Juncture epenthesis in Filomeno Mata Totonac: prosodic constraints and syntactic conditions

by

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Abstract

This thesis describes and analyzes the occurrence of juncture epentheses at word boundaries in Filomeno Mata Totonac. In this language, when two consonants come together at a word boundary, a vowel is often inserted; and when a vowel and an oral stop come together at a word boundary, there is often an insertion of a nasal homorganic to the oral stop. However, these segmental conditions are not enough to predict when these epenthesis rules will apply. In previous descriptions of juncture epentheses, both in Filomeno Mata Totonac and in other Totonac languages with similar phenomena, junctures were attributed mainly to prosody. The most developed analyses go so far as to propose that juncture phenomena demarcate a prosodic domain.

In this thesis, I examine the distribution of juncture epentheses in Filomeno Mata Totonac to find out what conditions their occurrence and how accurate the predictions made by previous descriptions are. To do this, I analyze a small corpus of spontaneous speech by annotating it to mark its prosodic units and basic syntactic relations. Then I test the two main hypotheses that could be derived from previous descriptions: Hypothesis 1, which posits that juncture epentheses do not occur at Intonational Phrase boundaries; and Hypothesis 2, which posits that if there is a Prosodic Word boundary within an Intonational Phrase that is segmentally eligible for a juncture epenthesis (i.e., consonant–consonant or vowel–oral stop boundaries), this will trigger one. Hypothesis 1 correctly predicts the position of 87% of the nasal epentheses, and 81% of the vowel epentheses in the corpus. Hypothesis 2 correctly predicts 61% of the nasal epentheses, and only 45% of the vowel epenthesis in the corpus. Paying further attention to the cases unpredicted by the tested hypotheses—that is, juncture epentheses occurring at Intonational Phrase boundaries and Prosodic Word boundaries that are segmentally eligible for a juncture epenthesis but that do not have one—it becomes evident that the conditions for these epentheses are motivated at the lexical and syntactic levels.

I also evaluate the possibility that the exceptions to Hypothesis 2 (i.e., the word boundaries that are segmentally eligible for a juncture epenthesis but that do not have one) correspond to a prosodic domain larger than the Prosodic Word and smaller than the Intonational Phrase, following analyses of related phenomena in other Totonac languages. However, I argue that there is no conclusive evidence yet to support such a hypothetical prosodic domain in Filomeno Mata Totonac as there appear to be no other prosodic phenomena associated with it, and the fact that the distribution of many junctures is sensitive to very specific syntactic information. What ultimately conditions the application of juncture epentheses in the corpus is a set of lexical and syntactic conditions that are exhaustively presented in this thesis.

This is not to say juncture epentheses are unrelated to prosody. I also show that they are constrained not to occur inside the Prosodic Word or at Utterance boundaries; that they tend not to occur at Intonational Phrase boundaries (although this tendency is occasionally overridden by syntactic structure); and that their absence can be read as an Intonational Phrase boundary when other acoustic cues are weak. In other words, juncture epentheses do provide evidence of at least three prosodic levels in Filomeno Mata Totonac—the Prosodic Word, the Intonational Phrase, and the Utterance.

In conclusion, in this thesis I show that juncture epentheses in Filomeno Mata Totonac are constrained by prosodic factors, display strong prosodic tendencies, and play a role in how some prosodic levels are demarcated, but that their distribution is also determined by lexical and syntactic motivations that cannot be captured by a prosodic domain.

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This thesis was entirely written during the COVID-19 pandemic. Thankfully, this did not severely impact its methodology or development. Only, sometimes, the morale of its writer.

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Abbreviations

1, 2, 3	first, second, third person
AP	accentual phrase
CAUS	causative
CIT	citative
CNTR	counterexpect
COM	comitative
DAT	dative
DEM	demonstrative
DES	desiderative
DIST	distal
DTV	determinative
FMT	Filomeno Mata Totonac
FUT	future
GEN	generic
H	human
IDF	indefinite
IMPF	imperfective
INC	inchoative
INST	instrumental
IO	indefinite object
IP	intonational phrase
IRR	irrealis
IT	iterative
J	juncture
LOC	locative
MAN	manner
NC	numeral classifier
NEG	negative
NH	nonhuman
OBJ	object
PFT	perfect
PFV	perfective
PhP	phonological phrase
PL	plural
PLC	place
POSS	possessive
POT	potential
PRG	progressive
PROX	proximal
PST	past
PTC	particle
PWd	prosodic word
REL	relative
RT	round trip
SBJ	subject
SG	singular
TRN	transitivizer
U	utterance

