmony change that took place in proto-Chatino. A few comparative examples that demonstrate this (from Campbell 2011b; 2013a) are listed in Table 10. Cognate forms from three modern Chatino varieties that retain at least some non-prominent syllables are included (Zenzontepec, Tataltepec, and Zacatepec), along with their proto-Chatino etyma. The proto-Chatino forms and their modern reflexes all have vowels of like quality on both sides of the medial glottals. In contrast, each of the

cognate proto-Zapotec reconstructions (Kaufman 1993) in the far right column has unlike vowels across the medial consonants, which is taken to be conservative.

Table 10. Examples of proto-Chatino translaryngeal vowel harmony

	ZEN	TAT	ZAC	pCh	pZp
'tortilla'	*chaja*	*tyaja*	*kyaja*	**kyaja*	**ketta*
'squash'	*chojo*	*tyojo*	*kyojō*	**kyōjō*	**kettu*
'lime (stone)'	*choʔo*	*tyoʔo*	(*kyoʔo*)	**kyoʔo*	**keʔyo*
'fresh corn'	*ntaʔą*	*ndaʔą*	*ndaʔą*	**n-taʔą*	**seʔą*
'to pass'	*-tejɛ̄*	—	*-tijɪ̄*	**-tijɪ̄*	**teʔti*
'sorcerer'	*kwi-tzāʔą́*	*kwchaʔą́*	*kwi tzaʔą́*	**(kwi-tzaʔą)*	**kwe=tzeʔa*
'skunk'	*kwījí*	*kjwí*	*kwijǐ*	**kwījí*	**kw=eʔtti(k)*
'raw'	*yáʔā*	—	—	**yaʔá*	**yeʔa*

Though the restriction against unlike vowels across glottal consonants goes back to a sound change that began in proto-Chatino, it is not the case that the current patterns in Zenzontepec Chatino are simply a relic of that earlier change. In fact, the constraint against unlike translaryngeal vowels within roots is still synchronically active, and it is now gradually extending its domain of application. The conditioning environment of the change now includes some cases where there is a sequence of /ʔ/ followed by a semivowel between two vowels, as shown in the cognate sets and reconstructions in Table 11. Crucially, the semivowel that follows the glottal must be homorganic to the vowel that precedes the glottal. Also, examples such as *nchīʔyú* 'fruit', *kíʔyū* 'male',

luʔwe ‘wing of’, *sūʔwá* ‘cargo of’, and *kūʔwí* ‘drunk’ show that the cases in Table 11 are not merely cases in which semivowels were first deleted, triggering translaryngeal vowel harmony.

Table 11. Recent extension of vowel harmony

	ZEN	TAT	ZAC	pCh	pZp
‘cut (v.)’	*nkā-x**ū**ʔ**ú***	*nk-siʔyú*	*nga-siʔyó*	*(*nka-s**i**ʔy**u**)*	—
‘screams’	*nti-x**a**ʔ**a***	*nxiʔyá*	*ndi-xiʔyå*	*(*nti-s**i**ʔy**a**)*	**ty(i)=o(k)=xiya*
‘mountain’	*ky**a**ʔ**ā***	*kaʔyā*	*kiʔyā*	**k**e**ʔy**ā***	**keʔya*
‘guilt, sin’	*ky**a**ʔ**a***	—	*kiʔya*	**k**e**ʔy**a***	**kiʔya*
‘you’	*n**u**ʔ**u***	*nuʔu*	*noʔwį*	**n**u**ʔw**į***	**luʔwi*
‘there is’	*ntz**u**ʔ**u***	*ntzuʔu*	*ndzoʔwi*	**n-tz**u**ʔw**i***	—
2PL	*kw**a**ʔ**ą***	*kuʔma*	*ngoʔwą*	**k**u**ʔw**ą***	—

The extension of translaryngeal vowel harmony appears to be currently in progress. First, the conditioning environment, as explained above, is fairly complicated because the change is in transition. Secondly, and relatedly, a few lexemes show variation across speakers, and even within one speaker’s production, tending towards vowel harmony in faster speech (187).

(187) *sukūʔwé ~ sukwēʔé* ‘Santa Catarina Juquila (town)’
nchīʔyú ~ nchūʔú ‘fruit’

4.4. Dynamics of phonotactics and sound change: constraints or patterns?

As stated earlier, phonotactics are the patterns by which phonological elements are arranged and combined to form larger phonological constituents, the syllable and the phonological word. Just as sounds inevitably change through time in all living languages, phonotactic patterns also change. Phonotactic change may be the result of sound changes, and diachronic examples of Zenzontepec Chatino syllable structure illustrate this well. Aside from the cases of /ʔ/ followed by /n/, /y/, or /w/, which probably predate proto-Zapotecan, most other glottal (/ʔ/ or /j/) plus sonorant complex onsets in Zenzontepec Chatino can be traced either to changes that occurred in proto-Chatino or to later changes specific to the language (§4.1.4.2). In contrast to this, according to Kaufman's (1993) proto-Zapotec reconstructions, **ʔ* could precede any consonant in proto-Zapotec (and there was no /j/ [h] phoneme in proto-Zapotec). The simplest account is to project these clusters of **ʔ* followed by any consonant back to proto-Zapotecan. Therefore, we may conclude that a sound change particular to proto-Chatino occurred in which glottal stops elided before obstruents and **l* (Campbell 2011b). The confluence of this change with later changes creating other glottal plus sonorant clusters has crystalized into the current phonotactic constraint allowing GS sequences as one of the two permissible types of clusters in Zenzontepec Chatino.

The dynamics between sound change and phonotactics are currently visible in other patterns and processes, such as the constraint against dissimilar vowels across glottal consonants. As just discussed in §4.3.5, this was the result of the translaryngeal vowel harmony change that began in proto-Chatino but is now gradually extending its

environment of application in Zenzontepec Chatino. The fact that the change is still active and evolving justifies calling the pattern a constraint instead of just a result of some particular earlier sound change.

Other phonotactic patterns are appropriately viewed as structural constraints that have been active over a long period of time. For example, proto-Zapotec had no prohibition of two identical glottal consonants within a root (Kaufman 1993) such as we find in Zenzontepec Chatino (§4.3.3). For example, Kaufman reconstructs proto-Zapotec **kwe=(t)tziiʔnaʔ* 'foam' and **laʔtyiʔ* 'emotional center', among others (cf. Zenzontepec Chatino *kuchinaʔ* 'foam' and *latīʔ* 'living core'). Since accounting for such additional glottal stops in only some Zapotec etyma evades explanation, it is likely that such multiple glottal stops were inherited from proto-Zapotecan. However, all of the evidence suggests that such co-occurrence of multiple glottal stops was never permitted at any stage that can be considered uniquely Chatino. Therefore, the term "constraint" is appropriate in this case too, due to the deep Chatino vintage and stability of the pattern.

On the other hand, some current phoneme co-occurrence patterns are of a different type. They are merely the outcome of particular sound changes that are no longer active, don't seem to have had any long-term operation, and don't appear to be structurally motivated or interacting with other processes. Such phonotactic limitations are perhaps better referred to simply as patterns rather than true constraints. This is most common in the outcomes of conditioned sound changes. For example, the sibilants /tz/ and /s/ very rarely occur before the high front vowel /i/. This fact is just a result of a

sound change particular to Zenzontepec Chatino in which the sibilants palatalized before the vowel /i/ (Campbell 2013a).[22]

There are several exceptional cases where /s/ (§2.1.3.3) occurs before /i/. Some of these are loanwords from Spanish, but others are seemingly native terms. Only very rarely is /tz/ found before /i/ (§2.1.3.2). An example is *ntzii* 'tiny bird species' (probably *Polioptila caerulea*), which one would expect to be *nchii** due to the palatalization change. However, bird names are one of the most fertile domains for sound symbolism, and this term is almost certainly onomatopoeic, which is why it may violate expected sound patterns (§8.2).

To summarize, when viewed realistically as products of historical processes, some cases of phoneme co-occurrence limitations are merely just residue from earlier sound changes, while other patterns seem to be of a more general, structural, nature and merit being called constraints.

4.5. Optimal analysis of phonotactics and inventory

The purpose of the present section is to demonstrate that the segmental (Chapter 2) and autosegmental (Chapter 3) inventory analysis and the phonotactic analysis in the present chapter together provide the most elegant analysis of Zenzontepec Chatino phonology. First, a general discussion of what is meant by "optimal analysis" is given in

[22] This change is interesting in the context of Chatino languages, because the corresponding sibilants palatalized only *after* /i/ in Coastal Chatino (i.e. all other known varieties), and earlier **t*, **l*, and **n* palatalized *after* **i* in proto-Chatino (Campbell 2013a).

§4.5.1. Then, it is argued that the complex consonants (/tz/, /ch/, /kw/, /ty/, etc.) are unitary phonemes and not consonant clusters (§4.5.2). After that, the consonant clusters are considered and shown not to be complex segments (§4.5.3) or heterosyllabic sequences (§4.5.4). These points are briefly summarized in §4.5.5.

4.5.1. On balancing phonotactics and inventory

The optimal phonological analysis of a language will capture all of the sound patterns, with minimal exceptions, while allowing for the fewest, broadest, and most natural phonotactic generalizations coupled with the smallest and most natural inventory. However, phonotactics and inventory are tightly interdependent, and a simplification in one often entails a complication in the other. For example, one might manipulate the inventory in order to streamline the phonotactic analysis, perhaps by reducing the possible types of consonant clusters. However, that strategy might complicate the inventory to such a degree that the overall phonological description would be less elegant. Conversely, it might be possible to reduce the size of the inventory, but at the expense of the phonotactic analysis, which might then require additional consonant clusters. Nevertheless, there is a sweet spot at which the phonotactic and phonemic analyses are balanced. From this spot, the benefits of further tweaking either one are outweighed by the concomitant costs in the other. This will be the optimal overall phonological analysis because it will require fewer, broader, and/or more natural generalizations than all other possible analyses, while accounting for all of the facts. This

is the principle of Occam's Razor, and the simplest and most elegant analysis is usually the correct one.

Crucially, for the analysis of a particular language to be well grounded, alternative analyses must be shown to be inferior to the advocated analysis because they either fail to account for some of the facts or they introduce gratuitous complexity to the analysis. In the following sub-sections, this will be done for the phonological analysis presented here for Zenzontepec Chatino.

4.5.2. Complex consonant segments are not clusters

The consonantal inventory presented in Figure 2 (in Chapter 2) includes seven consonants that imaginably could have been treated as consonant clusters instead of unitary phonemes: /tz/, /ch/, /ty/, /ly/, /ny/, /ky/, and /kw/. First of all, if /tz/ and /ch/ were clusters of /t/ + /s/ and /t/ + /x/ ([ʃ]), respectively, then one might expect to find clusters of other stops followed by fricatives, such as /k/ + /s/ or /kw/ + /x/. However, such clusters are not encountered. To avoid that issue, one could posit that stop plus fricative clusters may only occur if they are homorganic. However, that would predict clusters of /k/ + velar fricative (IPA [x]) or even /kw/ + labialized velar fricative (IPA [x^w]). No clusters of this type are found either, and velar fricatives are not part of the native Zenzontepec Chatino sound system. Furthermore, if /tz/ and /ch/ were in fact clusters, then the /n/ + /tz/ and /n/ + /ch/ sequences in ***ntz****átę̄* 'hog plum' and ***nch****uluwa* 'soursop', for example, would actually be tri-consonantal, demanding more elaborate phonotactics. Such imagined three-consonant clusters could be averted by treating the nasals as a

prenasalization feature of the obstruents, or as heterosyllabic segments, which for other reasons are sub-optimal alternatives, as discussed in §4.5.3 and §4.5.4.

Next, if /ty/, /ny/, and /ly/ were to be treated as clusters of /t/ + /y/, /n/ + /y/, and /l/ + /y/, respectively, then some of the patterns found in verbal inflection would become needlessly unusual. For example, consider the verb ‘boil’ in (188). The stem-initial /l/ is palatalized by the preceding /i/ of the Potential Mood and Habitual Aspect prefixes (§5.1.1), but it remains non-palatalized in the Progressive and Completive Aspect forms, whose prefixes lack a palatalizing /i/.

(188)

POT	/ki-lákwi/	[kī**l**ʲákʷi]	‘will boil (itrn.)’
HAB	/nti-lákwi/	[ndī**l**ʲákʷi]	‘boils (itrn.)’
PRG	/nte-lákwi/	[ndē**l**ákʷi]	‘is boiling (itrn.)’
CPL	/nku-lákwi/	[ŋgū**l**ákʷi]	‘boiled (itrn.)’

A cluster analysis of the palatalized coronal consonants would require epenthesis of the semivowel in just those forms that contain the most palatalizing of all vowels [i]. Such an analysis would be convoluted and unjustified. The palatalization arises via the spreading of some vowel features onto the consonant, which is a more natural account than claiming that these sounds involve two distinct places of articulation. Additionally, if palatalized coronals were clusters, then the otherwise fairly simple phonotactics would have to be bent to permit tri-consonantal clusters in the case of /n/ + /ty/, as in ***nty****atę* ‘is sleeping’ and *kwi-**nty**e?* ‘queen ant or termite’.

In the case of the velars, if /ky/ and /kw/ were clusters instead of segments with secondary articulations, then one might expect to find other clusters of obstruent followed

by semivowel, such as *py*, *pw*, *ty*, *tw*, *tzy*, *tzw*, *chy*, *chw* and perhaps even *sy* and *sw*, among others. Such clusters do not occur in native material and are only found in forms that are clearly Spanish loanwords, such as those in (189) (see also §7.3.4).

(189) *twóyā* [twójā] 'towel' < Sp. *toalla*
byernē [βjɐrnẽ] 'Friday' < Sp. *viernes*
syēntú [sjēndú] 'hundred' < Sp. *ciento*

The semivowel /w/ undergoes de-velarization and becomes [β̞] before /i/, unless the semivowel is preceded by a root-internal /u/ (§5.4.1). Therefore, if /kw/ were a cluster, then the would-be semivowel segment would become [β̞] before /i/, but it does not (190).

(190) /kw-ichī/ [kʷiʧ̃ī] 'rabbit' (not [kβ̞iʧ̃ī]*)
/y-akwiʔ/ [jakʷiʔ] 'spoke (v.)' (not [jakβ̞iʔ]*)

One might stipulate that de-velarization is also blocked by a root-internal /k/. However, with the case of root-internal /u/ blocking de-velarization, one can conceive that the semivowel is reinforced as such by the preceding homorganic /u/, a factor harder to imagine with /k/.

4.5.3. Consonant clusters are not complex segments

According to the analysis presented in §4.1.3.2, there are two types of consonant clusters in Zenzontepec Chatino: GS clusters (glottal + sonorant) and NO clusters (nasal + obstruent). The crucial matter here is that either of these types of clusters could imaginably be analyzed as series of unitary, complex segments: pre-glottalized or pre-

aspirated sonorants in the case of GS clusters, and pre-nasalized obstruents in the case of NO clusters.[23]

As argued in detail in §2.1.6.2, the weight of the evidence points to /ʔ/ being consonantal rather than a feature of vowels. With this conclusion, one must concede that word-final /ʔ/ is a coda consonant (§4.1.2) that violates an otherwise robust prohibition against codas. It was also shown in §2.1.6.2 that glottal consonants preceding sonorants syllabify into complex onsets with the sonorants and not as codas of preceding syllables. In line with this fact, one might attempt to avoid positing GS complex onsets by positing an additional class of glottalized sonorant phonemes. However, as the examples in §4.1.3.2 show, unless one were to pick and choose, such a move would require the inclusion of twelve additional consonants to the inventory: *jl*, *jly*, *jn*, *jny*, *jy*, *jw*, *jm*, *ʔn*, *ʔy*, *ʔw*, *ʔm*, *ʔb*. Since the complex onset analysis can be captured in one brief phonotactic statement appealing to natural classes of consonants (glottals followed by sonorants) that is a more elegant option than adding a dozen more consonants to the system.

Another bit of evidence in support of a cluster analysis of GS sequences comes from an active phonological process in which clusters of [h] plus sonorant are created through contraction (§5.8). A preaspirated sonorant analysis of such cases could only portray that process awkwardly. Also, from a diachronic view as laid out in §4.1.4.2, the

[23] For example, Rasch (2002: 4) posits eight distinct consonant phonemes for Yaitepec Chatino: *ʔ*, *ʔy*, *ʔw*, *ʔn*, *ʔny*, *j*, *jy*, and *jw*. It is not my purpose to evaluate the appropriateness of that analysis here, but it should be mentioned that Yaitepec Chatino is nearly completely monosyllabified, having lost almost all non-prominent vowels. The resulting consonant clusters have had significant effects on the phonotactics that could lead to the phonologization of such additional phonemes like glottalized sonorants. Nevertheless, Cruz (2011) treats these as clusters in her analisis of San Juan Quiahije Eastern Chatino, which is phonotactically very similar to Yaitepec Chatino.

addition of generalized GS clusters into the phonotactics of the language came about by a conspiracy of historical facts and changes, and there is not enough evidence to suggest that such clusters have been reanalyzed as complex segments.

Similar arguments are available for the analysis of NO complex onsets. If one were tempted to introduce a series of prenasalized obstruents to the inventory in order to avoid positing these complex onsets, then eight additional phonemes would be required: *mp*, *nt*, *ntz*, *nty*, *nch*, *nky*, *nk*, and *nkw*.[24] On the other hand, in the analysis chosen here, the NO complex onsets are captured with one simple, phonotactic statement: *complex onsets of nasal consonant plus obstruent are one of the two permitted types of consonant clusters.* The cost of adding nine consonants to the segmental inventory would be much higher than the cost of allowing an additional type of consonant cluster that is generalizable in terms of natural classes.

Also, as pointed out in §4.1.4.2, some NO clusters reflect where a nasal consonant has earlier accreted onto a stem, but other cases arise synchronically in the inflection of some verb stems with the *n-* Stative Aspect prefix. Finally, there is a body of literature arguing in favor of a cluster analysis of what were previously considered the classic cases of prenasalized consonants in Sinhalese (Feinstein 1979) and Bantu languages (Herbert 1975: 109-110; Hubbard 1995). Therefore, prenasalized consonants might be more typologically unusual than previously thought. The other possibility is that NO clusters are heterosyllabic, with the nasals functioning syllabically, and this is addressed in the following subsection.

[24] Recall that /s/ and /tz/ merge after a nasal consonant, as do /x/ and /ch/ (§4.1.3.2)

4.5.4. Nasals are not syllabic when preceding obstruents

In §4.1.3.2 it was asserted that NO clusters, just like GS clusters, always syllabify as complex onsets and are never heterosyllabic. If the nasals and obstruents of NO clusters were heterosyllabic, then in word-medial position (i.e. after a vowel) the nasal would syllabify in the coda of the preceding syllable. However, recall that no consonant other than /ʔ/ can occur in coda position (§2.1.6.1; §4.1.2). The fact that they always remain syllabified with the following obstruent is exemplified nicely in play language of *reversed speech* (§5.9). In reversed speech, the first syllable of a word is transposed to the end of the word. For example ***ma****ntzeʔ* 'tapir' becomes *ntzéʔ****ma*** in the language game, showing that the initial syllable is *ma* and not *man*.

Furthermore, if nasals and obstruents of NO clusters were heterosyllabic, then in word-initial position, the nasal would be the nucleus of its own syllable. Examining how words with initial nasal plus obstruent clusters come out in reversed speech shows that the nasals are not syllabic. If they were syllabic, then only the initial nasal would be moved to the end of the word, which is not the case (191).

(191)

Normal form		Reversed form	Gloss	
nt*akwą*	→	*kwą****nt****a*	'sandal'	(not ***t****ákwą****n*****)
ntz*ukwāʔ*	→	*kwáʔ****ntz****u*	'shelled corn'	(not ***tz****úkwaʔ****n*****)
nk*olō*	→	*ló****nk****o*	'turkey'	(not ***k****ólo****n*****)

The fact that nasals (like all others consonants) do not function as syllabic nuclei (§4.1.1) can also be demonstrated with tone in Zenzontepec Chatino. In §3.3.4 it was shown that trimoraic forms that bear the HØ tone pattern on their final two moras always carry M tone on the antepenultimate mora. Therefore, if nasals before obstruents were

syllabic, they would be moraic, and a word that bears the HØ tone pattern like *nkwítzą* ‘child’ would have a M tone on the initial /n/. This is not the case, as illustrated in Figure 21. Since the Negative Existential predicate *nālá* ends with a high tone, that high tone spreads and downsteps the initial H tone on *nkwítzą* ‘child’. If the initial nasal consonant were syllabic, it would carry M tone, and that M tone would be downstepped to a much lower level by the spreading high tone. What we see during the initial /n/ of *nkwítzą* is only a slight anticipatory descent from the H tone of *nālá* to the downstepped H tone on the /i/.

(192) *tī* *nu* *nālá* *nkwítzą* *j-naā*
/tī nu nālá nkwítzą jiʔį̄ naa/
COND NMZ NEG.exist child NSBJ 1PL.INCL
‘If we don’t have any children...’ [itza7 nu ntekakan7 jute7 4:44]

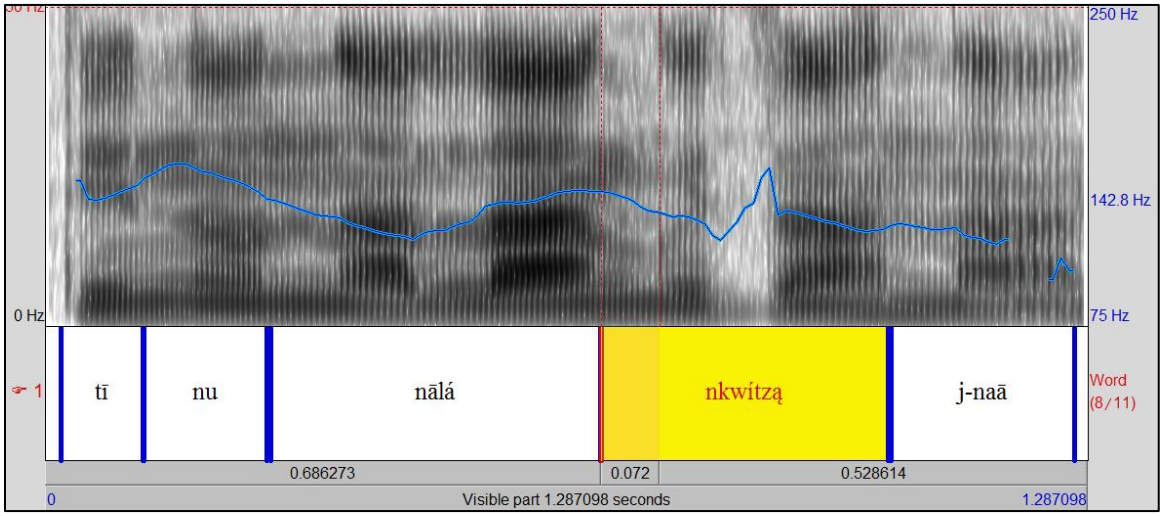


Figure 21. Spectrogram showing that a nasal in NO cluster is not syllabic

4.5.5. Summary of balance between inventory and phonotactics

In the preceding discussion and cross-references, it was shown that the analysis of the inventory of contrastive elements in Chapter 2 and Chapter 3 and the phonotactic analysis in the present chapter provide the best balance between the two, and therefore, together they provide the optimal overall phonological analysis of Zenzontepec Chatino. The basic system can be encapsulated quite simply: there are 30 contrastive elements (21 consonants, 5 vowels, 2 tones, vowel length, and vowel nasality), and two succinct generalizations about permissible consonant clusters. This balance is the sweet spot. Of course there are the further details of phoneme distribution in the phonological word (§4.2) and phoneme co-occurrence constraints (§4.3), but those patterns would be required by any possible analysis. Any of the alternative analyses discussed above would introduce unnatural patterns or require too much complication to either the inventory or the phonotactics.

Chapter 5

Phonological processes

Many of the phonological processes of Zenzontepec Chatino are mentioned and exemplified during the discussion of individual phonemes (Chapter 2 and Chapter 3) and their distributions (Chapter 4). However, one of the aims of the current chapter is to consolidate these facts into broader generalizations based on natural classes of sounds. In some cases, only a few examples of the phonological processes under discussion are given, but with detailed cross-referencing to the relevant parts of the earlier chapters so that further examples can be easily located. The phonological processes are organized into several types that will be discussed in turn: palatalization (§5.1), consonant lenition (§5.4), assimilation between nasals and neighboring obstruents (§5.2), elision (§5.3), and vowel harmony (§5.5). Since phonological processes of tone were treated in depth in §3.4, they are only summarized briefly here (§5.6).

This chapter is also devoted to phonological processes that function more at the interface with the morpho-syntax of the language, which include the phonology unique to

clitics (§5.7), and contractions (§5.8). Finally, the language game *nch-akwiʔ tzūʔ ntīlú* ‘speaking backwards’ accesses phonological structure and sheds valuable light on the nature and workings of the phonological system of Zenzontepec Chatino (§5.9). A list and summary of the phonological processes, their domains of operation, and any determinable ordering is provided in §5.10.

5.1. Palatalization

Several palatalization changes, or variations on them, have occurred in all Chatino languages (Campbell 2013a). In Zenzontepec Chatino, three types of palatalization can be identified, two of which remain synchronically active. The one that is no longer active was a conditioned palatalization of proto-Chatino sibilants **tz* and **s* before the vowel **i*, yielding /ch/ and /x/, respectively (see §2.1.3.2 and §2.1.3.3). The two palatalization processes that are still active are palatalization of /t/, /l/, and /n/ after /i/ (§5.1.1), and palatalization of /k/ before /e/ (§5.1.2).

5.1.1. Palatalization of coronals /t/, /l/, and /n/ after /i/

In proto-Chatino, **t, *l,* and **n* palatalized after **i*. The results of this change can be seen in the examples in (193), where palatalized coronals with preceding /i/ are on the left and non-palatalized coronals, preceded by other vowels, are on the right. As discussed in §2.1.3.5 and §2.1.6.2 and shown in the final line of (193), a /ʔ/ between /i/ and /n/ did not block the palatalization.

(193)	/ki**t**ī/	[ki**tʲ**ī]	‘paper’	/ká**t**ī/	[ká**t**ī]	‘seven’
	/nkī**l**á/	[ŋgī**lʲ**á]	‘arrow’	/n-ka**l**a yaāʔ/	[ŋga**l**a jaāʔ]	‘centipede’
	/kw-i**n**aʔ/	[kʷi**nʲ**ãʔ]	‘deer’	/kwé**n**āʔ/	[kʷé**n**ãʔ]	‘meat’
	/kiʔ**n**a/	[kiʔ**nʲ**ã]	‘bed’	/keʔ**n**ā/	[kʲeʔ**n**ã]	‘plate’

The fact that this process is still active in Zenzontepec Chatino was shown above in the aspectual inflection for the verb ‘boil’ in (188) in §4.5.2, where the stem-initial /l/ palatalizes after the Potential Mood and Habitual Aspect prefixes that end in /i/. The stem consonant does not palatalize after the Progressive or Completive prefixes, since those prefixes do not end in /i/. A similar example is given for /t/ in (194), in the inflection of the verb stem *-teę* ‘carry’. The initial /t/ palatalizes in all aspects other than the Progressive, since the Progressive prefix for that verb is the only one that does not end in /i/.

(194)	POT	/ki-**t**eę/	[ki**tʲ**ẽẽ]	‘will carry’
	HAB	/nti-**t**eę/	[ndi**tʲ**ẽẽ]	‘carries’
	PRG	/nte-teę/	[ndetẽẽ]	‘is carrying’
	CPL	/nkwi-**t**eę/	[ŋgʷi**tʲ**ẽẽ]	‘carried’

The paradigm in (195) shows the verb stem *-nāá* ‘get cleared (field)’ with initial /n/ that palatalizes in the Potential Mood and Habitual Aspect only, since only those prefixes end in /i/.

(195)	POT	/ki-**n**āá/	[kī**nʲ**ãã̌]	‘will get cleared (field)’
	HAB	/nti-**n**āá/	[ndī**nʲ**ãã̌]	‘gets cleared (field)’
	PRG	/nte-nāá/	[ndēnãã̌]	‘is getting cleared (field)’
	CPL	/nku-nāá/	[ŋgūnãã̌]	‘got cleared (field)’

In terms of rule ordering, the palatalization of coronals must follow vowel hiatus resolution (§5.3.1). The Habitual Aspect form of the verb *-ala* ‘be born’ illustrates this,

since the /l/ of the root is palatalized by the /i/ of the aspect prefix after the intervening root vowel /a/ is elided by the prefix /i/ (196). If the ordering were the reverse, then ‘gets born’ would be pronounced as the unattested form [ndila]* without palatalization.

(196)	POT	/k-ala/	[kala]	‘will be born’
	HAB	/nti-a**l**a/	[ndi**lʲ**a]	‘gets born’
	PRG	/nch-ala/	[nʲʤala]	‘is being born’
	CPL	/nku-ala/	[ŋgula]	‘was born’

Since palatalization of coronals alters the place of articulation of the nasal /n/, it can be ordered with respect to the process in which nasals assimilate in place of articulation to following obstruents (§5.2.1). The examples in (197) show that palatalization of coronals may precede nasal place of articulation assimilation, or else the nasals would be palatalized in the phonetic forms. Another possibility is that doubly-linked place features block the palatalization.[25]

(197)	/xi-**n**takwą/	[ʃi**n**dakʷã]	‘sandal of’	(not [ʃi**nʲ**dakʷã]*)
	/nte-lí**n**tō/	[ndelí**n**dō]	‘is going to waste’	(not [ndelí**nʲ**dō]*)

The palatalization of coronals does not occur across phonological word boundaries. This is exemplified in (198), where the complex lexeme *niʔi* ***t****unu* ‘building’ consists of two phonological words, and the final /i/ of the first does not palatalize the initial /t/ of the second. The textual example in (199) contains the verb *nti-kwiʔ* ‘spoke (habitually)’, which in this case hosts the adverbial enclitic *=nuʔū* ‘in vain’. The /i/ of the

[25] Juliette Blevins suggested the possibility of doubly-linked place features perhaps blocking the palatalization.

verb stem does not palatalize the initial /n/ of the adverb because clitics are separate phonological words from their hosts (§10.5).

(198) /niʔi **t**unu/ [nĩʔĩ **t**ũnũ] ‘building’ (lit. house big) (not [nĩʔĩ **tʲ**ũnũ]*)

(199) [ndikʷiʔ**n**ũʔ̃ũ̃ʔ laaʔ] (not [ndikʷiʔ**nʲ**ũʔ̃ũ̃ʔ laaʔ]*)
*nti-kwiʔ=**n**uʔū=ūʔ laaʔ*
HAB-speak=in.vain=3PL like.so
‘They spoke a lot (in vain) that way.’ [cuento novio 4:14]

For additional examples of palatalization of the coronals /t/, /l/, and /n/, see §2.1.3.1, §2.1.3.4, and §2.1.3.5, respectively.

5.1.2. Palatalization of /k/ before /e/

The plain velar stop /k/ has a palatalized allophone [kʲ] before the vowel /e/. A few cases are listed in (200), but see §2.1.5.2 for additional examples. The palatalized allophone of /k/ is pronounced like the phoneme /ky/, so the two phonemes are neutralized before /e/. This palatalization is probably quite old, since it is found in other Chatino varieties, such as Yaitepec Chatino (Rasch 2002: 29).

(200) /**k**étū/ [**k**ʲétū] ‘hole’
/**k**ekaʔ/ [**k**ʲekaʔ] ‘water gourd’
/**k**eę/ [**k**ʲẽẽ̃] ‘swelling’
/xi**k**ęʔ/ [ʃi**k**ʲẽ̃ʔ] ‘leg of’

Even though the palatalization of the velar stop may be old, the process is still synchronically active in Zenzontepec Chatino, as evidenced by the examples of verbal

inflection in (201). The velar stop of the Potential Mood prefix *k(i)-* palatalizes before the initial /e/ of the stems, after vowel hiatus resolution occurs.

(201)	/**k**i-etzāʔ/	[**k**ʲetsāʔ]	‘will inform’
	/**k**i-ene/	[**k**ʲenẽ]	‘will make sound’
	/**k**i-ē+tyukwā/	[**k**ʲetʲukʷā]	‘will sit down’

The palatalization of /k/ occurs only within the phonological word, but this is by default. That is, it is not possible to determine with certainty whether or not its domain is limited since the phonotactics do not permit /k/ in word-final or root-final position.

5.2. Assimilation between nasals and obstruents

One of the two consonant cluster types permitted by the native phonotactics of Zenzontepec Chatino is a nasal followed by an obstruent (§4.1.3.2). The consonants in these clusters are always homorganic, because the nasal assimilates in place of articulation to the following obstruent, as will be discussed in §5.2.1. The obstruents, in return, are always realized as voiced, assimilating in voicing to the preceding nasal (§5.2.2.).[26] Therefore, there is mutual partial assimilation in these NO consonant clusters.

[26] The assimilation of obstruent voicing to nasals is exceptionless in Zenzontepec Chatino. Some innovative, monosyllabified varieties of Chatino, such as San Juan Quiahije Chatino (Cruz 2011) and Yaitepec Chatino (Rasch 2002) do contrast some voiceless obstruents with voiced obstruents after nasals.

5.2.1. Place of articulation assimilation of nasals

A cross-linguistically common phonological process is for nasal consonants to assimilate in place of articulation to neighboring consonants. This is illustrated for Zenzontepec Chatino in (202). The example set lists all of the obstruents that a nasal could imaginably assimilate to, giving one example for each or noting occurrence limitations.

(202)	/p/	/mpii/	[**mb**ii]	‘small toad sp.’	(see more examples in §2.1.2.1)
	/t/	/ntáā/	[**nd**áā]	‘bean’	(see more examples in §2.1.3.1)
	/tz/	/ntzeę/	[**ndz**ẽẽ]	‘citrus fruit’	(see more examples in §2.1.3.2)
	/s/	/n-sukwā/	[**ndz**uk^{w}ā]	‘lying down’	(few cases, neutralizes with /tz/)
	/ty/	/n-tyúʔu/	[**n^{j}d^{j}**úʔu]	‘leaves (v.)’	(see more examples in §2.1.4.1)
	/ch/	/nchiʔna/	[**n^{j}dʒ**iʔn^{j}ã]	‘lip of’	(see more examples in §2.1.4.2)
	/x/	— would neutralize with /ch/ as [dʒ] after a nasal			(no clear examples)
	/ky/	/nk-yāá/	[**ŋ^{j}g^{j}**āá]	‘caught up with’	(see more examples in §2.1.5.1)
	/k/	/n-kātę́/	[**ŋg**ātẽ́]	‘white’	(see more examples in §2.1.5.2)
	/kw/	/nkwesǫʔ/	[**ŋg^{w}**esõʔ]	‘scab’	(see more examples in §2.1.5.3)

There are only three nasal consonant phonemes in the language, /n/, /ny/, and /m/. The environments where unassimilated nasals can be viewed are word-initial position and intervocalic position (203). Since /ny/ is a secondary, fairly recently innovated, phoneme (§2.1.4.5) that does not appear to have been involved in the formation of NO clusters, all nasals in clusters with non-bilabial obstruents are treated as /n/. If the obstruent is bilabial, the nasal is represented as /m/, though it could just as easily be represented as /n/ or an archiphoneme /N/ that is underspecified for place of articulation. The nasal plus obstruent clusters arose from a few morphological and grammaticalization processes, as explained in §4.1.4.2.

(203)	/**n-**āką́ʔ/	[**n**ā̃kā̃́ʔ]	‘tied up’	/kwa**n**a/	[kʷã**n**ã]	‘mirror’
	/**ny**akąʔ/	[**nʲ**ãkãʔ]	‘stuttering (adj.)’	/kwa**ny**o/	[kʷã**nʲ**õ]	‘squirrel’
	/**m**akǫʔ/	[**m**ãkõʔ]	‘fingerless’	/nku**m**e/	[ŋgũ**m**ẽ]	‘ripe’

5.2.2. Voicing assimilation of obstruents

It was just demonstrated in §5.2.1 that nasals in NO clusters assimilate in place of articulation to following obstruents. The obstruents in these clusters simultaneously assimilate in voicing to the preceding nasal, and all obstruents are underlyingly voiceless in Zenzontepec Chatino. Therefore, voiceless obstruents have voiced allophones after nasal consonants and after nasals only. For examples of this for each obstruent that may occur in the clusters, see again those just presented in (202) in §5.2.1 and the cross-references listed there.

5.3. Elision

There are a few processes of segment deletion that operate in Zenzontepec Chatino phonology. The most important one is the elision of one of two vowels brought into hiatus due to verbal aspect/mood inflection (§5.3.1). Next, there are two types of optional deletion that occur in rapid speech. In one type, word-medial consonants may be elided in a couple of very frequently occurring verbs (§5.3.2). The other type of optional elision is a process of haplology in which CV sequences in aspect prefixes may be omitted before similar stem sequences (§5.3.3).

5.3.1. Vowel hiatus resolution

All verbs in Zenzontepec Chatino must be inflected for aspect or mood (AM). Aside from a few stems that may take zero-marking for one AM category or another, aspect/mood inflection is achieved by prefixes that attach to the beginning of the Verbal Template and in many cases also tone change on the stem (§12.2.1). Most of these prefixes end in vowels, and quite a few verb stems are vowel-initial. Therefore, verbal inflection often produces what would be vowel sequences, which the phonotactics of the language do not permit within the phonological word (§4.3.1). In such cases of vowel hiatus, one of the two vowels is elided. Following Kaufman's (1987) analysis of Zapotec verbal morphophonology, Campbell (2011a) establishes the vowel hierarchy for Zenzontepec Chatino that determines which of two vowels will be deleted in hiatus (204). The hierarchy is to be read as follows: in a sequence of two vowels V_1V_2, delete whichever of the two is the weakest (rightmost) on the vowel hierarchy. There is one exception to the hierarchy stated as such: if /a/ precedes /u/, the /u/ is deleted. If /u/ precedes /a/, the /a/ is deleted. So, between /u/ and /a/, whichever is V_1 remains.

(204) Zenzontepec Chatino vowel hierarchy (Campbell 2011)

e » u » i » a, o

Due to the limited number of AM prefixes and their allomorphs, not every possible combination of two vowels occurs. First of all, sequences in which V_1 would be /o/ are not possible, since /o/ does not occur in prefixes and is highly restricted in non-final syllables (§2.2.4; §4.2.3). Of the remaining possible vowel sequences, only half are

attested, as shown in the examples in Table 12. Even though the combinations are limited, the vowel hierarchy is well supported because each vowel is shown to be higher than the two immediately below it on the hierarchy. That is, the examples attest to *e* » *u/i*, and in turn *u* » *i/a*, and finally *i* » *a/o*.

Table 12. Vowel elision and the vowel hierarchy

V_1-V_2	Phonemic	Phonetic	Gloss	Ranking
e-u	/nt**e-u**-laʔa/	[nd**e**laʔa]	‘is breaking (tr.)’	e » u
e-i	/nt**e-i**sę/	[nd**e**sẽ]	‘is getting wrapped’	e » i
e-a	—	—	—	—
e-o	—	—	—	—
u-e	—	—	—	—
u-i	—	—	—	—
u-a	/nk**u-a**la/	[ŋg**u**la]	‘was born’	u » a
u-o	—	—	—	—
i-e	/nt**i-e**tzāʔ/	[nd**e**tsāʔ]	‘informs’	e » i
i-u	/nt**i-u**-jnyā/	[nd**u**hnʲ̃ã]	‘makes’	u » i
i-a	/nt**i-ā**kéʔ/	[ndīkʲéʔ]	‘gets cooked’	i » a
i-o	/nt**i-o**joʔ/	[nd**i**hoʔ]	‘stings’, ‘pokes’	i » o
a-e	—	—	—	—
a-u	/nk**a-u**-xiką/	[ŋg**a**ʃikã]	‘chose’	a » u
a-i	—	—	—	—
a-o	—	—	—	—

5.3.2. Deletion of medial consonants

There are two verbs whose medial consonant is frequently elided in fast speech. The result is a long vowel. One such verb is *-tākąʔ* ‘suffer’, ‘undergo’, which is shown inflected for the four primary verbal aspects in (205). The underlying forms are on the left, the normal phonetic shapes and reduced phonetic forms with elided consonant and long vowel are to the right.

(205) Medial consonant deletion in *-tākąʔ* ‘suffer’, ‘undergo’

	Phonemic form	Normal phonetic		Reduced form	Gloss
POT	/tyākąʔ/	[tʲākɐ̃ʔ]	~	[tʲɐ̃ɐ̃ʔ]	‘will suffer’
HAB	/n-tyākąʔ/	[nʲdʲākɐ̃ʔ]	~	[nʲdʲɐ̃ɐ̃ʔ]	‘suffers’
PRG	/nte-tākąʔ/	[ndetākɐ̃ʔ]	~	[ndetɐ̃ɐ̃ʔ]	‘is suffering’
CPL	/nku-tākąʔ/	[ŋgutākɐ̃ʔ]	~	[ŋgutɐ̃ɐ̃ʔ]	‘suffered’

The other verb that undergoes medial consonant elision is *-akwiʔ* ‘speak’ (206). The reduction only occurs in the Potential Mood and Habitual Aspect forms, where the surrounding vowels are of the same quality. The deletion does not occur in the Progressive Aspect and Completive Aspect forms, where the result would be a sequence of unlike vowels, which is not permitted by the phonotactics. These examples show that there is some rule ordering at work. The resolution of vowel hiatus must occur before the elision of the medial consonant, or else the necessary condition of like vowels surrounding the medial consonant would not be present.

(206) Medial consonant deletion in *-akwiʔ* ‘speak’

	Phonemic form	Normal phonetic		Reduced form	Gloss
POT	/ki-akwiʔ/	[kikʷiʔ]	~	[kiiʔ]	‘will speak’
HAB	/nti-akwiʔ/	[ndikʷiʔ]	~	[ntiiʔ]	‘speaks’

PRG	/nch-akwiʔ/	[nʲʤakʷiʔ]	—	‘is speaking’
CPL	/y-akwiʔ/	[jakʷiʔ]	—	‘spoke’

5.3.3. Haplology

Haplology is an often sporadic phonological process by which one string of segments is deleted when adjacent to an identical or similar string of segments. In Zenzontepec Chatino, haplology typically occurs in inflected verbs. Where a CV string in an aspect or mood prefix precedes a similar CV string in a verb stem, the former may sporadically elide. Some examples are listed in (207). The first two cases show a /tu/ sequence that deletes before another /tu/ sequence, after vowel hiatus resolution has occurred. The next two examples (lines c. and d.) have a sequence of /tV/ followed by another sequence of /tV/, with unlike vowels. First, vowel hiatus is resolved and then haplology occurs. The fifth example (line e.) is similar, but one of the alveolar stops is underlyingly palatalized. Finally, the last example (line f.) shows a /ku/ string deleted before an identical string. The haplologized variants are most likely to occur in rapid speech.

(207)

	Phonemic form	Normal phonetic		Reduced form	Gloss
a.	/nti-u-tusūʔ/	[ndutusūʔ]	~	[ndusūʔ]	‘grabs’
b.	/nti-ū-túkwi/	[ndūtúkʷi]	~	[ndúkʷi]	‘chases off’
c.	/nti-u-taja/	[ndutaha]	~	[ndaha]	‘makes hole in’
d.	/nti-u-tano/	[ndutanõ]	~	[ndanõ]	‘leaves (trn.)’
e.	/nti-ū-tyó+tza/	[ndūtʲótsa]	~	[ndʲótsa]	‘puts on top of’
f.	/nku-kukwą̄=rīké/	[ŋgukukʷãɾīkʲé]	~	[ŋgukʷãɾīkʲé]	‘got disgusted’

5.4. Other processes involving consonants

Two other phonological processes involving individual consonants are discussed in this section: the de-velarization of /w/ (§5.4.1), and the realization of /t/ as the alveolar tap [ɾ] (§5.4.2).

5.4.1. De-velarization of /w/

The voiced labio-velar semivowel /w/ has an allophone of [β̞] before some instances of /i/. A few examples are listed in (208), and additional examples can be found in §2.1.5.4.

(208)	/**w**iʔ/	[**β̞**iʔ]	NVIS
	/**w**itza/	[**β̞**itsa]	‘day after tomorrow’
	/kwé**w**ī kii/	[kʷé**β̞**ī kii]	‘flute’
	/ti-**w**īlá/	[ti**β̞**īlʲá]	‘jealous’

The environment in which this process operates is quite specific. The labio-velar /w/ does not lose its velar articulation before /i/ if it follows a root-internal /u/, as in (209), repeated from (74) in §2.1.5.4, but it does occur following a heteromorphemic /u/, as in (210), repeated from (75).

(209)	/ki chu**w**ī/	[ki ʧu**w**ī]	‘large basket’	/ku**w**īʔ/	[ku**w**īʔ]	‘young child’
	/nk-y-ū**w**íʔ/	[ŋʲgʲū**w**íʔ]	‘went out/off’	/ntu**w**i/	[ndu**w**i]	‘shiny’

(210)	/nti-u-wii/	[ndu**β̞**ii]	‘cleans (trn.)’
	/nku-wīʔí/	[ŋgu**β̞**īʔí]	‘became skinny’
	/nku-witi/	[ŋgu**β̞**itʲi]	‘dried (itrn.)’

The phoneme /w/ is realized as the voiceless bilabial fricative [ɸ] when following /j/ and preceding a front vowel (211) (see also §2.1.5.4). This is a part of the develarization of /w/ discussed above.

(211)	/j**w**iī/	[h**ɸ**iī]	‘whistle’	
	/j**w**entē/	[h**ɸ**endē]	‘bridge’	< Sp. *puente* ‘bridge’
	/tyúj**w**i/	[tʲúh**ɸ**i]	‘hearthstone’	
	/nku-j**w**i/	[ŋguh**ɸ**i]	‘died’	

5.4.2. Tapping of medial /t/

As discussed in §2.1.3.6, the voiceless dento-alveolar stop /t/ may be realized as a voiced alveolar tap [ɾ]. This is not a regular or fully predictable allophony, but it usually occurs following /u/ or in clitic-initial position. It is most common in a few frequently occurring verbs, especially in rapid speech. The example from a folk tale in (212) is a typical case, where the stem-initial /t/ of the verb, the first word in the sentence, weakens to a tap. A couple of other verbs that frequently undergo the alternation are in (213).

(212)	[ŋgā**ɾ**ūkʷá	hĩʔĩ̃	nãnẽ̃ʔ	ʦaka	kiʧuwī	kusõ̃]
	*nka-**t**ūkwá*	*jiʔį̄*	*nanēʔ*	*tzaka*	*kichuwī*	*kusǭ*
	CPL.CAUS-be.inside[.3]	NSBJ[.3]	inside	one	basket	old
	‘He put them in an old basket.’ [nkwitzan ti7i 5:25]					

(213)	/nkā-túkwi/	[ŋgā**t**úkʷi] ~ [ŋgā**ɾ**úkʷi]	‘chased off’
	/nkā-tūsúʔ/	[ŋgā**t**ūsúʔ] ~ [ŋgā**ɾ**ūsúʔ]	‘grabbed’

The tapping of /t/ appears to have resulted in certain forms relexicalizing with /r/, since they are always pronounced with the tap and never the stop despite the process remaining optional more generally. The verb *-ūrá* ‘hit’ and the adverbial enclitics *=ri*

'only' and *=rú?* 'more' are a few instances (see §2.1.3.6 for additional examples). Recall that /r/ is a somewhat marginal phoneme that has relatively recently phonologized due to the confluence of such forms as discussed here with some Spanish loans (§7.2.7) and sound symbolic forms (§8.1).

5.5. Vowel harmony

There are several phonological processes by which one vowel assimilates to another within a phonological word. Since vowels do not occur in sequence within that domain, these are all cases of non-contact, or long distance, assimilation.[27] They include translaryngeal vowel harmony (§5.5.1), progressive vowel harmony (§5.5.2), and vowel nasality spreading (§5.5.3). The last is not truly a type of vowel harmony per se, since nasality is a contrastive element that is not underlyingly part of vowel quality. Nevertheless, it fits here because nasality is realized on vowels, and its spreading is akin to translaryngeal vowel harmony.

5.5.1. Translaryngeal vowel harmony

As discussed in §4.3.5, a change of translaryngeal vowel harmony took place in proto-Chatino (Campbell 2013a). The process is still active in Zenzontepec Chatino, where it is now extending its domain of application. For examples of this sound change and its current extension, see the tables in §4.3.5, where the process was discussed from

[27] Note that vowel sequences do occur at host-clitic boundaries, but as such, those sequences span multiple phonological words and may undergo fusion (§5.7) but not harmony.

the perspective of co-occurrence constraints. Translaryngeal vowel harmony is not easy to demonstrate in action because it appears to operate at the root level, and roots never occur with unlike vowels across glottals. On the other hand, it can be shown that it does not operate between stems and prefixes, as in the inflected verbs in (214). If translaryngeal vowel harmony did occur between stem and prefix, then we'd expect [nduhũũ] instead of [ndihũũ] 'spins thread (tr.)', for instance. For additional examples of roots that reflect the results of translaryngeal vowel harmony, see §2.1.6.1 for /ʔ/ and §2.1.6.3 for /j/.

(214)	/nti-juų/	[ndihũũ]	'spins thread (tr.)'
	/nka-júʔū/	[ŋgahúʔū]	'was embarrassed'
	/nte-jiʔį̄/	[ndehĩʔį̃]	'is one's turn'
	/chi-ju&/	[ʧihũ]	'maize spike'

5.5.2. Progressive vowel harmony

After the consonant /n/, the vowel /e/ will raise to [i] if the vowel of the preceding syllable is /i/. This process is only visible in the Potential Mood and Habitual Aspect forms of a few verbs, where the aspect prefixes contain the vowel /i/, as in the example of the verb *-nee* 'demand' (215). In the Progressive and Completive forms, the vowel raising does not occur, because the aspect prefixes do not contain the vowel /i/. Underlying sequences of /ine/ are only found across morpheme boundaries, because any such sequences within roots would have changed to /ini/, a historical fact that would only be recoverable through comparison with related languages.

(215)	/ki-nee/	[kinʲĩĩ]	'will demand'
	/nti-nee/	[ndinʲĩĩ]	'demands'

/nte-nee/	[ndenẽẽ]	‘is demanding’
/nka-nee/	[ŋganẽẽ]	‘demanded’

The verb in (216), illustrates that the process occurs across glottal stops, just like palatalization of /n/ after /i/ (§2.1.3.5; §5.1.1). In this example, the /e/ of the verb stem raises in all four primary aspect forms, since the derivational Iterative prefix underlyingly precedes the root in all forms. That prefix also explains the palatalization of the root /n/ in all cases. Therefore, first the Iterative derivation occurs, then the palatalization of /n/ and raising of /e/, and finally, vowel hiatus resolution.

(216)	/ki-i-ʔne+tzoʔō/	[kiʔnʲitsoʔō]	‘will fix’ (lit. ‘make good again’)
	/nti-i-ʔne+tzoʔō/	[ndiʔnʲitsoʔō]	‘fixes’
	/nte-i-ʔne+tzoʔō/	[ndeʔnʲitsoʔō]	‘is fixing’
	/nkwi-i-ʔne+tzoʔō/	[ŋgʷiʔnʲitsoʔō]	‘fixed’

Another example of this vowel raising is apparent while comparing the verb *-u-nēʔé* ‘to throw’ (217) with its derived Iterative form *-i-nīʔí* ‘to throw again’, ‘to throw back’ (218). In the Iterative forms, there is an underlying vowel /i/, the Iterative prefix *i-* in all forms, which palatalizes the root-initial /n/ and causes the root vowel(s) to raise, all before hiatus resolution occurs.

(217)	POT	/ki-u-nēʔé/	[kūnẽʔẽ́]	‘will throw’
	HAB	/nti-u-nēʔé/	[ndūnẽʔẽ́]	‘throws’
	PRG	/nte-u-nēʔé/	[ndēnẽʔẽ́]	‘is throwing’
	CPL	/nka-u-nēʔé/	[nkānẽʔẽ́]	‘threw’

(218)	POT	/ki-i-nēʔé/	[kīnʲĩʔĩ́]	‘will throw again’
	HAB	/nti-i-nēʔé/	[ndīnʲĩʔĩ́]	‘throws again’
	PRG	/nte-i-nēʔé/	[ndēnʲĩʔĩ́]	‘is throwing again’
	CPL	/nkwi-i-nēʔé/	[ŋgʷīnʲĩʔĩ́]	‘threw again’

5.5.3. Nasality spreading

Contrastive vowel nasality is restricted to the final mora of the phonological word, but it phonetically spreads to non-final syllables across the glottal consonants /ʔ/ and /j/ (219). Nasality spreading is one of very few phonological processes that occur over clitic boundaries in addition to within the phonological word, as shown in (220). In those examples, nasality is present only in the enclitic, but it phonetically spreads into the host. See §3.1 and §4.2.2 for further examples of nasality spreading.

(219)	/chaʔą/	[ʧ**ãʔ**ã]	‘will wash’
	/koʔǫ/	[k**õʔ**õ]	‘deaf’
	/tyejẹ/	[tʲ**ẽ**hẽ]	‘will pass’
	/kwi-tzāʔą́/	[kʷitʂ**ãʔ**ã́]	‘sorcerer’

(220)	/yaāʔ=ą/	[j**ãã̃**ʔã]	‘our (incl.) hands’
	/nch-ulaʔ=ąʔ/	[nʲʤul**ã**ʔã̃ʔ]	‘I’m cold’

5.6. Tonology recap

Since the phonological processes involving tone are very useful in defining the tones as contrastive elements, they were presented and discussed in detail in §3.4. To sum up briefly, there are several processes that tones undergo in context. First, the pitch of a high tone (H) will spread through any and all subsequent moras that bear no tone of their own (§3.4.3.1). The spreading continues either until another tone is encountered or until the end of the intonational phrase. Second, any H or M tone will downstep to a lower pitch if a spreading H tone bumps into it (§3.4.3.2). Third, a mid tone on a monomoraic enclitic will be replaced by a /H/ tone if and only if its host bears only a single M tone on

its final mora (§3.4.3.3). Aside from these three processes, two other phonetic tonal effects occur. First, on monomoraic phonological words in isolation, the /M/ and /H/ tones are realized at phonetically elevated pitches (§3.3.1), and the H is also phonetically elevated on stems bearing the ØH tone pattern of second person singular inflection (§3.3.3). Lastly, if the MM second person singular pronominal tonal inflection pattern occurs on a long vowel, the pitch of the first is elevated and that of the second is lowered (§3.3.3).

It should be mentioned here that verbal inflection is a domain with considerable complexity in tone pattern alternations. First of all, the two exponents of 2SG pronominal inflection are purely tonal. As explained in §3.3.3, basic stems bearing the ØM tone pattern will have the ØH tone pattern if inflected for second person singular. Basic stems bearing the ØØ, MH, HØ, or HM tone patterns have the MM tone pattern in their 2SG form. These patterns are morpho-phonological and not strictly phonological. The domain on which 2SG inflection operates in the phonological word, and only the final phonological word of a complex stem will bear the tonal inflection. That final phonological word may be a root with or without prefixes, the final component of a compound, or an enclitic. Second, tone patterns on verb stems may vary considerably depending on which aspect they are inflected for. These tone pattern alternations in aspect inflection vary from verb to verb and are in large part lexically conditioned (see Campbell 2013b). Therefore, they are not phonological but rather morphological (Aronoff 1994).

5.7. Phonology of clitics

A few phonological patterns are unique to host-clitic boundaries. First of all, if a monomoraic enclitic bears mid tone and is hosted by a stem bearing M tone on its final mora but no other tones on its other moras, then the M tone of the enclitic will become a /H/ tone (221). This process, referred to as mid tone transformation, was discussed in greater detail in §3.4.1 and §3.4.3.3.

(221) [ŋgahnʲãã́ʔ kiʔnʲã kʷãã̃]

/nka-jnyā=**ą̄ʔ** kiʔna kwaą̄/
CPL-(CAUS)make=**1SG** bed high
'I made a loft.' [historia2 17:13]

Next, an enclitic boundary is the only environment where vowel hiatus is tolerated. As shown in §5.3.1, when vowel sequences arise between aspect prefixes and verb stems, one of the two vowels elides. However, between vowel-final stems and vowel-initial enclitics, elision does not occur, and there are two different outcomes, depending on the quality of the vowel of the enclitic. Note that only two vowels are found in enclitic-initial position: /a/ and /u/. That only these two vowels occur in initial position of enclitics is likely merely a result of the infrequency of vowel-initial enclitics. It is probably not due to any restriction.

If a vowel-initial enclitic begins in the vowel /a/, and its host ends in a vowel, then the vowels will fuse and become a long vowel. There are two enclitics that begin with /a/: the first person singular pronoun *=ą̄ʔ* and the first person plural inclusive pronoun *=ą*. If the host vowel is a mid vowel, then the resulting fused vowel is mid (222). If the host

vowel is high, the resulting fused vowel may be high or mid, tending towards mid (223). It may be that the lowness of the /a/ in the enclitic pulls the vowel height down, but recall that high and mid vowels are nearly merged when nasal (§3.1) If the host vowel is also /a/, there is unsurprisingly no change in vowel quality (224).

(222) /nte-ʔn**e**=**ą**ʔ/ [nde.ʔn**ẽẽ**ʔ] ‘I am doing’
/tz-a+lóʔ**ō**=**ą**/ [tsalǒʔ**õõ**] ‘we’ll go to leave it’

(223) /nku-jw**ī**=**ą**ʔ/ [ŋgu.hɸ**ẽ́ẽ́**ʔ] ~ [ŋgu.hɸ**ĩ̋ĩ̋**ʔ] ‘I got’
/ki-is**u**=**ą**/ [kis**õõ**] ~ [kis**ũũ**] ‘we (incl.) will pay’

(224) /y-ūn**á**=**ą**ʔ/ [jūn**ǎ̃ã**ʔ] ‘I cried’
/nka-jy**ā**=**ą**/ [ŋgahj**ãã**] ‘we (incl.) played’
/nyáʔa=**ą**ʔ/ [nʲǎʔ**ãã**ʔ] ‘my mother’

If the host already ends in a long vowel, in careful speech the fusion may yield an extra-long, trimoraic, vowel. However, more commonly, and in fast speech, the inflected form will reduce to two moras, preserving the phonetic shape of the final two moras, that is, the final mora of the host and the mora of the enclitic, along with their tones (225).

(225) /t**āá**=**ą**ʔ/ [**tãǎ̃ã**ʔ] ~ [t**ǎ̃ą̃**ʔ] ‘I will give’
/nti-u-l**ōó**=**ą**/ [ndū.l**õǒ̃õ**] ~ [ndū.l**ǒ̃õ**] ‘we (incl.) take out’
/ki-u-l**úū**=**ą**/ [ku.l**ǒ̃õ̃õ**] ~ [ku.l**õ̃õ**] ‘we (incl.) will dug’
/nt**oo**=**ą**ʔ/ [nt**õõõ̃ʔ**] ~ [nt**õõ̃ʔ**] ‘my face’

There is one enclitic that begins with the vowel /u/, but only in the Core Zenzontepec dialect: the 3rd person plural/nonspecific pronoun *=ūʔ*. This pronoun has the form *=jų̄ʔ* in the Santa María and Tlacotepec dialects (Chapter 6). When the clitic’s host ends in a vowel, there is typically no fusion in the Core Zenzontepec dialect like that

found with enclitics beginning in /a/. The vowels in sequence are unaltered in quality and realized heterosyllabically (226). This clitic thus provides some of the rare cases in which syllables may occur without an onset (§4.1.3.3). In rapid speech, when the enclitic attaches to a host that ends in /u/, the result may be a long /u/, as shown in the alternate realization of the first example in (226). When the host ends in a long vowel, that vowel may shorten in rapid speech, leaving intact only its final mora, as in the alternate realization of the final example in (226).

(226)	/nt-ak**u=ū**ʔ/	[ndak**u.ū**ʔ] ~ [ndak**uū**ʔ]	‘they eat’
	/nku-jw**ī=ū**ʔ/	[ŋgu.hɸ**ī.ú**ʔ]	‘they got’
	/nte-ʔn**e=ū**ʔ/	[nde.ʔn**ẽ.ũ**ʔ]	‘they are doing’
	/nyáʔ**a=ū**ʔ/	[nʲã̀.ʔ**ã.ũ**ʔ]	‘their mother’
	/nti-u-l**ōó=ū**ʔ/	[ndū.l**ōó.ū**ʔ] ~ [ndū.l**ó.ū**ʔ]	‘they take out’

5.8. Contractions

Contractions are the phonological reduction and fusion of multiple forms into one. The contractions found in Zenzontepec Chatino are not automatic or required processes, as it is possible to pronounce the same strings unreduced and unfused. Contraction is most common in fast or casual speech. It can lead to the formation of new lexical material, but once lexicalization of a fused form occurs, it is no longer appropriate to think of it as contraction synchronically.

The most common type of contraction in Zenzontepec Chatino involves the Non-subject NP marker *jiʔɻ̄*. This function word is used to flag NPs with various functions in a clause. First of all, in casual speech it frequently phonologically reduces to one syllable as [hĩ̄] (227), where it retains its vowel nasality and mid tone. Since this reduction

involves only this one form, it is not an example of contraction. However, it is this reduced form that often undergoes contraction.

(227) [ndēlāʔá kʷẽʔẽ **hĩ̄** hwaā]
/nte-u-lāʔá kweʔę **jiʔį̄** jwaā/
PRG-CAUS-blow air NSBJ Juan
'The air is blowing on Juan.' [verb examples 8 5:54]

When *jiʔį̄* flags a non-zero NP whose first element is a sonorant-initial function word, or pronoun, then the two may contract, with *jiʔį̄* reducing to [h] and forming a complex onset with the following sonorant (228). There are a couple of noteworthy facts to point out in the example. First, note that the mid tone of *jiʔį̄* is preserved and realized on the final syllable of the new phonological word that the TBU is incorporated into, even though that vowel carries no lexical tone in the basic form of the pronoun *nuʔu*. Second, the initial /n/ of the pronoun does not palatalize in the contraction process due to the /i/ of *jiʔį̄*.

(228) [ŋgʷetsāʔ tī nāáʔ **hnũʔũ̃**]
/nkwi-etzāʔ tī nāáʔ **jiʔį̄** **nuʔu**/
CPL-inform TPLZ 1SG NSBJ 2SG
'I informed you.' [muchacha ixtayutla 7:38]

Other forms that frequently contract with *jiʔį̄* include the first person singular independent pronoun *nāáʔ*, the first person plural inclusive independent pronoun *naa*, the third person respectful pronoun *niʔ*, the definite article *na*, the nominalizer *nu*, and the

deictic demonstrative pronouns *nūwą́* and *nuwę́ʔ* (229).[28] From left to right, the examples show the phonemic forms, the unreduced phonetic forms, the phonetic outcomes with *jiʔį̄* shortened to [hĩ̃], and the contracted phonetic forms.

(229)			Phonemic →	Basic phonetic →	Reduced *jiʔį̄* →	Contraction
	nuʔu	2SG	/jiʔį̄ nuʔu/	[hĩʔĩ̃ nũʔũ]	[hĩ̃ nũʔũ]	[hnũʔũ̃]
	nāáʔ	1SG	/jiʔį̄ nāáʔ/	[hĩʔĩ̃ nãã́ʔ]	[hĩ̃ nãã́ʔ]	[hnãã́ʔ]
	naa	1PL.INCL	/jiʔį̄ naa/	[hĩʔĩ̃ nãã]	[hĩ̃ nãã]	[hnãã̃]
	niʔ	3SG.RSP	/jiʔį̄ niʔ/	[hĩʔĩ̃ niʔ]	[hĩ̃ niʔ]	[hnĩ̃ʔ]
	na	DEF	/jiʔį̄ na .../	[hĩʔĩ̃ nã ...]	[hĩ̃ nã ...]	[hnã̃]
	nu	NMZ	/jiʔį̄ nu .../	[hĩʔĩ̃ nũ ...]	[hĩ̃ nũ ...]	[hnũ̃]
	nūwą́	NMZ.DIST	/jiʔį̄ nūwą́/	[hĩʔĩ̃ nũ̃wã́]	[hĩ̃ nũ̃wã́]	[hnũ̃wã́]
	nuwę́ʔ	NMZ.NVIS	/jiʔį̄ nuwę́ʔ/	[hĩʔĩ̃ nũwẽ̃ʔ]	[hĩ̃ nũwẽ̃ʔ]	[hnũwẽ̃ʔ]

The same type of reduction is paralleled where *jiʔį̄* hosts a sonorant-initial enclitic. The only differences are that the enclitic is already attached to its host before any phonological reduction or fusion occurs, and there is perhaps a more fine-grained cline of increasing fusion, as illustrated in (230) with the pronominal enclitics *=yu* (3SG.M), *=na* (1PL.INCL), *=ya* (1PL.EXCL), and *=wą* (2PL).

(230)			Phonemic →	Basic phonetic →	Reduced →	Fused →	Most fused
	=yu	3SG.M	/jiʔį̄=yu/	[hĩ.ʔĩ̃.ju]	[hĩ̃.ʔju]	[hĩ̃.ju]	[hjū]
	=na	1PL.INCL	/jiʔį̄=na/	[hĩ.ʔĩ̃.nã]	[hĩ̃.ʔnã]	[hĩ̃.nã]	[hnã̃]
	=ya	1PL.EXCL	/jiʔį̄=ya/	[hĩ.ʔĩ̃.ja]	[hĩ̃.ʔja]	[hĩ̃.ja]	[hjā]
	=wą	2PL	/jiʔį̄=wą/	[hĩ.ʔĩ̃.wã]	[hĩ̃.ʔwã]	[hĩ̃.wã]	[hwã̃]

The same cline of increasing fusion occurs when *jiʔį̄* hosts vowel-initial enclitic pronouns (231). For some reason, the /a/ of the 1SG enclitic never fuses with the vowel of the Non-subject marker as [hĩ.ʔẽ̃é̃ʔ]* as it does with vowels of other hosts. In the least

[28] The demonstrative pronouns *nùwą́* and *nuwę́ʔ* are lexicalizations of earlier fusions of the nominalizer *nu* followed by the demonstratives *wá* and *wiʔ*, respectively.

reduced phonetic form [hĩ.ʔĩ̃.**j**ã̌ʔ], a glide is inserted to separate the vowels, or they are just pronounced heterosyllabically in hiatus.

(231)

		Phonemic	Phonetic →	Fused →	More fused →	Most fused
=ą̄ʔ	1SG	/jiʔɨ̄=ą̄ʔ/	[hĩ.ʔĩ̃.**j**ã̌ʔ]	[hĩ̃.ʔjã̌ʔ]	[hĩ̃.jã̌ʔ]	[hjã̌ʔ]
=ūʔ	3PL/NSPC	/jiʔɨ̄=ūʔ/	[hĩ.ʔĩ̃.ů̌ʔ]	[hĩ̃.ʔjů̌ʔ]	[hĩ̃.jů̌ʔ]	[hů̌ʔ]

5.9. Reversed speech: the play language *nchakwiʔ tzūʔ ntīlú*

In this section, the Zenzontepec Chatino language game *nchakwiʔ tzūʔ ntīlú* 'reversed speech' (or 'speaking backwards') is presented and analyzed. General discussion of language games and the basic characteristics of Zenzontepec Chatino reversed speech are discussed first (§5.9.1). Aside from its great entertainment value, reversed speech is important because it offers valuable insights into Zenzontepec Chatino syllable structure (§5.9.2) and the structure and limits of the phonological word (§5.9.3). As in normal speech, second person singular pronominal inflection is marked by unique tone patterns, and this is the case in reversed speech as well (§5.9.4), though the marking is distinct from that in normal speech and quite unexpected. Finally, some examples of full utterances in reversed speech are presented and discussed, revealing further details of the game.

5.9.1. Basics of reversed speech

Language games, or *ludlings* as termed by Laycock (1972: 61), are ways of speaking that are the result of applying some regular transformations to strings of ordinary speech, typically undertaken for either secrecy or entertainment (see also

Conklin 1959). Ludlings are very useful for probing native speakers' knowledge about the phonological structure of their language (Sherzer 1970; Laycock 1972; Hombert 1986). They are widespread in the world's languages, as evidenced by the impressive and diverse inventory of examples that Laycock (1972) provides in establishing his preliminary ludling typology. His typology is based on classifying play languages by the type of transformations that they involve: expansion, contraction, substitution, rearrangement, or polysystematic (some combination of the others). Expansion and rearrangement may operate on words, syllables (see also Blevins 1995: 209), or sounds.

So far, I have encountered and documented one ludling for Zenzontepec Chatino, though there probably are, or have been, others. I have been told that in the 1950s or 1960s a man from San Pedro del Río created a play language referred to as *nti-kwiʔ tzūʔ ntīlú* 'reversed speech (Sp. *hablar al revés*)'. It is no longer widely practiced, if ever it was, but a few speakers in San Pedro del Río still use it for fun.

In *nti-kwiʔ tzūʔ ntīlú*, speakers move the first syllable of a word to the end of the word.[29] Some basic examples are listed in (232).

(232)	Normal form		Reversed form	Gloss
	chi*wū*	→	*wú****chi***	'goat'
	jwa*nā*	→	*ná****jwa***	'Juana'
	ká*tī*	→	*tí****ka***	'seven'
	ki*tzę*	→	*tzę́****ki***	'village'
	ki*xę̄ʔ*	→	*xę́ʔ****ki***	'wild', 'herb'
	kwe*la*	→	*lá****kwe***	'fish'
	kwe*tǫ*	→	*tǫ́****kwe***	'bee'
	li*wrū*	→	*wrú****li***	'book'

[29] Note that this is exactly what Sherzer (1970: 344) states for *sorsik sunmakke* 'talking backwards' in Kuna, a Chibchan language of Panama.

ma*ntzeʔ*	→	*ntzéʔ**ma***	‘tapir’
na*kwę*	→	*kwę́**na***	‘say’, ‘said’
nkū*súʔ*	→	*súʔ**nku***	‘old’
su*wa*	→	*wá**su***	‘vulva of’
tu*kwi*	→	*kwí**tu***	‘which’, ‘who’
tzú*na*	→	*ná**tzu***	‘three’
xī*nkáʔ*	→	*nkáʔ**xi***	‘snot of’
xī*yáʔ*	→	*yáʔ**xi***	‘small’
wi*skā*	→	*ská**wi***	‘minister’
yu*waʔ*	→	*wáʔ**yu***	‘*Piper sp.* (hierba santa)’

The examples in (232) reflect a few additional details of the game. The phonotactics of the language are often violated as a result of the modifications. First of all, vowel nasality remains with its original syllable, so in reversed forms it occurs in non-final syllables, which is strongly dispreferred by the normal phonotactics (§3.1; §4.2.2). Second, word-final glottal stop remains with its syllable, resulting in non-native sequences of glottal stop followed by obstruents. Third, since tone is suprasegmental, it might be expected to remain in place relative to the overall word, as Hombert (1986: 179-180) shows for Bakwiri (Bantu). Alternatively, one might predict that tones would remain with the moras to which they are linked, following those moras when transposed. However, in Zenzontepec Chatino reversed speech we find an unusual tonal transformation. The reversed examples in (232) all bear the HØ basic tone pattern, regardless of the tone pattern of the unaltered forms (ØØ, ØM, MH, HØ, or HM). What this means is that tone is present in reversed speech, but it is completely neutralized. What is a bit surprising is that the HØ tone pattern is the one adopted even though it is the least common of the five basic tone patterns (§3.3.5). As a result of this tone

neutralization, words that typically differ only in their tone patterns end up homophonous in reversed speech (233).

(233)	Normal form		Reversed form	Gloss
	kwichī	→	*chíkwi*	‘rabbit’
	kwīchí	→	*chíkwi*	‘large wild feline’
	lisū	→	*súli*	‘avocado’
	lísū	→	*súli*	‘vulture’

The play language is an operation that occurs at the end of the word-level phonology, since phonological processes apply before the transposition of syllables. For example, in normal speech, the /l/ and /t/ of the word *kilitu?* [kiⁱlʲiⁱtʲuʔ] ‘navel of’ are palatalized since they are preceded by /i/ (§5.1.1). In reversed speech the form is [lʲīⁱtʲúʔki], with even the /l/ palatalized, even though it is not preceded by /i/ in the surface realization. Conversely, the question word *tukwi* ‘which?’ becomes *kwítu* [kʷítu] in reversed speech, and there is no palatalization of the /t/ even though it follows /i/ in the modified form. Another example is *kwe?ę* [kʷẽʔẽ] ‘wind’, in which vowel nasality spreads to the first syllable across the glottal consonant in normal speech (§5.5.3). In reversed speech it is [ʔẽ́kwẽ], where both vowels are nasalized as well, even though the now-medial *kw* would block nasality spreading if this were in normal speech.

Since the operating rule in the game is to move the initial syllable of a word to the end of the word, monosyllabic forms should be unaffected by the process. This is what we find in cases where monosyllabic words are part of complex lexemes or larger constructions. Some examples of this are listed in (234), where the first word in each example is monosyllabic and the second word is disyllabic. Only the disyllabic forms are

modified. We may see something different with monosyllabic forms that are not part of complex lexemes, which will be discussed after briefly looking at the status of glottal stop in reversed speech.

(234)

Normal form		Reversed form	Gloss
ntzeę *tunu*	→	***ntzeę*** *nútu*	‘orange’
ntzeę *tiyeʔ*	→	***ntzeę*** *yéʔti*	‘lime’
tí *tzaka*	→	***tí*** *kátza*	‘eleven’
léē *tīkéʔ*	→	***léē*** *kéʔti*	‘it’s very hot out’
júų̄ *kiyāʔ*	→	***júų̄*** *yáʔki*	‘commercial thread’

5.9.2. Probing syllable structure in reversed speech

The reversed speech data sheds valuable light on questions about Zenzontepec Chatino phonology. First and foremost, since the relevant units in reversed speech are the syllable and the (phonological) word, the game is a useful tool for determining the boundaries and probing the internal structure of these phonological constituents in the language. For example, in §2.1.6.1, it is concluded that in Zenzontepec Chatino the evidence in favor of a segmental analysis of /ʔ/ is more compelling than the evidence for treating it as a feature of the syllable nucleus. Reversed speech provides some of this evidence. First of all, intervocalic glottals are demonstrated to be consonantal by the examples in (235). If these were cases of a single syllable with a laryngealized vowel, as is found in Zapotec, then they should not undergo the syllable reversal.

(235)	Normal form		Reversed form	Gloss
	*tzo**ʔō***	→	***ʔó**tzo*	‘good’
	*nko**ʔo***	→	***ʔó**nko*	‘banana’
	*kwe**ʔę***	→	***ʔę́**kwę*	‘wind’
	*n-tya**ʔą***	→	***ʔą́**ntyą*	‘goes around’
	*tyá**ʔā***	→	***ʔá**tya*	‘relative of’
	*nyá**ʔa***	→	***ʔá**nya*	‘mother of’
	*cha**ja***	→	***já**cha*	‘tortilla’
	*tó**jō***	→	***jó**to*	‘squash vine’
	*y-o**joʔ***	→	***jóʔ**yo*	‘stung’

Furthermore, if desired, there is a way to modify monosyllabic words in order to allow them to undergo reversal for the purpose of obscuring their forms. In these cases, the vowel can be broken by an inserted glottal, and the newly created initial syllable can then be transposed (236). Since the basic forms have no glottals to begin with, the insertion of glottals to split the forms into two syllables provides some evidence for the consonantal status of /ʔ/ and the disyllabic nature of CVʔV words.

(236)	Normal form		Reversed form	Gloss
	lyáā	→	***ʔá**lya*	‘opossum’
	tíi	→	***ʔí**ti*	‘ten’
	ntáā	→	***ʔá**nta*	‘beans’
	choo	→	***ʔó**cho*	‘rain’

Glottals always syllabify with neighboring sonorant consonants as complex onsets, both in the normal phonology (§2.1.6.2; §4.1.3.2) and in reversed speech. If such glottals were merely a laryngeal feature of the preceding vowels, then they would remain adjacent to those vowels in reversed speech, which they do not, as shown in the examples in (237).

(237)	Normal form		Reversed form	Gloss	
	*kíʔ**y**ū*	→	***ʔy**úki*	‘male’	(not ***y**úkiʔ*****)
	*kāʔ**y**ú*	→	***ʔy**úka*	‘five’	(not ***y**úkaʔ*****)
	*sūʔ**w**á*	→	***ʔw**ásu*	‘cargo of’	(not ***w**ásuʔ*****)
	*sūʔ**w**é*	→	***ʔw**ésu*	‘Teojomulco’	(not ***w**ésuʔ*****)
	*ni**jy**aą*	→	***jy**ąni*	‘is coming’	(not ***y**ąni**j***)
	*lí**jy**ā*	→	***jy**áli*	‘sugar cane’	(not ***y**áli**j***)
	*kwi**jny**aʔ*	→	***jny**áʔkwi*	‘mouse’	(not ***ny**áʔkwi**j***)

Additionally, it was argued in §4.5.4 that the nasal consonants in nasal plus obstruent clusters never function as syllabic nuclei in word-initial position, as they always syllabify as complex onsets with the obstruents. If they did function as syllabic nasals, then only the nasal would transpose to word-final position in reversed speech. The examples in (238) demonstrate that this is not what happens.

(238)	Normal form		Reversed form	Gloss	
	***nt**akwą*	→	*kwą**nt**a*	‘sandal’	(not ***t**ákwą**n***)
	***ntz**ukwāʔ*	→	*kwáʔ**ntz**u*	‘shelled corn’	(not ***tz**úkwaʔ**n***)
	***nk**olō*	→	*ló**nk**o*	‘turkey’	(not ***k**ólo**n***)
	***nk**unuʔ*	→	*núʔ**nk**u*	‘worm’	(not ***k**únuʔ**n***)
	***nk-y**atę*	→	*tę**nky**a*	‘slept’	(not ***ky**átę**n***)
	***mp**eleʔ*	→	*léʔ**mp**e*	‘thick tortilla’	(not ***p**eleʔ**m***)

5.9.3. Phonological words, prefixes, and enclitics in the game

In §3.3.4 it is shown that, aside from a few additional minor details, trimoraic forms bear the same basic tone patterns as bimoraic forms (§3.3.3). That is, trimoraic forms that are single phonological words behave more or less the same as bimoraic phonological words. Excluded here are compounds and host-clitic combinations, since they are comprised of multiple phonological words (§10.2.1). In reversed speech, trimoraic forms behave as would be expected, with the first syllable moving to the end of

the word, regardless of whether the word is disyllabic (239) or trisyllabic (240). The only unexpected result is that the now word-initial long syllable of the disyllabic forms becomes short (239), whereas the trisyllabic trimoraic forms remain as such (240).