1. Introduction

This thesis describes and analyzes the occurrence of vowel and nasal juncture epenthesis at word boundaries in Filomeno Mata Totonac. When a vowel and an oral stop come together at a word boundary, there is often an insertion of a nasal segment homorganic to the oral stop:

(1)	'this woman'	/amá puskát/	→	[amá **m** puskát]
	'because she's sick'	/špaalakáta tatatlámaa/	→	[špaalakáta **n** tatatlámaa]

(#03)[1]

When two consonants come together at a word boundary, a vowel is often inserted (2). When the consonant on the right side of the boundary is an oral stop, vowel epenthesis triggers a nasal epenthesis as well (3):

(2)	'your frog is not here'	/łaatiʔanán miwánqen/	→	[łaatiʔanán **i** miwánqen]
	'a frog'	/tantím wánqen/	→	[tantím **i** wánqen]

(#02)

(3)	'long bridge'	/łmáan puénte/	→	[łmáan **im** puénte]
	'later they came out'	/akalistáł tatáštu/	→	[akalistáł **in** tatáštu]

(#10)

However, these epenthesis rules do not apply at every word boundary that meets these segmental conditions. For example, both instances in (4) create a similar word boundary, but only in (4)a is there a juncture epenthesis:

(4)

a. [aqatím **iŋ** kíwiʔ]

aqa–tím	kíwiʔ
NC–one	tree

'A tree' (#06)

b. [aqtím káata]

aq–tím	káata
NC–one	year

'One year' (#04)

McFarland (2009) briefly describes juncture epentheses in Filomeno Mata Totonac as optional postlexical processes that take place in order to fulfill the segmental preferences that the language has at word and phrase boundaries. According to her description, juncture epentheses would occur

[1] Numbers given after data sets indicate the source in the corpus prepared for this sudy. A detailed description of the sources and specific materials used for this thesis can be found in §3.2.

in connected speech at most of the word boundaries that meet the minimal segmental conditions (i.e., the word boundaries that have one of the segmental transitions that are dispreferred by the language), and they would not occur at phrase boundary or prepausally. She acknowledges that these epentheses do not occur at all the eligible boundaries, but it is not further specified if there are specific contexts that can condition their occurrences and explain their distribution.

Juncture epentheses are not unique to Filomeno Mata Totonac; other Totonac languages show similar phenomena too. The available accounts of junctures in other Totonac languages (Juárez Esteban, 2020; Levy, 2020, 2015; Levy & Hernández-Green, 2018, 2021; Román Lobato, 2008; Moore, forthcoming) propose that junctures are better explained in terms of the Prosodic Hierarchy (PH). They propose that the distribution of epentheses can be attributed to a specific prosodic level in the PH, and that their function is mainly to demarcate that prosodic level. In these analyses, the junctures that are equivalent to these studied in this thesis are expected to occur at the boundaries of a prosodic unit larger than the prosodic word and smaller than the intonational phrase. They are also expected not to occur at the boundaries of intonational phrases.

It is important to note that both McFarland (2009) and the analyses based on the Prosodic Hierarchy consider a third process to be closely related to the juncture epentheses analyzed in this thesis. This additional process is the process of word-final glottal stop retention (or glottal stop insertion, depending on the analysis) at a phrase boundary or prepausally. This is a process related to juncture epenthesis and will be mentioned when relevant in the literature review, but it will not be analyzed in this thesis. To properly assess that process, it would first be necessary to determine the status of glottal stops and laryngealized vowels in the language, which is still unclear.

In this thesis, I study the distribution of juncture epentheses and evaluate the claims made by previous studies by examining the contexts under which junctures epentheses regularly occur. Then I evaluate whether their distribution is arbitrary or if there are determining factors that condition their application and what the nature of these factors is. To do so, I analyze a corpus consisting of sixteen recordings of spontaneous speech that I chose at random from the data collected by Teresa McFarland during fieldwork, and which are available to the public at the California Language Archive (García Cortés et al., 2020). I annotated the textual corpus to mark prosodic units and basic syntactic

structures, and then examined the contexts where the epentheses occur to compare them to those where they do not.