(239)	Normal form		Reversed form	Gloss
	kwi*seēʔ*	→	*séʔ**kwi***	‘raccoon’
	kwi*teeʔ*	→	*tyéʔ**kwi***	‘ant’
	ni*jyaą*	→	*jyá**ni***	‘comes’
	ni-*kaą*	→	*ką́**ni***	‘penis of’

(240)	Normal form		Reversed form	Gloss
	ku*tunu*	→	*tūnú**ku***	‘large crayfish’
	kū*náʔa*	→	*nāʔá**ku***	‘woman’
	kwi*līxí*	→	*lyīxí**kwi***	‘butterfly’
	ki*lituʔ*	→	*lyītúʔ**ki***	‘navel of’
	kwi*tīʔyú*	→	*tyīʔyú**kwi***	‘lightning’

The shortened vowels in (239) are likely due to influence from the native phonotactics, which restrict vowel length to final syllables. Note that the initial syllable in the trisyllabic examples bears the M tone that always accompanies trimoraic forms with the HØ basic tone pattern in normal speech (§3.3.4). These examples provide key evidence that the tones found in reversed speech forms truly bear the (M)HØ basic tone pattern and not some other, phonetically similar, tone pattern particular to reversed speech.

Forms with inflectional prefixes behave exactly as forms without prefixes in reversed speech. This is best exemplified with verbs, since verbal inflectional prefixes in most cases are not mere lexicalized fossilizations, but rather are added via synchronic morphological processes. The verb examples in (241) show the typical transposition of the initial syllable, which depending on the shape of the prefix and the stem may include the entire prefix, a part of the prefix, or all of the prefix and part of the stem.

(241)

Normal form		Reversed form	Gloss
nka-*xiti*	→	*xītí**nka***	‘laughed’
nte-*lákwi*	→	*lākwí**nte***	‘is boiling’
nkā-*sāʔą́*	→	*sāʔą́**nka***	‘wrote’
nku-*taʔą*	→	*tāʔą́**nku***	‘went around’
nku-*suxíī*	→	*sūxí**nku***	‘began the day’
nka-*sukwi*	→	*sūkwí**nka***	‘sucked’
nti-*joʔ*	→	*jóʔ**nti***	‘stings’, ‘pokes’
nka*y*-*ūná*	→	*yūná**nka***	‘cried’
k-***a****ku*	→	*kú**ka***	‘will eat’
y-***a****ku*	→	*kú**ya***	‘ate’
nch-***ū****lá*	→	*lá**nchu***	‘is dancing’
nch-***ū****ná*	→	*ná**nchu***	‘is crying’
nch-***a****kwiʔ*	→	*kwíʔ**ncha***	‘is speaking’
nt-***ya****tę*	→	*tę́**ntya***	‘slept’

Since the domain of operation of many other phonological processes and phonotactic patterns includes prefixes along with their stems, the fact that the ludling does so is not surprising. Reversed speech therefore serves as one more piece of evidence used to define the phonological word of Zenzontepec Chatino (§10.2.1).

Clitics, on the other hand, do not group with their hosts in the operation of most phonological and phonotactic rules. Because of this, clitics are considered to be outside of the phonological word to which their host belongs (§10.5). The evidence from reversed speech is in line with these patterns, as any enclitics attach to the ends of words that have already undergone transposition of their initial syllable. This fact shows that the phonological word is undeniably the domain in which the ludling operates. Some examples of reversed speech forms with enclitics are given in (242).

(242)	Normal form		Reversed form	Gloss
	sa*teʔ=yu*	→	*téʔ**sa**=yu*	‘his clothes’
	sa*teʔ=wą*	→	*téʔ**sa**=wą*	‘your (pl.) clothes’
	ju*ti=yu*	→	*tí**ju**=yu*	‘his father’
	ju*ti=ą̄ʔ*	→	*tí**ju**=ą̄ʔ*	‘my father’
	ny*áʔa=ą̄ʔ*	→	*ʔá**ny**a=ą̄ʔ*	‘my mother’
	ny*áʔa=ą*	→	*ʔá**ny**a=ą*	‘our (incl.) mother’
	tyá*ʔā=yu*	→	*ʔá**tya**=yu*	‘his relative’

The examples in (243) show normal speech forms that have inflectional prefixes and enclitics. As should be expected, in reversed speech the transposition of the initial syllable includes all or part of the prefix, and in some cases even part of the stem. Again, the enclitics attach only after the syllable movement has occurred. These examples highlight well the fact that prefixes form a more narrowly circumscribed phonological constituent with their stems than do enclitics with their hosts.

(243)	Normal form		Reversed form	Gloss
	nkā*-sāʔą́=yu*	→	*sāʔą́**nka**=yu*	‘he wrote’
	y-a*ku=wą*	→	*kú**ya**=wą*	‘you (pl.) ate’
	k-a*ku=ūʔ*	→	*kú**ka**=ūʔ*	‘they will eat’
	nka*-xiti=chūʔ*	→	*xītí**nka**=chūʔ*	‘she laughed’
	nku*-suxíī=ą*	→	*sūxí**nku**=ą*	‘we began the day’
	nka*y-ūná=ūʔ*	→	*yūná**nka**=ūʔ*	‘they cried’
	nka*y-ūná=ą̄ʔ*	→	*yūná**nka**=ą̄ʔ*	‘I cried’

5.9.4. Second person singular inflection in reversed speech

In the normal grammar, second person singular pronominal inflection is marked solely by the ØH and MM tone patterns, which are restricted to 2SG inflection (§3.3.3). Uninflected (or third person) forms with the basic tone pattern ØM become ØH in 2SG, and uninflected forms with any other basic tone pattern (ØØ, MH, HØ, HM) take the MM tone pattern when inflected for 2SG (§3.3.3). It was shown above in §5.9.1 that all

five basic tone patterns neutralize as HØ in reversed speech. The two 2SG tone patterns are also neutralized in reversed speech, and that inflectional category is realized solely by a tone pattern that is distinct from both of the typical second person tone patterns. All 2SG forms in reversed speech are created by adding a single M tone to the final mora of the uninflected (third person) reversed speech form (HØ tone pattern) (244).

(244)	Normal 3rd pers.		Reversed 3rd pers.		Reversed 2SG	Gloss
	***ju**ti*	→	*tí**ju***	→	*tí**jū***	'your father'
	***nyá**ʔa*	→	*ʔá**nya***	→	*ʔá**nyā***	'your mother'
	***xī**nkąʔ*	→	*nkąʔ**xi***	→	*nkąʔ**xī***	'your snot'
	***xi**kǭ*	→	*kǫ́**xi***	→	*kǫ́**xī***	'your arm'
	***ntya**tę*	→	*tę́**ntya***	→	*tę́**ntyā***	'you slept'
	***nka**-xiti*	→	*xītí**nka***	→	*xītí**nkā***	'you laughed'
	***nka**-sukwi*	→	*sūkwí**nka***	→	*sūkwí**nkā***	'you sucked'
	***nku**-taʔą*	→	*tāʔą́**nku***	→	*tāʔą́**nkū***	'you went around'
	***nku**-suxíī̄*	→	*sūxí**nku***	→	*sūxí**nkū***	'you began the day'
	*ta **y-a**ku chaja*	→	*ta kú**ya** jácha*	→	*ta kú**yā** jácha*	'you ate tortillas'

5.9.5. Reversed speech in full utterances

The reversed speech data that have been presented so far are mostly single words or simple clauses comprised of verbs with their subject enclitics. Now we turn to examples with more complex syntax and meaning. It must be pointed out that the examples here do not come from texts or any type of naturalistic speech, but rather were spontaneously offered by a single speaker. A few final details of reversed speech are evident upon examination of full utterances that have undergone the process. First of all, the example in (245) reflects how the basic syntax is typically unaltered in reversed speech. The first line shows the utterance in reversed speech, and the second line

provides the basic, underlying form of the utterance. Only the disyllabic content words in this case have been modified.

(245) *léē ʔyú**ki** ʔne tī na sú**ʔkwe**é*
/léē **kí**ʔyū ʔne tī na **kwē**súʔ=V́/
very male HAB.do TPLZ DEF little.man=DIST
'The little dear guy behaves very well.' [hablar reves list 29:59]

The function words *léē*, *tī*, and *na* are all unaffected in the reversed speech in (245). However, they are all monosyllabic, so their avoiding rearrangement is not surprising. The next example (246) illustrates another basic part of the game: function words do not undergo modification, even if they are polysyllabic. The Non-subject marker *jiʔį́* (inflected for 2SG) and the adverb *laʔā* are unaltered in (246).

(246) *kwítu kwę́na **jiʔį́** **laʔā** ʔócho*
/tukwi nakwę jiʔį́ laʔā choō/
who CPL.say NSBJ.2SG like.so friend.VOC
'Who told you that, friend?' [hablar reves list 30:25]

Since component stems in compounds behave as separate phonological words (§10.3), one would predict that both stems of a compound, if disyllabic, would undergo syllable movement in the game. This is in fact what occurs in some cases, such as the verb 'sing' in (247). However, in the compound verb at the end of the example in (248), the first stem with its prefix (*nte-ʔne+*) has not undergone syllable movement. Therefore, there appears to be some degree of variability in the handling of compounds. What would be unexpected is for the initial syllable of the first stem of a compound to be transposed to after the second stem, and this does not occur.

(247) *lá**nchu**+ʔwá**tu*** *lóʔō* *na* *strúma=á*
/nch-ūlá+**tu**ʔwa lóʔō na mastrū=V́/
PRG-dance+mouth[.3] with DEF musician=DIST
'He is singing with the musicians.'

(248) *la* *tzę́ki* *náʔa-nka=ą̄ʔ* *j-nā* *nájwa=aʔ* ***nte-ʔne**+ʔyúki*
/la kitzę nka-náʔā=ą̄ʔ jiʔį̄.nā jwanā=Vʔ **nte-ʔne**+kíʔyū/
up.to village CPL-see=1SG NSBJ-DEF Juana=NVIS PRG-do+male
'I saw Juana in the village flirting...' [hablar reves 2:23]

Example (248) also illustrates that contraction operates in reversed speech just as it does in normal speech (§5.8), since the marker *jiʔį̄*, which flags the object of the first verb, fuses with the following article *na*. The same contraction occurs in (249), but in utterance-initial position. This is a case in which the object is extracted from its usual post-verbal position and fronted for pragmatic purposes.

(249) ***j-nā*** *nájwa=á* *yākwá* *náʔa-nka=ą̄ʔ*
/jiʔį̄.nā jwánā=V́ yākwá nka-náʔā=ą̄ʔ/
NSBJ-DEF Juana there CPL-see=1SG
'I saw Juana there.' [hablar reves 1:35]

Though the preceding discussion does not provide a detailed comparison between the syntax of reversed speech and that of normal speech, none of the examples show any syntactic rearrangement unique to the play language. Therefore, *nch-akwiʔ tzūʔ ntīlú* appears to be a purely phonological operation. It sheds valuable light on the phonology and the phonological status of morphological elements, such as prefixes and enclitics. It provides a view of native speaker knowledge about the structure and limits of the syllable and the phonological word.

5.10. Summary of phonological processes and domains

Table 13 lists all of the phonological processes discussed in the previous subsections (and Chapter 3 for tone), along with their domains of operation and any determinable relative ordering of operation. A couple of processes occur at the root level, but most occur at the level of the phonological word. A few operate at the host-enclitic juncture, and finally, two tonal phonological processes have the intonational phrase as their domain. Along with evidence from phonotactic patterns and constraints, these processes are used to define the phonological word and the nature and boundary of clitics in Chapter 10.

Table 13. Phonological processes, domains, and ordering

Phonological process	Domain	Occurs after	Section
Insertion of onset /ʔ/ (or /j/ or /y/)	Syllable (or phon. word)	—	§4.1.3.3
De-velarization of /w/	Root	—	§5.4.1
Translaryngeal. V harmony	Root	—	§5.5.1
Progressive V harmony	Phon. word	—	§5.5.2
Vowel hiatus resolution	Phon. word	prog. V harm.	§5.3.1
/k/ → [kʲ] / _ e	Phon. word	hiatus res.	§5.1.2
/t/, /l/, /n/ → [tʲ], [lʲ], [nʲ] / i _	Phon. word	hiatus res.	§5.1.1
Nasal place assimilation	Phon. word	pal. of coronal	§5.2.1
Medial consonant elision	Phon. word	hiatus res.	§5.3.2
Haplology	Phon. word	hiatus res.	§5.3.3
Obstruent voicing after nasal	Phon. word	—	§5.2.2
Reversed speech	Phon. wd. (targets syll.)	—	§5.9
2sg inflection	Phon. word	—	§3.3.3
M tone dissimilation	Phon. wd. (targets syll.)	2sg infl.	§3.3.3
Vowel fusion	Clitic juncture	—	§5.7
M tone transformation	Clitic juncture	—	§3.4.3.3
Tapping of /t/ (optional)	Phon. word, Clitic junct.	—	§5.4.2
Nasality spreading	Phon. word, Clitic junct.	—	§5.5.3
H tone spreading	Intonational phrase	—	§3.4.3.1
H or M downstep	Intonational phrase	—	§3.4.3.2

Chapter 6

Regional phonological variation

The previous chapters have dealt with the segmental (Chapter 2) and autosegmental (Chapter 3) inventories, phonotactics (Chapter 4), and phonological processes (Chapter 5) of Zenzontepec Chatino. The purpose of the present chapter is to provide a brief, preliminary account of regional phonological variation within Zenzontepec Chatino. Compared to most other rural Oaxacan languages, including all other Chatino varieties, Zenzontepec Chatino is spoken across a relatively large geographic area with a fairly low degree of linguistic variation. There is nearly absolute mutual intelligibility throughout the area, so all of the speech forms within the area uncontroversially constitute a single language. However, there are three identifiable dialect areas: the Core Zenzontepec dialect, the Santa María dialect, and the highly endangered Tlacotepec dialect. Unless otherwise specified, the data presented throughout this grammar are from, or at least representative of, Core Zenzontepec. The reason for

this is the simple fact that the majority of the available data is from that dialect, though speakers from all dialect areas have contributed to the documentation of their language.

In the discussion to follow, Core Zenzontepec will be the base to which the other dialects are compared. However, it must be stressed that this is a matter of convenience: Core Zenzontepec has no inherent higher value than either of the other dialects, and all three dialects are equally valid and important. First, a few minor points of variation within Core Zenzontepec will be discussed by comparing the typical speech in the village of San Pedro del Río with that of the village of La Aurora (§6.1). Then, preliminary comparison of the Santa María dialect with Core Zenzontepec is presented (§6.2), followed by a brief look at variation between the Tlacotepec dialect and the Core Zenzontepec dialect (§6.3). Though there must be variation based on other variables, such as age, gender, and other social factors, no systematic research has yet been conducted in that topic area.

6.1. Phonological variation within Core Zenzontepec

The most salient point of phonological variation within Core Zenzontepec is a difference in vowel quality after the consonant /ky/ in some forms. In some villages, such as San Pedro del Río, words have the vowel /a/ in these forms, while in other villages, for example La Aurora, these words have the vowel /e/ (250).

(250)	San Pedro del Río	La Aurora
‘entered’	*nk-y-**ā**tę́*	*nk-y-**ē**tę́*
‘slept’	*nk-y**a**tę*	*nk-y**e**tę*
‘was skinned’	*nk-y-**a**tą*	*nk-y-**e**tą*

‘remained’	*nk-y-**á**nō*	*nk-y-**é**nō*
‘was tied’	*nk-y-**ā**ką̀ʔ*	*nk-y-**ē**ką̀ʔ*
‘got untied’	*nk-y-**a**tiʔ*	*nk-y-**e**tiʔ*
‘stood up’	*nk-y**a**+toǫ*	*nk-y**e**+toǫ*
‘multiplied’	*nk-y**a**ʔne*	*nk-y**e**ʔne*
‘sleepiness’	*ky**ā**lá*	*ky**ē**lá*
‘queen leafcutter ant’	*ky**á**nchę*	*ky**é**nchę*

Most of the examples in (250) above are verbs whose stems begin with the semivowel /y/, which fuses with the Completive Aspect prefix, yielding the sequence *nky*. By looking at these verbs inflected for other aspects, it is clear that the forms with /e/ reflect the innovation since these verbs have the vowel /a/ when inflected for other aspects in La Aurora (251).

(251) The verb *-y-ālú* ‘get spilled’ in La Aurora

CPL	*nky**ē**lú*	‘was spilled’
PRG	*ntey**ā**lú*	‘is getting spilled’
HAB	*nch**ā**lú*	‘will get spilled’

Therefore a change /a/ > *e* / *ky* __ has occurred in parts of Core Zenzontepec, merging (or neutralizing) /a/ and /e/ after /ky/. Recall that /ky/ is a rare phoneme (§2.1.5.2), while /k/ is a very common phoneme that has an allophone of *ky* [kʲ] before /e/ (§5.1.2). Because of this, the vast majority of cases of phonetic [kʲ] are found before /e/, and this fact perhaps primed the change of /a/ to /e/ following /ky/.

A couple of other forms show the same correspondence of /a/ in San Pedro del Río with /e/ in La Aurora but not following the consonant *ky*. There are too few such cases to make any generalization, but it can be noted that there is a palatalized sound /ny/ or /ky/ soon after the vowel in both cases (252).

(252)	San Pedro del Río	La Aurora
‘true’, ‘truly’	*tz**a** jnyāʔá*	*tz**e** nyāʔá*
‘Mixtec’, ‘foreigner’	*kwe-t**a** kyaʔā*	*kwe-t**e** kyaʔā*

Interestingly, there are some forms that have /e/ in San Pedro del Río corresponding to /a/ in La Aurora (253), showing a pattern opposite to that just mentioned. These cases never involve the environment (following /ky/) that conditions the reverse correspondence above in (250). Again, there are too few examples of this correspondence to make any insightful generalization about its development.

(253)	San Pedro del Río	La Aurora
‘world’	*tz**e**lā yuu*	*tz**a**lā yuu*
‘intestinal parasite’	*kw**e**-jlyā*	*kw**a**-jlyā*
‘fingernail’	*x**e**tąʔ*	*x**a**tąʔ*

There are a few cases where the vowel /i/ in San Pedro del Río corresponds to /u/ in La Aurora (254). The varying vowel in ‘butterfly’ was likely originally /u/, as evidenced by the Zacatepec Chatino cognate *l**u**sǐ.* The original phonetic form in Zenzontepec Chatino, as preserved in La Aurora, was [kʷilʲūʃĭ], where the vowel [u] is surrounded by palatalized consonants and other instances of the vowel /i/ in neighboring syllables. Therefore, the San Pedro del Río form reflects a sporadic assimilation of the vowel to its heavily palatal, and palatalizing, environment. The other two varying forms in (254) reflect innovations of *i* > *u* specific to La Aurora. Recall from §2.1.4.3 that in most cases the phoneme /x/ arose out of a palatalized allophone of /s/ before /i/. If the vowel in these forms had originally been /u/, then the initial consonant should not be palatal /x/, but rather non-palatalized /s/. The lexeme *x**í**kwą̄* ~ *x**ú**kwą̄* ‘sunlight’ is a root that has lexicalized from an earlier compound *xíī+kwaą̄* ‘light(.of)+sky’.

(254)		San Pedro del Río	La Aurora
	‘butterfly’	*kwi-l**ī**xí*	*kwi-l**ū**xí*
	‘smooth’	*x**i**kwi*	*x**u**kwi*
	‘sunlight’	*x**í**kwą̄*	*x**ú**kwą̄*

In nasality contexts where speakers from San Pedro del Río tend to have the vowel [u], speakers from La Aurora tend to have [o]. This is a purely phonetic difference, since /u/ and /o/ only minimally contrast in non final syllables (§2.2.4; §4.2.3), and are nearly merged when occurring with vowel nasality (§3.1). A few examples of this variation are listed in (255), and the varying vowels are written as they are pronounced in each variety.

(255)		San Pedro del Río	La Aurora
	‘ripe’	*nk**u**me*	*nk**o**me*
	‘worm’	*nk**u**n**ū**ʔ*	*nk**o**n**ō**ʔ*
	‘you’	*n**u**ʔ**u***	*n**o**ʔ**o***
	‘remained’	*ty**u**kᵩ*	*ty**o**kᵩ*
	‘fifteen’	*tiʔn**u***	*tiʔn**o***
	‘is breaking down’	*nte-n**u**ʔ**u***	*nte-n**o**ʔ**o***

A few more examples of variation between the speech of San Pedro del Río and La Aurora are listed in (256). In the first two cases, in San Pedro del Río a penultimate syllable /i/ has shifted to another vowel, leaving the preceding /t/ palatalized as /ty/. The personal name ‘Juan’ in San Pedro del Río has a long vowel with nasality, the ØM basic tone pattern found on most Spanish loanwords, and no glottal stop. In La Aurora, on the other hand, the vowel is short, toneless, non-nasal, and precedes a glottal stop. The latter form is quite unusual among Spanish loanwords (see Chapter 7), which are almost never toneless and almost never contain /ʔ/. The compound verb ‘swelled up’ has /o/ in the first stem of the compound in San Pedro del Río and /u/ in La Aurora. Finally, the name of a

red bird species derives from a now opaque compound. It is still a compound in San Pedro del Río, allowing it to violate the translaryngeal vowel harmony constraint on root shape (§4.3.5; §5.5.1). In La Aurora, the semivowel /y/ follows the glottal fricative, so the unlike vowels are permitted, conforming to the phonotactics of roots.

(256)	San Pedro del Río	La Aurora
'yanked'	*nka-**tyé**lē*	*nka-**tí**lē*
'came out'	*nkū-**tyū**kwá*	*nkū-**tī**kwá*
'Juan'	*jwa**ą̄***	*jwa**ʔ***
'swelled up'	*nk-y**ó**+keę*	*nk-y**ú**+keę*
'red bird sp.'	*chí+jąʔ*	*chíj**y**ąʔ*

In sum, the dialectal differences between La Aurora and San Pedro del Río presented here are fairly minor, and they are no hindrance to mutual intelligibility. Though the discussion here includes most of the points of phonological variation within Core Zenzontepec that I have identified so far, there are likely more.

6.2. Variation between Santa María and Core Zenzontepec

It is well known to speakers throughout the Zenzontepec Chatino region that there is variation between the Santa María Tlapanalquiahuitl dialect and the Core Zenzontepec dialect. Santa María was formerly part of the municipality of Tataltepec de Valdés, which is located to its south in the district of Juquila. Community members report that the Santa María dialect is largely limited to the confines of the village of Santa María and speakers in its satellite villages and hamlets speak the Core Zenzontepec dialect.

The most commonly cited difference between Santa María and Core Zenzontepec is the numeral ‘two’, where Santa María has the vowel /a/ in the penultimate syllable, while Core Zenzontepec has /u/ (257). This is not a regular sound correspondence, so it reflects a sporadic change in this lexeme. That Santa María is the innovator is evident in cognates from more distantly related languages, such as Zacatepec Eastern Chatino *t**u**kwa* and pZp **k-ty**o**kkwa* (Kaufman 1993), where /o/ does often correspond to Core Zenzontepec /u/.

(257)		Santa María	Core Zenzontepec
	‘two’	*t**á**kwa*	*t**ú**kwa*

Another salient feature of the Santa María dialect is the presence of the vowel /i/ after /n/ where Core Zenzontepec has /e/ (258). The Santa María pattern is matched in Tataltepec and in some cases in Zacatepec Eastern Chatino. Recall that in (Core) Zenzontepec Chatino, /e/ and /i/ are partly merged when nasal, tending toward [ẽ], especially in the absence of high tone (§2.2.1; §3.1). Therefore, some of the cases of this correspondence were probably **i* in proto-Chatino, with the vowel lowering to /e/ in Core Zenzontepec due to the nasalization effect from the /n/. On the other hand, some of these vowels appear to have come from proto-Chatino **e*, raising after nasals in Santa María. Note that /e/ never follows /n/ in the Santa María dialect. In the Core dialect, /e/ raises to /i/ after a nasal, but only if the vowel in the preceding syllable is /i/ (see progressive vowel harmony in §5.5.2). The details of front vowel correspondences are not yet all worked out, but the correspondence of /i/ in Santa María with /e/ in Core Zenzontepec after /n/ seems to have come about by a combination of different innovations in each.

(258)	Santa María	Core Zenzontepec
‘animal’	*nyaʔn**i***	*nyaʔn**e***
‘blood’	*ten**i***	*ten**e***
‘neck of’	*yan**i***	*yan**e***
‘toad’	*sēn**í***	*sēn**é***
‘belly’	*nan**ī**ʔ*	*nan**ē**ʔ*
‘does’	*ʔn**i***	*ʔn**e***

As described in §4.1.4.2, a sound change particular to Zenzontepec Chatino occurred in which words of the shape $C_1V_1C_2V_2$(ʔ) reduced to *j*C_2V_2(ʔ) in a very specific environment. In Core Zenzontepec Chatino, the change has occurred if four conditions are met: (i) C_1 was a simple obstruent (i.e. an obstruent other than *kw*, *ch*, *tz*, or *ky*) in a simple onset; (ii) V_1 was a high vowel; (iii) C_2 was either /n/ or /l/; and (iv) $V_1 \neq V_2$. In the Santa María dialect, the change has spread to a couple of forms that are not affected in Core Zenzontepec (259). The word *sulu* ‘cactus spine’ has monosyllabified as *jlu* in the Santa María dialect even though V_1 is the same as V_2. Also, the word *kuchilū* ‘knife’, a Spanish loan, has reduced its medial syllable and become *kujlyū* even though /ch/ is not a simple obstruent. Finally, the word *kinī* ‘bird’ has remained disyllabic in both Santa María and Core Zenzontepec, but it has monosyllabified in Santa María only in the old compound *kē kinī* ‘Tututepec’ (lit. ‘mountain’+‘bird’).

(259)	Santa María	Core Zenzontepec
‘cactus spine’	***j**lu*	***su**lu*
‘knife’	*ku**j**lyū*	*ku**chi**lū*
‘Tututepec (town)’	*kē **j**nyī*	*kē **ki**nī* (‘mountain’+‘bird’)
cf. ‘bird’	***ki**nī*	***ki**nī*

Some cases of an initial, non-palatalized consonant followed by a front vowel in Santa María correspond to a palatalized consonant followed by a non-front vowel in Core

Zenzontepec (260). The Core Zenzontepec forms are likely the innovations, since several cases may be explained by some kind of harmony to a vowel, semivowel, or secondary articulation in the following syllable. Recall from §6.1 that within Core Zenzontepec, the speech of La Aurora is somewhat conservative (like Santa María) in this respect.

(260)	Santa María	Core Zenzontepec
'firefly'	***lí**nkwi*	***lyú**nkwi*
'dove sp.'	***ti**kǫ*	***tyu**kų*
'comes out'	*n-**ti**kwā*	*n-**tyu**kwā*
'herb sp. (Sp. *pitiona*)'	***ke**nuʔ*	***kyu**nuʔ*
'prickly pear'	***chī**ntíʔ*	***chū**ntíʔ ~ **kyū**ntíʔ*
'queen leafcutter ant'	***ké**nchę*	***kyá**nchę*

Finally, some other lexemes show variation between Santa María and Core Zenzontepec, but they seem to be the result of some sporadic change in one dialect or the other (261). First of all, the third person nonspecific/plural pronominal enclitic has an initial /j/ in Santa María that has been eroded away in Core Zenzontepec. Second, the Santa María dialect, like the Tlacotepec dialect (§6.3), has *yakwa* for the first person plural exclusive independent pronoun, while Core Zenzontepec has the form *kwaa* (or *kwa* in fast speech) with the initial syllable clipped off. All three dialects have *=ya* as the corresponding dependent form of this pronoun (i.e. the first syllable of the independent pronoun *yakwa*). Therefore, the Santa María and Tlacotepec forms of the independent pronoun nicely reveal the source of the enclitic *=ya*, which would be unrecoverable from the Core Zenzontepec dialect alone. Finally, Core Zenzontepec *ntyūsé* 'god' is borrowed from Spanish *dios* 'god'. In most cases Spanish /d/ is adapted into Zenzontepec Chatino as /nt/ (§7.2.5), palatalized in this case due to the following semivowel/diphthong in the

Spanish source form. The outcome in Santa María (and in the speech of some in La Aurora), however, is *lyūsé*, which appears to be a sort of phonological recomposition (Hock 1991: 199) in which the /n/ is removed, perhaps after having been reanalyzed as an accreted nasal consonant (see §4.1.4.2 and Campbell 2013: 409 for nasal accretion). Note that historically *nl* > *nt* [nd].

(261)	Santa María	Core Zenzontepec
3NSPC/PL	*=jɻ̄ʔ*	*=ūʔ*
1PL.EXCL	*yakwa*	*kwaa*
'god'	*lyūsé*	*ntyūsé*

A thorough study of tonal variation between Santa María and Core Zenzontepec Chatino is not yet possible due to the limited data so far gathered from Santa María. However, one difference stands out. While the H tone in Core Zenzontepec will spread through any, and even many, following toneless moras until the end of the intonational phrase (§3.4.3.1), in the Santa María dialect H tone spreading continues maximally through a single following phonological word. This is exemplified in (262), illustrated in the spectrogram in Figure 22. The H tone of the verb *k-ājá* spreads through the first phonological word of the following compound verb, *k-aku+* 'will eat', but it fails to continue spreading through the postpound, the toneless phonological word *xeę* 'dinner'. In Core Zenzontepec the H tone would spread through both parts of the compound and then downstep the M tone of the enclitic pronoun (§3.4.3.2), at which point its spreading would halt. This limit on H tone spreading to one phonological word is very likely an innovation, since even in the more distantly related Eastern Chatino variety of San Marcos Zacatepec H tone spreading continues through multiple words as it does in Core

Zenzontepec. Therefore, such long distance spreading is probably best reconstructed for proto-Chatino.

(262) a. *jā* *k-ājá* *k-aku+xeę=jūʔ*
CONJ POT-get POT-eat+dinner=3PL
'so that they would get it to eat dinner' [ntelinto itza7 31:36]

b. *jā* *k-ājá* *k-aku+xeę=jūʔ*
M MH M

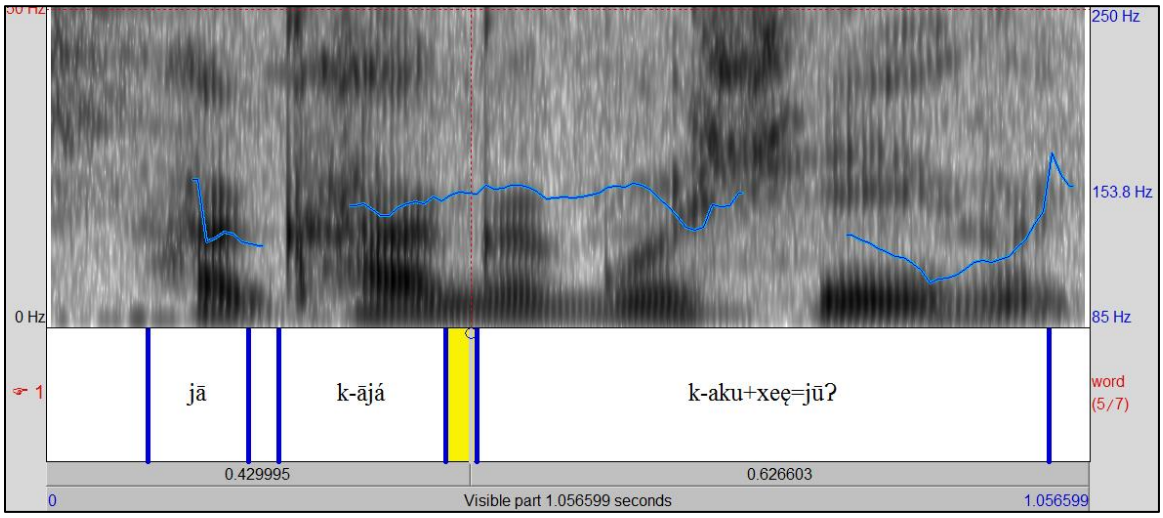


Figure 22. High tone spreading in the Santa María dialect

There are likely more phonological differences between the Santa María dialect and the Core Zenzontepec dialect that are not yet identified. The preceding discussion is only an initial step, and future work may allow for a more detailed account. One issue that has so far arisen in attempts to study regional variation within the Zenzontepec region, as pointed out by native speaker collaborators, is that Santa María speakers might adopt some markers of the Core Zenzontepec dialect in recording contexts due to its

relatively higher prestige as the majority dialect, the traditional dialect of the municipal seat, and the dialect of widest geographic distribution.

6.3. Variation between Tlacotepec and Core Zenzontepec

San Jacinto Tlacotepec is now an autonomous municipality, but it formerly pertained to the municipality of Santa Cruz Zenzontepec. It lies along the eastern border of Zenzontepec on the same primary access road. Nearly 50 years ago, Upson and Longacre (1965) reported that Chatino was no longer spoken in Tlacotepec, and it is true that the language there underwent rapid decline due to shift to Spanish. However, in 2011 some 15 speakers still remained, but most were over 60 years old at that time. The language there is more divergent from Core Zenzontepec than is the Santa María dialect. However, when questioned about regional variation, speakers always mention Santa María instead of Tlacotepec, probably because very few are familiar with the Tlacotepec dialect and many are unaware that the language is still spoken there at all.

The Tlacotepec dialect shows some similarities with the Santa María dialect that are not shared with Core Zenzontepec. It remains to be determined if these similarities reflect shared retentions, shared innovations within a shallower subgroup including Tlacotepec and Santa María, or parallel development. Since Santa María is to the south of Core Zenzontepec and relatively distant from Tlacotepec, the geography would suggest that their similarities are more likely due to retention than to shared innovation. In some cases, Tlacotepec (and Santa María) features that are lacking in Core Zenzontepec are found in Coastal Chatino languages, strongly suggesting that those features are

retentions. Nevertheless, the question of the place of the Tlacotepec dialect within a fine-grained dialectology must remain unanswered until more data can be gathered from there, which is now urgent due to the almost certain loss of the dialect in the near future. At the moment only a limited number of recordings have been collected, and therefore, the data and observations presented here are quite tentative.

First of all, as in Santa María (and Tataltepec Chatino as well), Tlacotepec has /i/ following /n/ where Core Zenzontepec has *e* (263).

(263)	Tlacotepec	Core Zenzontepec
'animal'	*nyaʔn**i***	*nyaʔn**e***
'long ago'	*saʔn**i***	*saʔn**e***
'belly'	*nan**ī**ʔ*	*nan**ē**ʔ*
'did'	*nka-ʔn**i***	*nka-ʔn**e***
'abounds'	*n-chaʔn**i***	*n-chaʔn**e***

A couple of differences between the Tlacotepec dialect and the Core Zenzontepec dialect involve pronouns. First of all, the independent third person plural pronoun is *nkóʔ*, which corresponds functionally to the unusual vowel-initial *ɨ́ʔ* of the Core dialect (264). Note that the Tlacotepec form is quite similar to that in the Chatino of Tataltepec de Valdés, where we find *nkúʔ*, so it is likely a conservative feature.[30] In §4.1.4.1 it was suggested that the unusual form in Core Zenzontepec may be due to analogy to the corresponding vowel-initial enclitic pronoun *=ūʔ*. Next, the independent 1PL.EXCL pronoun in Tlacotepec is the disyllabic *yakwa*, just as it is in the Santa María dialect (§6.2), while Core Zenzontepec has the clipped (and lengthened) *kwaa* (264).

[30] I am not aware of any Eastern Chatino cognate of *nkóʔ*.

(264)		Tlacotepec	Core Zenzontepec
	3PL	*nkóʔ*	*ųʔ*
	1PL.EXCL	*yakwa*	*kwaa*

There is a highly productive language-wide process in which pairs of versive (intransitive) and conversive (causative) verbs are derived from adjectives by compounding the adjectives with the verbs *-aka* ~ *-a* ‘become’ ‘be done’ (versive) and *-ʔne* ‘do’ (conversive). In both Tlacotepec and Core Zenzontepec, the verb *-ā+xátīʔ* ‘get tired’ has the Completive Aspect form *nkw-ā+xátīʔ* ‘got tired’ (265). The verb is a compound of *-a* ‘to become’ + *xátīʔ*, which is likely a reduced and now lexicalized amalgamation of *xīyáʔ* ‘small’ and *=tīʔ* ‘one’s living core’. In Tlacotepec, the other documented versive verbs inflect for Completive Aspect in exactly the same way, with the allomorph *nkw-* (266). In contrast, almost all other versive verbs in Core Zenzontepec have the non-labialized velar stop in the Completive Aspect prefix (*nk-*) and not the labiovelar (266).

(265)	Tlacotepec	Core Zenzontepec
‘got tired’	***nkw****-ā+xátīʔ*	***nkw****-ā+xátīʔ*

(266)	Tlacotepec	Core Zenzontepec
‘there was’	***nkw****-ā+tákā*	***nk****-ā+tāká*
‘became separate’	***nkw****-ā+xaaʔ*	***nk****-ā+xaaʔ*
‘was called (named)’	***nkw****-ā+naa*	***nk****-ā+naa*

In §6.2 it was illustrated that high tone spreading in the Santa María dialect extends maximally through one phonological word, while it may continue through many phonological words in Core Zenzontepec (§3.4.3.1). Though further work is needed to say anything definitive about tone in the Tlacotepec dialect, a striking difference between

the Tlacotepec dialect and the others is that high tone spreading apparently does not occur in many contexts where it would in Core Zenzontepec. The final H tone on words with the MH tone pattern in the Core and Santa María dialects appears to correspond to a high to low sharply falling pitch in Tlacotepec. Words of the HØ tone pattern in Tlacotepec have a high pitch on the first mora and the sharp fall on the second mora.

Though the treatment of regional variation within Zenzontepec Chatino presented in this section and the preceding ones is quite preliminary, it does serve to illustrate that some variation exists in spite of the fact that the language shows a relatively low degree of internal variation for being spoken in an area of such size in rural Oaxaca. I consider this fact to be due to a relatively recent expansion and dialect diversification in the Zenzontepec area.

Chapter 7

Phonology of Spanish loanwords

Probably all living languages are in contact with some other language(s), and their structure has been affected to some degree due to that language contact. Zenzontepec Chatino has now been in intense contact with Spanish for several hundred years, and no language has had nearly as profound an impact on Zenzontepec Chatino as Spanish has, at least at any time recently enough for such impact to be detectable. A majority of the inhabitants of the Santa Cruz Zenzontepec region speak at least some Spanish, and many are fluent in it. A significant and growing minority of the population are monolingual Spanish speakers.

Except where otherwise noted, the Zenzontepec Chatino phonology described in Chapter 2 through Chapter 6 focuses on linguistic material that is native to the language. The present chapter details the phonology of Spanish loanwords and how it differs from the basic, native phonology. In the case of recent loanwords or nonce borrowings, a Chatino form will closely resemble its Spanish source form, but the longer a loanword

has been in the language, the more adapted it tends to be to the native phonology and the less it may resemble the Spanish source form. Examples of some of the oldest Spanish loanwords yet identified are given in (267). Not only do they look very different from the Spanish forms, but many of the source forms are now archaic or not present anymore in the local Spanish.

(267)	/jnē/	[hnẽ]	‘money’	<	Sp. *tomín* ‘silver coin’
	/selū/	[selū]	‘hat’	<	Sp. *sombrero* ‘hat’
	/lometā/	[lometā]	‘bottle’	<	Sp. *limete* ‘vial’
	/serlī/	[seɾlī]	‘traditional pants’	<	Sp. *zaragüelles* ‘poofy white pants’
	/majmā/	[mãhmã]	‘steward’	<	Sp. *mayordomo* ‘steward’
	/+jlyā/	[hlʲā]	‘Castilla’	<	Sp. *Castilla* ‘Castile’
	/jlyā/	[hlʲā]	‘saddle’	<	Sp. *silla* ‘mount’, ‘saddle’
	/matī/	[matī]	‘machete’	<	Sp. *machete* ‘machete’
	/majlyā/	[mahlʲā]	‘almud, ~4 kg’	<	Sp. *maquilla* ‘unit of dry measure’
	/neyā/	[nẽjā]	‘~100 kg measure’	<	Sp. *fanega* ‘dry measure (volume)’
	/ya rawū/	[ja ɾawū]	‘plow’	<	Sp. *arado* ‘plow’

There is a considerable degree of phonological variation in loanwords across speakers. Though the reality is more complicated than will be presented here, in general monolingual Chatino speakers will show, on average, the highest degree of nativization of Spanish loanwords. That is, their pronunciation of loans will most closely fit the native Zenzontepec Chatino phonology. On average, bilingual but Chatino-dominant speakers show a higher degree of nativization of loanwords than do Spanish-dominant bilinguals.

In the following discussion, tone in Spanish loanwords is treated first (§7.1). After that, the strategies for adapting non-native, or marginally native, consonants are discussed (§7.2), followed by adaptation of Spanish forms that do not fit the native Chatino phonotactics (§7.3). Finally, a special section is devoted to personal names, nearly all of

which are of Spanish origin (§7.4). Parts of the analysis and discussion in this chapter are informed by Spanish historical phonology, particularly as described by Penny (2002). However, as a word of caution, there are significant gaps in our knowledge about the history of Spanish pronunciation, and loanwords into American Indian languages are an important type of data that have not yet been extensively taken into consideration.

7.1. Tone in Spanish loanwords

Non-nativized, minimally nativized, and nonce borrowings show one of two alternating tone patterns. One pattern is a high tone on the syllable that is accented in Spanish and a mid tone on the following syllable, as in the first form of each example in (268). If the Spanish source form has penultimate syllable stress, then the outcome in Zenzontepec Chatino fits with the native HM basic tone pattern (§3.3.3). In the other pattern, the accent-bearing syllable in Spanish carries a mid tone in Zenzontepec Chatino with no other tone on the word, as in the second (alternate) phonemic form in each example.

(268)

/mákīna/	~	/mākina/	‘machine’	< Sp.	*máquina* ‘machine’
/númēro/	~	/nūmero/	‘number’	< Sp.	*número* ‘number’
/chamárā/	~	/chamāra/	‘jacket’	< Sp.	*chamarra* ‘jacket’
/churísū/	~	/churīsu/	‘chorizo sausage’	< Sp.	*chorizo* ‘chorizo sausage’
/kájā/	~	/kāja/	‘box’	< Sp.	*caja* ‘box’
/kaníkā/	~	/kanīka/	‘marble’	< Sp.	*canica* ‘marble’
/lápī/	~	/lāpi/	‘pencil’	< Sp.	*lápiz* ‘pencil’
/mankérā/	~	/mankēra/	‘hose’	< Sp.	*manguera* ‘hose’
/palétā/	~	/palēta/	‘popsicle’	< Sp.	*paleta* ‘popsicle’
/seríyū/	~	/serīyu/	‘matches (n.)’	< Sp.	*cerillos* ‘matches’
/yábē/	~	/yābe/	‘spigot’	< Sp.	*llave* ‘spigot’

A large majority of loanwords that are at least partly nativized bear only a mid tone on the final mora of the word (269), i.e. the ØM basic tone pattern (§3.3.3).

(269)	/chinō/	[ʧĭnʲõ]	‘curly’	< Sp. *chino* ‘curly’
	/karenā/	[kaɾenã̆]	‘chain’	< Sp. *cadena* ‘chain’
	/kosā/	[kosā]	‘thing’	< Sp. *cosa* ‘thing’
	/kwentū/	[kʷendū]	‘story’	< Sp. *cuento* ‘story’
	/letrā/	[letɾā]	‘letter (character)’	< Sp. *letra* ‘letter’
	/maletā/	[maletā]	‘suitcase’	< Sp. *maleta* ‘suitcase’
	/nkuwyernō/	[ŋguwjeɾnõ̆]	‘government’	< Sp. *gobierno* ‘government’
	/orō/	[oɾō]	‘gold’	< Sp. *oro* ‘gold’
	/pantiyǭ/	[pandijõ̆]	‘graveyard’	< Sp. *panteón* ‘graveyard’
	/semanā/	[semãnã̆]	‘week’	< Sp. *semana* ‘week’
	/torō/	[toɾō]	‘bull’	< Sp. *toro* ‘bull’
	/yantā/	[jandā]	‘tire’	< Sp. *llanta* ‘tire’

In (268), one of the tone pattern alternants found on minimally-nativized or nonce borrowings is a single mid tone associated with the accented syllable in Spanish. From there, the more-nativized ØM tone pattern in (269) is arrived at by the application of one general rule: shift the sole M tone to the final mora of the word. Therefore, a loanword such as *karenā* ‘chain’ (< Spanish *cadena*) would have gone through the following tonal nativization process: *karénā* > *karēna* > *karenā*. The ØM tone pattern is a conspicuous signal of nativization because the duration, intensity, and pitch are at their maximum on the final syllable, while the majority accent pattern in Spanish is for prominence to fall on the penultimate syllable. Zenzontepec Chatino speakers are aware of the dominant loanword tone pattern and can playfully convert any Spanish word into a “Chatino word” by providing it with the ØM tone pattern.

A handful of partly nativized Spanish loanwords carry the MH basic tone pattern (270) instead of the ØM pattern. Though there are relatively few examples with this

pattern compared to the ØM pattern, it is the second most common tone pattern in loanwords. A higher proportion of borrowed personal names bear the MH tone pattern (§7.4.2). There is no yet identified reliable phonetic or phonological basis that would determine whether a loanword would take the MH tone pattern instead of the ØM pattern.

(270)	/jūntá/	[hūndá]	‘meeting’	< Sp. *junta* ‘meeting’
	/mūltá/	[mūltá]	‘fine (penalty)’	< Sp. *multa* ‘fine’
	/ntyūsé/	[nʲdʲūsé]	‘god’	< Sp. *dios* ‘god’
	/pālyá/	[pālʲá]	‘shovel’	< Sp. *pala* ‘shovel’
	/payāsú/	[pajāsú]	‘clown’	< Sp. *payaso* ‘clown’
	/sēyú/	[sējú]	‘seal (stamp)’	< Sp. *sello* ‘seal (stamp)’
	/syēntú/	[sjēndú]	‘hundred’	< Sp. *ciento* ‘hundred’

In sum, recently borrowed or nonce Spanish insertions typically alternate between the HM tone pattern and the pattern of M tone on the Spanish-accented syllable. The majority of nativized loans have the ØM tone pattern, and a smaller but significant number have the MH tone pattern. No Spanish loans bear the HØ tone pattern, and outside of a couple of personal names (§7.4.2), perhaps only one loanword, *maxi* ‘even if’, is toneless.

7.2. Adaptation of non-native or marginally native consonants

This section describes the strategies for adapting foreign sounds from Spanish into Zenzontepec Chatino. To begin, adaptation of the Spanish bilabials /p/ and /m/ is discussed (§7.2.1), followed by /b/ (§7.2.2), and then /f/ (§7.2.3). After that the Spanish voiced stops /g/ (§7.2.4) and /d/ (§7.2.5) are treated, followed by the Spanish sibilants

(§7.2.6), and finally the rhotics (§7.2.7). In some cases loanword stratigraphy can be determined by also considering the historical phonology of Spanish.

7.2.1. Adaptation of Spanish bilabials /p/ and /m/

As discussed in §2.1, the bilabials /p/ and /m/ are marginal phonemes in the native Zenzontepec Chatino sound system. They are typically unmodified in Spanish loanwords, except for /p/ becoming voiced after a nasal, due to obstruent voicing after nasals (§5.2.2). Some examples of /p/ in loanwords are given in (271), and examples of /m/ are in (272).

(271)	/**p**atū/	[**p**atū]	‘duck’	< Sp. ***p**ato* ‘duck’
	/**p**anyō/	[**p**anʲõ]	‘shawl’	< Sp. ***p**año* ‘cloth’
	/**p**esū/	[**p**esū]	‘peso’	< Sp. ***p**eso* ‘peso’
	/**p**ichǭ/	[**p**iʧõ]	‘pigeon’	< Sp. ***p**ichón* ‘pigeon’
	/m**p**aā/	[m**b**aā]	‘father of one’s godchild’	< Sp. *com**p**adre*
	/tyem**p**ū/	[tʲem**b**ū]	‘time’	< Sp. *tiem**p**o* ‘time’

(272)	/**m**a**m**ilā/	[**m**ã**m**ĩlʲā]	‘baby bottle’	< Sp. ***m**a**m**ila* ‘baby bottle’
	/**m**esā/	[**m**ẽsā]	‘table’	< Sp. ***m**esa* ‘table’
	/**m**isā/	[**m**ĩsā]	‘mass’	< Sp. ***m**isa* ‘mass’
	/**m**usū/	[**m**ũsū]	‘hired worker’	< Sp. ***m**ozo* ‘hired worker’
	/tu**m**inkū/	[tu**m**ĩŋgū]	‘Sunday’	< Sp. *do**m**ingo* ‘Sunday’

One case where a /p/ in Spanish has been adopted differently is *jwentē* ‘bridge’ (< Sp. *puente* ‘bridge’) (273). This difference is likely conditioned by the presence of the following semivowel /w/, which is not found in any of the cases listed in (271). The outcome of Spanish /p/ plus /w/ in this case is the cluster /jw/, which is realized as [hɸ] before front vowels in Zenzontepec Chatino (§2.1.5.4). The /jw/ [hɸ] cluster is the typical

outcome of Spanish /f/ (§7.2.3) and also the native pronunciation of /w/ when following /j/ and preceding a front vowel (§2.1.5.4).

(273) /**jw**entē/ [**hɸ**endē] ‘puente’ < Sp. ***p****uente* ‘bridge’

7.2.2. Adaptation of Spanish bilabial /b/

In Spanish, /b/ is realized as the stop [b] only after a pause or after a nasal, and it is realized as the fricative [β] elsewhere. In Zenzontepec Chatino the marginal voiced bilabial approximant phoneme /b/ (§2.1.2.2), usually pronounced [β̞], is the closest phonetic match to both [b] and [β], and it is the sound that occurs in non-nativized loanwords (274).[31]

(274) /ú**b**ā/ [ú**β̞**ā] ‘grape’ < Sp. *u****v****a* ‘grape’
/**b**érū/ [**β̞**érū] ‘watercress’ < Sp. ***b****erro* ‘watercress’

However, Zenzontepec Chatino /b/ is a relatively new phoneme, and many loanwords that are nativized to some degree will have /w/ in place of Spanish /b/, where the /b/ in the source forms would have been realized as either [b] or [β]. Some Spanish loanwords containing /b/ whose outcome is /w/ in Zenzontepec Chatino are listed in (275).

(275) /**w**akā/ [**w**akā] ‘cow’ < Sp. ***v****aca* ‘cow’
/**w**ajā/ [**w**ahā] ‘pocket knife’ < Sp. *na****v****aja* ‘pocket knife’
/**w**asū/ [**w**asū] ‘cup’ < Sp. ***v****aso* ‘cup’

[31] Note that the difference between Spanish orthographic <b> and <v> might or might not be relevant, as those previously distinct sounds showed some signs of merger in Spanish as early as the early 13th century A.D. (Penny 2002: 97), well before Spanish arrived in the New World. However, not all dialects have undergone the merger, and those that have may have done so at different times.

/**w**otē/	[**w**otē]	‘bottle’, ‘jug’	<	Sp. ***b**ote* ‘bottle’, ‘jug’
/**w**ilū/	[**β̬**iˡʲū]	‘castrated’	<	Sp. *no**v**illo* ‘young bull’
/ser**w**anō/	[seɾ**w**anõ̞]	‘town secretary’	<	Sp. *escri**b**ano* ‘town secretary’
/li**w**rū/	[li**w**ɾū]	‘book’	<	Sp. *li**b**ro* ‘book’
/sa**w**rō/	[sa**w**ɾō]	‘Saturday’	<	Sp. *sá**b**ado* ‘Saturday’
/tri**w**ū/	[tɾi**w**ū]	‘stirrup’	<	Sp. *estri**b**o* ‘stirrup’
/ru**w**ā/	[ɾu**w**ā]	‘arroba, ~12 kg’	<	Sp. *arro**b**a* ‘25 lb. measure’

Nevertheless, some other older loanwords do have /b/ instead of /w/ (276), perhaps conditioned by the presence of the following front vowel or semivowel. Recall that /w/ is realized as [β̬] before /i/ (§2.1.5.4) in Zenzontepec Chatino, as in *witza* [β̬ɨtsa] ‘two days later’.

(276)	/**b**yernē/	[**β̬**jeɾnẽ̞]	‘Friday’	<	Sp. ***v**iernes* ‘Friday’
	/jwe**b**ē/	[hwe**β̬**ē]	‘Thursday’	<	Sp. *jue**v**es* ‘Thursday’

Some loanwords have variant forms in which an original /b/ is adapted as either /b/ or /w/ (277). In the case of *wurū* ‘donkey’ (< Sp. *burro*), some speakers leave out the initial consonant altogether, pronouncing it as [uɾū], likely influenced by the phonotactic constraint against /w/ (and /kw/) before rounded vowels (§4.3.2).

(277)	/**b**entanā/	[**β̬**endanã̞]	‘window’	<	Sp. ***v**entana* ‘window’
	~ /**w**entanā/	[**w**endanã̞]			
	/**b**aretǭ/	[**β̬**aɾetõ̞]	‘planting stick’	<	Sp. ***b**arretón* ‘planting stick’
	~ /**w**aretǭ/	[**w**aɾetõ̞]			
	/**b**urū/	[**β̬**uɾū]	‘donkey’	<	Sp. ***b**urro* ‘donkey’
	~ /**w**urū/	[**w**uɾū]			
	~ /urū/	[uɾū]			

The old loan *kwayū* ‘horse’ (< Sp. *caballo* ‘horse’) lost the vowel in the first syllable, and then later the resulting /k/ plus /w/ sequence was reanalyzed as the phoneme

/kw/ (278), perhaps encouraged by the fact that a large majority of animal names begin in /kw/ since they contain an old, now opaque, Animacy Classifier prefix *kwi-*.

(278) /**kw**ayū/ [**kʷ**ajū] ‘caballo’ < Sp. *ca**b**allo* ‘horse’

There is at least one case of deletion of /b/ in a loanword: *lirā* ‘pound (measure)’ < Sp. *libra* ‘pound (measure)’ (279). Note that the /b/ precedes /r/ in this case, an environment where /g/ is deleted in loanwords (§7.2.4). However, the case of *liwrū* ‘book’ < Sp. *libro* ‘book’ precludes making the same broader generalization for /b/. Since obstruents do not occur as the first consonant of clusters, the loss of the /b/ in *lirā* ‘pound (measure)’ makes that loanword more phonotactically nativized than *liwrū* ‘book’.

(279) /lirā/ [liɾā] ‘pound (measure)’ < Sp. *li**b**ra* ‘pound (measure)’

7.2.3. Adaptation of Spanish /f/

Zenzontepec Chatino does not have a language-wide voiceless labio-dental fricative phoneme /f/ like that of Spanish. Some (likely bilingual) individual speakers may have such a phoneme. Where /f/ was present in loanword sources, its most common outcome is what is now the cluster /j/ followed by /w/ (280). Recall that /w/ is realized as [ɸ] where following /j/ and preceding a front vowel (§2.1.5.4; §5.4.1).

(280) /**jw**résā/ [**hʍ**ɾésā] ‘strawberry’ < Sp. ***f**resa* ‘strawberry’
/**jw**estǭ/ [**hɸ**estȭ] ‘festón’ < Sp. ***f**estón* ‘garland’
/**jw**īrmá/ [**hɸ**īɾmá] ‘firma’ < Sp. ***f**irma* ‘signature’
/ka**jw**ē/ [ka**hɸ**ē] ‘coffee’ < Sp. *caf**é*** ‘coffee’

A couple of old loanwords show that Spanish /f/ may have an outcome of simply /w/, without any preceding /j/. One such example is *wiskā* [βi̯skā] ‘minister’ (281). Recall that /w/ is de-velarized before /i/ (§5.4.1).

(281) /**w**iskā/ [**β**i̯skā] ‘minister’ < Sp. ***f****iscal* ‘minister’

7.2.4. Adaptation of Spanish /g/

Parallel to /b/, the Spanish phoneme /g/ surfaces as a stop ([g]) after a pause or a nasal consonant, and it is realized as a fricative (/ɣ/) elsewhere. In most cases where /g/ is realized as a stop in Spanish, the outcome in Zenzontepec Chatino is either /k/ or the cluster /nk/ (282), where the latter achieves the phonetic voicing of the velar. Though the /nk/ outcome in Chatino is predictable if a nasal precedes the /g/ in Spanish, in other cases it is not predictable which of the two outcomes a form will have.

(282) /**k**aranyō/ [**k**aɾaɲi̯õ] ‘stallion’ < Sp. ***g****arañón* ‘stallion’
/**k**anā/ [**k**anã̄] ‘earnings’ < Sp. ***g****anar* ‘to earn’
/**k**aruchā/ [**k**aɾuʧ̯ā] ‘pike (pick)’ < Sp. ***g****arrucha* ‘pike’
/**nk**ayū/ [**ŋg**ajū] ‘rooster’ < Sp. ***g****allo* ‘rooster’
/**nk**ajnarā/ [**ŋg**ahnaɾā] ‘pomegranate’ < Sp. ***g****ranada* ‘pomegranate’
/**nk**arnī/ [**ŋg**aɾnĩ̄] ‘pouch-belt’ < Sp. ***g****arniel* ‘pouch, pouch-belt’
/**nk**arajwo̯/ [**ŋg**aɾahwȭ] ‘large jug’ < Sp. ***g****arrafón* ‘large jug’
/tumi**nk**ū/ [tumi**ŋg**ū] ‘Sunday’ < Sp. *domin****g****o* ‘Sunday’

The stop /g/ is dropped altogether in loanwords if it preceded /r/ in the Spanish source form (283).

(283) /**r**uperā/ [**ɾ**uperā] ‘crupper’ < Sp. ***gr****upera* ‘crupper’
/**r**úwā/ [**ɾ**úwā] ‘crane (machine)’ < Sp. ***gr****úa* ‘crane’

Where Spanish /g/ precedes the semivowel /w/ (or a diphthong /uV/, depending on the analysis of Spanish), it is pronounced [ɣ] or [w] in Spanish, and the outcome in Zenzontepec Chatino is just /w/ (284). This can be collapsed with the treatment of /g/ before /r/ (283) into one statement: /g/ deletes if it precedes a sonorant consonant (or semivowel onglide) in the source form.

(284)	/yu**w**ā/	[ju**w**ā]	‘mare’	< Sp. *ye**g**ua* ‘mare’
	/**w**ántē yaāʔ/	[**w**andē jaāʔ]	‘glove’	< Sp. ***g**uante* ‘glove’
	/**w**artyentē/	[**w**arʲendē]	‘booze’	< Sp. *a**g**uardiente* ‘distilled spirits’

Elsewhere when /g/ is realized as [ɣ] in Spanish, it is adapted into Zenzontepec Chatino as the semivowel /y/ (285). In the speech of some bilinguals, it may be realized as [ɣ] (e.g. [miɣū] ‘friend’), suggesting an emergent voiced velar obstruent phoneme /ɡ/ for those speakers.

(285)	/ne**y**ā/	[nẽ**j**ā]	‘measure ~100 kg’ (vol.)’	< Sp. *fane**g**a* ‘dry measure
	/mi**y**ū/	[mi**j**ū] ~ [mi**ɣ**ū]	‘friend’	< Sp. *ami**g**o* ‘friend’
	/testi**y**ū/	[testi**j**ū]	‘witness’	< Sp. *testi**g**o* ‘witness’

7.2.5. Adaptation of Spanish /d/

The Spanish stop /d/ patterns with the other voiced stops /b/ and /g/, being pronounced as an occlusive [d] after a nasal consonant or after a pause, but unlike the others, it is realized as a stop after /l/ also. Elsewhere it is realized as the fricative [ð]. Where Spanish has the allophone [d], it is typically adapted as the sequence /nt/ in Zenzontepec Chatino (286). Note that where Spanish /d/ follows /l/, either the /l/ is

elided, as in *kantū* ‘broth’ < Sp. *caldo* ‘broth’ or the /d/ is elided, as in *kalē* ‘mayor’ < Sp. *alcalde* ‘mayor’.

(286)	/**nty**ūsé/	[**nd**^{j}ūsé]	‘god’	< Sp. ***d**ios* ‘god’
	/kale**nt**ā/	[kale**nd**ā]	‘paper monkey toy’	< Sp. *cale**nd**a* ‘paper toy’
	/ma**nt**īlí/	[mã**nd**īl^{j}í]	‘apron’	< Sp. *ma**nd**il* ‘apron’
	/sa**nt**arū/	[sa**nd**aɾū]	‘soldier’	< Sp. *so**ld**ado* ‘soldier’
	/ka**nt**ū/	[ka**nd**ū]	‘soup’, ‘broth’	< Sp. *cal**d**o* ‘broth’
	/kalē/	[kalē]	‘mayor’	< Sp. *alcal**d**e* ‘mayor’

Where /d/ is realized as the fricative [ð] in Spanish, it is usually adapted into Zenzontepec Chatino as the tap /r/ (287).

(287)	/saw**r**ō/	[saw**ɾ**ō]	‘Saturday’	< Sp. *sába**d**o* ‘Saturday’
	/ka**r**enā/	[ka**ɾ**enã̄]	‘chain’	< Sp. *ca**d**ena* ‘chain’
	/ru**r**ā/	[ɾu**ɾ**ā]	‘rue (herb)’	< Sp. *ru**d**a* ‘rue’
	/nkajna**r**ā/	[ŋgahnã**ɾ**ā]	‘pomegranate’	< Sp. *grana**d**a* ‘pomegranate’
	/santa**r**ū/	[sanda**ɾ**ū]	‘soldier’	< Sp. *solda**d**o* ‘soldier’
	/se**r**ā/	[se**ɾ**ā]	‘silk’	< Sp. *se**d**a* ‘silk’

One exceptional case remains, where Spanish /d/ that is realized as [d] is adapted as /t/ in Zenzontepec Chatino (288).

(288)	/**t**uminkū/	[**t**umiŋgū]	‘Sunday’	< Sp. ***d**omingo* ‘Sunday’

7.2.6. Adaptation of Spanish sibilants

The variety of Spanish brought to Mexico was largely that of Andalusia in southern Spain, as Seville was the major hub from which colonization of the Americas was based. By around the start of the 16th century, that is, just before the conquest of Mexico, the dental and alveolar sibilants had merged in Andalusian Spanish (Penny 2002: 103), which is largely why the Spanish varieties in the Americas lack the contrast

between /θ/ and /s/ that is now characteristic of northern peninsular Spanish dialects. Typically, reflexes of the Medieval Spanish dento-alveolar and pure alveolar sibilants come into Zenzontepec Chatino as /s/ (289).

(289)	/**s**apatū/	[**s**apatū]	‘shoe’	< Sp. ***z**apato* ‘shoe’
	/**s**ewū/	[**s**ewū]	‘grease’	< Sp. ***s**ebo* ‘grease’
	/**s**etē/	[**s**etē]	‘oil’	< Sp. *a**c**eite* ‘oil’
	/**s**uwelā/	[**s**uwelā]	‘pan’	< Sp. *ca**z**uela* ‘pan’
	/pe**s**ū/	[pe**s**ū]	‘peso’	< Sp. *pe**s**o* ‘peso’
	/ko**s**ā/	[ko**s**ā]	‘thing’	< Sp. *co**s**a* ‘thing’

However, a few forms enter Chatino as palatal /x/ ([ʃ]) (290). One possible explanation for this is that these forms where borrowed from a more northern peninsular Spanish variety, where /s/ is apico-alveolar [s̻], which might have sounded closer to the Chatino palatal sibilant /x/ ([ʃ]) instead of the non-apical /s/ [s]. Another possibility is that Zenzontepec Chatino speakers borrowed *kexū* ‘cheese’ from Tataltepec Chatino speakers since in that language the /s/ would have palatalized due to the preceding /e/ (Campbell 2013: 406). Note that *maxi* ‘even if’ in (290) bears no tone, which is highly unusual for a Spanish loanword, so it may ultimately have a different origin altogether. However, since Zenzontepec /s/ palatalized before /i/, if *maxi* were borrowed from Spanish *mas* ‘but’ + *si* ‘if’ the palatal would be expected if the borrowing occurred before the palatalization change.

(290)	/ke**x**ū/	[k^{j}e**ʃ**ū]	‘cheese’	< Sp. *que**s**o* ‘cheese’
	/ma**x**i/	[ma**ʃ**i]	‘even if’	< Sp. *mas **s**i* ‘but if’

There is at least one example of Spanish /s/ whose outcome is /j/ in Zenzontepec Chatino: *limojnā* ‘alms’ < Sp. *limosna* ‘alms’ (291). The sibilant was likely weakened in

this case to fit the native phonotactics, which prohibit clusters of /s/ followed by /n/ but permit clusters of /j/ followed by a sonorant (§4.1.3.2).

(291) /limojnā/ [limohnã] ‘alms’ < Sp. *limosna* ‘alms’

As described in §2.1.3.3, the Zenzontepec Chatino sibilants /s/ and /tz/ palatalized before /i/, yielding /x/ and /ch/, respectively (see also Campbell 2013: 405). Therefore, we can determine the relative chronology between this change and the borrowing of Spanish loanwords that contained the sequence /s/ followed by /i/. Note that Spanish has had no phoneme /tz/ during its period of contact with Zenzontepec Chatino. Most relevant loanwords maintain the non-palatalized alveolar sibilant before /i/, showing that they were likely borrowed after the palatalization of sibilants had run its course (292).

(292)	/**si**ntīkú/	[**si**ndīkú]	‘public minister’	<	Sp. ***sí**ndico* ‘public minister’
	/**sí**yā/	[**sí**jā]	‘chair’	<	Sp. ***si**lla* ‘chair’
	/**si**lantrū/	[**si**landrū]	‘coriander’	<	Sp. ***ci**lantro* ‘coriander’
	/ka**si**tū/	[ka**si**tʲū]	‘small earthenware jar’	<	Sp. *ca**ci**to* ‘small pan’
	/kuru**sī**/	[kuɾu**sī**]	‘cross’	<	Sp. *cru**z*** ‘cross’

However, there is one case of a Spanish loan that shows sibilant palatalization (*xintyā* ‘strap’ < Sp. *cinta* ‘strap’), but it forms a doublet with another borrowing of the same form that lacks the palatalization (293). There are two possible explanations for the existence of the palatalized form: either the word was borrowed before the palatalization change took place and therefore underwent the change, or perhaps it was borrowed after the change but was modified to fit the general phonotactic patterns in the language, in which /s/ rarely occurs before /i/ because of the change. It may be the case that this word was borrowed twice, once before the palatalization change occurred, and once afterwards.

(293) /**xi**ntyā/ [**ʃi**ndʲā] ‘strap’, ‘belt’ < Sp. ***si****ntyā* ‘strap’
/**si**ntyā/ [**si**ndʲā] ‘strap’, ‘belt’ < Sp. ***si****ntyā* ‘strap’

The other relevant development of Spanish sibilants was the merger of the reflexes of the Medieval Spanish palatal sibilants /ʃ/ and /ʒ/ with /h/ in American Spanish, which took place in about the 17th century (Penny 2002: 103). In a couple of cases, forms that had the Spanish palatals were adopted into Chatino with the palatal fricative /x/, proving that they are relatively old loanwords borrowed before the merger had run its course in Spanish (294).

(294) /ja**x**ū/ [ha**ʃ**ū] ‘garlic’ < Sp. *aj**o*** ‘garlic’
/ti**x**erē/ [ti**ʃ**eɾē] ‘scissors’ < Sp. *ti**je**ras* ‘scissors’

Other words which had contained the Medieval Spanish palatals are adapted as Zenzontepec Chatino /j/ ([h]) (295), betraying the fact that they were borrowed after the merger of the Spanish palatals with /h/, or at least at some intermediate stage of the change during which the palatals were dorsals ([x]) before finally ending up as /h/. This layer of loanwords is larger than the older layer with palatal outcomes.

(295) /**j**webē/ [**h**weβ̤ē] ‘Thursday’ < Sp. ***j****ueves* ‘Thursday’
/**j**u**j**ulī/ [**h**u**h**ulī] ‘sesame’ < Sp. *aj**on**j**olí* ‘sesame'
/**j**ūntá/ [**h**ūndá] ‘meeting’ < Sp. ***j****unta* ‘meeting’
/ka**j**o̰/ [ka**h**õ] ‘chest of drawers’ < Sp. *caj**ón*** ‘drawer’
/te**j**ā/ [te**h**ā] ‘roof tile’ < Sp. *te**ja*** ‘tile’

7.2.7. Adaptation of the Spanish tap and trill

Both of the Spanish rhotics, the simple alveolar tap [ɾ] and the alveolar trill [r], are adapted in Zenzontepec Chatino as the tap /r/ ([ɾ]). Examples of borrowings of

Spanish forms that contained the tap are in (296), and examples that had the trill are listed in (297).

(296)	/mast**r**ū/	[mast**ɾ**ū]	‘musician’	< Sp.	*maest**r**o* ‘master’
	/to**r**ō/	[to**ɾ**ō]	‘bull’	< Sp.	*to**r**o* ‘bull’
	/let**r**ā/	[let**ɾ**ā]	‘letter (character)’	< Sp.	*let**r**a* ‘letter’
	/kwete**r**ū/	[k^{w}ete**ɾ**ū]	‘fireworks maker’	< Sp.	*cohete**r**o* ‘fireworks maker’
	/p**r**esū/	[p**ɾ**esū]	‘prisoner’	< Sp.	*p**r**eso* ‘prisoner’

(297)	/**r**usaryū/	[**ɾ**usaɾjū]	‘rosary’	< Sp.	***r**osario* ‘rosary’
	/**r**uū/	[**ɾ**uū]	‘rice’	< Sp.	*a**rr**oz* ‘rice’
	/**r**etā/	[**ɾ**etā]	‘hauling line’	< Sp.	*reata* ‘rope for hauling’
	/**r**eē/	[**ɾ**eē]	‘king’	< Sp.	***r**ey* ‘king’
	/**r**ejā/	[**ɾ**ehā]	‘type of plow’	< Sp.	***r**eja* ‘harrow’
	/ka**r**etā/	[ka**ɾ**etā]	‘cart’	< Sp.	*ca**rr**eta* ‘cart’
	/ya wapu**r**ū/	[ja wapu**ɾ**ū]	‘eucalyptus tree’	< Sp.	*(Vick’s) Vapo**R**ub*

In a couple of Spanish loans, Zenzontepec Chatino adapts the tap as the lateral /l/ (298). These are probably relatively old, reflecting a stage of the language during which the tap was even more marginal than it is now. Recall that the tap is a fairly new phoneme in the language (§2.1.3.6), while the lateral is much older and occurs more frequently in the lexicon (§2.1.3.4).

(298)	/se**l**ū/	[se**l**ū]	‘hat’	< Sp.	*sombre**r**o* ‘hat’
	/mye**l**kū/	[mje**l**kū]	‘Wednesday’	< Sp.	*mié**r**coles* ‘Wednesday’

7.2.8. Summary of adaptation of non-native consonants

As detailed in §7.2.1 through §7.2.7, loanwords from Spanish have been, and continue to be, adapted to better fit the phonology of Zenzontepec Chatino. Where Spanish phonemes have various outcomes in loanwords, it is usually due to the phonetic

environments in which the sounds occurred in the Spanish source forms. This may be due to phonological processes in Spanish (allophones) or environment-sensitive adaptation in Zenzontepec Chatino. However, since Chatino and Spanish have been in intense contact for several hundred years, loanwords have entered Zenzontepec Chatino at different historical stages. Spanish phonology has changed over this period of time, as in the shift of /ʃ/ to /h/ in most varieties of American Spanish, and this accounts for some apparent discrepancies in the outcomes of Spanish sounds. Spanish historical phonology therefore provides some insight into the stratigraphy (or relative age) of some loanwords. At the same time, Zenzontepec Chatino has undergone its own phonological changes, such as the palatalization of sibilants before /i/, and we can evaluate the relative chronology between these changes and particular borrowings. Finally, the older a loanword is, the more it will undergo further modification to better fit the native phonotactics. Figure 23 summarizes how Spanish sounds that are marginal or not present in the native sound system of Zenzontepec Chatino are adapted in loanwords. Also listed are sounds that show exceptional or unexpected varied outcomes.

Spanish	Chatino outcome	Environment	Section
/p/	/j/	p > j / __ w/ŭV	§7.2.1
	/p/	elsewhere	
/m/	/m/	all cases	§7.2.1
/b/	/w/	most partly-nativized loans	§7.2.2
	/b/	before front vowel or /y/?; recent loans	
/f/	/w/	few sporadic cases	§7.2.3
	/jw/	elsewhere	
/g/	Ø	/ __ r	§7.2.4
	/w/	/ __ w/ŭ	
	/k/ or /nk/	word-initial or after nasal (where [g] in Sp.)	
	/y/	elsewhere where [ɣ] in Sp.	
/d/	/nt/	word-initial; nd/ld > /nt/ (where [d] in Sp.)	§7.2.5
	/t/	few old loans	
	/r/	elsewhere (where [ð] in Sp.)	
/s/	/s/	most cases	§7.2.6
	/x/	a few cases (dialect loans from Tataltepec?)	
/h/	/j/ [h]	all cases	§7.2.6
/ʃ/	/x/	only a few old loans before 18th c.	§7.2.6
/ɾ/	/r/	most cases	§7.2.7
	/l/	few old loans	
/r/	/r/	all cases	§7.2.7

Figure 23. Adaptation of Spanish sounds in loanwords

7.3. Phonotactics and Spanish loanwords

Spanish and Zenzontepec Chatino have quite different phonotactic patterns, and loanwords from Spanish are adapted to better fit the native phonotactics. As with the adaptation of foreign segments, phonotactic nativization of loanword material increases

the longer it is in the language. What follows is an account of how Zenzontepec Chatino handles Spanish word-final consonants (§7.3.1), onsetless syllables (§7.3.2), long words of three or more syllables (§7.3.3), and non-native consonant clusters (§7.3.4).

7.3.1. Handling of Spanish word-final consonants

The phonotactics of Zenzontepec Chatino prohibit word-final consonants other than /ʔ/ (§4.1.2). Spanish phonotactics, however, permit several consonants in word-final position: most commonly /s/, /n/, /r/, /d/, and /l/. One strategy that Zenzontepec Chatino employs for accommodating word-final consonants in Spanish loans is to make them onsets via epenthesis of word-final vowels (299). If the vowel in the preceding syllable is a high vowel, then /i/ is inserted. Otherwise, the epenthetic vowel is /e/. The example *lonixē̱* ‘Monday’ would appear to be an exception, but high and mid nasal vowels show incipient neutralization, /i/ with /e/ and /u/ with /o/, tending towards mid vowel qualities in the absence of high tone (§3.1). Though the nasalization of the final vowel is unusual, the palatalization of the final fricative is expected if the inserted vowel were /i/.

(299)	/jēl**é**/	[hēl**é**]	‘angel’	< Sp. *ángel* ‘angel’
	/jwēs**é**/	[hwēs**é**]	‘judge’	< Sp. *juez* ‘judge’
	/kantor**ē**/	[kandoɾ**ē**]	‘singer’	< Sp. *cantor* ‘singer’
	/ntyōs**é**/	[nd^{j}ōs**é**]	‘god’	< Sp. *dios* ‘god’
	/kurus**ī**/	[kuɾus**ī**]	‘cross’	< Sp. *cruz* ‘cross’
	/mantīl**í**/	[mandīl^{j}**í**]	‘apron’	< Sp. *mandil* ‘apron’
	/mīl**í**/	[mīl^{j}**í**]	‘thousand’	< Sp. *mil* ‘thousand’
	/lonix**ē̱**/	[lonɨʃ**ẽ**]	‘Monday’	< Sp. *lunes* ‘Monday’

Another strategy for dealing with word-final consonants in Spanish loans is elision of the final consonant (300). If the final consonant in the Spanish source form was /n/, then the outcome in Zenzontepec Chatino is the corresponding nasal vowel (301).

(300)	/abrī/	[aβ̞ɾī]	'April'	< Sp. *abri**l*** 'April'
	/martē/	[maɾtē]	'Tuesday'	< Sp. *marte**s*** 'Tuesday'
	/relō/	[ɾelō]	'clock'	< Sp. *relo**j*** 'clock'
	/wiskā/	[β̞iskā]	'minister'	< Sp. *fisca**l*** 'minister'

(301)	/sakristą/	[sakɾistą]	'sexton'	< Sp. *sacrist**án*** 'sexton'
	/treę/	[tɾẽẽ̃]	'train'	< Sp. *tr**en*** 'train'
	/listyǫ/	[listʲõ̃]	'ribbon'	< Sp. *list**ón*** 'ribbon'
	/kamiyǫ/	[kamĩjõ̃]	'truck'	< Sp. *cami**ón*** 'truck'
	/pisarǫ/	[pisaɾõ̃]	'blackboard'	< Sp. *pizarr**ón*** 'blackboard'

7.3.2. Adapting loanwords with onsetless syllables

The native phonotactics of Zenzontepec Chatino strongly disprefer onsetless syllables (§4.1.3.3). In Spanish, on the other hand, there is no such restriction, and onsetless syllables are common. In Spanish loans with word-initial /a/ or /e/ the vowel is usually elided (302), and a following consonant is also deleted in a few cases (303), which may result from simplification of non-native consonant clusters. Many of the examples in (302) and (303) are ultimately of Arabic origin, beginning in /a/ or /al/, since the Arabic article *a(l)-* was borrowed with the nouns into Spanish.