My analysis of the annotated corpus shows that, by looking at the contexts where junctures can or cannot occur, we can see that many parts of the grammar are involved in their distribution. Junctures are indeed constrained by prosodic factors, have strong prosodically defined distributional tendencies, and they can play a role on how certain prosodic units are demarcated. However, big part of what determines their application is a set of lexical and syntactic conditions that will often override some of these prosodic tendencies. I also evaluate the approaches taken by previous accounts of juncture phenomena in other Totonac languages which posit a mid-level unit the in PH to find out if the distribution of junctures in FMT can be better explained in this way. In the end, however, I reject the addition of such mid-level prosodic unit in Filomeno Mata Totonac due to a lack of conclusive prosodic evidence to support it.

1.1 Filomeno Mata Totonac

Filomeno Mata Totonac (henceforth FMT) is a polysynthetic, highly agglutinating, head marking language with VSO basic order that is a language spoken in Veracruz, Mexico (McFarland, 2009). According to the INEGI census, in 2010 it had 14,565 speakers, of which 32% were monolingual.[2] It is a member of the Totonac-Tepehua language family, and it is classified as belonging to the Sierra-Lowland branch of the Totonac family. Figure 1 below illustrates the distribution of Totonacan languages highlighting the location of Filomeno Mata.

[2] http://ceieg.veracruz.gob.mx/wp-content/uploads/sites/21/2019/06/Filomeno-Mata_2019.pdf

Figure 1: Map of Totonacan languages (Beck, 2014).

Currently, the most extensive description of its phonology and morphology is McFarland (2009), on which a big part of the analysis in this thesis was based. The consonant and vowel inventories are presented in Table 1 and Table 2, respectively.

	labial	coronal			dorsal		glottal
stops	p	t			k	q	ʔ
affricates		ts	č	tl			
fricatives		s	š	ɬ	x		
nasals	m	n					
oral sonorants					y	w	
taps		(ɾ)					

Table 1: Filomeno Mata consonant inventory (McFarland 2009)

	front		central		back	
high	i	ii			u	uu
mid	(e)				(o)	
low			a	aa		

Table 2: Filomeno Mata vocalic inventory (McFarland 2009)

McFarland reports that, unlike other Totonac languages, FMT does not make a consistent distinction between modal and non-modal vowels, although this assessment is not accepted by other Totonac specialists (Beck, p.c.)[3]. However, it is not the purpose of this thesis to suggest changes or corrections to her description of the segmental phonological system of the language. For that reason, in this thesis I will follow McFarland's (2009) phonemic inventory as provided in her dissertation, as well as her choice of employing Americanist phonetic notation to represent it.

The vowel system shown in Table 2 is quite simple: three vowel qualities with length distinction plus two marginal vowels (shown in parentheses) that occur mostly in loanwords (McFarland, 2009:20), but while the overall phonemic inventory is simple, the language allows for very complex syllable types. The minimal syllable is CV and the maximal syllable is CCCVVCCC. Table 3 below shows the permitted syllable types and an example of each:

CV	*la*	's/he lives'
CVV	*čaa*	's/he cooks it'
CVC	*tanʔ*	'you go'
CCV	*štu*	'be out'
CCVV	*staa*	's/he sells it'
CCVC	*spun*	'bird'
CCVCC	*stunk*	's/he straightens it'
CVCCC	*čimpš*	's/he blinks'
CCCVC	*kstak*	'I grow'
CVVC	*qa**wáač***	'boy'
CVVCC	***lóonq**ni*	'cold'
CCCVVCCC	*kɬqoonqɬ*	'I snore'

Table 3: Syllable types in FMT (McFarland, 2009:24)

[3] Also, McFarland (2009) argues that vowel laryngealizations have a very light lexical load and does not regularly transcribe them neither in her thesis nor in her fieldwork materials, but the status of non-modal voice is somewhat unclear. (Santiago, 2012:25) mentions that FMT *has* laryngealized vowels and presents a few minimal pairs of laryngealized and modal vowels. However, he does not elaborate on the phonemic status of non-modal vowels, nor he openly counterargues McFarland's (2009) representation of the vocalic inventory.

All the consonant clusters that the language allows, along a thorough description of its phonotactics restrictions can be found in McFarland (2009:23).

1.2 General outline

This thesis is organized as follows. In Chapter 2, I review the literature of the Prosodic Hierarchy, its motivations, and basic tenets; I also review Domain Rules, which apply over prosodic domains defined by the Prosodic Hierarchy. Also in Chapter 2, I give an overview of previous accounts and analyses of juncture phenomena in Totonac languages: these include the initial description of junctures for FMT, as well as the descriptions of junctures in three other Totonac languages making use of the Prosodic Hierarchy. I end Chapter 2 by standardizing and comparing the different rules proposed in all four previous works.