(302)	/jentē/	[hendē]	'village executive'	< Sp. ***a**gente* 'village executive'
	/miyū/	[mĩjū]	'friend'	< Sp. ***a**migo* 'friend'
	/niī/	[nĩ̃]	'anise'	< Sp. ***a**nís* 'anise'
	/ruū/	[ɾuū]	'rice'	< Sp. ***a**rroz* 'rice'
	/rumusā/	[ɾumũsā]	'breakfast'	< Sp. ***a**lmuerzo* 'lunch'
	/ruwā/	[ɾuwā]	'arroba, 12 kgs'	< Sp. ***a**rroba* '25 lb. (measure)'
	/setē/	[setē]	'oil'	< Sp. ***a**ceite* 'oil'

	/sukā/	[sukā]	‘sugar’	< Sp. ***a**zúcar* ‘sugar’
	/sukwelā/	[suk^{w}elā]	‘school’	< Sp. ***e**scuela* ‘school’
(303)	/kalē/	[kalē]	‘alcalde’	< Sp. ***al**calde* ‘mayor’
	/pītyú/	[pītʲú]	‘holy spirit’	< Sp. ***es**píritu* ‘spirit’
	/triwū/	[tɾiwū]	‘stirrup’	< Sp. ***es**tribo* ‘stirrup’

The loanword *jachā* ‘axe’ is a borrowing of Spanish *hacha* ‘axe’, which begins in /a/ in modern Spanish, since the orthographic <h> is no longer pronounced (304). However, the Zenzontepec Chatino form does begin with the glottal fricative. This loanword is probably fairly old and perhaps reflects an earlier or dialectal Spanish pronunciation in which the initial /h/ had not yet been entirely lost.

(304)	/jachā/	[haʧā]	‘axe’	< Sp. *hacha* [aʧa] ‘axe’

Borrowings of Spanish forms that began in /o/ preserve the vowel in Zenzontepec Chatino, as either /o/ or /u/ (305). These provide some of the rare examples of onsetless syllables in the language, and they may alternatively be pronounced with an initial glottal stop in order to satisfy the onset preference (§4.1.3.3).

(305)	/orō/	[oɾō] ~ [ʔoɾō]	‘gold’	< Sp. ***o**ro* ‘gold’
	/orasyǭ/	[oɾasjə̃] ~ [ʔoɾasjə̃]	‘prayer’	< Sp. ***o**ración* ‘prayer’
	/untzā/	[undzā] ~ [ʔundzā]	‘ounce’	< Sp. ***o**nza* ‘ounce’

7.3.3. Long words

Aside from very old loans that show considerable phonological modification and reduction, like the examples first presented in (267), some loanwords show loss of an initial, seemingly phonotactically well-behaved CV syllable that was present in the

source form (306). The loss of such CV syllables may be motivated by pressure from the predominance of disyllabic roots in the language. However, other longer forms (e.g. *kanelā* ‘cinnamon’ < Sp. *canela* ‘cinnamon) have resisted such clipping.

(306)	/payā/	[pajā]	‘papaya’	< Sp. ***pa****paya* ‘papaya’
	/rabatū/	[ɾabatū]	‘hook’	< Sp. ***ga****rabato* ‘hook’
	/senā/	[senɐ̃]	‘dozen’	< Sp. ***do****cena* ‘dozen’
	/suwelā/	[suwelā]	‘pan’	< Sp. ***ca****zuela* ‘pan’
	/pachī/	[paʧī]	‘fermented drink’	< Sp. ***te****pache* ‘fermented drink’

7.3.4. Non-native consonant clusters

As detailed in §4.1.3.2, the native phonotactics of Zenzontepec Chatino permit only two general types of consonant clusters, which always syllabify as complex onsets. One type is a glottal consonant (/j/ or /ʔ/) followed by a sonorant consonant. The other type is a nasal consonant followed by an obstruent. Spanish, on the other hand, has a broader set of permissible consonant clusters. A syllable can begin with an oral stop followed by /ɾ/, an oral stop other than /t/ or /d/ followed by /l/, or /f/ followed by either of the two liquids. A coda may contain two consonants if the second one is /s/. Following the above stipulations for Spanish codas and onsets, there may be as many as four consonants in sequence word-medially, as in *instrumento* [i**ns.tr**u.men.to] ‘instrument’.

There are several ways in which Zenzontepec Chatino adapts loanwords whose source forms have consonant clusters that the native sound patterns do not permit. In a few cases, a vowel is inserted to break up a cluster (307). However, there is variation in the realization of these forms, and some of the common alternants contain clusters that do

not fit the native phonotactics but fit a special set of loanword phonotactic constraints (308).

(307)	/k**u**rusī/	[k**u**ɾusī]	‘cross’	< Sp. *cruz* ‘cross’
	/r**u**musā/	[ɾ**u**musā]	‘breakfast’	< Sp. *almuerzo* ‘lunch’
	/s**u**kwelā/	[s**u**k^{w}elā]	‘school’	< Sp. *escuela* ‘school’

(308)	/k**u**rusī/ ~ /krusī/ ~ /kusī/	‘cross’
	/r**u**musā/ ~ /rmusā/	‘breakfast’
	/s**u**kwelā/ ~ /skwelā/	‘school’

Another strategy for adapting loanwords with non-native clusters is deletion of one of the consonants (309). However, this strategy is not very widespread either, and some of these forms show variation, alternating with forms that even more egregiously violate the native consonant cluster phonotactic patterns. For example, *matrū* ‘musician’ (< Sp. *maestro* ‘master’) alternates with *mastrū*, which is just as common, even though it has three consonants in sequence.

(309)	/masū/	[masū]	‘tame’	< Sp. *ma**n**so* ‘tame’
	/jujulī/	[huhulī]	‘sesame’	< Sp. *ajo**n**jolí* ‘sesame’
	/kalē/	[kalē]	‘mayor’	< Sp. *a**l**cal**d**e* ‘mayor’
	/matrū/ ~ /mastrū/	[matrū]	‘musician’, ‘teacher’	< Sp. *mae**s**tro* ‘master’

The main strategy for handling non-native consonant clusters in loanwords is to simply retain them in some form, even in cases that have otherwise undergone significant nativization. There is therefore in effect an alternate phonological system for loanwords in the language. This can be viewed as a subsystem of the phonology in which the phonotactic constraints differ from those in the primary, native phonology.

One type of consonant cluster found in loanwords is /s/ or /x/, the fricatives, followed by a stop or a semivowel (310). In one case (*ma**str**ū* ‘musician’), there is an additional following liquid, making a tri-consonantal cluster (311).

(310)	/st/	/jwe**st**ǫ̨/	[hɸe**st**õ]	‘garland’	< Sp. *fe**st**ón* ‘garland’
		/li**st**ā/	[li**st**ā]	‘list’	< Sp. *li**st**a* ‘list’
	/sty/	/pa**sty**ō/	[pa**stʲ**ō]	‘animal herder’	< Sp. *pa**st**or* ‘herder’
		/li**sty**ǫ̨/	[li**stʲ**õ]	‘ribbon’	< Sp. *li**st**ón* ‘ribbon’
	/sk/	/wi**sk**ā/	[βi̯**sk**ā]	‘minister’	< Sp. *fi**sc**al* ‘minister’
	/skw/	/**skw**elā/	[**skʷ**elā]	‘school’	< Sp. *escuela* ‘school’
	/sy/	/ora**sy**ǫ̨/	[oɾa**sj**õ]	‘prayer’	< Sp. *oración* ‘prayer’
		/pala**sy**ū/	[pala**sj**ū]	‘palace’	< Sp. *palacio* ‘palace’
	/sw/	/jachā **sw**elā/	[haʃā **sw**elā]	‘type of axe’	< Sp. *hacha **su**ela* ‘axe’
	/xty/	/ma**xty**ī/	[ma**ʃtʲ**ī]	‘machete’	< Sp. *machete* ‘machete’
		/mi**xty**u/	[mi**ʃtʲ**ū]	‘cat’	< see footnote 6

(311)	/str/	/ma**str**ū/	[ma**str**ū]	‘musician’	< Sp. *mae**str**o* ‘master’

Another type of consonant cluster found in partly-nativized loanwords is a plain stop (/p/, /b/, /t/, or /k/) followed by /r/ (312). In a couple of cases, such a sequence may follow a nasal, yielding a tri-consonantal cluster (313).

(312)	/pr/	/**pr**esū/	[**pɾ**esū]	‘prisoner’	< Sp. ***pr**eso* ‘prisoner’
		/**pr**esiyentē/	[**pɾ**esijendē]	‘municipal head’	< Sp. ***pr**esidente* ‘head’
		/ʔne+**pr**estā/	[ʔnẽ**pɾ**estā]	‘lends’	< ‘do’ + Sp. ***pr**estar* ‘lend’
	/br/	/a**br**ī/	[a**bɾ**ī]	‘April’	< Sp. *A**br**il*
	/tr/	/**tr**eę̨/	[**tɾ**ẽę̃]	‘train’	< Sp. ***tr**en* ‘train’
		/**tr**iwū/	[t**ɾ**iwū]	‘stirrup’	< Sp. *es**tr**ibo* ‘stirrup’
		/le**tr**ā/	[le**tɾ**ā]	‘letter (character)’	< Sp. *le**tr**a* ‘letter’
	/kr/	/**kr**istyū/	[**kɾ**istʲū]	‘Christ’	< Sp. ***Cr**isto* ‘Christ’
		/sa**kr**istą̨/	[sa**kɾ**istą̨]	‘sexton’	< Sp. *sacrist**án*** ‘sexton’

(313)	/mpr/	/kostu**mpr**ē/	[kostu**mbɾ**ē]	‘custom’	< Sp. *costu**mbr**e* ‘custom’
	/ntr/	/sila**ntr**ū/	[sila**ndɾ**ū]	‘coriander’	< Sp. *cila**ntr**o* ‘coriander’
		/kula**ntr**ū/	[kula**ndɾ**ū]	‘coriander’	< Sp. *cula**ntr**o* ‘coriander’

In loanwords that have undergone some nativization, the tap /r/ ([ɾ]) occurs as the first consonant in clusters before sonorants (314) or before the stops /t/ or /ty/ (315).

(314)	/rm/	/jwī**rm**á/	[hɸī**ɾm**á]	‘firma’	< Sp.	*fi**rm**a* ‘signature’
	/rn/	/nka**rn**ī/	[ŋga**rn**ī]	‘pouch’	< Sp.	*ga**rn**iel* ‘pouch’
		/bye**rn**ē/	[βje**ɾn**ẽ]	‘Friday’	< Sp.	*vie**rn**es* ‘Friday’
	/rl/	/se**rl**ī/	[se**ɾl**ī]	‘traditional pants’	< Sp.	*za**r**agüe**ll**es* ‘big pants’
	/ry/	/rusa**ry**ū/	[ɾusa**ɾj**ū]	‘rosary’	< Sp.	*rosa**ri**o* ‘rosary’
		/kalenta**ry**ū/	[kalenda**ɾj**ū]	‘calendar’	< Sp.	*calenda**ri**o* ‘calendar’
	/rw/	/se**rw**anō/	[se**ɾw**anõ]	‘secretary’	< Sp.	*esc**r**i**b**ano* ‘scribe’

(315)	/rt/	/ma**rt**ē/	[ma**ɾt**ē]	‘Tuesday’	< Sp.	*ma**rt**es* ‘Tuesday’
		/sa**rt**ę̃/	[sa**ɾt**ẽ]	‘frying pan’	< Sp.	*sa**rt**én* ‘frying pan’
	/rty/	/wa**rty**entē/	[wa**ɾtʲ**endē]	‘booze’	< Sp.	*agua**rdi**ente* ‘spirits’

The remaining attested consonant clusters in loanwords are listed and exemplified in (316). They are not generalizable in terms of natural classes as straightforwardly as those above. What can be said about them is that most contain a semivowel with some other consonant, and several contain /r/, the marginal consonant that is unusually frequent in consonant clusters.

(316)	/by/	/**by**ernē/	[**βj**eɾnẽ]	‘Friday’	< Sp.	***vi**ernes* ‘Friday’
	/my/	/**my**elkū/	[**mj**elkū]	‘Wednesday’	< Sp.	***mi**ércoles* ‘Wednesday’
	/tw/	/**tw**oyā/	[**tw**ojā]	‘towel’	< Sp.	***to**alla* ‘towel’
	/wr/	/li**wr**ū/	[li**wɾ**ū]	‘book’	< Sp.	*li**br**o* ‘book’
		/sa**wr**ō/	[sa**wɾ**ō]	‘Saturday’	< Sp.	*sa**b**a**d**o* ‘Saturday’
	/jwr/	/**jwr**esā/	[**hwɾ**esā]	‘strawberry’	< Sp.	***fr**esa* ‘strawberry’
		/re**jwr**ī/	[ɾe**hwɾ**ī]	‘refridgerator’	< Sp.	*re**fr**i* ‘fridge’
	/lk/	/mye**lk**ū/	[mje**lk**ū]	‘Wednesday’	< Sp.	*mié**rc**oles* ‘Wednesday’

Aside from personal names, most of the morphologically simplex loanwords have been presented in this section, so this account of loanword consonant clusters is nearly complete. One other place to look at non-native clusters, and loanword phonology in

general, is the domain of personal names, a domain made up almost entirely of loans. Personal names are treated in depth in the following section, but the only additional consonant clusters that appear in them are listed here in (317).

(317)	/rs/	/se**rs**ū/	[se**rs**ū]	‘Celso’	< Sp. Ce**ls**o
	/wy/	/jwa**wy**ą̄/	[hwa**wj**ã]	‘Fabián’	< Sp. Fa**bi**án
	/ntzy/	/ta**ntzy**ū/	[ta**ndzj**ū]	‘Constancio’	< Sp. Consta**nci**o
		/tá**ntzy**ā/	[tá**ndzj**ā]	‘Constancia’	< Sp. Consta**nci**a

7.4. Phonology of borrowed personal names

This section continues the discussion of loanword phonology, but confined to the domain of personal names. Borrowed personal names follow much the same patterns as those of other loanwords just presented, but there are some additional details. First, §7.4.1 provides a general discussion about determining the origins of personal names and why they are particularly interesting. Second, tone patterns on borrowed names are treated in §7.4.2. After that, borrowed names are presented and discussed in groups according to which syllable bears the accent in the Spanish source forms: the dominant pattern of penultimate syllable stress (§7.4.3), final syllable stress (§7.4.4), and the marginal antepenultimate syllable stress pattern (§7.4.5). An additional purpose of the present section is to provide a extensive (though not exhaustive) documentation of the lexicon of personal names in Zenzontepec Chatino.

7.4.1. Determining origins of personal names

Personal names of Chatino etymology are rare and largely limited to the domain of playful nicknames.[32] Nearly all official personal names in Zenzontepec Chatino are ultimately of Spanish origin. They must be handled carefully in discussion of phonological adaptation of loanwords because a name may be borrowed from its full Spanish form or from one of its hypocoristic forms. Hypocoristic names are shortened and simplified versions of full names, often bearing a sense of familiarity or endearment. Some English hypocoristics are Tony for Anthony, Terry for Terrence, and Sally for Sarah. A few Spanish examples are *Nacho* for *Ignacio*, *Fina* or *Pina* for *Josefina*, *Chalo* for *Gonzalo*, and *Chana* for *Susana* (see Boyd-Bowman 1955 for an extensive study of Spanish hypocoristics). In general, the simplified phonotactics of Spanish hypocoristics brings them more in line with the native sound patterns of Zenzontepec Chatino. Therefore, personal names borrowed from hypocoristics may appear older or more nativized than they actually are.

The Zenzontepec Chatino forms of the four Spanish names just mentioned are given in (318) along with their Spanish sources.

(318)	/nasiyū/	[nãsijū]	‘Ignacio’	<	Sp. *Ignacio*, **not** from hypocoristic *Nacho*
	/jwīná/	[hɸīnʲã́]	‘Josefina’	<	Sp. *Josefina*, **or** from hyocoristic *Fina*
	/chāló/	[ʧ̃ālό]	‘Gonzalo’	<	Sp. *Chalo*, hypocoristic of *Gonzalo*
	/chanā/	[ʧ̃anã̄]	‘Susana’	<	Sp. *Chana*, hypocoristic of *Susana*

[32] Nicknames are not discussed in this grammar because of their personal and sometimes sensitive nature.

The name *nasiyū* is borrowed directly from the full name *Ignacio*. If it were from the hypocoristic *Nacho*, it would probably be *nachū* in Zenzontepec Chatino. The form *jwīná* 'Josefina' is possibly from hypocoristic *Fina*, but it could be borrowed from the full name *Josefina*, with subsequent reduction to two syllables. If it were borrowed from the hypocoristic form *Pina*, it would begin in /p/ (§7.2.1), so we can rule that out as a possible source. The name *chāló* 'Gonzalo' must have been borrowed from the hypocoristic Spanish form *Chalo* since it contains the affricate /ch/. The Spanish consonant /s/ in the name *Gonzalo* (orthographic <z> here) is never adapted as /ch/ in loanwords (§7.2.6). If the full name were borrowed, its outcome would be *kusalū*, *nkusalū*, *salū* or perhaps even *ntzalū*. Finally, it is not possible to write off the name *chāló* as a mere nonce or recent borrowing from the hypocoristic Spanish form, since it has the MH tone pattern instead of the HM tone pattern found on very recent loans and insertions (§7.1). Using the same arguments that were used to determine the source of *chāló* 'Gonzalo', it is clear that the source for *chanā* 'Susana' must have been the hypocoristic form *Chana* and not the full name *Susana*.

Another issue with hypocoristic names is that although they are formed by regular phonological processes, there are several ways, or different series of processes, for deriving them (see Lipski 1995 and references therein). As a result, some Spanish names have multiple, or even many, hypocoristic forms. For example, the name *Francisco* has at least ten: *Pancho, Pacheco, Paco, Paqui, Chico, Chicho, Kiko, Franco, Francho* and even *Frasco*. Therefore, one must take considerable care in identifying which form of a name was the source of a borrowing. The name *Francisco* is *xikū* in Zenzontepec

Chatino, whose disyllabic CVCV structure resembles a Spanish hypocoristic form, perhaps *Chico*, with the /ch/ adapted as /x/. However, /x/ is not a regular outcome of Spanish /ch/ in loanwords. The palatalized sibilant /x/ may suggest it came from something like "Sico", with regular palatalization of the /s/ before /i/ (/s/ > x / __ i [§2.1.3.3]). However, *Sico* is not one of the likely hypocoristic forms of *Francisco*. Ultimately, the source of *xikū* was probably the full name *Francisco*, since *xikū* would be a likely outcome of the final two syllables *cisco*.

Since a Spanish name may have multiple hypocoristic forms in addition to its full form, it is not surprising that some Spanish names have multiple outcomes in Zenzontepec Chatino. For example, there are two distinct forms for the name *Isabel* that have been borrowed into the language: *chabē* and *xawē* (319). The former is borrowed from the hypocoristic *Chabe*, while the latter does not appear to be from any hypocoristic form since it lacks the expected /ch/ in place of the /s/. If it were borrowed from the full form *Isabel*, then it would probably be *sawē* or *sabē* instead of *xawē*, since there is no /i/ following the /s/ that could palatalize it. However, in Coastal Chatino (i.e. all other Chatino varieties), the sibilants /s/ and /tz/ are palatalized by a *preceding* /i/ (Campbell 2013: 404). Therefore, the form *xawē* 'Isabel' might be borrowed from another Chatino language. Another possibility is that the name underwent a sporadic palatalization change particular to that form, or perhaps a sporadic de-affrication change of *ch* > *x*, if it were in fact from the hypocoristic form. Therefore, there is some uncertainty in determining the immediate origin of the name *xawē* 'Isabel'.

(319) /chabē/ [ʧaβ̞ē] ‘Isabel’ < Sp. *chabe(la)*, hypocoristic of *Isabel*
/xawē/ [ʃawē] ‘Isabel’ < possibly from another Chatino language

It is fairly common for Spanish names, like *Isabel*, to have multiple outcomes in Zenzontepec Chatino. This may come about if the name has been borrowed more than once from variant Spanish forms of the name, or if a single form has been borrowed more than once at different times. In the latter case, the older borrowing may be more nativized. A few further examples of names with multiple forms in Zenzontepec Chatino are listed in (320).

(320)	/ntānyó/	/ntōǫ́/	/nyoǭ/	‘Antonio’
	/chu māsú/	/ntámā/		‘Dámaso’
	/kikē/	/rūké/	/rikē/	‘Enrique’
	/mateyū/	/tyeyū/		‘Mateo’
	/ōlí/	/wīlá/		‘Olivia’
	/tyūú/	/pēyú/		‘Pedro’
	/kirīná/	/kīná/		‘Quirina’
	/énā/	/rijinā/		‘Regina’
	/lenchū/	/nchulē/		‘Leonardo’

Among the variant forms for the name *Lorenzo* in the final example in (320), the source of *lenchū* is *Lencho*, a hypocoristic form of *Lorenzo*. The name *lenchū* in reversed speech (§5.9) would be *nchúle*. Though the tone is not as expected, this reversed speech form is the only imaginable source of the Chatino name *nchulē*, and therefore, reversed speech of borrowed Spanish hypocoristics is an additional possible source of personal names. The tone pattern may have changed on analogy to the predominant loanword tone pattern (ØM) (§7.1).

Though the exact sources of many names, such as *nasiyū*, *jwīná*, *chāló*, *chanā*, *xikū* and *chabē*, can be confidently determined, many personal names in Zenzontepec

Chatino are more like *xawē* ‘Isabel’ and not so easily traceable. That is, they bear some resemblance to the Spanish name or one or more of its common hypocoristic forms, but it is no longer determinable which form of the name was the immediate source of the borrowing. Many appear to have undergone some sporadic or non-transparent phonological modification (321).

(321)	/chūkwá/	[ʧ̟ūkʷá]	‘Pascual’	/lyōjó/	[lʲōhó]	‘Rodolfo’
	/jlawū/	[hlawū]	‘Lasislao’	/lyonē/	[lʲonẽ̞]	‘Cornelio’
	/jwiryē/	[hɸiɾjē]	‘Fidel’	/matéyā/	[mãtéjā]	‘Dorotea’
	/kāyú/	[kājú]	‘Arcadio’	/mōó/	[mõ̞ő̞]	‘Guillermo’
	/kojnē/	[kojnẽ̞	‘Cosme’	/nixę̄/	[nĩʃẽ̞]	‘Ginés’
	/kyēlú/	[kʲēlú]	‘Marcelo’	/ntōǫ́/	[ndõ̞ő̞]	‘Antonio’
	/lējú/	[lēhú]	‘Alejandro’	/pājlá/	[pāhlá]	‘Paula’
	/lyākú/	[lʲākú]	‘Heraclio’	/wíyū/	[β̞ʲíjū]	‘Maclovio’

Still other Zenzontepec Chatino names bear even less resemblance to their corresponding Spanish names and their hypocoristic forms (322). In particular, *miī* ‘Tomás’, *ooʔ* ‘Nabor’, and *yuʔū* ‘Margarito’ are so different from the Spanish forms that one wonders if they might have previously been Chatino nicknames of individuals that somehow shifted to be used for the name generally. It is doubtful that they reflect somehow preserved ancient Chatino personal names, because in pre-contact times, people were named after the day on which they were born, according to the appropriate version of the pre-Colombian Mesoamerican ritual calendar. Most day names were names of animals (e.g. caiman, deer) or natural forces (e.g. wind, earthquake).[33] If the unusual

[33] For the day names in colonial Northern Zapotec see Justeson & Tavarez 2010: 18.

personal names in (322) were old day names, then some would perhaps be recognizable as such.

(322)	/chayī/	[ʧajī]	‘Eleazar’	/nyayū/	[nʲãjū]	‘Leobardo’, ‘Leonardo’
	/lyeē/	[lʲeē]	‘Feliciano’	/ooʔ/	[ooʔ]	‘Nabor’
	/miī/	[mĩ̃]	‘Tomás’	/tyūú/	[tʲūú]	‘Pedro’
	/miyū/	[mijū]	‘Pascual’	/yuʔū/	[juʔū]	‘Margarito’

Since there are multiple productive, or semi-productive, processes for forming hypocoristics in Spanish, and since outcomes of borrowed names may be quite idiosyncratic, the forms of personal names in Zenzontepec Chatino may correspond to multiple Spanish names or may have multiple Spanish sources. That is, Spanish names may end up homophonous when borrowed into Zenzontepec Chatino. Some examples are given in (323).

(323)	/chāyú/	Isaías, Cesáreo	/mēlá/	Imelda, Camelia, Carmen
	/chimī/	Benjamín, Fermín	/minā/	Nina, Luminada
	/chīná/	Lucina, Virginia	/tānú/	Avertano, Cayetano
	/létū/	Cleto, Modesto	/tīnú/	Faustino, Justino
	/līntá/	Florida, Florentina, Hermelinda	/walō/	Eduardo, Álvaro
	/linū/	Bernardino, Marcelino, Saturnino	/weē/	Manuel, Abel
	/lólō/	Heliodoro, Teodoro	/yōlá/	Yolanda, Viola
	/meē/	Samuel, Salomé		

7.4.2. Tone patterns on borrowed personal names

In light of the fact that quite distinct Spanish names may wind up homophonous in Zenzontepec Chatino, it is interesting that homophonous hypocoristic forms from multiple Spanish names may be adopted in Zenzontepec as non-homonyms with distinct tone patterns (324).

(324)	/chelā/	[ʧelā]	‘Marcela’	< Sp. ***Chela*** < *Marcela*
	/chēlá/	[ʧ̃elá]	‘Gisela’	< Sp. ***Chela*** < *Gisela*
	/chenchū/	[ʧenʲʧū]	‘Crecencio’	< Sp. ***Chencho*** < *Crecencio*
	/chénchū/	[ʧénʲʧū]	‘Vicencio’	< Sp. ***Chencho*** < *Vicencio*
	/lāyá/	[lājá]	‘Hilaria’	< Sp. ***Laya*** < *Hilaria*
	/láyā/	[lájā]	‘Adelaida’	< Sp. ***Laya*** < *Adelaida*
	/nētá/	[nẽtá]	‘Ernesta’	< Sp. ***Neta*** < *Ernesta*
	/nétā/	[nẽtā]	‘Ernestina’	< Sp. ***Neta*** < *Ernestina*

The tonal (near-)minimal pairs in (324) that derive from homophonous Spanish forms reflect the fact that tone patterns on borrowed personal names, just as other loanwords, are not fully predictable. However, the range of possible tone patterns is limited, and it is the same as that found on regular loanwords: ØM (most common), MH (second most common), and HM (recent loans) (see §7.1 for tone on other Spanish loans). One difference between personal names and other loanwords is that the frequency of occurrence of the MH tone pattern is greater in names than it is in other loans. A particularly high proportion of female names have the MH tone pattern. The pairs of female versus male names in (325) reflect this. The Spanish source forms in most of these pairs differ solely in their final vowels, usually *-a* for feminine and *-o* for masculine. In each of these cases, the female name has the MH tone pattern, while the male name has either the ØM or HM tone pattern.

(325)	/lētá/	[lētá]	‘Modesta’	< Sp. *Leta* < *Modesta*
	/létū/	[létū]	‘Modesto’	< Sp. *Leto* < *Modesto*
	/chēnchá/	[ʧ̃enʲʤá]	‘Conciencia’, ‘Inocencia’	< Sp. *Chencha*
	/chenchū/	[ʧenʲʤū]	‘Crecencio’, ‘Inocencio’	< Sp. *Chencho*

/līpá/	[līpá]	‘Felipa’	< Sp. *Felipa*
/lipē/	[lipē]	‘Felipe’	< Sp. *Felipe*
/māntá/	[mə̃ndá]	‘Amanda’	< Sp. *Amanda*
/mantū/	[mãndū]	‘Armando’	< Sp. *Armando*
/xīká/	[ʃīká]	‘Francisca’	< Sp. *Francisca*
/xikū/	[ʃíkū]	‘Francisco’	< Sp. *Francisco*

Despite the higher frequency of the MH tone pattern on female names, pairs such as the one in (326) show that the reverse can be the case, with the male name bearing the MH tone pattern and the female name bearing another tone pattern. Note that there is a stress difference as well between the Spanish female and male source names in this case. However, placement of Spanish stress is not a strong predictor of the tone pattern of a loan, as will be discussed shortly.

(326)	/jwanyā/	[hwanʲə̃]	‘Epifanía’	< Sp. *Epifanía*
	/jwānyó/	[hwānʲõ]	‘Epifanio’	< Sp. *Epifanio*

The pairs in (327) are borrowed from Spanish female/male name pairs that differ only minimally as well, but both names in each pair have the same tone pattern.

(327)	/jēnyá/	[hēnʲə̃]	‘Eugenia’, ‘Higenia’	< Sp. *Geña* < *Eugenia*
	/jēnyú/	[hēnʲũ]	‘Eugenio’	< Sp. *Geño* < *Eugenio*
	/chēntá/	[ʧə̃ndá]	‘Vicenta’	< Sp. *Chenta* < *Vicenta*
	/chēntú/	[ʧə̃ndú]	‘Rosendo’	< Sp. *Chendo* < *Rosendo*
	/linā/	[linʲə̃]	‘Marcelina’	< Sp. *Marcelina, Chelina*
	/linū/	[linʲũ]	‘Marcelino’	< Sp. *Marcelino, Chelino*

Therefore, though there is some correlation between the tone patterns on personal names and the gender of their Spanish source forms, the tone patterns on borrowed names

remain fairly unpredictable. Table 14 provides a quantitative picture of this, showing that 53% of female names (62 out of the 117 that I have so far documented) have the MH tone pattern, while only 22% have the ØM tone pattern, which is typically the most frequent on Spanish loans (§7.1). In contrast, only 34% of male names bear the MH tone pattern, while 47%, a plurality (118 out of 250), bear the ØM tone pattern. There are also a few male names that bear no tone, which is very uncommon for Spanish loans.

Table 14. Tone pattern frequencies in personal names

	Female names		Male names	
Tone	number	percentage	number	percentage
ØM	26	22%	118	**47%**
MH	62	**53%**	84	34%
HM	29	25%	44	18%
ØØ	0	0%	4	2%
Total	117		250	

Cruz (2011) finds that in San Juan Quiahije (Eastern) Chatino, tone patterns on borrowed Spanish names show a fairly strong correlation with position of stress in the Spanish source forms. This is not the case in Zenzontepec Chatino, as illustrated above in the examples in (325), which all have penultimate stress in Spanish. A further look at borrowed names whose sources were full Spanish names with penultimate syllable stress, the majority stress pattern in Spanish, further illustrates the point. Many of these names in Zenzontepec Chatino have the ØM tone pattern (328), but almost as many have the MH

tone pattern (329). Finally, a lower but significant number have the HM tone pattern (330).

(328) Spanish names with penult stress adapted with ØM tone pattern

/anā/	‘Ana’	< Sp.	*Ana*	/minkū/	‘Domingo’	< Sp.	*Domingo*
/jontzō/	‘Alfonso’	< Sp.	*Alfonso*	/mirū/	‘Ramiro’	< Sp.	*Ramiro*
/jwanā/	‘Juana’	< Sp.	*Juana*	/nkayū/	‘Olegario’	< Sp.	*Olegario*
/jwasiyū/	‘Bonifacio’	< Sp.	*Bonifacio*	/rijinā/	‘Regina’	< Sp.	*Regina*
/jwinyū/	‘Delfino’	< Sp.	*Delfino*	/rosā/	‘Rosa’	< Sp.	*Rosa*
/jwiryū/	‘Porfirio’	< Sp.	*Porfirio*	/sentē/	‘Vicente’	< Sp.	*Vicente*
/kulasā/	‘Nicolasa’	< Sp.	*Nicolasa*	/sirū/	‘Isidro’	< Sp.	*Isidro*
/kuriyū/	‘Gregorio’	< Sp.	*Gregorio*	/telā/	‘Estela’	< Sp.	*Estela*
/kuntū/	‘Facundo’	< Sp.	*Facundo*	/temyū/	‘Artemio’	< Sp.	*Artemio*
/luwisā/	‘Luísa’	< Sp.	*Luisa*	/teresā/	‘Teresa’	< Sp.	*Teresa*
/mariyā/	‘María’	< Sp.	*María*	/tyawū/	‘Santiago’	< Sp.	*Santiago*
/markū/	‘Marcos’	< Sp.	*Marcos*	/tyewā/	‘Esteban’	< Sp.	*Esteban*
/marū/	‘Mario’	< Sp.	*Mario*	/tyeyū/	‘Mateo’	< Sp.	*Mateo*
/mateyū/	‘Mateo’	< Sp.	*Mateo*	/xanū/	‘Luciano’	< Sp.	*Luciano*

(329) Spanish names with penult stress adapted with MH tone pattern

/ēbá/	‘Eva’	< Sp.	*Eva*	/mīlú/	‘Emilio’	< Sp.	*Emilio*
/jnyārú/	‘Genaro’	< Sp.	*Genaro*	/nkawīnú/	‘Gabino’	< Sp.	*Gabino*
/julīyá/	‘Julia’	< Sp.	*Julia*	/ntūnyá/	‘Antonia’	< Sp.	*Antonia*
/jūtá/	‘Justa’	< Sp.	*Justa*	/pālyú/	‘Pablo’	< Sp.	*Pablo*
/jwīrá/	‘Freda’	< Sp.	*Freda*	/pīyú/	‘Pompilio’	< Sp.	*Pompilio*
/kāyá/	‘Leocadia’	< Sp.	*Leocadia*	/talīyá/	‘Natalia’	< Sp.	*Natalia*
/klārá/	‘Clara’	< Sp.	*Clara*	/welīyá/	‘Aurelia’	< Sp.	*Aurelia*
/kāpó/	‘Policarpo’	< Sp.	*Policarpo*	/wīná/	‘Alvina’	< Sp.	*Alvina*
/lusīyá/	‘Lucía’	< Sp.	*Lucía*	/wītá/	‘Jovita’	< Sp.	*Jovita*
/marīnú/	‘Marino’	< Sp.	*Marino*	/wīyú/	‘Liberio’	< Sp.	*Liberio*
/mārá/	‘Maura’	< Sp.	*Maura*	/wūntyú/	‘Abundio’	< Sp.	*Abundio*
/milānú/	‘Emiliano’	< Sp.	*Emiliano*				

(330) Spanish names with penult stress adapted with HM tone pattern

/chintéyū/	‘Desiderio’	< Sp.	*Desiderio*	/míyą́/	‘Herminia’	< Sp.	*Herminia*
/énā/	‘Reina’	< Sp.	*Reina*	/tyówā/	‘Cristóbal’	< Sp.	*Cristóbal*
/mátā/	‘Marta’	< Sp.	*Marta*	/únā/	‘Bruna’	< Sp.	*Bruna*

7.4.3. Borrowed Spanish names with penultimate syllable stress

As mentioned above, in Spanish the majority of personal names have stress on the penultimate syllable. Many examples of Zenzontepec Chatino personal names borrowed from full form Spanish names with penultimate stress are listed in (328), (329), and (330) in §7.4.2. In a few cases, names with penultimate stress are reduced to single syllables in Zenzontepec Chatino, and somewhat surprisingly, the unstressed final syllable is preserved (331).

(331)

/mēé/	[mə̃e̋]	‘Jaime’	< Sp. *Jaime*
/mōó/	[mə̃ő]	‘Guillermo’	< Sp. *Memo* (hypocoristic) or *Guillermo*?
/ntyuū/	[nd^{j}uū]	‘Jacinto’	< Sp. *Jacinto*
/nyoǭ/	[n^{j}õə̃]	‘Antonio’	< Sp. *Antonio*

Zenzontepec Chatino has adopted some Spanish names with penultimate syllable stress from hypocoristic forms that are based solely on the initial two syllables, which may or may not include the stressed syllable (332). All three of the main loanword tone patterns are found in this group.

(332)

/cháwī/	< Sp. *Chavi* < *Sabina*	/rīká/	< Sp. *Rika* < *Ricarda*
/jwīlí/	< Sp. *Fili* < *Filiberto*	/sélē/	< Sp. *Cele* < *Celerina*
/kāró/	< Sp. *Caro* < *Carolina*	/tīmú/	< Sp. *Timo* < *Timoteo*
/kātá/	< Sp. *Cata* < *Catalina*	/walē/	< Sp. *Vale* < *Valentina*
/márī/	< Sp. *Mari* < *Marina*	/wiwī/	< Sp. *Vivi* < *Viviana*
/mīká/	< Sp. *Mika* < *Micaela*		

A large number of personal names are borrowed from hypocoristic forms that are based on the final two syllables of Spanish names with penultimate syllable stress (333). The three tone patterns (ØM, MH, and HM) are all well represented in this set as well.

(333)

/bétā/	< Sp. *Beta* < *Alberta*		/lōlá/	< Sp. *Lola* < *Teodora*
/búchā/	< Sp. *Bucha* < *Tiburcia*		/lūpé/	< Sp. *Lupe* < *Guadalupe*
/chábā/	< Sp. *Chaba* < *Rosaura*		/menchē/	< Sp. *Menche* < *Ubense*
/chekū/	< Sp. *Checo* < *Sergio*		/mēntyé/	< Sp. *Mente* < *Clemente*
/chélī/	< Sp. *Cheli* < *Araceli*		/nālú/	< Sp. *Nado* < *Leonardo*
/chēmú/	< Sp. *Chemo* < *Anselmo*		/nantū/	< Sp. *Nando* < *Fernando*
/jantā/	< Sp. *Janda* < *Alejandra*		/nētú/	< Sp. *Neto* < *Ernesto*
/jwáchā/	< Sp. *Pacha* < *Eufrasia*		/nkōyá/	< Sp. *Goya* < *Gregoria*
/kachū/	< Sp. *Kacho* < *Acacio*		/nkóyū/	< Sp. *Goyo* < *Ligorio*
/kikē/	< Sp. *Kike* < *Enrique*		/pīpį́/	< Sp. *Pipín* < *Crispín*
/lāló/	< Sp. *Lalo* < *Gerardo*		/rātú/	< Sp. *Rato* < *Erasto*
/lānchá/	< Sp. *Lancha* < *Esperanza*		/tāchú/	< Sp. *Tacho* < *Pascacio*
/lélā/	< Sp. *Lela* < *Adela*		/tichū/	< Sp. *Ticho* < *Patricio*
/lenā/	< Sp. *Lena* < *Magdalena*		/tinā/	< Sp. *Tina* < *Cristina*
/lētá/	< Sp. *Leta* < *Modesta*		/tōyá/	< Sp. *Toya* < *Victoria*
/līchá/	< Sp. *Licha* < *Alicia*		/úchū/	< Sp. *Bucho* < *Tiburcio*
/līkú/	< Sp. *Lico* < *Federico*		/wetū/	< Sp. *Beto* < *Roberto*

A few Spanish names with penultimate syllable stress in their full forms have fairly idiosyncratic outcomes in Zenzontepec Chatino. Some of these do not appear to be borrowed from the full Spanish names or any common hypocoristic forms of them. Several are based on disyllabic hypocoristic forms whose two syllables do not include either the initial syllable or the final syllable of the full name.

(334)

/pātí/	[pātí]	'Patricio'	< Sp. *Pati* (?)	
/jūlí/	[hūlí]	'Julio'	< Sp. *Julio*	
/kīlí/	[kīlʲí]	'Aquilino'	< Sp. *Kili* > *Aquilino*	
/kōpí/	[kōpí]	'Procopio'	< Sp. *Copi?* < *Procopio*	
/mímī/	[mĩ́mĩ̃]	'Emiliana'	< Sp. *Mimi* < *Emiliana*	
/tūná/	[tūnã́]	'Fortunata'	< Sp. *Tuna* < *Fortunata*	
/winā/	[βi̯nʲã̄]	'Virginia'	< Sp. *Gina?* < *Virginia*	

7.4.4. Borrowed Spanish names with final syllable stress

Spanish personal names with final syllable stress are much less numerous than those with penultimate syllable stress, but there are many examples nonetheless.