In Chapter 3, I put forward two hypotheses to be tested, both of a prosodic nature. These are based on the observations in McFarland (2009) but are reformulated in terms of Prosodic Domains, which in turn allows us to reconcile her observations with the other description of Totonac junctures which employed the Prosodic Hierarchy. Also in Chapter 3, I discuss the sources of the data used, how the prosodic annotation was done, and how exactly the counts in the corpus were made.

Chapter 4 is divided in three parts. In the first part, I present the general results. In the second part, I show at what type of prosodic boundaries juncture epentheses tend to occur the most. The third part of the chapter is concerned with cases where junctures are not distributed as predicted by the hypotheses in Chapter 3. These instances are treated as exceptions and are classified as regular or irregular exceptions. Regular exceptions are those that hold throughout the corpus and that can therefore be predicted, and the irregular exceptions are those that show more variation. As I will argue, most of these exceptions are syntactically driven.

Chapter 5 is also divided in three parts. In the first part, I present the prosodic generalizations that can be drawn from the results, and propose additional considerations that enhance the predictions made by the initial hypotheses. In the first part of this chapter, I also address how the addition of a mid-level prosodic unit demarcated by junctures would operate. In the second part of Chapter 5, I summarize the lexical and syntactic generalizations that ultimately condition the application of juncture rules. In the last part of this chapter, I discuss the reasons why these lexical

and syntactic conditions cannot be captured by the addition of a mid-level prosodic unit as proposed in previous accounts.

Chapter 6 is the conlcussion to the thesis.

2. Literature Review

Juncture phenomena have been documented in the literature for a number of Totonacan languages, especially in the Sierra varieties. Attempts to describe these phenomena and to account for their behavior range from rough descriptions to more elaborate accounts that have approached juncture phenomena by referring to the Prosodic Hierarchy and to domain-sensitive rules.

In the first part of this chapter, §2.1, I will give a short overview of the Prosodic Hierarchy. In §2.2 I will briefly review different types of domain sensitive rules. In §2.3, I will give an overview of the different accounts and descriptions of the juncture and boundary phenomena in four Totonac Languages: Filomeno Mata in §2.3.1, Ozelonacaxtla in §2.3.2, Coatepec in §2.3.3, and Coahuitlán in §2.3.4. Finally, in §2.4 I will summarize and compare these analyses.

2.1 The Prosodic Hierarchy

Prosodic Hierarchy Theory posits that speech is organized hierarchically into phrases of different levels. The most widely known version of the theory was developed in detail by Selkirk (1980a, 1980b) and later extended by Nespor and Vogel (2007). Under this theory, in essence, lower-level units of speech are grouped into larger units, which are in turn grouped into even larger units, and so on for several levels. This phrasing is determined by syntactic structure to some extent, but it is not isomorphic to it.

That prosodic and syntactic phrasing are different is one of the pillars of the Prosodic Hierarchy as initially conceived. This is because many phonological rules refer to domains that do not correspond to syntactic constituents, and in many cases these rules are better explained by referring to prosodic domains. In this regard, the Prosodic Hierarchy has proven useful in accounting for phonological rules whose distributions do not uniformly match syntactic structures (Hayes, 1989; Nespor and Vogel, 2007; Selkirk, 1980a, 1980b, 1984).

There have been several takes on the Prosodic Hierarchy. Different authors employ different units in the hierarchy, and the definition of some of these units also varies according to the author. A helpful overview of the most widely-used accounts of the Prosodic Hierarchy is Shattuck-Hufnagel and Turk (1996), who compare various models and their units. Most of the major differences among the proposed models of the Prosodic Hierarchy are in their mid-level units, but there is fairly good agreement about their highest constituents (i.e., the Utterance and the Intonational Phrase) and

about their lowest ones (i.e., moras and syllables). In this section, I will briefly discuss the prosodic units that are relevant for this study, from the largest to the smallest.

The largest constituent in the Prosodic Hierarchy is the **Utterance** (U). The U is the largest unit that can be the domain of a phonological rule and is the maximal sequence between meaningful non-hesitation pauses (Hayes, 1989). It often matches a full syntactic sentence, but in some languages, under certain conditions it can contain more than one. In these cases, two syntactic sentences can belong to the same U only if they are adjacent, uttered by the same speaker to the same addressee, and if, in addition, they are related syntactically by ellipsis or anaphora, or if they could be linked by one of the logico-semantic connectors *and*, *therefore*, or *because* (Nespor and Vogel, 2007:237). This definition can vary across languages and depending on the author.