Monosyllabic names, which are rare, can be considered among these. They remain monosyllabic when borrowed into Zenzontepec Chatino (335).

(335) /jwaā/ [hwaā] ‘Juan’ < Sp. *Juan*
/jwaʔ/ [hwaʔ] ‘Juan’ < Sp. *Juan*
/wiī/ [β̥iī] ‘Luis’ < Sp. *Luis*

Full form polysyllabic Spanish personal names with final syllable stress are adapted into Zenzontepec Chatino with various tone patterns, just like those with penultimate syllable stress. However, a larger proportion bear the ØM tone pattern (336) relative to the MH tone pattern (337), and a handful have the HM tone pattern (338).

(336) Spanish names with final stress adapted with ØM tone pattern

/jusē/	<	Sp. *Moisés*	/mechō/	<	Sp. *Melchor*
/kanū/	<	Sp. *Nicanor*	/mikē/	<	Sp. *Miguel*
/kulā/	<	Sp. *Nicolás*	/rawū/	<	Sp. *Raúl*
/kusē/	<	Sp. *José*	/tomā/	<	Sp. *Tomás*
/malū/	<	Sp. *Amador*	/witū/	<	Sp. *Victor*

(337) Spanish names with final stress adapted with MH tone pattern

/pātyó/	<	Sp. *Pastor*	/wīrá/	<	Sp. *Vidal*

(338) Spanish names with final stress adapted with HM tone pattern

/nábō/	<	Sp. *Nabor*	/ntáwī/	<	Sp. *David*
/nkáwī/	<	Sp. *Gabriel*	/rákē/	<	Sp. *Raquel*

If the final stressed syllable of the full Spanish name contains the diphthong /ia/, it is broken into two syllables and bears the ØM tone pattern (339).

(339) /juliyą̄/ < Sp. *Julián* /riyą̄/ < Sp. *Adrián*
/masiyā/ < Sp. *Marcial* /tiyą̄/ < Sp. *Sebastián*

For a couple of Spanish names with final syllable stress, hypocoristic forms based on the final one or two syllables are the source of the borrowing (340).

(340) /chaā/ 'Isaac' < Sp. hypocoristic *Cha* < *Isaac*?
/cheē/ 'José' < Sp. *Che* < *José*
/chimī/ 'Benjamín' < Sp. *Chemín* < *Benjamín*
/chuchū/ 'Jesús' < Sp. *Chucho* < *Jesús*

A handful of polysyllabic Spanish names with final syllable stress are reduced to single syllables in Zenzontepec Chatino even though the full Spanish name is the source of the loan. In these cases, the final, stressed syllable is the one that is preserved, having a long vowel in the adopted form (341). These all bear the ØM tone pattern.

(341) /jwreę̄/ < Sp. *Efrén* /moō/ < Sp. *Salomón*
/kiį̄/ < Sp. *Joaquín* /ntreē/ < Sp. *Andrés*
/loǭ/ < Sp. *Odilón* /weē/ < Sp. *Manuel*
/meē/ < Sp. *Salomé*

A few trisyllabic or quadrisyllabic Spanish names with final syllable stress are borrowed from two of the unstressed syllables, either from a hypocoristic form, as in *chábā* 'Salvador' and *pōlyį́* 'Apolinar', or from mere apocope of the stressed syllable, which probably occurred in the Spanish source forms (342).

(342) /chábā/ < Sp. *Chava* < *Salvador* /rājwé/ < Sp. *Rafe* < *Rafael*
/pōlyį́/ < Sp. *Polín* < *Apolinar* /rējwé/ < Sp. *Rafe* < *Rafael*
/bálē/ < Sp. *Vale* < *Valentín* /sébā/ < Sp. *Seba* < *Sebastián*
/mísā/ < Sp. *Misa* < *Misael*

7.4.5. Borrowed Spanish names with antepenultimate syllable stress

Relatively few Spanish names have antepenultimate syllable stress. Some names borrowed from full form Spanish names with that stress pattern are listed in (343). Most of them involve the loss of some syllable, which may be pre-tonic, post-tonic, or even the tonic syllable, in the case of *sarō* < Sp. *Lázaro*.

(343)

/jeronī/	<	Sp. *Jerónimo*	/sarō/	<	Sp. *Lázaro*
/masimū/	<	Sp. *Onésimo*	/sikyū/	<	Sp. *Ezíquio*
/pājló/	<	Sp. *Pánfilo*	/tējwá/	<	Sp. *Estéfana*
/pulītú/	<	Sp. *Hipólito*			

A few examples of names borrowed from hypocoristic forms of Spanish names with antepenultimate syllable stress are in (344). In all of these cases, the Zenzontepec Chatino name is disyllabic.

(344)

/chāyú/	<	Sp. *Chayo* < *Cesáreo*	/ntámā/	<	Sp. *Dama* < *Dámaso*
/chekē/	<	Sp. *Cheque* < *Ezéquiel*	/wíkī/	<	Sp. *Viki* < *Brígida*

In sum, personal names in Zenzontepec Chatino are almost all borrowed from Spanish, and the Spanish source forms may be either full names or their hypocoristic forms, which in at least one case may be lexicalized after undergoing the process of reversed speech. Because of the diversity and productivity of Spanish hypocoristic strategies, identifying the immediate source of a borrowed name is sometimes difficult. Even after the precise form of a Spanish name that was the source of a borrowing is identified, some of the details of the phonological adaptation of the loan are not fully predictable. In some cases segmental modifications are idiosyncratic, and the tone pattern

on a borrowed name is not predictable, not even based on the placement of stress or the syllable count in the Spanish source form.

Chapter 8

Phonology of sound symbolism

This chapter outlines the basics of sound symbolism in Zenzontepec Chatino and how the phonology of sound symbolism differs from the standard phonology presented in Chapter 2 through Chapter 5. Sound symbolism, as defined by Hinton et al. (1994b: 1), is "the direct linkage between sound and meaning". It is therefore a problem for Saussure's notion that the connection between a linguistic sign and what it signifies is arbitrary, a principle that is widely held to be a basic and defining feature of human language. Nevertheless, though sound symbolism poses some challenge to arbitrariness, many examples of it still involve some degree of conventionalization. If this were not so, we would not expect to find significant differences across languages for something such as a rooster's call, which is "cock-a-doodle-doo" in English, *quiquiriquí* in Spanish, and *ntetēré joʔo* in Zenzontepec Chatino. It is now known that sound symbolism is cross-linguistically very common, and it has received increasing attention in the literature (Hinton et al. 1994a; Nuckolls 1999). A well known feature of sound symbolism is that it

need not follow a language's standard phonology, and therefore one can identify an alternate phonology, or sub-phonology, particular to sound symbolic material.

Hinton et al. (1994) distinguish between four types of sound symbolism: corporeal, imitative, synesthetic, and conventional. The first, which includes coughs, screams, and laughter, is not treated here. The other types are all present to varying degrees in Zenzontepec Chatino. Imitative sound symbolism, the most elaborated, is discussed in §8.1 and organized upon the useful distinction between "wild" versus "tame" imitation (Rhodes 1994). Some imitative sound symbolic forms have become lexicalized as terms that no longer refer only to sounds but to the things that produce those sounds (§8.2). Synesthetic sound symbolism is not an elaborated domain in Zenzontepec Chatino, but a few notable examples have been identified in texts (§8.3). Only one clear example of conventional sound symbolism (a phonestheme) has been found, and it is discussed in §8.4 (see also §2.1.2.1). The chapter concludes with a brief discussion of how sound symbolic material is incorporated into the grammar (§8.5).

8.1. Imitative sound symbolic material

Imitative sound symbolism includes onomatopoeic forms such as *meow*, *thud*, and *choo choo train*. The difference between the actual sound and the linguistic representation may range from very little to quite a lot. Where imitation is more realistic the forms may diverge significantly from the basic phonology in order to more closely reflect the actual sounds. Where imitation is less realistic the sound symbolic material may better conform to the standard phonology. This difference is referred to as wild

versus tame sound symbolism (Rhodes 1994). Particular focus is placed on tame sound symbolism here, though a few examples of wild sound symbolism are provided first.

8.1.1. Wild imitative sound symbolism

Wild imitative sound symbolic material includes forms that are only minimally adapted to the native phonology and significantly deviate from it. In general, this material is more directly imitative. In Zenzontepec Chatino wild sound symbolism, voiceless vowels and vowels of non-native qualities are frequent, along with non-native or extra-long consonants (345).

(345)	[ʧ̥ u̥ ʧ̥ u̥ ʧ̥ u̥]	‘sound of searching for something among papers’
	[ʦ̥ɪ̥ʔ ʦ̥ɪ̥ʔ ʦ̥ɪ̥ʔ]	‘sound of the leafcutter ant’
	[hɸ́í ʔí ʔí ʔí ʔí]	‘sound a stallion makes when it sees a mare’
	[mbəʔ mbəʔ mbəʔ]	‘sound billy goat makes when chasing nanny goats’
	[jə jə jə]	‘sound of hen before laying an egg’
	[fru fru fru̥ fru̥]	‘sound of a butterfly flying’
	[bɾouum: :: ::]	‘sound of thunder’
	[tiiŋ ʃ: :: tiiŋ ʃ: ::]	‘sound of washing dishes’
	[dɾ̥ɪ̥ŋ]	‘sound of telephone ringing’
	[tɾiín: :: bǫʔ]	‘sound of metal hitting metal’
	[bɾóō̥ bɾóō̥]	‘sound of closing a door’
	[kʁ̥ʔ kʁ̥ʔ]	‘sound of drowning’
	[ru̥ ru̥ ru̥]	‘sound of sawing’
	[sáā ::]	‘sound of splash when something drops into water’
	[ʁáāʔ ʁáāʔ]	‘sound of raccoon’
	[ʔī́ʔ ʔī́ʔ]	‘sound made by mule about to kick’
	[kərə jloʔ kərə jloʔ]	‘sound of water boiling’

A handful of wild imitative sound symbolic forms include click consonants that tend to occur without surrounding vowels, making them highly non-native sounding. Some of these forms are used for imitating multiple sounds.

(346) a. [t| t| t| t|] ‘sound of a puppy nursing’;
‘sound of a gecko’;
‘sound made by beetle in water when grabbed’;
‘sound of crawfish when it lets out foam’

[t| t|] ‘sound of gutting a tomato’

c. [t|] ‘sound of spitting’;
‘sound meaning “hurry up!”’

d. [j! j! j! j!] ‘sound of dog drinking water’

e. [ty| ty| ty|] ‘sound of a pig eating’

These few examples serve to provide a glimpse of what wild sound symbolism is like in Zenzontepec Chatino, but more work is needed to determine the degree of conventionalization of such forms.

8.1.2. Tame imitative sound symbolism

Tame imitative sound symbolism differs from the wild type in that it more closely fits the native sound patterns of the language. Forms with non-native sounds or atypical distributions of native sounds are considered tame sound symbolism if they otherwise more or less fit the native phonology. In Zenzontepec Chatino, there are several general word shapes, or templates, that are frequently used in tame sound symbolic forms, and these will be presented here, followed by other types of tame sound symbolic material.

Many forms referring to hitting or pounding fit into a general word template of *(n)tV?*. It is the varying vowel quality that reflects, to some extent, the composition of the material that is struck. If the contacted surface is wood, or the ground in one case, then

the vowel is /o/ (347), and in others cases where the surface is the ground, or cement, the vowel is /u/ (348). Another example that has /u/ is the sound of a beating heart.

(347)	a.	*toʔ*	[toʔ]	‘sound of hitting wood or a bucket’; ‘sound of knocking on a door’; ‘sound of calf's feces hitting ground’ (not wood)
	b.	*toʔ riʔ*	[toʔ ɾiʔ]	‘sound of splitting a board or firewood with an axe’
(348)	a.	*tuʔ*	[tuʔ]	‘sound of hitting ground/cement with fist or tool’; ‘sound of a mango hitting the ground’
	b.	*tuʔ tuʔ tuʔ*	[tuʔ tuʔ tuʔ]	‘sound of children running’; ‘sound of frightened person's heart’ (not ground)

If the surface that is struck is metal or stone, then the vowel is often /a/ (349). Note that in this case, as in the cases above in (347) and (348), the form bears no tone and will assume a high pitch if a spreading H tone happens to precede it (§3.4.1). This fact provides strong evidence that though the forms are imitative, they are quite highly conventionalized and incorporated into the normal phonology of the language.

(349)	*taʔ*	[taʔ]	‘sound of hitting stone or metal’

Keeping within the same basic *(n)tVʔ* template, and remaining well within the native phonotactics of Zenzontepec Chatino, several sound symbolic forms have an initial nasal consonant before the /t/ (350). As expected in this environment, the /t/ becomes voiced [d] after the nasal consonant (§5.2.2). Most of these examples also involve striking of some sort, and still most of them have no lexical tone.

(350) a. *ntuʔ ntuʔ* [nduʔ nduʔ] ‘sound of plucking a bird’s feathers’

b. *ntoʔ ntoʔ* [ndoʔ ndoʔ] ‘sound of thwacking one’s check with finger’; ‘sound of the heel of a shoe while walking’

c. *ntaʔ* [ndaʔ] ‘sound of hitting a goard’; ‘sound of hitting (some)one's head’

d. *ntiʔ ntiʔ ntiʔ* [ndiʔ ndiʔ ndiʔ] ‘sound of a clock ticking’; ‘sound of tapping fingernails’

e. *ntzēʔ ntzēʔ* [ndzēʔ ndzēʔ] ‘sound of peeling vegetables’; ‘sound of sharpening a machete’

Expanding the *(n)tVʔ* template to include vowel nasality and permitting either /tz/ or /ty/ in place of the /t/, the examples in (351) all involve hitting or contact of some sort, while those in (352) are calls or sounds made by creatures.

(351) *tzuʔ* [tsuʔ] ‘sound of hitting a bed’
tząʔ [tsãʔ] ‘sound of a punch in the shoulder’
tzeʔ tzeʔ [tseʔ tseʔ] ‘sound of walking on dry leaves’
tzīíʔ [tsīíʔ] ‘sound of kissing a baby’
tzúʔ [tsúʔ] ‘another sound of kissing a baby’
tyoʔ [tʲoʔ] ‘sound of a kiss (in general)’

(352) *tzuʔ tzuʔ tzuʔ tzuʔ* [tsuʔ tsuʔ tsuʔ tsuʔ] ‘sound of baby mouse’
tziʔ tziʔ tziʔ tziʔ [tsiʔ tsiʔ tsiʔ tsiʔ] ‘sound of bat’; ‘sound made by beetle’
tyąʔ tyąʔ [tʲãʔ tʲãʔ] ‘grackle’s call’
tyoʔ tyoʔ [tʲoʔ tʲoʔ] ‘sound of frog species (*kwitīʔ kwinaʔ*)’
tyuʔ tyuʔ tyuʔ tyuʔ [tʲuʔ tʲuʔ tʲuʔ tʲuʔ] ‘sound made by quail’

A couple of other sound symbolic forms have shapes that resemble the *(n)tVʔ* template presented above, but involve either partial reduplication (353) or lack of the final glottal stop (354).

(353) *tzetzeʔ* [tsetseʔ] ‘sound of gourd used as rattle’

(354) *ntzéē* [ndzéē] ‘sound of rattlesnake’s rattle’

Still other sounds of hitting, breaking, or clinking resemble the forms above, but include /r/ ([ɾ]) in clusters with the coronal obstruents, e.g. /tr/, /ntr/, /tzr/ (355). Such clusters do not fit the native phonotactic patterns (§4.1.3.2), but they do fit with the slightly more liberal phonotactics of fairly nativized Spanish loanwords (§7.3.4).

(355)	*truʔ truʔ*	[tɾuʔ tɾuʔ]	‘sound of cutting cord with knife’
	triʔ	[tɾiʔ]	‘sound of cracking an egg’
	tríʔ	[tɾíʔ]	‘sound of rock rolling among trees’
	trīʔ	[tɾīʔ]	‘sound of bottle or plate breaking’; ‘sound of hitting glass’
	triʔ triʔ triʔ triʔ	[tɾiʔ tɾiʔ tɾiʔ tɾiʔ]	‘sound of mouse eating maize’
	ntriʔ	[ndɾiʔ]	‘sound of breaking a pencil’
	tzraʔ	[tsɾaʔ]	‘sound of plate breaking’
	ṇtraʔ raaʔ	[ṇdɾaʔ ɾaaʔ]	‘sound of tree breaking and falling’
	trii ntzeʔ trii ntzeʔ	[tɾi: ndzeʔ tri: ndzʔ]	‘sound of shaking a can of pebbles’
	ntruntuʔ	[ndɾunduʔ]	‘sound of biting hard thing’
	ntruntuʔ ntruntuʔ	[ndɾunduʔ ndɾunduʔ]	‘sound of one's back cracking’
	ntruntiʔ ntruntiʔ xíī	[ndɾundiʔ ndɾundiʔ ʃíī]	‘sound of soup sloshing in a bag’
	tru tru tru	[tɾu tɾu tɾu]	‘sound of grinding corn on quern’

Sounds of chopping, sloshing, or striking wet surfaces (356) and several animal noises and bird calls (357) share the general shape *chV(ʔ)*.

(356)	a.	*chęʔ*	[ʧẽʔ]	‘noise in general’
	b.	*chaąʔ*	[ʧaãʔ]	‘sound of punching mud’
	c.	*chąʔ chąʔ*	[ʧãʔ ʧãʔ]	‘sound of walking in mud’; ‘sound of washing clothes’; ‘sound of cutting bush w/ machete’
	d.	*chąʔ ntaʔ*	[ʧãʔ ndaʔ]	‘sound of chopping meat’

(357) *chāą̨ chāą̨* [ʧ̃ãą̃ ʧ̃ãą̃] ‘sound made by opossum’
chaʔ chaʔ chaʔ [ʧ̃aʔ ʧ̃aʔ ʧ̃aʔ] ‘call of chachalaca (bird sp.)’
chéę̃ʔ chéę̃ʔ [ʧ̃éẽ̃ʔ ʧ̃éẽ̃ʔ] ‘call of small oriole sp.’
chęʔ mpeʔ chęʔ mpeʔ [ʧ̃ẽʔ mbeʔ ʧ̃ẽʔ mbeʔ] ‘sound of sexual intercourse’

The affricate /ch/ preceded by a nasal consonant occurs in sound symbolic forms that involve creaking or squeaking (358). Similar examples (359) involve a syllabic nasal or intentionally creaky voice, and thus diverge from the native phonology with a slightly more wild type of sound symbolism. The vowel in all of these cases is /i/.

(358) a. *nchiīʔ nchiīʔ* [nʲʤʒiīʔ nʲʤʒiīʔ] ‘sound of eating tortillas’; ‘sound of small cicada’

b. *nchīʔ nchīʔ* [nʲʤʒīʔ nʲʤʒīʔ] ‘sound of wooden cart rolling’

c. *nchiʔ nchiʔ nchiʔ* [nʲʤʒīʔ nʲʤʒīʔ nʲʤʒīʔ] ‘sound of new *huaraches* (sandals)’

(359) [n̥chiʔ n̥chiʔ] ‘sound of forcing something into something’
[nchi̯ʔ nchi̯ʔ nchi̯ʔ] ‘sound of opening a door’

Bilabials are used quite frequently in sound symbolism of booming, popping, or crashing, at times preceded by a homorganic nasal or followed by /r/. (360). Some of these forms stretch beyond the native phonotactics by ending with nasal consonants or containing diphthongs. Sounds of bubbling and dripping tend to begin with the cluster /mp/ ([mb]) (361), and one case involves a syllabic nasal.

(360) *brōún sáā* [bɾōún sáā] ‘sound of mountain landslide’
broun [bɾoun] ‘sound of quails lifting off in flight’
brom brom brom [bɾom bɾom bɾom] ‘sound of train approaching’
mprǫʔ [mbɾõʔ] ‘sound of one rock knocking another’
mpǫʔ mpǫʔ [mbõʔ mbõʔ] ‘sound of bouncing basketball’
mpuų̨ [mbũũ] ‘sound of punch in the back’
mpom mpom [mbom mbom] ‘sound of drum’

pǫʔ	[põʔ]	‘sound of punch in stomach’
poʔ	[poʔ]	‘sound of balloon popping’; ‘sound of coconut being opened’

(361)

mpruʔ mpruʔ	[mbɾuʔ mbɾuʔ]	‘sound of bubbles boiling in thick sauce’
mpɾuʔ m̩pɾuʔ	[mbɾuʔ m̩bɾuʔ	‘sound of bubbles underwater’
mpiʔ mpiʔ	[mbiʔ mbiʔ]	‘sound of water dripping into cup or bowl’

Though the velar stops /k/ and /kw/ are some of the most frequently occurring consonants in the native phonology, they are not as frequent in sound symbolism. A few examples that do contain them are listed in (362).

(362)

kāáʔ kāáʔ	[kāáʔ kāáʔ]	‘song of magpie jay’
kataʔ kataʔ	[kataʔ kataʔ]	‘sound of flapping of wings’
korontǫʔ	[koɾondõʔ]	‘sound of biting something hard’
kōtóʔ kōtóʔ	[kōtóʔ kōtóʔ]	‘sound of donkey shaking its ears’
kōʔ kōʔ kōʔ	[kōʔ kōʔ kōʔ]	‘sound of hen putting her chicks to sleep’
kǫʔ kǫʔ kǫʔ	[kõʔ kõʔ kõʔ]	‘sound made by armadillo’
kraa kraa kraa	[kɾaa kɾaa kɾaa]	‘call of macaw’
krīí krīí krīí	[kɾ̄íí kɾ̄íí kɾ̄íí]	‘sound of cricket’
kwi kwi kwi kwi	[kʷi kʷi kʷi kʷi]	‘sound of large woodpecker’
nkɰ́ʔ nkɰ́ʔ	[ŋgɯ̃ʔ ŋgɯ̃ʔ]	‘sound of swallowing’
nkróōʔ	[ŋgɾóōʔ]	‘sound of disemboweling slaughtered animal’
nkwāʔ	[ŋgʷāʔ]	‘sound of punch in mouth’

Another recurring word shape in sound symbolic material is *jlVʔ*, where V is /a/, /o/, or /u/. These sounds typically refer to noises in water, plops, plunks, or flops, among other things (363). One similar form violates the regular phonology by having an extra-high pitch (364).

(363)

jlooʔ	[hlooʔ]	‘sound of something heavy plunking in water’
chęʔ jloʔ chęʔ jloʔ		‘sound of sexual intercourse’
jlaʔ jlaʔ jlaʔ	[hlaʔ hlaʔ hlaʔ]	‘sound of flip-flops’
jloʔ jloʔ	[hloʔ hloʔ]	‘sound of horse testicles knocking together’
jlaʔ	[hlaʔ]	‘sound of wet clothing hitting floor’;

			‘sound of fruit falling into leave and brush’;
			‘sound of water lapping under rock’;
			‘sound of coconut falling in mud’;
			‘sound of slap on the cheek’;
			‘sound of punch in the jaw’
(364)	*jlűʔ jlűʔ*	[hlűʔ hlűʔ]	‘call of female mottled owl’

A couple of tame sound symbolic examples that fully fit the native sound patterns but do not clearly fit into any of the groups above are given in (365).

(365)	*jwaaʔ*	[hwaaʔ]	‘sound of a burp’
	xaaʔ xaaʔ	[ʃaaʔ ʃaaʔ]	‘sound of rowing in water’

Some sound symbolic material contains certain consonants that are not in the native phonological system but can still be considered to be fairly tame otherwise. For example, the velar nasal [ŋ] is not a phoneme in the language but occurs as an allophone of /n/ before velar obstruents (§5.2.1). However, [ŋ] occurs in final position in several sound symbolic forms. It (or /n/) follows the high front vowel /i/ in sounds of clinking or ringing (366), and it follows /o/ in a couple of forms referring to cracking or stomping sounds.

(366)	*diliiŋ diliiŋ*	[diliiŋ diliiŋ]	‘sound of small bell ringing’
	triiŋ	[tɾiiŋ]	‘sound of bottle breaking’
	nyíīŋ nyíīŋ	[nʲíīŋ nʲíīŋ]	‘sound of mosquito flying’
	drīín	[dɾīín]	‘sound of ring hitting the ground’;
			‘sound of coins hitting the ground’
(367)	*proōŋ*	[pɾoōŋ]	‘sound of mango falling and hitting tin roof’
	pooŋ	[pooŋ]	‘sound of firecracker’;
			‘sound of stomping to frighten someone’

The trilled rhotic consonant, IPA [r], written here as <rr>, is not found in the native Zenzontepec Chatino sound system. It is not encountered in the phonology of loanwords either, since the Spanish trill is adapted as the simple tap /r/ [ɾ] (§7.2.7). However, the trill is found in several sound symbolic expressions that are otherwise fairly tame (368). This group has no semantic coherence like most of the others discussed so far.

(368)	*rrų rrų*	[rũ rũ]	‘sound of donkey eating grass’
	rru rru rru	[ru ru ru]	‘sound of grinding corn in a mill’
	rro rro rro rro	[ro ro ro ro]	‘sound of spotted fly’
	rriʔ rriʔ rriʔ	[riʔ riʔ riʔ]	‘sound of donkey's fart’; ‘sound of ripping cloth’; ‘sound of tree branches rubbing in wind’

Spanish loanwords that contain(ed) the voiceless labio-dental fricative [f] typically have the consonant cluster /jw/ as an outcome in Zenzontepec Chatino (§7.2.3). The sound [f] does not occur in native vocabulary or in nativized Spanish loanwords. However, it does occur word-initially in sound symbolic expressions, usually accompanied by the vowel [i] (369).

(369)	*fiīí fīí*	[fiīí fīí]	‘sound of whistling’
	friʔ friʔ	[friʔ friʔ]	‘sound of whipping a beast’
	frīʔ	[frīʔ]	‘sound of whipping a beast’
	fi fi fi fi fíi	[fi fi fi fi fíi]	‘call of the grackle’
	fíī fíī	[fíī fíī]	‘sound of a flute’ (also *pipí pipī pipí*)

Some of the tame sound symbolic forms already mentioned refer to animal calls that are imitated by speakers. Cross-linguistically, the domain of animal calls is one of

the most common in which to find sound symbolism. Other animal sounds and calls that fall into the category of tame imitative sound symbolism are listed in (370).

(370)	*su su su su su*	[su su su su su]	‘sound made by vulture’
	tǫ tǫ tǫ tǫ tǫ	[tõ tõ tõ tõ tõ]	‘male owl's call’
	kwe kwe kwe kwe	[kʷe kʷe kʷe kʷe]	‘sound of toad *kwitīʔ sēné*’
	xaą xaą xaą	[ʃãã ʃãã ʃãã]	‘sound of opossum’
	kwą́ kwa kwa kwa kwa	[kʷą́ kʷa kʷa kʷa kʷa]	‘sound of hen after laying egg’
	chíliʔ chíliʔ	[ʧĩlʲiʔ ʧĩlʲiʔ]	‘call of parakeet’
	wāʔ wāʔ wāʔ	[wāʔ wāʔ wāʔ]	‘sound of dog barking’

One somewhat surprising example is *kii kiri kii* ‘sound of a small chick’ (371), since in Spanish that is the form of a rooster’s call. This makes one wonder if it is perhaps borrowed from the Spanish rooster call with slightly shifted meaning. In contrast, the cry of a rooster in Zenzontepec Chatino is *ntetēré joʔo*, which has a wilder variant with extra-long vowel *ntetēré joʔo: :: ō* (372).

(371) *kii kiri kii* [kii kiɾi kii] ‘sound of small chick’

(372) *ntetēré joʔo* [*ndetēré hoʔo*] ~ [*ndetēré hóʔó: :: ō*] ‘sound of rooster call’

The examples of tame imitative sound symbolism above show some fairly minor deviations from the basic phonology of Zenzontepec Chatino, which include the use of certain otherwise absent sounds (e.g. [f], [r], [d], [ə]), exceptional distribution of sounds (e.g. final [ŋ] or [m]), and non-native consonant clusters (e.g. *kr*, *nkr*, *mpr*, *tzr*).

8.2. Lexicalization of sound symbolic forms

Many of the sound symbolic forms referring to animal calls, cries, and songs are fairly tame. Several of them, especially bird calls, contain some or all of the lexeme that is the name of the animal which produces them (Table 15). Most likely, the names for these animals were based on the imitative forms, but it is imaginable that the reverse could be true in some rare cases, via a type of folk etymology.

Table 15. Animal names likely lexicalized via sound symbolism

Animal sound or call	Animal name	Gloss of name
kítú jwii kítú jwii	/kítu jwiī/	'kiskadee (bird) (*Pitangus sulphuratus*)'
kwiʔ chę kwiʔ chę	/kwichę/	'quail species'
kwiiʔ kwiiʔ	/kw-iiʔ/	'oriole species'
pi pi pi pi	/pii/	'turkey chick'
tiruwiʔ tiruwiʔ	/tí rūwíʔ/	'bird species'
tyąʔ tyąʔ	/kinī kwi-**tąʔ**/	'grackle species'
kwlaʔ kwlaʔ kwlaʔ	/kinī **kūláʔ**/	'blue bird species'
jōó jōó	/kw-īchí **jóo**/	'margay (feline similar to ocelot)'
kwāʔ kwāʔ	/nkwāáʔ nkaʔa/	'green frog species'
[mbɐ̨ɐ̨ːʔ]	/mpeēʔ/	'calf'
mpīí mpīí	/mpii/	'tiny toad species'
[nʲʤíʔi̯ nʲʤíʔi̯]	/nchiīʔ nkātá/	'small cicada species'

Most of the animal names in Table 15 are so similar to their respective calls or sounds that there is little room for doubt about a connection between them. However, only in the case of the sound *kwiiʔ kwiiʔ* made by the bird *kwiiʔ* 'oriole species' is the phonological form of the call identical to the animal name. In all other cases, there is either some segmental, tonal, or vowel length difference between the two. In fact, it is

quite striking just how much the tones may differ between an animal name and its phonologically related call. What these differences betray undoubtedly is the independent lexicalization of the imitative sounds and the animals names based on them, since such phonological divergences can not be predicted or explained in any principled way.

Other birds appear to have sound symbolic names but either they are reported to have calls that are very different from those names or no call has yet been documented (373).

(373)	/kūkṷ́/	[kūkṷ̃́]	‘mottled owl (*Ciccaba virgata*)’
	/kúrū/	[kúɾū]	‘ground dove species (*Columbina spp.*)’
	/mpirītóʔ/	[mbirītʲóʔ]	‘flycatcher (bird)’
	/mpiʔ/	[mbiʔ]	‘small bird species’
	/ntyaʔ/	[nʲdʲaʔ]	‘ground cuckoo’
	/ntyuu/	[nʲdʲuu]	‘russet-crowned motmot (*Momotus mexicanus*)’
	/ntzaą/	[ndʑãã]	‘cuckoo species’
	/tyorę́ʔ jii/	[tʲoɾẽ́ʔ hii]	‘Masked Tityra (*Tityra semifasciata*)’

Sound symbolic forms involve links between sound and meaning, and because of this they are known to provide exceptions to phonological patterns and even resist otherwise regular sound changes (see discussion and references in Nuckolls 1999: 238-239). An example of this in Zenzontepec Chatino is the name of a small bird species, *ntzii* (374), which would be expected to have the palatalized affricate /ch/ due to the following /i/ (§2.1.3.2).

(374)	/ntzii/	[ndʑii]	‘small bird similar to hummingbird’

8.3. Synesthetic sound symbolism

There are very few clear cases of synesthetic sound symbolism in Zenzontepec Chatino. However, a couple of examples have appeared in the corpus of texts processed so far (~17 hours). These sound symbolic forms are all monosyllabic with long vowels, and they refer to feelings, functioning as modifiers along with the verb *nt-ii* 'feel'. The first example *nkwaą* refers to an uncomfortable feeling as if one's head were big and swollen or if one gets a serious fright at night (375). The second one, *tzaa* (376), refers to a feeling of nervousness throughout the body, and the third example, *nchíį̄* (377), is a feeling of noisy ringing in the ears. What they all share is that they refer to uncomfortable sensations. There are likely more of these lexemes in the language yet to be documented.

(375) ***nkwaą*** *nt-ii=ūʔ* *nku-tiyaa=ūʔ* *wiʔ* *nakwę*
big.headed.feeling HAB-feel=3PL CPL-arrive.there.NBS=3PL there say[.3]
'Big-headed they felt when they arrived there, they say.' [kwiti7yu 6:25]

(376) *tukwi wá niī lyakwā* ***tzaa*** *nt-ii=ą* *nakwę=ūʔ*
what DIST now why bad.nervous.feeling HAB-feel=1PL.INCL say=3PL
'"What is this now? Why do we feel bad?" they said.' [kwiti7yu 7:53]

(377) ***nchíį̄****=ri* *nt-ii* *kétū* *yaką=ą* *jā* *n-ch-uʔu*
nchii=only HAB-feel hole ear=1PL.INCL CONJ HAB-ITRN-be.inside[.3]

xī *nee* *n-toǫ* *ya* *ntāʔwé*
NMZ.LOC say[.3] STAT-be.standing CL.wood black.zapote
'"*Nchíį̄*" felt our ears when they were where the black zapote trees are.'
[no hay brujos 10:04]

8.4. Conventional sound symbolism

Hinton et al. (1994a: 5) define conventional sound symbolism as "the association of certain phonemes and clusters with certain meanings", citing the classic example of the English phonestheme *gl-* found in many words related to shining or flashing (*glisten*, *glitter*, *glimmer*, *glow*, *gleam* etc.). I have only identified one phonestheme so far in Zenzontepec Chatino: the sequence $pV^{[-back]}$ is found in many forms that refer to small or cherished things (as discussed in example (5) in §2.1.2.1). For convenience these are repeated here in (378).

(378)

/**p**ii/	[**p**ii]	'female turkey'	/**p**itzu juū/	[**p**ɪtsu huū]	'quail sp.'
/**p**iī/	[**p**iī]	'cute, colorful'	/m**p**eēʔ/	[m**b**eēʔ]	'calf'
/m**p**ii/	[m**b**ii]	'small toad sp.'	/m**p**ichuʔ/	[m**b**iʧuʔ]	'puppy'
/**p**iīʔ/	[**p**iīʔ]	'baby'	/m**p**ilējéʔ/	[m**b**il^{j}ēhéʔ]	'snail'
/**p**īyúʔ/	[**p**ījúʔ]	'baby girl'	/m**p**irītóʔ/	[m**b**irītʲóʔ]	'flycather (bird)'
/m**p**iʔ/	[m**b**iʔ]	'small bird sp.'			

8.5. Sound symbolic material in the grammar

Like the synesthetic examples in (375), (376), and (377), sound symbolic forms in Zenzontepec Chatino may be inserted into phrases as phonologically independent material (379), but they are never derived from lexemes of basic grammatical classes, nor do they function as bases for any derivation. However, they frequently serve as hosts for enclitics, as in (380) and (381), which is not surprising, since clitics may attach to almost any element in the language (§10.5).

(379) *lō nu nte-lákwi tyā* ***[kərə hloʔ kərə hloʔ]*** *nt-ene*
when NMZ PRG-boil water kərə jloʔ kərə jloʔ HAB-be.heard[.3]
'When the water was boiling, the sound *kərə jloʔ kərə jloʔ* was heard.' [offered]

(380) ***chąʔ chąʔ****=ra* *nt-ene* *nte-xūʔú=ą̄ʔ* *jiʔį̄* *na* *kixę̄ʔ* *yaka=V́*
chąʔ chąʔ=now HAB-be.heard PRG-(CAUS)cut=1SG NSBJ ART plant tree=DIST
‘“Chąʔ chąʔ” is heard when I'm cutting the bush with my machete.’ [offered]

(381) ***xáą̄****=ri* *nt-ukwą̄+suweʔ* *kwénā* *nakwę*
xáą̄=only HAB-pull+scrape[.3] snake say[.3]
‘Just [ʃ̃ãã] he dragged a snake, it says.’ [juan oso 4:25]

A summary of the phonology of sound symbolism and comparison to the standard native phonology and loanword phonology is provided in Chapter 9.

Chapter 9

Summary of the phonological system(s)

There are three distinct but largely overlapping levels of the Zenzontepec Chatino phonological system: the native system (described in Chapter 2 through Chapter 5), which has some internal variation Chapter 6; the broader system including influence and loans from Spanish (Chapter 7); and the sound symbolic phonological sub-system (Chapter 8), which includes both tame and wild symbolic material.

Strictly speaking, the native, non-symbolic, phonological system consists of the segmental inventory, autosegmental inventory, and basic patterns listed in (382). The bilabials (§2.1.2) and /r/ (§2.1.3.6) are relatively recent additions and fairly infrequently occurring, and /ky/ (§2.1.5.1) is native but fairly rare.

(382) Zenzontepec Chatino native phonology

Consonants: /p b m t tz s l n r ty ch x ly ny y ky k kw w ʔ j/

Vowels:	/i e a o u/
Suprasegmentals:	vowel nasality, vowel length, high tone, mid tone
Onsets/codas:	near-obligatory onsets, no codas (except /ʔ/)
Permitted clusters:	only GS (glottal+sonorant) or NO (nasal+obstruent)
Distribution:	/o/, vowel nasality, vowel length rare in non-final syll.

In loanwords (Chapter 7), the bilabials and /r/ are more frequent than in native vocabulary. However, the segmental inventory of the loanword phonological sub-system is no different than that of the native phonological system, aside from the very rare occurrence of /d/ or /g/, which may perhaps be written off as nonce insertions. Where the loanword phonology does significantly diverge from the basic sound system is in the greater number of permitted consonant clusters and the broader distributions of some phonemes (383).

(383) Additions in loanword phonological sub-system

Clusters (§7.3.4):	/XT/ or /XY/ sibilant fricative + plain plosive or semivowel
	/Tr/ plain plosive (/p b t k/) + /r/
	/str/
	/NTr/ nasal + plain plosive + /r/
	/r/ + sonorant consonant
	/r/ + /t/ or /ty/
	/by/, /my/, /tw/, /wr/, /jwr/, /lk/
Distribution:	/w/ before rounded vowels
	/s/ more frequent before /i/
	/ty ly ny/ more frequent after vowels other than /i/
	/o/ more frequent in non-final syllables
	more onsetless forms

The sound symbolic sub-phonology builds, in two steps, on the already expanded loanword phonology. Tame sound symbolic material incorporates a few segmental additions, creaky voice, extra-high pitch, and slightly loosened distributional restrictions,

while wild sound symbolism permits further additional segments and phonation types (384).

(384) Further additions in sound symbolic phonological sub-system(s)

Tame sound symbolism:	/f/, /d/, /rr/ ([r])
	creaky vowels
	sequences of two H tones; extra-high pitch
	/tz/ before /i/
	coda nasals; syllabic nasals
Wild sound symbolism:	/ə/, /ʁ/, /fr/
	extra-long segments
	breathy voice
	voiceless vowels and semivowels
	clicks

Chapter 10

Words, affixes, and clitics

The preceding chapters (Chapter 2 through Chapter 9) deal primarily with sound patterns in Zenzontepec Chatino: the phonology. Later chapters deal with word structure and word formation: the morphology. The purpose of the present chapter, and the one after it (Chapter 11), is to provide a bridge from the phonology to the morphosyntax of Zenzontepec Chatino. This chapter deals primarily with form, the building blocks of words; the next chapter deals primarily with function, the types of words that exist in the language according to how and where they occur in larger constructions.