The unit immediately below the U is the **Intonational Phrase** (IP). This is possibly the most intuitive unit of the hierarchy. The IP is delimited by an intonational contour whose boundaries are perceptually clear and coincide with the positions where a pause *could* be inserted. Note that an IP boundary does not necessarily entail an audible pause, but an audible pause does entail an IP boundary. The IP is not isomorphic with any syntactic constituent, but there is a tendency for certain syntactic constituents, such as parenthetical expressions, non-restrictive relative clauses, vocatives, expletives, and certain dislocated elements, to form their own IP (Nespor and Vogel, 2007). Different types of IPs (e.g., interrogation, hesitation, or continuation IPs) have different types of intonation patterns, and these patterns can widely vary depending on several factors, such as speech rate, register, or mood.

What the units immediately below the IP are varies depending on the model of the prosodic hierarchy proposed by the author. Selkirk (1980a) proposes that the unit immediately below the IP— and immediately above the Phonological Word— is a **Phonological Phrase** (PhP) that groups a syntactic phrasal head with its specifier, and a "non-lexical" constituent (e.g., determiners, prepositions, auxiliaries) with its sister constituent. This was only an initial proposal; Selkirk's PhP evolved in different ways throughout the years. In later proposals, Selkirk's PhP is divided into two Phrases, Major and Minor PhP. The Major PhP aligns with one of the edges of a non-lexically governed maximal syntactic projection as a whole, and the Minor PhP with one of the edges of the head of the maximal projection (Hale and Selkirk, 1987). On the other hand, Nespor and Vogel (2007) propose a

PhP that groups a lexical head and all the elements on its non-recursive side up to the next head outside of the maximal projection. With slight but significant differences, these proposed PhPs are all, in essence, defined by syntactic structure. However, despite the syntactic components in the definition of the proposed PhPs, none of them is equivalent to a specific syntactic category, nor do they make direct reference to them; instead, they generalize across *maximal projections*.

In addition to the PhP, other mid-level units have been proposed. In Nespor and Vogel's (2007) model, the PhP is the level immediately below the IP but, unlike Selkirk's model, it is not immediately above the Phonological Word. Immediately below the PhP and above the Phonological Word, they propose a **Clitic Group**, a unit constituted by a content word and, if any, associated clitics and some adjacent function words. Another proposed mid-level unit is the **Accentual Phrase** (AP), which in some descriptions corresponds to a unit composed by one or more Phonological Words but with no more than one pitch accent (Beckman and Pierrehumbert, 1986). The AP is also described as a unit composed by one or more content words with, optionally, their adjacent function words, and which is demarcated by primary stress (Jun and Fougeron, 2002).

The next unit down in the hierarchy is the **Phonological Word** (PWd). Depending on the model one follows, this unit is immediately below the PhP, the Minor Phrase, the AP, or the Clitic Group. It is roughly equivalent to a morphosyntactic word, although there is a lot of disagreement about what exactly constitutes a PWd. In some instances (e.g., in the analysis of demotic Greek) the PWd is by rule isomorphic to the morphosyntactic word or to the terminal element of a syntactic tree (Nespor and Vogel, 2007:110). In other languages, the PWd domain can be smaller than the morphosyntactic word, and it can be defined as the domain of, for example, primary stress assignment. In these latter cases, isomorphism with the morphosyntactic word may still often occur, but only coincidentally (Nespor and Vogel, 2007:117).

Another of the most salient disagreements among the different approaches to PWd formation is the treatment of function versus content words. In some accounts (for example, the ones that use the Clitic Group), both content and function words can form their own PWds. In other accounts, only content words can form their own PWd, while function words and clitics are either part of the same PWd with their adjacent content words, or they are left out of the PWd and are later attached to a phrase in the postlexical component of the grammar (Shattuck-Hufnagel and Turk, 1996).

There is, as with the larger units, a better agreement on what the units below the PWd are: feet, syllables and moras. Unlike the units in other levels in the hierarchy, these units are defined purely in terms of phonological components. The **Foot**, the unit immediately below the PWd, is a rhythmic constituent of prominence. It is usually formed by one or two syllables in which one of them is more prominent than the other. The unit immediately below the Foot is the **syllable**, which is composed of a nucleus (most often vocalic) and its associated consonants in onset or coda position. Finally, the unit below the syllable is the **mora**, a unit of syllabic weight. Usually, only syllable nuclei and codas can be moras (Goldsmith, 1995).