In this chapter roots, stems, and particles are defined first (§10.1). Then the "word" in Zenzontepec Chatino is defined (§10.2), which involves two types of partly independent criteria that yield two non-identical definitions of the word: the phonological word and the grammatical word. Then, definitions are given of the other formal elements that participate in the building of phonological and/or grammatical words, starting with compounding (§10.3), affixes (§10.4), and finally, clitics (§10.5).

10.1. Roots, stems, and particles

A root is a morphologically simplex form that has lexical content. A root has no synchronically analyzable internal structure. A stem is a form to which some morphological elaboration applies, which in Zenzontepec Chatino may be compounding, affixation, encliticization, or tone change. Therefore, a root is a stem with respect to some morphological process if the root is the element on which that process operates. The stem in some morphological process is a root if it is not internally analyzable. A particle is a phonologically unbound element that contains no root, is uninflectable, and serves some grammatical function.

To illustrate, a simple clause has been chosen from a text that provides examples of roots, particles, and stems in (385).

(385) *ta* *k-u-tūkwá=ą* *lōʔó*
PRF POT-CAUS-be.insde=1PL.INCL fence
'We will have put in a fence…' [antes aparatos 10:46]

The first element is the Perfect Tense particle *ta*. The second form *k-u-tūkwá=ą* 'we are going to put in' is built on the intransitive verb root *-tūkwá* 'be inside', which is the stem from which the transitive verb *-u-tūkwá* 'put in' is derived. That derived transitive verb is a stem which is then inflected for Potential Mood by the prefix *ki-*. That inflected stem *k-u-tūkwá* 'are going to put in' is the host of the first person plural inclusive pronominal enclitic *=ą*, which function as the verb's subject. Finally, the form *lōʔó* 'fence' is a free noun root that functions as the direct object of the verb.

10.2. Words

Though the word would seem to be the linguistic unit that would be the most accessible to speakers and students of a language, defining "the word" in a language must be done with care, as it is often not straightforward. This is largely because the "traditional notion of the word conflates […] syntactic and phonological criteria" (Bickel & Nichols 2007: 174). Crucially, phonological and grammatical criteria for defining the word in a language often do not coincide or provide an unambiguous answer to the question of what exactly *is* a word. Because of this, Dixon & Aikhenvald (2002: 13) advise "to keep apart the two kinds of criteria and the units which they define". For any language, a phonological word and a grammatical word should be defined independently of one another, and those definitions should be based on language-internal evidence. This is the approach taken here, and in what follows, the phonological word (§10.2.1) and the grammatical word (§10.2.2) are defined for Zenzontepec Chatino. In the case of the phonological word, much of the evidence was presented in earlier chapters, so only a few examples are provided here, but with cross-references to the appropriate sections in other chapters.

10.2.1. The phonological word

Perhaps every language has some roughly word-sized prosodic constituent that if referenced allows for certain sound patterns in the language to be captured more accurately and/or more succinctly than would be possible without reference to the unit.

This is the phonological word (Nespor & Vogel 1986). According to Hall (1999:3), the phonological word can be identified using three types of evidence:

1. it is the domain of patterns in the distribution of sounds (phonotactics);
2. it is the domain of some phonological rules;
3. and, it is the domain for minimality constraints.

In Zenzontepec Chatino, a large number of sound patterns converge on a unit that consists of one to three moras and often includes a lexical root and any prefixes that attach to it. Therefore, this domain is easily identified as the phonological word in the language. Component stems with compounds are always separate phonological words, and enclitics are always separate phonological words from their hosts. A list of distributional evidence for the existence and extent of the phonological word (ω) is given in Table 16. All of the patterns listed there refer only to the phonological word and not to any other larger or smaller phonological constituent.

Table 16. Distributional evidence for the phonological word

Phonotactic constraints and distributional patterns	Cross-reference
Contrastive V nasality restricted to final μ of ω	§3.1; §4.2.2
V length restricted to final syllable of ω	§3.2; §4.2.2
/o/ rare outside of final syllable of ω	§2.2.4; §4.2.3
Domain of 5 basic tone patterns is ω	§3.3.3; §4.2.4
Maximum one /H/ tone per ω	§4.3.4
If HØ tone pattern, then M tone on antepenultimate μ of ω	§3.3.3
Maximum one instance of /ʔ/ per ω	§4.3.3
Final syllable of ω is most prominent	§4.2.5
No vowel hiatus permitted within ω	§5.3.1
Coda glottal stop only at end of ω	§4.2.1

Many (morpho-)phonological processes take as their target or have as their domain of operation the same phonological constituent defined by the distributional patterns listed in Table 16. For example, the non-sibilant coronal consonants /t/, /l/, and /n/ are palatalized ([tʲ, lʲ, nʲ]) when following the vowel /i/ (§5.1.1), as shown root-internally in the examples in (386) and also between the prefixes and stem in the Potential Mood and Habitual Aspect forms of the verb *-nāá* ‘get cleared (field)’, as the prefixes that mark those categories end in /i/.

(386) *kitē* [kitʲē] ‘pine’
ntīlú [ndīlʲú] ‘upside-down’
kwinoʔ [kʷinʲõʔ] ‘wart’

(387) POT *ki-nāá* [kīnʲãã̌] ‘will get cleared (field)’
HAB *nti-nāá* [ndīnʲãã̌] ‘gets cleared (field)’

Since the Progressive and Completive Aspect prefixes for the same verb, *nte-* and *nku-* respectively, do not end in /i/, the initial /n/ of the verb stem is not palatalized in those forms (388).

(388) PRG *nte-**n**āá* [ndē**n**ã̄á̰] ‘is getting cleared (field)’
CPL *nku-**n**āá* [ŋgū**n**ã̄á̰] ‘got cleared (field)’

A list of the phonological processes that share the domain of the phonological word are listed in Table 17, and along with the phonotactic patterns and constraints listed in Table 16, they provide the evidence for the existence and extent of the phonological word.

Table 17. Phonological processes that refer to *ω*

Phonological processes that refer to the phonological word	Cross-reference
Palatalization of /t, l, n/ after /i/, occurs only within *ω*	§5.1.1
Haplology may occur only within *ω*	§5.3.3
Progressive V harmony occurs only within *ω*	§5.5.2
Domain of 2sg tone inflection is *ω*	§3.3.3
Play language *nch-akwiʔ tzūʔ ntīlú*: move 1st syll. of *ω* to end of *ω*	§5.9

There happen to be no non-trivial minimality constraints that help define the phonological word in Zenzontepec Chatino, as there is no longer any bimoraicity requirement for words (§4.1.4.2), nor do words necessarily have to bear any tone(s) (§3.3.5).

Any bound morphological elements that follow the stem to which they attach behave as distinct domains in terms of all of the distributional patterns and phonological processes that define the phonological word. That is, any and all postposed bound morphemes make up separate phonological words. This is true of postpounds (final stems within compounds) and enclitics, the latter of which may be adverbial or pronominal. For example, the palatalization of /t/, /l/, and /n/ does not occur between the two stems in the compound *niʔ**i** **t**unu* 'building' (389), nor does it occur between a host and enclitic, as shown in the example *nku-su+xíī=na* 'we woke up' in (390), where the /n/ of the subject enclitic is not palatalized by the final /i/ of the compound verb stem.

(389) *niʔ**i** **t**unu* [nĩʔ**ĩ** **t**unũ] 'building (lit. house big)' not *[nĩʔĩ **tʲ**ũnũ]

(390) *nku-su+xíī=na* [ŋgusuʃĩĩna] 'we woke up' not *[ŋgusuʃĩĩ**n**ʲa]

In terms of tone patterns, consider the verb *nt-uʔyā+kwentā=tzoʔō=ą̄ʔ* 'I watch over (things) well' in (391), which is morphologically and prosodically quite complex. The verb stem *-uʔyā+kwentā* 'watch over' is an idiomatic compound. Each of its component stems bears the ØM basic tone pattern. It cannot be a single phonological word, since there cannot be a toneless mora after a M tone within a single phonological word (§3.3.3). The same argument holds for the adverbial enclitic *tzoʔō* 'well' since it also bears the ØM basic tone pattern, and must be a separate phonological word. Finally, the subject enclitic *=ą̄ʔ* undergoes M tone transformation, which only occurs at the host=clitic juncture and never within a single phonological word (§3.4.3.3). The subject enclitic therefore must be treated as a separate phonological word. Additionally, there are

three glottal stops in the whole complex verb, which would violate the constraint of maximally one glottal stop per phonological word (§4.3.3). Therefore, the complex verb in (391) consists of four phonological words. However, as will be discussed in the next sub-section, that verb is only one grammatical word.

(391) *wī laaʔ laa ntuʔyākwentātzoʔōǫ́ʔ*
/wī laaʔ laa nt-uʔyā+kwentā=tzoʔō=ą̄ʔ/
CONJ like.so be HAB-buy+account=good=1SG
'And that's why I watch over (things) well' [floripondio ruda 3:42]

10.2.2. The grammatical word

The grammatical word, unlike the phonological word, is defined in morpho-syntactic and semantic terms and not on phonological grounds. According to Dixon & Aikhenvald (2002: 19), the "grammatical word consists of a number of grammatical elements which:

1. always occur together, rather than scattered through the clause...;
2. occur in a fixed order;
3. have a conventionalized coherence and meaning."

In Zenzontepec Chatino, the grammatical word may consist of a monomoraic uninflectable particle, a free root, a derived stem, a compound stem, or a phrasal complex lexeme (392).

(392)	*ta*	Perfect Tense		particle
	kátī	'seven'		free root
	ti-kalaʔ	'cool'	[ADJZ-cool.off]	derived stem

nteʔya lichī	‘molar’	(lit. ‘tooth molar’)	compound stem
chu nt-u-jnyā selū	‘hatmaker’	(lit. ‘one who makes hats’)	phrasal lexeme

A single grammatical word may also consist of any of the above along with any and all of its associated bound elements (whether preposed or postposed). The verb (and sentence) in (393) consists of a compound stem *-aku+su* ‘bite off’ with a Completive Aspect prefix *y-*, an adverbial enclitic *=kāʔá* ‘also’, and a third person plural subject enclitic *=ūʔ*. It is a single grammatical word as the elements cannot occur in any other order.

(393) *y-aku+su=kāʔá=ūʔ* ‘they also bit off’

Consider the example in (394), which consists of seven phonological words but only five grammatical words. The Negative Existential predicate *nālá* is one grammatical word. The noun *tyākwę́* ‘road’ is a free root and grammatical word. The particle *xī* functions here as a relativizer and is a grammatical word. The verb in the subordinate clause *n-tyaʔą* ‘go around’ consists of a verb root and aspect prefix and is a grammatical word, and finally, *nu n-tyaʔą jlyá* ‘car’ is a phrasal lexeme that functions as the subject of the subordinate clause and literally means ‘that which goes around fast’. It consists of the nominalizer particle *nu*, the inflected verb *n-tyaʔą* ‘goes around’, and the adverb *jlyá* ‘fast’. Since these three elements in the lexeme meaning ‘car’ occur in a fixed order and have a conventionalized meaning, they make up a single grammatical word, even though they are three separate phonological words.

(394) *nālá tyākwę́ xī n-tyaʔą nu n-tyaʔą jlyá*
NEG.exist road where HAB-go.around NMZ HAB-go.around fast
‘There wasn’t any road for cars to go on.’ [trabajo antiguo 2:40]

The example with the complex verb *nt-uʔyā+kwentā=tzoʔō=ą̄ʔ* ‘I watch over well’ was discussed earlier in (391) and consists of four phonological words. It is repeated in (395). This verb must be treated as a single grammatical word, since the compound stem is idiomatic and lexicalized, the adverbial enclitic can only occur between the stem and the subject enclitic, and the subject enclitic can only occur in final position. None of the elements in the verb can be ordered in any other way.

(395) *wī laaʔ laa ntuʔyākwentātzoʔōǫ́ʔ*
/wī laaʔ laa nt-uʔyā+kwentā=tzoʔō=ą̄ʔ/
CONJ like.so be HAB-buy+account=good=1SG
‘And that’s why I watch over (things) well’ [floripondio ruda 3:42]

As the discussion in this section has shown, the structure of Zenzontepec Chatino is such that a single grammatical word often consists of several phonological words since component stems in compounds and all enclitics behave as separate phonological words. This is especially the case for verbs, which is where the majority of the morphology is found in the language. The converse is not true, as there are only a few cases where two grammatical words join to form one phonological word, as is the case in contractions (§5.8).

10.3. Compounds

Compounds are stems that are made up of at least two component stems, each of which contains, or is, a root. A compound is a single grammatical word. The meanings of some compounds are somewhat compositional, as in the examples in (396). These

compounds are considered single grammatical words because the order of the component stems is not flexible and their meanings are conventionalized, even if they appear to be fairly compositional. The head of a compound is always in initial position in Zenzontepec Chatino, following the robustly head-initial syntax throughout the language.

(396)	*lateʔ chaja*	'tortilla cloth'	(lit. 'cloth' + 'tortilla')
	lyūkwá xīyáʔ	'whisk broom'	(lit. 'broom' + 'small')
	nyatę̄ ku-sūʔ	'elder (n.)'	(lit. 'person' + 'elder')
	nkunūʔ mankū	'mango worm'	(lit. 'worm' + 'mango')

In contrast to the compounds in (396), the meanings of other compounds are quite idiomatic and not nearly as compositional, as in the examples in (397). Some of these are exocentric compounds. In many of these cases there is some discernible metaphorical connection between the combined meanings of the component stems and the meaning of the compound, but the composition of the compound is largely not predictable.

(397)	*lutzeʔ kiiʔ*	'flame'	(lit. 'tongue' + 'fire')
	jniʔ jnē	'interest (on a loan)'	(lit. 'offspring + 'money')
	niʔi luwe	'room (of house)'	(lit. 'house' + 'small')
	kyaʔā kékū	'community', 'environment'	(lit. 'slope' + 'watering place')
	xetąʔ kwīchí	'herbaceous plant species'	(lit. 'claw' + 'jaguar')
	-u-suʔū+ntoo	'to appear to someone'	(lit. CAUS-show+face)

A useful diagnostic for checking if a sequence of stems is a compound instead of two separate grammatical words is to inflect the form in question with a dependent pronoun (if possible) since the pronoun will encliticize to the entire stem. For example, take the pair of verbs in the examples in (398). In the first case the uninflected verb stem is *-u-t-ūʔú* 'put in', and the end of the stem is clear from the placement of the subject enclitic *=ūʔ*. The noun *leta* 'path' is the direct object of the verb, and it is a separate

grammatical word. The meaning ‘put a path in’ is quite compositional in such a construction. In the second example in (398) the same verb stem *-u-t-ūʔú* ‘put in’ is the first stem in a compound, while the noun *leta* ‘path’ is the second stem in the compound. This compound has the conventionalized meaning ‘guide’, and it does not mean ‘make a path’. That this is a compound is clear from the placement of the pronominal subject enclitic *=ą̄ʔ* after the whole compound. Therefore, the entire compound is a single grammatical word.

(398) a. *nka-t-ūʔú=ūʔ* *leta* *wá*
CPL-(CAUS)TRN-be.inside=3PL path DIST
‘they put a path there’ [verb examples5 19:22]

b. *k-u-t-ūʔú+leta=ą̄ʔ* *jiʔį̄=wą*
POT-CAUS-TRN-be.inside+path=1SG NSBJ=2PL
‘I will guide you (pl.)” [verb examples5 21:34]

The component stems of compounds are always rendered as separate phonological words. All of the phonotactic patterns and phonological processes whose domain is the phonological word treat the separate stems within compounds as separate domains. For example, 2SG pronominal inflection is realized by tone change on the final phonological word of the stem (§3.3.3). This is shown in (399), where the compound *jne tikwę* ‘middle finger’ when inflected for 2SG is *jne tīkwę̄*, with the M tones of the 2SG pronominal inflection only on the final stem of the compound. If the compound were one single phonological word, then the inflected form would be *jnē tīkwę̄**, with M tone also on the first component.

(399) *jne tikwę* ‘his/her middle finger’ → *jne tīkwę̄* ‘your middle finger’
(lit. ‘finger’ + ‘long’)

Further evidence that component stems in compounds are separate phonological words is demonstrated by the compounds in (400). In the first one, *kwítī laa* ‘mason’, the initial /l/ of the second stem would be palatalized by the final /i/ of the first stem if the compound were one phonological word (§5.1.1). The second compound in (400), *kiī tene* ‘thatch grass’, would not have a long vowel (§4.2.2) in the first stem and the initial /t/ of the second stem would be palatalized if the two stems weren’t separate phonological words. The third compound, *tzáʔ tiʔi* ‘poverty’ would violate the restriction against sequences of /ʔ/ followed by an obstruent (§2.1.6.1; §4.1.3.2) and also the constraint of maximally one /ʔ/ per word (§4.3.3). If the final compound in (400), *júų̄ seʔę̄* ‘intestines’, were one phonological word, it would not have vowel length or vowel nasality in its first component stem (§4.2.2). Finally, the tone patterns of these four compounds: HMØØ, ØMØØ, HØØ, and HMØM, respectively, all violate the restrictions on possible tone patterns within the phonological word (§3.3.4). Each compound is therefore two phonological words.

(400)	*kwítī laa*	[kʷítʲī laa]	‘mason’	(lit. ‘specialist’ + ‘church’)
	kiī tene	[kiī tenẽ]	‘thatch grass’	(lit. ‘grass’ + ‘blood’)
	tzáʔ tiʔi	[tzáʔ tiʔi]	‘poverty’	(lit. ‘thing’ + ‘poor’)
	júų̄ seʔę̄	[hṹų̃ seʔę̄]	‘intestines’	(lit. ‘rope’ + ‘excrement’)

10.4. Affixes

Affixes are morphological elements that attach to a stem, cannot occur alone, and often have an abstract meaning (Haspelmath & Sims 2010: 19). Unlike clitics, they tend to “exhibit a high degree of selection with respect to their stems” (Zwicky & Pullum

1983). I define affixes in Zenzontepec Chatino as bound morphemes that (i.) are not plausibly roots; (ii.) occur with stems of a particular lexeme class (Chapter 11); and (iii.) always occur adjacent to stems of that class. Affixes are thus defined in morpho-syntactic terms and not on phonological grounds. However, an affix may have many variant forms, or allomorphs, and the occurrence of one allomorph instead of another may be either phonologically or lexically conditioned.

The only affixes in Zenzontepec Chatino are prefixes, and they are always part of the same phonological word, and grammatical word, as the stem to which they attach. Examples of some prefixes are listed in (401). In each row, there is a prefix on the left, a stem to which it attaches in the middle, and the resulting prefixed stem on the right.

(401)

Prefix		Stem		Prefixed stem	
u-	CAUS	*-laʔa*	'get broken'	*-u-laʔa*	'to break (trn.)'
ki-	POT	*-laʔa*	'get broken'	*ki-laʔa*	'will get broken'
nku	CPL	*-laʔa*	'get broken'	*nku-laʔa*	'got broken'
y-	ITRN	*-aku*	'eat'	*-y-áku*	'get eaten'
i-	ITER	*-tano*	'leave (trn.)'	*-i-t-ano*	'leave (trn.) again'
kwe-	NMZ	*-ūlá*	'make music'	*kwē-lá*	'dancer'
ti-	ADJZ	*-ākéʔ*	'get cooked'	*tī-kéʔ*	'hot'
la-	ADJZ	*-kiʔi*	'get toasted'	*la-kiʔi*	'toasted'
xi-	POSS	*ītzáʔ*	'word'	*x-ītzáʔ*	'his/her language'

10.5. Clitics

Clitics are like affixes in that they cannot occur on their own. According to some scholars, the most salient and defining trait of clitics, unlike affixes, is that they may attach to hosts of various grammatical categories (Zwicky & Pullum 1983; Bickel & Nichols 2007: 174-175), which in some cases is due to their placement at phrasal

boundaries instead of word boundaries. This definition of clitics emphasizes syntactic factors. On the other hand, clitics are like words in that they are often just alternate forms of free-standing words, but they are phonologically deficient. Along these lines, other treatments of clitics focus on phonological factors instead of syntactic properties, defining clitics as "morphemes which are prosodically deficient or unusual in certain ways" (Aikhenvald 2007: 42).

Anderson (2005: 33-35) argues that the central distinction between affixes and clitics is that affixes are adjoined to stems within the lexical phonology and clitics join with their hosts later, during the post-lexical phonology. This approach nicely handles several of the commonly observed differences between affixes and clitics. For example, affixes tend to associate with stems of a particular category because they are part of word formation in the lexicon, while clitics tend not to be sensitive to grammatical category because the post-lexical phonology does not access the internal structure of words. This approach also accounts for why clitics tend to occur outside of any affixes and not among them or between a stem and an affix. The lexical-phonological nature of affixes also accounts for the fact that they may show gaps in their patterns of occurrence or have idiosyncratic shapes and/or meanings with certain lexemes, behaviors which are less common for clitics.

In Zenzontepec Chatino the difference between affixes and clitics is very stark and can be captured well in Anderson's (2005) framework. This does not mean that all languages are like this, nor does it rule out the possibility that something that is an affix may also be a clitic. That clitics are added at a later (post-lexical) level of phonology in

Zenzontepec Chatino is perhaps most clearly reflected in the play language *nch-akwiʔ tzūʔ ntīlú* ‘reversed speech’ (§5.9.3). The examples in (402) illustrate this.

(402)	Normal form		Reversed form	Gloss
	***nka**-xiti*	→	*xītí**nka***	‘laughed’
	***ju**ti=yu*	→	*tí**ju**=yu*	‘his father’
	***nka**-xiti=yu*	→	*xītí**nka**=yu*	‘he laughed’

The first example, ***nka**-xiti* ‘laughed’, is a verb inflected with the Completive Aspect prefix *nka-*, which, being the first syllable of the phonological word, is transposed to the end of the word in the reversed speech form. The second example, ***ju**ti=yu* ‘his father’, consists of the noun *juti* ‘father’ with the third person singular masculine pronoun encliticized to it, in an inalienable possession construction (§11.2.1). In the reversed speech form, the enclitic attaches only after syllable transposition occurs. The final example in (402) has the same verb as in the first but with both the aspect prefix and the enclitic pronoun attached to it. In that case, the aspectual prefix is transposed to the end of the verb root/stem, and only after that is the enclitic adjoined in final position.

The reversed speech data reflect the fact that affixes belong to the same phonological word as their stems, as defined by the many phonotactic patterns listed in Table 16 and phonological processes listed in Table 17. Clitics, on the other hand, behave as separate phonological words from their hosts, not participating in the domain of operation of any of those sound patterns.

Clitics in Zenzontepec Chatino also fit into the frequently observed pattern of clitics being relatively unrestricted in terms of grammatical category of their host. At first this might appear to be due to the fact that there is only one set of dependent pronoun

inflectional formatives in the language. The examples in (403) illustrate the 2PL enclitic pronoun *=wą* on forms of many categories: a noun, a topicalizer particle, a relational noun, a numeral, a quantifier, an interrogative pronoun, an adjective, a verb, and an adverbial enclitic attached to a verb.

(403)	*nyáʔa=wą*	Noun=2PL	‘your (pl.) mother’
	x-ītzáʔ tī=wą	Noun TPLZ=2PL	‘your (pl.) language’
	lóʔō=wą	Rel.Noun=2PL	‘with you (pl.)’
	tzúna=wą	Numeral=2PL	‘you three’
	tātīyá=wą	Quantifier=2PL	‘all of you’
	tukwi=wą	Interrogative=2PL	‘which of you (pl.)?’
	kuʔnā=wą	Adjective=2PL	‘you (pl.) are rich’
	nkwi-tyána=wą	Verb=2PL	‘you (pl.) searched’
	nkwi-tyána=tzoʔō=wą	Verb=Adverb=2PL	‘you (pl.) searched well’

It is not only enclitic pronouns that take a wide range of host categories, but adverbial enclitics do as well. The examples in (404) show the adverbial enclitic *=kāʔá* ‘also/again’ after a noun, a pronoun, adverbs, an adjective, a numeral, another adverbial enclitic, and a verb.

(404)	*kweʔę=kāʔá*	Noun=also/again	‘air also’
	nāáʔ=kāʔá	Pronoun=also/again	‘me too’
	laaʔ=kāʔá	Adverb=also/again	‘like so too’
	la kii=kāʔá	Adverb=also/again	‘tomorrow also’
	tzoʔō=kāʔá	Adjective=also/again	‘it’s also good’
	tzúna=kāʔá	Numeral=also/again	‘three also’
	tzaxī=ri=kāʔá	Adverb=Adverb=also/again	‘just a little also’
	nku-la=kāʔá	Verb=also/again	‘was born also’

The distinction between affixes and clitics is very sharp in Zenzontepec Chatino not only in phonological terms, but also in formal morphosyntactic terms because the only affixes in the language are prefixes, while the only segmental clitics in the language

are enclitics. Since the two types of morphemes attach from different directions, even when both occur on a single stem, in normal speech they are never in the same area with respect to the stem.

Since separate stems within compounds behave as separate phonological words, and so do enclitics, phonological clues are limited in some cases when trying to distinguish between a compound and a sequence of host plus clitic. For example, the compound verb *nka-ʔne+tzoʔō* 'fixed, repaired' (lit. 'make+good') would sound similar to the form *nka-ʔne=tzoʔō* 'did (it) well'. The semantics would provide the cue, since the compound is idiomatic but the host=clitic form is compositional in meaning. Nevertheless, there are some phonological criteria that set clitics apart form all other forms in the language, including compounds, since the processes of mid tone transformation (§3.4.3.3) and vowel fusion (§5.7) occur solely at the boundary of host and clitic. Compounds are defined on semantic and grammatical criteria and clitics are defined on phonological grounds.

Chapter 11

Lexeme classes

Word classes, commonly known as *parts of speech*, and here called lexeme classes, are an important aspect of the structure of a language, since much of the morphology and syntax operates with reference to them. A distinction is often made between lexical and grammatical word classes, or content words versus function words. Another distinction often made is that between open and closed classes, with only the former being able to readily accept new members. Though lexeme classes typically have some broad semantic coherence, such as nouns being words for people, places, and things, a robust characterization of lexeme classes in any particular language is only possible on morphological and syntactic (i.e. distributional) grounds (see e.g. Croft 2000 for general discussion).

The purpose of this chapter is to provide an overview of the lexeme classes of Zenzontepec Chatino, and some of the salient sub-classes within them. The classes are defined based on morpho-syntactic criteria and exemplified with textual data. The

treatment here is only brief, and many of the finer details of the topics touched on here are reserved for later work. There are four primary lexical classes, where "primary" is defined as classes whose members may function as predicates: verbs (§11.1), nouns (§11.2), adjectives (§11.3), and quantifiers (§11.4). Adverbs (§11.5) are not a definable class, but rather just a collection of the remaining words with lexical content that do not fit into any of the primary lexical classes. They cannot function as predicates. There are two other minor, marginally-lexical classes (§11.6), which are very small and specialized: vocatives and interjections. Particles (§11.7) are elements with grammatical function that are uninflectable and cannot serve as predicates. They include prepositions, tense/aspect/mood particles, nominalizers, conjunctions, and others.

11.1. Verbs

Zenzontepec Chatino verbs obligatorily inflect for aspect and mood, while words of other classes cannot do so. This is the criterion that most sharply sets verbs apart as a lexeme class. There are six morphological aspect/mood categories that verbs inflect for: Potential Mood, Habitual Aspect, Progressive Aspect, Completive Aspect, Stative Aspect, and Imperative mood. Some verbs do not inflect for all of these categories, but all verbs can be inflected for at least some of them. Other TAM (tense, aspect, and mood) inflectional categories exist in the language, but they are realized by free particles or combinations of particles with particular morphological aspect/mood categories.

Morphological aspect/mood inflection is typically realized by prefixes, which in some cases fuse with the stem, and in some cases are accompanied by tone pattern

alternations on the stem (Campbell 2011). The verb in (405) is inflected for Potential Mood by the prefix *ki-*, and the verb in (406) is inflected for Habitual Aspect with the prefix *nti-*. Tone is not part of the exponents of these categories in these two particular examples.

(405) *nto kitī* ***k-u-sāʔą́*** *chaja*
on paper POT-CAUS-be.attached[.3] tortilla
'On plastic sheets she'll make tortillas.' [historia1 19:44]

(406) *lēʔ* ***nt-u-lōó*** *nkuluʔ kiiʔ tya tuʔwa*
then HAB-CAUS-take.out[.3] ball fire to mouth[.3]
'Then, he took hot coals out of his mouth.' [kela ke kwiten7 3:49]

A few verbs happen to have no overt (segmental or tonal) marking for one or other of the aspect/mood categories, such as the verb 'give' in the Potential Mood (407), which has the exact same shape as the verb root. The Potential meaning is present even without the formal marking. Verbs with no formal marking of some aspect/mood category do have some overt marking for other aspect/mood categories, as in the Completive Aspect form of the same verb, which is realized by the prefix *nka-* (408).

(407) *nu-węʔ* ***tāá****=ą* *jį̄* *kuweʔ*
NMZ-NVIS **POT.give**=1PL.INCL NSBJ pig
'That (stuff) we will give to the pigs.' [siembra antigua 6:52]

(408) ***nka-tāá****=ūʔ* *jnē* *jiʔį̄*
CPL-give=3PL money NSBJ[.3]
'They gave him money.' [tres hombres 3:40]

11.1.1. Morphologically-based verb classes

Verbs are grouped into morphological sub-classes according to which allomorphs of the aspect/mood prefixes they select (Campbell 2011a). Though the phonological shape of a verb stem and its lexical semantics provide some clues about which prefix-class it belongs to, prefix-class membership is to some extent unpredictable. Verbs may also have varying tone patterns across aspect/mood categories, and these tonal alternations are not predictable from the aspect/mood prefixes, nor are they predictable from the shape of the stem or its meaning (Campbell 2013b). These two layers of morphological complexity (the prefixal layer and the tonal layer) combine to yield a system of about 50 non-singleton inflectional classes to which verbs may belong, based on their morphological aspect/mood inflection.

11.1.2. Semantically-based verb classes

Verbs may also be classified according to their semantics and syntactic behavior. In particular, verbs can be grouped with other verbs that have similar argument structure. For starters, verbs can be classed as intransitive (409) versus transitive (410), the former taking only one argument and the latter taking two. A few verbs are ditransitive, with up to three core arguments possibly realized (411).

(409) ***nk-y-ākǫ́ʔ*** *skwelā*
CPL-ITRN-close school
'The school closed.' [historia aurora 17:02]

(410) ***nte-t-ākǫ́ʔ****=wą* *niʔi=V́* *jiʔį̄=ya*
PRG-(CAUS)TRN-close=2PL house=DIST NSBJ=1PL.EXCL
'You (pl.) are closing our house there.' [amigo borracho 2:44]

(411) ***tyāá****=yu* *nu* *luʔu* *jiʔį̄=yu* *jiʔį̄* *na* *kwiniʔ* *laja=VʔV*
POT.ITER.give=3SG.M NMZ alive NSBJ=3SG.M NSBJ DEF person wild=NVIS
'He was going to turn in his life to the devil.' [mujer gana diablo 1:13]

Following Levin's (1993) work on English verb classes, verbs can be placed into an even finer-grained classification according to which valency alternations they participate in (Campbell *in press*). Such verb classes, which are based on syntactic and lexical semantic factors, show only minimal alignment with the morphological verb classes.

11.1.3. Postural verbs

Verbs of posture share special syntactic and semantic traits and therefore form a special sub-class of verbs. Their meanings are fairly fluid and may overlap with one another significantly. They may function as existential predicates (412), and their Stative Aspect forms often function as secondary predicates indicating posture or location of a noun (413).

(412) *wiʔ* ***nku-tūkwá*** *tzaka* *kétū* *nakwę* *kétū* *kyaʔā*
there CPL-be.inside one opening say[.3] hole mountain
'There was an opening there, they say, a tunnel.' [kela ke kwiten7 1:32]

(413) ***n-tákwì*** *nijyaą* *nto* *kweʔę* *nti-sesu*
STAT-be.suspended[.3] PRG.come[.3] face air HAB.turn.over[.3]
'When he came through the air **up above**, he flipped over.' [nu ntza7an 2:34]

11.1.4. Auxiliaries

Auxiliaries are a sub-class of verbs that add some additional dimension of meaning to the event denoted by a main lexical verb. Auxiliaries may be motion verbs (414), or they may add inceptive or terminative aspect, i.e. 'begin to *verb*' and 'finish *verb*ing'. One auxiliary is a causative derivation. Formally, auxiliaries are unique in that they form compounds with the main verb. The main verb follows the auxiliary and it occurs in a dependent form. The dependent form of a verb may be the verb with potential mood inflection, completive aspect inflection, or just the uninflected stem (Campbell in press). The aspect/mood inflection of the entire compound attaches to the auxiliary.

(414) ***tz-a***+*k-ī?yá=wą* *nta?ą* *jā* *k-aku=na*
POT-go+POT-transport=2PL fresh.corn CONJ POT-eat=1PL.INCL
'Go get some fresh corn so that we can eat!' [kwiti7yu 11:45]

11.2. Nouns

There are two main criteria that set nouns apart from other lexeme classes. First, nouns are the only words that may function as arguments of predicates, at least without first undergoing special modification or derivation. Second, nouns are the only class of words that can occur as either the possessor or the possessum in a possession relation, again at least without first undergoing some change in lexeme class.

The example in (415) has one noun in it, *kwijnya?* 'mouse', which functions as the subject of the verb 'passed by'.

(415) *ná keēʔ nku-tejẽ=kāʔá* ***kwijnyaʔ***
NEG while CPL-pass.by=also mouse
'Not much later a mouse also passed by.' [dos cuentos raton 3:16]

The utterance in (416) contains two nouns. The first word *kwāchíʔ* 'iguana' is a noun that functions as the direct object of the verb 'eat', and the enclitic first person plural exclusive pronoun *=ya* is the verb's subject.

(416) ***kwāchíʔ*** *nt-aku***=ya**
iguana HAB-eat=1PL.EXCL
'We would eat iguana.' [ntelinto itza7 30:18]

Example (417) shows the adjective *tikwę* 'long' used as an adjectival predicate. Its subject, and sole argument, is the compound noun *kitząʔ ke* 'her hair'.

(417) *tikwę* ***kitząʔ ke***
long hair head[.3]
'Her hair was long.' [mujer gana diablo 6:42]

Nouns too can function as predicates (418), but they cannot inflect for aspect/mood, which sets verbs apart from them.

(418) ***kwanā*** *tī nū-wą́*
thief TPLZ NMZ-DIST
'That guy is a thief.' [tres hombres 1:39]

Since adjectives and quantifiers may also function predicatively, and they cannot inflect for aspect/mood either, ability to function as a predicate is not reliable grounds on which to distinguish nouns from adjectives or quantifiers.

11.2.1. Alienably vs. inalienably possessed nouns

Possession relations not only help to define nouns as a class, but they also allow lexical nouns to be divided into two sub-classes: alienably possessed nouns versus inalienably possessed nouns. Alienable possession is exemplified in (419), where the possessum is *ntzukwāʔ* 'dried corn'. The possessor, *majmā* 'festival steward', follows the possessum but is immediately preceded by the Non-subject marker *jiʔį̄*.

(419) *nte-y-úkwāʔ* ***ntzukwāʔ*** *jiʔį̄* ***majmā***
PRG-ITRN-shell dried.corn NSBJ festival.steward
'The festival steward's corn is getting shelled.' [historia2 13:08]

Inalienable possession is expressed by juxtaposition of the two nouns, with the possessor immediately following the possessum. This is illustrated in (420), where the noun *juti* 'parents' is possessed by *nkwítzą* 'children'. Another example of inalienable possession is 'her hair' in (417) above, but the third person pronominal possessor in that case is not overtly expressed.

(420) *ki-xiʔya=ūʔ* *jį̄* ***juti*** ***nkwítzą*** *niī*
POT-shout=3PL NSBJ father child now
'…(so that) they call on the children's parents.' [lengua tlaco 53:50]

The sub-class of inalienably possessed nouns includes most body parts and kinship terms, along with a few other culturally significant assets that one might possess. In cross-linguistic terms, these are exactly the domains that are typically inalienably possessed in languages that have such a distinction (Nichols 1988). Some inalienably possessed nouns are derived from alienably possessed basic nouns.

11.2.2. Relational nouns

In languages with a distinction between alienable and inalienable possession, the latter construction is often also used for part-whole relations and/or spatial relations (Nichols 1988). This is the case in Zenzontepec Chatino, and in most other Mesoamerican languages (Campbell et al. 1986), where another sub-class of nouns can be identified: relational nouns (Kaufman 1971). An example of the relational noun *tzǫʔ* 'behind', which is grammaticalized from the body part 'back', is given in (421).

(421) *nkw-ise+teʔę=yu* ***tzǫʔ*** *lōʔó* *j-yū*
CPL-turn+be.located=3SG.M back fence NSBJ-3SG.M
'He returned to behind his fence.' [choo kwe7en 1:12]

11.2.3. Pronouns

A pronoun is a noun that may take the place of a noun phrase whose referent is recoverable via the discourse context or is otherwise not known or not important for the speaker's communicative purpose. The default personal pronouns in Zenzontepec Chatino are the enclitic dependent pronouns, which can stand in for nouns or noun phrases of any function within the clause. The enclitic second person plural dependent pronoun *=wą* is shown in (422), where it functions as the subject of the verb. In the same example, the enclitic first person plural exclusive pronoun *=ya* is the object of the verb, and it is attached to the Non-subject marker *jiʔī*.

(422) *ta* *k-isu=**wą*** *jiʔī**=ya***
PRF POT-pay NSBJ=1PL.EXCL
'…as soon as you (pl.) have paid us' [piedra rajada 1:51]

Independent pronouns are unbound phonological words, as exemplified by the second person plural independent pronoun *kwaʔą* (423). The third person independent pronouns are demonstrative pronouns, which are formed by combining demonstrative adjectives with the third person dependent pronouns or nominalizers. An example of a third person independent pronoun is *nū-wą́* in (424), which is a word formed by combining the nominalizer *nu* and the Distal demonstrative adjective *wá*.

(423) *wala y-aa tī* ***kwaʔą***
where CPL-go TPLZ 2PL
'Where did you (pl.) go?' [kwiti7yu 12:18]

(424) ***nū-wą́*** *ntē-s-áta* *jiʔį́*
NMZ-DIST PRG-(CAUS)TRN-chop.up[.3] NSBJ[.3]
'This (Spanish) is chopping it (Chatino) up.' [santa maria1 22:53]

11.3. Adjectives

Adjectives are a class of words that modify nouns by assigning some property to them. This semantic characterization, however, does not reliably distinguish them from verbs, as only formal and distributional criteria can do so. Adjectives may function predicatively, as in (417) above and (425). They cannot take aspect/mood inflection without first undergoing some derivation, which does distinguish them from verbs, but not from nouns or quantifiers.

(425) ***jlyālá*** *tī na wātá*
dangerous TPLZ DEF bovine
'Bulls are dangerous.' [historia2 6:24]

Two criteria serve to define adjectives as a class distinct from nouns. First, bare adjectives cannot function as arguments in a clause, which is the crucial defining property of nouns (§11.2). In (426) the adjective *luwe* ‘small (pl.)’ provides the semantic content of the verb’s subject, which is *nu luwe=ri* ‘just the small ones’. Crucially, the adjective is preceded by the nominalizer particle *nu*, which makes the string a noun phrase that can serve as the subject.

(426) *jā* *lēʔ* *k-atzu=kāʔá* *nu* ***luwe*=*ri***
CONJ then POT-burst=also NMZ small.PL=only
‘And then just the small ones will explode again.’ [historia2 7:07]

Second, adjectives cannot occur in a possession relation, another defining behavior of nouns in Zenzontepec Chatino.

Besides serving as predicates, the other primary function of adjectives is to attribute properties to nouns within noun phrases. Attributive adjectives follow the nouns that they modify, as exemplified by the adjective *kukwi* ‘new’ in (427).

(427) *kwi-tyūkwá* *jiʔɻ̄* *nanēʔ* *tzaka* *chinaʔ* ***kukwi***
IMP-be.inside NSBJ[.3] stomach one tortilla.basket new
‘Put it in a new tortilla basket.’ [kwena yata 6:03]

The attributive use of adjectives does not help much to distinguish them from nouns, since nouns that modify other nouns may occupy the same position, immediately following the modified noun. An example of a noun modifying a noun is in (428), where the noun *skwelā* ‘school’ modifies *niʔi* ‘house’. Many such noun pairs are lexicalized as compounds, but since component stems of compounds are parsed as separate

phonological words (§10.3), it is not always clear if a sequence of two nouns is a compound or not.

(428) *kulo niʔi* ***skwelā*** *nk-yāáʔ*
first house school CPL.be.made
'First a school was built.' [trabajo antigua 1:13]

Another fact that makes distinguishing nouns from adjectives sometimes challenging is that there is a fairly productive zero-derivation between the two classes. Really, the difficulty arises more in identifying the lexical class of the root and not necessarily the grammatical class of the word. For example, in (429) the word *taą* 'fat' is a noun since it functions as the direct object in both clauses. In (430), in contrast, the word *taą* 'fat' is an adjective in predicative use.

(429) *nte-lōó* ***taą.*** ***taą*** *nyatę̄* *nte-nījnyá*
PRG-(CAUS)take.out[.3] fat fat person PRG-(CAUS)use[.3]
'He was extracting fat. He was using human fat.' [nkwitzan ti7i 10:24]

(430) *ná* *lā-wīʔí* *ná* ***taą*** *nakwę*
NEG ADJZ-get.skinny[.3] NEG fat[.3] say[.3]
'They're not skinny, and they're not fat, he said.' [vaquero 3:09]

11.4. Quantifiers

Quantifiers in Zenzontepec Chatino, which include numerals, are a distinct lexeme class. The quantifier class is a closed class, while verbs, nouns, and adjectives are open classes. Quantifiers often occur in the noun phrase, and they modify a noun by specifying the number or quantity of the noun. They differ from adjectives in that they precede the modified noun instead of follow it, as in (431) and (432). The numeral

systems of Chatino languages are quite elaborate (Campbell & Cruz 2010) and can reach fairly large numbers (at least 400 or so).

(431) *nk-yāá=yu* ***túkwa*** *nyatę̄*
CPL-run.into two person
'He ran into two people.' [choo kwe7en 1:13]

(432) *ta* *nku-tá+sukwā* ***túʔwa*** ***tíi*** *nyájā* *nu* *n-tzuʔu=ą̄ʔ*
PRF CPL-become+be.lying forty ten year NMZ STAT-be.inside=1SG
'I now have fifty years (of age) completed.' [animales desaparecidos 0:28]

Quantifiers, like words of other main lexeme classes (verbs, nouns, and adjectives) may function as predicates. Like nouns and adjectives, but unlike verbs, they do not take aspect/mood inflection. The interrogative of quantity is the predicate in (433), as it is directly inflected with the subject pronoun. In the response in (433), the quantifier *kenaʔa* 'many' is the predicate, whose subject immediately follows it.

(433) a. ***lakwa****=wą* *xī* *tāká=wą*
how.many=2PL NMZ.LOC exist=2PL
'How many of you are there where you (pl.) live?' [naten7 michen 3:49]

b. ***kenaʔa*** *tī* *kwaa* *nī*
many TPLZ 1PL.EXCL now
'Well, we are many.' [naten7 michen 3:51]

11.5. Adverbs

Adverbs are not a coherent lexeme class but rather a collection of the words with lexical content that do not belong to one of the four coherent classes: verbs (§11.1), nouns (§11.2), adjectives (§11.3), and quantifiers (§11.4). In many cases, adverbs are zero-derived from words of the other lexical classes, as will be seen in some of the

following examples, but some adverbs have no counterpart in another lexeme class. What adverbs do all share is that they cannot take any inflection. They never function as predicates, and therefore, they cannot have arguments. This fact sets them apart from the other four lexical classes. In broad terms, adverbs modify the clause or some non-nominal element within it.

Though adverbs do not all together form a cohesive class, some groups of adverbs share similar function and distribution: manner adverbs, temporal adverbs, degree adverbs, locational adverbs, demonstrative adverbs. The discussion is only a sketch and it is not meant to be a thorough treatment of adverbs.

One class of adverbs are the **manner adverbs**, which tend to occur adjacent to the predicate, as does *tikwą* 'badly' in (434).

(434) *lyakwā* ***tikwą*** *nte-ʔne* *na* *nchīʔyú=V́* *ntii=ą̄ʔ*
why badly PRG-do DEF fruit=DIST HAB-feel=1SG
'I think "why is the fruit doing badly?"' [la familia 4:44]

Temporal adverbs provide information about when an event occurs. An example is *telā* 'at.night' in (435), which is a noun root that can function as an adverb without any overt derivation.

(435) *nteʔę=yu* *nā+neʔe* ***telā*** *nkuláā=yu*
STAT-be.located=3SG.M inside+house at.night CPL-escape=3SG.M
'He was inside (the jail), and he escaped at night.' [palyu 1:26]

Another class of adverbs is the **degree adverbs**, such as *tzaxī* 'a little bit' in (436). This particular adverb is zero-derived from a quantifier meaning 'few'. Some

adverbs are enclitics that attach to whichever word they are modifying, such as *=kāʔá* ‘also/again’ attached to the verb in both (436) and (438).

(436) *kikwiʔ**=kāʔá**=wą* ***tzaxī*** *nyāʔā*
POT-speak=also=2PL little.bit see.2SG
‘They may also speak a little bit, you see.’ [fundacion aurora 11:34]

Locational adverbs provide information about where an event occurs. An example is *tijyuʔ* ‘far away’ in (437).

(437) *ta* ***tijyuʔ*** *nk-ya+tyukwā* *tī* *na* *lyáā=Vʔ*
PRF far.away CPL-go+be.sitting TPLZ DEF opossum=NVIS
‘The opossum went to sit a bit further away.’ [cuento erh 2:10]

Demonstrative adverbs are a closed sub-class of locational adverbs that are deictic and specify the location at which some event occurs. An example is the Proximal demonstrative *nteē* ‘here’ in (438).

(438) ***nteē*** *nku-la**=kāʔá*** *nāáʔ* *nakwę*
here CPL-be.born=also 1SG say[.3]
‘I was born here too, he said.’ [kwentu nu ntza7an 1:34]

11.6. Minor lexeme classes

Two minor, somewhat lexical, lexeme classes are introduced in this section: vocatives (§11.6.1) and interjections (§11.6.2).

11.6.1. Vocatives

Vocatives are special words used to address an interlocutor. They are akin to nouns in that they refer to people, but they are not nouns because they cannot function as arguments or participate in possession relations.

(439) *chiīʔ* *tī* *nt-ii* *nuʔu* *kī-kwīʔ* *jnyá*
VOC.young COND HAB-feel 2SG POT-speak work
'Young one, if you want to, govern!' [historia1 28:16]

11.6.2. Interjections

Interjections are expressions of emotion that do not have any syntactic relation within a clause, such as *wow!* or *no way!* in English. An example of an interjection in Zenzontepec Chatino is *chukwī* 'wow!' in (440).

(440) *na* *kwitijyuū* *nch-aa* *wá* *chukwī*
DEF comet PRG-go there whoa!
'The comet went over there, wow!' [dos cuentos raton 3:01]

11.7. Particles

Particles are uninflectable, free words that have no referential capability and whose function is grammatical. They tend to be short, often monosyllabic and monomoraic. There is much to say about particles, but in this section only a few sub-types are briefly introduced: prepositions (§11.7.1), tense/aspect/mood particles (§11.7.2), nominalizers, relativizers, and complementizers (§11.7.3), and conjunctions (§11.7.4).

11.7.1. Prepositions

Prepositions are a small, closed class of words used to express the relationship of a noun phrase to an event. Most spatial and temporal relations in Zenzontepec Chatino are handled by relational nouns, and therefore prepositions are a minor lexeme class. Relational nouns are derived from nouns, while prepositions are not clearly related to any noun. One preposition, *tya* 'towards', is exemplified in (441), and another, *la* 'up to/until', is shown in (442).

(441) *nch-aa=ūʔ* ***tya*** *kē+kinī*
PRG-go=3PL towards Tututepec
'They went towards Tututepec.' [el brujo 0:06]

(442) *y-a+tūkwá* ***la*** *nto kyaʔā kwaą̄*
CPL-go+be.placed up.to face mountain high
'He went up to the top of the tall mountain.' [kwentu nu ntza7an 2:18]

11.7.2. TAM particles

Some particles provide a meaning having to do with tense, aspect, or mood, or a combination of them. These differ from the primary, morphological aspect/mood categories in not being obligatory and not being prefixal. One example is *tíʔ*, which is an Immediate Tense marker (443), and another example is *wílā*, which means 'not yet'.

(443) *n-tonēʔé* *nu* *chu* ***tíʔ*** *nte-tiyaa*
STAT-be.gathered NMZ NMZ.HUM IMM PRG-arrive
'Those who were just arriving were gathered together.' [nkwitzan ti7i 10:54]

(444) ***wílā*** *k-ū-kéʔ=ą̄ʔ* *jiʔį̄*
not.yet POT-CAUS-get.cooked=1SG NSBJ[.3]
'I haven't cooked it yet.' [historia medicina2 12:55]

11.7.3. Nominalizers, relativizers, and complementizers

Certain particles serve to derive noun phrases from other constituents. For example, the generic nominalizer *nu* occurs twice in (445), once before the adjective *tzoʔō* 'good' and again before the adjective *jnya* 'bad'. The derived noun phrases mean 'the good' and 'the bad', respectively. There is a special nominalizer of location, *xī*, which is exemplified in (446).

(445) *tātīyá* ***nu*** *tzoʔō* ***nu*** *jnya* *n-tzuʔu* *tī* *jiʔį* *tzelā+yuu*
every NMZ good NMZ bad STAT-be.inside TPLZ NSBJ world
'The world has all of the good and the bad.' [santa maria1 16:02]

(446) *lēʔ* *nkw-i-tyúʔu+xālá=ąʔ* *l-asiya=ąʔ* ***xī*** *n-tyatę=ąʔ*
then CPL-ITER-leave+dream=1SG ADJZ-be.lying=1SG NMZ.LOC HAB-sleep=1SG
'Then I woke up again, lying where I sleep.' [sueno nikolasa 6:36]

Nominalizers like those shown in (445) and (446) are employed as a fairly productive strategy for creating complex (phrasal) nominal lexemes. Some such complex lexemes are highly conventionalized, so there is little doubt that they are truly lexical items (447).

(447)

nu ntūlōó kwīnákwę̄	'camera', 'photographer'	(lit. what takes.out images)
nu teję̄ʔ	'glue'	(lit. what sticky)
xī lākúti ke	'fontanel'	(lit. where soft head)
xī nchuʔu jii	'ashtray'	(lit. where is.put ash)

The nominalizers also function as relativizers, and the complex lexemes in (447) can be viewed as relative clauses that are lexicalized as complex lexemes. In many cases it is not clear if a nominalizer particle is functioning as a nominalizer or as a relativizer, since in many cases such constructions are formally identical. This is not cross-

linguistically uncommon (see discussion and references in Comrie & Thompson 2007: 378). In some cases it is quite clear that the nominalizers are functioning as relativizers, as in the example in (448), where the direct object of the matrix clause is the head and subject of the relative clause.

(448) *tyána* *nāáʔ* *nyatē* ***nu*** *ʔne* *ti+joʔō*
POT.search.for 1SG person REL POT.do[.3] x-sacred
'I'll look for a person who can do a rite.' [kela ke kwiten7 1:22]

Nominalizers may also function as complementizers. In the example in (449), the object of the verb 'make' is *nu k-aku* 'what he was going to eat'.

(449) *nte-jnyā* *niʔ* *kūnáʔa* *nu* *k-aku*
PRG-(CAUS)make 3SG.RSP female NMZ POT-eat[.3]
'The lady was making what he was going to eat.' [escarabajo 3:43]

11.7.4. Conjunctions

Conjunctions function to join two constituents. I'll use the term conjunction here to include both coordinating and subordinating particles. The example in (450) is a conditional construction in which the first clause begins with the Conditional particle *tī* and functions as the "if" clause. The second clause is the "then" clause, and it begins with the conjunction *jā*.

(450) *tī* *laaʔ* *nu* *ná* *k-aku=ą* *nyāʔā*
COND like.so NMZ NEG POT-eat=1PL.INCL see.2SG

jā *ki-wīʔí=na*
CONJ POT-get.skinny=1PL.INCL
'If we don't eat, like that, you see, we'll get skinny.' [hist. medicina1 22:52]

The example in (451) contains a Concessive conditional dependent clause, which begins with the particle *maxi* ‘even if’, which is likely an old borrowing of the Spanish conjunction *mas si* ‘but if’ (§7.2.6). Modern Spanish no longer has the subordinator *mas* ‘but’.

(451) *tz-aa* *nāáʔ* *skwelā* ***maxi*** *léē* *nkū-súʔ=ą̄ʔ*
POT-go 1SG school even.if very CPL-get.old=1SG
‘I’ll go to school even if I’m very old.’ [historia1 8:43]

The discussion here just serves to provide a couple of examples of particles that function as clause connectors. This is an area of the syntax of Zenzontepec Chatino that is highly nuanced and will be treated in more depth in later work.

11.7.5. Other particles

There are a great number of other grammatical particles in Zenzontepec Chatino that will not be covered here since the purpose of this section is only to exemplify the basic facts about lexeme classes in the language. Even those particles discussed here were only handled in a fairly superficial way. The point here is that particles serve a wide range of grammatical functions. They do not inflect, and they do not all together share any distributional patterns. Therefore, particles do not form a coherent lexeme class like the main, and even the minor, lexical classes. A fuller treatment of particles will be handled in future work.

Chapter 12

Overview of verbal morphology

Zenzontepec Chatino verbs are the only words that inflect for morphological aspect or mood, and this property defines the lexeme class of verbs (§11.1). Aspect/mood inflection is obligatory, though for a few verbs the exponent of one or another of the aspect/mood categories is zero. Zenzontepec Chatino is a strongly head-marking language, and in line with this, the majority of the morphology in the language takes place on the verb, which is the head of the clause. The verbal morphology is mildly synthetic and mildly agglutinating with a bit of fusion. A fully elaborated verb can be quite long and morphologically and prosodically complex.

The purpose of this chapter is to briefly outline the morphological structure of verbs, providing textual examples that illustrate some of the many structures that verbs may have. In sum, this chapter is meant to provide a practical demonstration of how verbs work. Each of the areas discussed will be described in greater detail in later work, but the reader may consult Campbell (2011a; 2013b; in press) for detailed treatments of

several facets of verbal morphology in Zenzontepec Chatino. For the most part, the morphological structure of Zenzontepec Chatino verbs is templatic, that is, there are fixed slots in which elements of certain kinds can occur. The templatic representation is challenged only in cases of fusion involving elements in non-adjacent positions (§12.2.1; §12.2.3).

The Verbal Template is introduced in §12.1. The head of a verb is the verb root that provides the primary lexical content of the verb. The head root occurs in the Verbal Core along with three prefixal positions (§12.2). At the end of the Verbal Template there are adverbial and pronominal (subject) enclitic positions (§12.3). The Verbal Core may form a compound with another stem (§12.4), and there are two such types of compound verbs. In one type of compound verb the first component stem is the head verb in the Verbal Core and the second component stem follows it. Such verbs are compound verbal lexemes. In the other type of compound verb, the head verb in the Verbal Core is the second component stem and an auxiliary verb is the first component of the compound. The structure of verbs is summarized in §12.5, where a selection of the verbs throughout this chapter is represented in tabular format according to position in the Verbal Template.

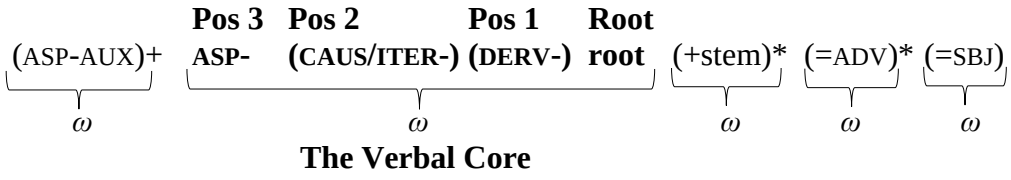
12.1. The Verbal Template

The verbal template is given in (452). The Verbal Core makes up a single phonological word (ω) and consists of the head verb root and three prefixal positions (adapted from Campbell in press, based in part on Kaufman 1987). Position 1, the closest to the root, may contain one of several derivational prefixes. Position 2 may contain one

of two derivational prefixes: the Causative prefix *u-* or the Iterative prefix *i-*. Position three contains the aspect or mood inflectional prefix. If the verb has an auxiliary, the auxiliary precedes the verbal core, forming a compound with it, making up a separate phonological word from the core, as all separate stems in compounds do (§10.3). A verbal lexeme may itself be a compound with the head verb root in the core and the incorporated stem (or stems) following it. Any such stems are separate phonological words. One or multiple adverbial enclitics may follow the simple or compound verb stem, and finally, a pronominal subject enclitic, if present, occurs last. Each enclitic is a separate phonological word.

Since the positions of the various elements within a verb are fixed, the entire Verbal Template is a single grammatical word (§10.2.2), though it may consist of many phonological words (§10.2.1). Since subject enclitics, if present, always occupy the final position of a verb, person inflection is a useful diagnostic for determining where exactly a verb ends.

(452) Zenzontepec Chatino Verbal Template (from Campbell in press)



The Verbal Core

As the diagram of the Verbal Template shows, the only obligatory elements of a verb are a root and aspect inflection in Position 3 of the Verbal Core. Therefore, a minimal utterable verb in the language contains just those two elements, except for the

few cases in which a verb has a null exponent of some aspect/mood category, in which case the utterable verb will have only one overt morpheme.

12.2. The Verbal Core: verb roots and their prefixes

The Verbal Core consists of the head verb root position in the Verbal Template and any prefixes attached to it in the three prefixal slots. Position 3, the one furthest from the root is the position of aspect/mood inflectional prefixes (§12.2.1). Position 2 (§12.2.2) and Position 1 (§12.2.3) are derivational prefix slots. They are part of lexeme formation, so in that sense they are also obligatory, if called for, though many verbs will not have any prefix in one or either of these positions. The examples in this section serve only to illustrate the morphological structure of verbs. The details of the semantics of the derivational processes, and their syntactic repercussions, are treated in Campbell (in press) and will be incorporated into an expanded version of this work at a later date. The complexity of aspect/mood inflectional patterns is not dealt with here either, but see Campbell (2011; 2013b) for more details on inflectional classes.

12.2.1. Position 3 inflectional morphology: aspect/mood

An example of a verb of minimal morphological complexity is in (453). There is no formal difference, segmental or tonal, between the verb root *-tāá* ‘give’ and its Potential Mood inflected form *tāá* ‘will give’ (*Ø-tāá*). Therefore, there is only one overt morpheme in the entire verb that a hearer has access to, though it is in fact inflected. Other inflectional categories do have formal exponents on the same verb, e.g. *nte-tāá* ‘is

giving' (Progressive Aspect), *nka-tāá* 'gave' (Completive Aspect), *n-tāá* (Habitual Aspect).

(453) *ná* ***tāá*** *ntyōsé* *tzáʔ* *kwēyáʔ*
NEG POT.give god word measure
'God will not give permission.' [lengua tlaco 29:47]

Only a handful of verbs are like *-tāá* 'give' in having some utterable inflected form that is identical in shape to the abstract form of the bare root. Most verbs of minimal morphological complexity consist of a simplex root and some aspect/mood prefix in Position 3 of the Verbal Core. An example is the verb *-isu* 'pay for' in (454), which has the *ki-* allomorph of the Potential Mood prefixed to it.

(454) ***k-isu*** *tī* *kwaʔą* *maxi* *kāʔyú*
POT-pay.for TPLZ 2PL even.if five
'You (pl.) will pay, even if only five (thousand pesos).' [historia2 3:49]

For some verbs, there is some fusion of aspect/mood morphology with the stem. For example, *y*-initial verbs in the Potential Mood, without exception, mark that category by replacement of the stem-initial *y* with *ch*. This is due to (an earlier) fusion of the Potential Mood prefix /k(i)-/ with the *y* of the stem (455).

(455) *wílā* ***chála*** *keē=VʔV*
not.yet POT.open.up flower=NVIS
'The flower had not yet opened up.' [santa maria2 12:02]

A few other examples of verbs that contain just a root and an aspect/mood prefix are in (456) and (457). In the former, the verb in clause-final position is *nte-xáʔā* 'are yelling'. It has the Progressive Aspect prefix *nte-* and the root *-xáʔā* 'shout'. The example in (457)

contains three verbs that consist only of roots with some allomorph of the Completive Aspect prefix, either *nku-* or *y-* prefixed directly to the simplex roots. In the verb *nku-jwī* 'was gotten' in (457), the initial /a/ of the root/stem is deleted by the /u/ of the prefix via vowel hiatus resolution (§5.3.1).

(456) *kwēyáʔ tī-kéʔ* ***nte-xáʔā***
time ADJZ-get.cooked PRG-shout[.3]
'At the hot time (of day), they (the bulls) are yelling.' [antes de aparatos 11:29]

(457) *lēʔ* ***nku-jwī*** *na kwítī=VʔV* ***y-aku*** ***y-oʔō***
then CPL-be.gotten DEF remedy=NVIS CPL-eat[.3] CPL-drink[.3]
'Then the remedy was gotten, (she) ate (it), and she drank it.' [ni7 mateya 6:07]

12.2.2. Position 2 derivation: Causative *u-* and Iterative *i-*

One of two prefixes may occupy the Position 2 derivational slot of the Verbal Core. One is the causative prefix *u-*, which adds an agent to the event expressed by the verb (Campbell in press). In the verb in (458) the Causative prefix in Position 2 causes the final vowel /i/ of the preceding Habitual Aspect prefix to delete (§5.3.1).

(458) *nu-wę́ʔ ta* ***nt-u-lōó*** *j-nā lúkwī=VʔV*
NMZ-NVIS PRF HAB-CAUS-take.out NSBJ-DEF mezcal=NVIS
'That one was already making the mezcal.' [lukwi historia 0:59]

The other prefix that can occupy Position 2 of the Verbal Core is the Iterative prefix *i-*, which is present in the clause-initial verb in (459). This example is a case of a verb that has all three prefix positions filled. The root is *-ākǫ́ʔ* 'cover', which has the Transitivizer prefix *t-* in Position 1, which is palatalized (§5.1.1) by the Iterative prefix in Position 2, which in turn is preceded by the Completive Aspect prefix *nkwi-*.

(459) ***nkw-i-ty-ākǫ́ʔ*** *tī na kūʔwí=Vʔ j-nā tuʔwa na lometā=Vʔ*
CPL-ITER-TRN-cover TPLZ DEF drunk=NVIS NSBJ-DEF mouth DEF bottle=NVIS
'The drunk closed the opening of the bottle again.' [amigo borracho 5:02]

12.2.3. Position 1 derivational morphology: valency

Position 1 of the Verbal Core may be occupied by one of a few derivational prefixes related to valency: the Intransitivizer prefix *y-*, and the Transitivizer prefixes *t-* and *s-*. These prefixes are not highly productive, and only certain verbs occur with them. For a more in-depth discussion see Campbell (in press). The verb in (460) contains the abstract root *-ánō* 'stay', 'be left', which cannot take aspect inflection directly without first undergoing some derivation. In this case the Intransitivizer prefix *y-* attaches to the root to derive the verb stem *-y-ánō* 'stay', which is then inflected with the Completive Aspect prefix allomorph *nk-* in Position 3.

(460) ***nk-y-ánō*** *na nkwítzą kíʔyū=Vʔ lóʔō juti*
CPL-ITRN-stay DEF child male=NVIS with father[.3]
'The child remained with his father.' [nkwitzan ti7i 0:32]

The verb in (461) consists of the uninflectable root *-akę* 'burn', which in this case takes the Transitivizer prefix *t-* in Position 1 to derive the active intransitive verb *-t-ákę̄* 'burn', which is then inflected with the Completive Aspect prefix *nku-* in Position 3.

(461) *lēʔ* ***nku-t-ákę̄*** *tī nu-węʔ*
then CPL-TRN-burn COND NMZ-NVIS
'Then that (house) burned.' [kwichi nkwaan 6:47]

Finally, in some cases there is fusion of a Position 3 inflectional formative with a Position 1 derivational prefix. The underlying form of the uninflected verb stem in (462)

is *-y-uʔu* ‘be put inside’. The Potential Mood is realized via a fusion of the prefix *k(i)-* and the initial *y* of the stem, which is the Intransitivizer prefix of Position 1.

(462) *nteē* ***ch-uʔu*** *tī* *na* *nkwītítzūʔ=VʔV*
here POT.ITRN-be.inside TPLZ DEF pineapple=NVIS
‘Here the pineapple will be put.’ [lukwi proceso 0:22]

12.3. Enclitics that follow the Verbal Core

Moving to the end of the Verbal Template we come to the positions that enclitics may occupy at the end of a verb. The most frequently filled enclitic slot is the final one, the subject pronoun position (§12.3.1). Before that, closer in to the verb stem, is the adverbial enclitic position, which can be filled iteratively (§12.3.2).

12.3.1. Subject enclitics

There is a single set of dependent, enclitic pronouns in Zenzontepec Chatino, and they may occur in place of a nominal constituent of any clausal function. They take hosts of various lexeme classes. As subjects, they may attach to verbs, adjectival predicates, nominal predicates, or quantificational predicates. As possessors they attach to nouns in inalienable possession constructions or to the Non-subject marker *jiʔī* in alienable possession constructions.

For the purpose of illustrating the structure of verbs here, just a couple of examples of enclitic subject pronouns attached to verbs are given, but there are several more on other verbs in this chapter (see Table 18). The first person plural exclusive

enclitic pronoun *=ya* occurs twice in (463): once on the verb *nt-ii* 'want', and again on the verb *k-u-xī-kąʔ* 'will tie up'. The latter verb also has all three prefixal slots filled.

(463) *nt-ii=**ya*** *k-u-xī-kąʔ=**ya*** *jį̄*
HAB-feel=1PL.EXCL POT-CAUS-TRN-tie.up=1PL.EXCL NSBJ[.3]
'We want to tie him up.' [naten7 michen 4:57]

There are three enclitic pronouns in (464): *=wą* (2SG), *=ą* (1PL.INCL), and *=na* (also 1PL.INCL). The first two of the three are subjects of verbs.

(464) *tī* *nt-ii=**wą*** *ki-chaa=**ą*** *tatīyá=**na***
COND HAB-want=2PL POT-arrive(there).BS=1PL.INCL all=1PL.INCL
'If you (pl.) want, we can all arrive there. All of us.' [kwiti7yu 3:08]

12.3.2. Adverbial enclitics

Adverbial enclitics occur between the Verbal Core and the verb-final subject enclitic position. There is a limited set of about a dozen adverbs that have these enclitic forms, some of which have a corresponding independent form as well. One of the most common adverbial enclitics is *=ri* 'only', whose free form is *ti* (465).

(465) *ki-jlyā=**ri*** *nū-wą́* *j-nā*
POT-get.smeared=only NMZ-DIST NSBJ=1PL.INCL
'That (mezcal) only gets smeared on us.' (i.e. we don't drink it) [historia2 8:34]

Another very frequently occurring adverbial enclitic is *=kāʔá* 'also/again'. In the example in (466), this adverb immediately follows the verbal root, and then the first person subject enclitic pronoun *=ą̄ʔ* follows the adverb.

(466) *nti-chaa**=kāʔá**=ą̄ʔ* *nyāʔā* *to+neʔe* *jy-ą́ʔ*
HAB-arrive(there).BS=again=1SG see.2SG mouth+house NSBJ=1SG
'I arrive there again, you see, at my house.' [cuento zopilote 1:03]

Multiple adverbial enclitics may occur between the Verbal Core and the subject enclitic. For example, in (467) the two adverbial enclitics *=ri* 'only' and *=kāʔá* 'again' just seen in (465) and (466), respectively, co-occur on the verb *nkwi-chaą̄* 'arrived here'.

(467) *nkwi-chaą̄**=ri=kāʔá*** *tī* *jnīʔ*
CPL-arrive(here).BS=only=again TPLZ child.2SG
'Your son has only arrived here again.' [nkwitzan ti7i 4:00]

12.4. Compounding in the Verbal Template

There are several types of compounds that occur within the Verbal Template. First of all, the main verb root may head a compound verbal lexeme (§12.4.1). Second, auxiliaries precede the Verbal Core, and the two often form a compound together (§12.4.2).

12.4.1. Compound verbal lexemes

Of the non-auxiliary compound verbs, there are several types. Some are quite idiosyncratic lexicalizations, for example the verb *-túʔu+jná* 'run' in (468), which is composed of the root *-túʔu* 'leave' and the root *-jná* 'flee'. It should be mentioned that

this is the basic word for ‘run’ in Zenzontepec Chatino and not merely an alternative way of expressing this basic verb meaning.[34]

(468) *jā* ***n-tyúʔu+jná*** *tī* *kwaa* *nakwę* *na* *sēné=VʔV*
CONJ HAB-leave+flee TPLZ 1PL.EXCL say DEF toad=NVIS
‘“We (excl.) run”, said the toad.’ [500 toads 0:15]

Another frequently-used lexicalized compound verb is *-asu+xíī* ‘wake up’ or ‘start the day’, which is composed of the verb root *-asu* ‘lay down’ and the noun *xíī* ‘light’. The former no longer occurs alone but is lexicalized in several other compounds and collocations. This compound verb is shown in (469), followed by three enclitics, two of which are adverbial, and the last of which is the subject pronoun.

(469) ***nku-su+xíī****=tzoʔō=kāʔá=na* *tzáą̄* *niī*
CPL-lay.down+light=good=again=1PL.INCL day now
‘We (incl.) have begun the day well again today.’ [rabo de hueso 0:24]

There is a productive process by which transitive (conversive) and intransitive (versive) verbs are derived from adjectives or adverbs by compounding them with generic verbs. The generic verb *-ʔne+* ‘do’ is used for deriving transitive verbs from adjectives or adverbs, and its counterpart generic intransitive verb *-akā+* ~ *-ā+* ‘become’, ‘be done’, is used to derive intransitive verbs. An example of the latter is the verb *-ka+kuʔnā* ‘become rich’ in (470).

[34] Other Chatino and Zapotec languages have cognates to the stem *+jná* that by themselves mean ‘run’, so that was the original verb of that meaning.

(470) ***nti-ka+kuʔnā***=*úʔ* *teluʔ=rā*
HAB-become+rich=3PL quickly=x
'They become rich quickly.' [santa maria 26:37]

12.4.2. Auxiliary constructions

Most auxiliary constructions are compounds in Zenzontepec Chatino. Auxiliaries precede main verbs and the two, together, form a compound. The auxiliary, being the initial element of the entire complex verb, takes the appropriate aspect/mood prefix for the entire event. The main verb, the postpound, is the Verbal Core. However, the main verb occurs in a fixed, dependent form in these compounds, which in addition to the root may include a Position 1 prefix, a Position 3 aspect/mood prefix (bleached of its meaning), or prefixes in all three of the pre-root positions. The dependent form of a verb is predictable knowing which aspect/mood-prefix-class it normally belongs to. Though the finer details of auxiliary compounds will be treated in later work, a few examples are provided here since they are part of verbal morphology and serve to illustrate some of the more complex verbal structures that occur in the language.

The most frequently occurring auxiliaries are verbs of motion, such as 'go', 'come', and 'go around'. An example is (471), where the main verb *-īʔyá* 'transport' is in its dependent form, with the Potential Mood prefix, and is preceded by, and compounded with, the auxiliary *y-a+* 'go to non-base'.

(471) *kenaʔa* *tī* *kwítī* *ta* *y-a+k-īʔyá=q̄ʔ*
a.lot COND remedy PRF CPL-go.NBS+POT-transport=1SG
'I have gone to get a lot of medicine already.' [historia medicina 47:33]

Another example with the same auxiliary meaning ‘go’, but inflected for the Potential Mood, is in (472). This verb hosts the adverbial enclitic *=jnáʔ* ‘forcefully’.

(472) ***tz-a+nēʔé=jnáʔ****=ą̄ʔ* *jį́* *nto* *kiiʔ*
POT-go.NBS+throw=forcefully=1SG NSBJ.2SG face fire
‘I’m going to go throw you forcefully in the fire.’ [dos cuentos raton 3:58]

Verb stems that are already compounds can also take auxiliaries, since the auxiliary position is distinct from the positions occupied by component stems of compounds. An example is in (473), where the main verb *-ʔne+tzáʔą̄* ‘study’ is composed of *-ʔne* ‘do’ and the noun *tzáʔą̄* ‘studies’ and has the andative auxiliary *-a+* compounded to it. It is therefore all together a compound of three stems.

(473) *tz-aa=yu* ***tz-a+ʔne+tzáʔą̄****=yu*
POT-go.NBS=3SG.M POT-go.NBS+do+study=3SG.M
‘He is going to go. He is going to go to study.’ [juan oso 0:29]

Another example of an already compound stem with an auxiliary is given in (474).

(474) ***cha+y-uʔu+seʔę****=na*
POT-go.BS+ITRN-be.inside+place=1PL.INCL
‘We are going to go rest.’ [historia1 4:40]

Besides motion verbs, the verbs meaning ‘begin’ and ‘finish’ function as auxiliaries. An example of the latter is in (475), where the main verb again is already a compound meaning ‘get drunk’. The dependent form of the head verb includes its Position 3 prefix for Potential Mood, though there is no Potential Mood semantics involved in the verb. It is purely formal.

(475) ***nkwi-ta+k-a+kūʔwí*** *tī na kwiniʔ laja=Vʔ*
CPL-finish+POT-become+drunk TPLZ DEF person wild=NVIS
'The devils finished getting drunk.' [amigo borracho 3:55]

One of the causative derivations in Zenzontepec Chatino is an auxiliary construction (Campbell in press). This is the Causative Auxiliary *-ē+*, which is exemplified in (476). In this case, the dependent form of the main verb in the Verbal Core has two of its prefixal positions filled: the Potential Mood prefix in Position 3 and the Causative *u-* prefix in Position 2, both of which are again semantically vacuous. That is, there is no double causation in the semantics of the event.

(476) ***nkw-ē+k-u-lákwi****=ūʔ* *j-nā* *ítā=Vʔ*
CPL-CAUS+POT-CAUS-boil=3PL NSBJ-DEF water=NVIS
'They boiled the water.'

Another example of the Causative Auxiliary *-ē+* is in (477). In this case, the dependent main verb 'get dressed' has all three of it Core prefixal positions filled, with no semantic content.

(477) *laaʔ l-aa* ***nkw-ē+k-u-tūʔú****=ūʔ* *jiʔi̱*
like.so STAT-be CPL-CAUS+POT-CAUS-TRN-be.inside=3PL NSBJ[.3]
'That's why they dressed her.' [4 bailes 6:11]

12.5. Summary of the morphological structure of verbs

This chapter has provided a brief overview of the morphology of verbs in Zenzontepec Chatino. It has focused solely on the formal dimension of verb morphology, and the semantics of the various structures has been largely excluded. The Verbal Template is characterized by the rigidity of the positions in which elements of various

distinct categories occur. There is also phonological evidence that provides clues as to the prosodic structure of the Template. For example, the Causative Auxiliary *-ē+* bears /M/ tone in the Progressive and Completive Aspects (477), which would not be possible if it occurred within the same phonological word as the head root (§3.3.6). Another auxiliary *-tá+* 'begin' has /H/ tone, which likewise would not be possible.

Table 18 contains most of the verbs in the examples used in this chapter to illustrate the structure of the Verbal Template. Each position in the Template is represented by a column. The example verbs are broken down morpheme-by-morpheme. They are cross-referenced to the source examples in the text in the leftmost column of the table. For reasons of space, verbs with multiple adverbial enclitics are omitted. The table is intended to offer a bird's eye view of the various internal structures that Zenzontepec Chatino verbs may have, from the most simple to the highly complex. Though no examples of verbs in which every slot is filled have yet been identified, it is in theory possible that such a verb could occur.

Table 18. Verb examples and Verbal Template positions

Ex. #	(ASP-	AUX+)	ASP-	(DERV-)	(DERV-)	Root	(+stem)*	(=ADV)*	(=SBJ)
(453)	—	—	*Ø*	—	—	*tāá*	—	—	—
(454)	—	—	*ki-*	—	—	*isu*	—	—	—
(458)	—	—	*nti-*	*u-*	—	*lōó*	—	—	—
(459)	—	—	*nkwi-*	*i-*	*t-*	*ākǫ́ʔ*	—	—	—
(460)	—	—	*nk-*	—	*y-*	*ánō*	—	—	—
(463)	—	—	*ki-*	*u-*	*xi-*	*ākąʔ*	—	—	*=ya*
(465)	—	—	*ki-*	—	—	*jlyā*	—	*=ri*	—
(466)	—	—	*nti-*	—	—	*chaa*	—	*=kāʔá*	*=ą̄ʔ*
(468)	—	—	*n-*	—	—	*túʔu*	*+jná*	—	—
(470)	—	—	*nti-*	—	—	*aka*	*+kuʔnā*	—	*=úʔ*
(471)	*y-*	*a+*	*k-*	—	—	*īʔyá*	—	—	*=ą̄ʔ*
(472)	*tz-*	*a+*	—	—	—	*nēʔé*	—	*=jnáʔ*	*=ą̄ʔ*
(473)	*tz-*	*a+*	—	—	—	*ʔne*	*+tzáʔą̄*	—	*=yu*
(474)	*cha+*		—	—	*y-*	*uʔu*	*+seʔę*	—	*=na*
(475)	*nkwi-*	*ta+*	*k-*	—	—	*a*	*+kūʔwí*	—	—
(476)	*nkwi-*	*ē+*	*ki-*	*u-*	—	*lákwi*	—	—	*=ūʔ*
(477)	*nkwi-*	*ē+*	*ki-*	*u-*	*t-*	*ūʔú*	—	—	*=ūʔ*

Chapter 13

Conclusion and looking ahead

This work presents an analysis of aspects of the phonology and morphology of Zenzontepec Chatino. It is part of ongoing research and work on the composition of a full descriptive grammar of the language. The approach to grammatical description taken here has several defining characteristics: inclusion of large amounts of data; careful argumentation and consideration of alternate possible analyses; typological grounding; historical, cultural, and ethnographic perspectives; extensive cross-referencing; and building the analysis from the ground up. However, this product is not entirely mature, and is best viewed as a stage along the way to providing a more comprehensive description of Zenzontepec Chatino grammar.

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