These are the most relevant units in the Prosodic Hierarchy. It should be noted that these units are justified as prosodic constituents if they are needed for rule formulation or if there are other phenomena associated with them. They have been found to be relevant to the description of many rules in different languages, but that does not mean all units will be equally relevant in all languages. Their definition and constituency can also vary slightly across languages.

As mentioned above, the Prosodic Hierarchy theory assumes that prosodic phrasing, while constrained to some extent by the syntax, is not identical to syntactic phrasing. Syntactic phrasing is by its nature hierarchical, but there is a fundamental difference between the syntactic and prosodic hierarchies, and that difference lies in the relationship between constituents at adjacent levels (Shattuck-Hufnagel and Turk, 1996). The standard Prosodic Hierarchy theory follows the Strict Layer Hypothesis presented in (5):

(5) STRICT LAYER HYPOTHESIS. The categories of the Prosodic Hierarchy may be ranked in a sequence C_1, C_2, … C_n, such that a. all segmental material is directly dominated by the category C_n and b. for all categories C_i, i ≠n, C_i directly dominates all and only constituents of the category C_{i+1}.

(Hayes, 1989:204, based on Selkirk, 1984)

What the Strict Layer Hypothesis requires is that, for example, in a hierarchy where the three largest constituents are, in this order, the Utterance, the Intonational Phrase and the Phonological Phrase, the Utterance has to directly dominate at least one Intonational Phrase, and this Intonational Phrase has to directly dominate at least one Phonological Phrase. The Utterance cannot dominate another Utterance or skip the Intonational Phrase to dominate a Phonological Phrase directly. The same

phrasing rules would apply for all the levels down of the hierarchy. This phrasing is exhaustive and non-recursive. Only elements of the same type of unit can be sisters; a higher-level unit X can only dominate units of one type, Y, disallowing recursion. This differs from syntactic structures, where a unit X can dominate several different types of units, including other Xs, allowing recursion. Recursion in prosodic phrasing has been recently discussed as a favorable possibility for phonological analysis (Elfner, 2018; Selkirk aet al., 2011); however, these latter accounts will not be discussed in detail in this thesis.

This difference between prosodic and syntactic phrasing is one of the reasons that leads to non-isomorphic constituency (Nespor and Vogel, 2007). Specific prosodic constituents do not correspond to particular syntactic constituents, but they are still clearly related. Certain syntactic constituents show a strong tendency to correlate with certain prosodic units, which allows us to make some predictions about how they will be uttered, and, in turn, prosodic structure can disambiguate utterances that would otherwise be syntactically ambiguous. However, syntax alone cannot predict how a sentence will be uttered, just as the prosodic structure of an utterance does not always match its syntactic phrasing.

2.2 Domain Rules

The Prosodic Hierarchy allows us to formulate rules whose domain of application is not a syntactic phrase but a prosodic one. Following Selkirk (1980b), these rules fall into three different formal types—domain span rules, domain juncture rules, and domain limit rules.

Domain span rules are restricted to a certain prosodic domain and apply across it regardless of how it may be subdivided into lower prosodic domains. In abstract terms, domain span rules have the form in (6):

(6) $A \rightarrow B \ / \ (\ldots \varphi \_\_ \psi \ldots)_{Di}$ (adapted from Selkirk, 1980b: 111)

In (6), A and B are segments (possibly empty, ∅), φ and ψ are strings (also possibly ∅), and D_i is a prosodic domain. If, for example, D_i were the IP, that would mean that the rule (A→ B) would take place anywhere within the boundaries of the IP, regardless of whether it occurs at a PhP, PWd, Foot, or syllable boundary, as long as the segmental environment it requires for its application, $(\varphi \_\_ \psi)_{IP}$, is contained by the same IP.

Domain juncture rules are more specific, as they occur only at constituent boundaries when two neighboring units of the same level in the hierarchy are contained by a larger constituent. In abstract terms, domain juncture rules have the form of (7).

(7)

a. $A \rightarrow B \ / \ (\ldots(\ldots\varphi\_\_)_{Dj}\ (\psi\ldots)_{Dj}\ \ldots)_{Di}$

b. $A \rightarrow B \ / \ (\ldots(\ldots\varphi)_{Dj}\ (\_\_\psi\ldots)_{Dj}\ \ldots)_{Di}$ (adapted from Selkirk, 1980b: 112)

In (7) D_j is a smaller prosodic domain contained by a larger D_i domain. A and B are segments, and φ and ψ are strings (all of which can be ∅).[4] Domain juncture rules can occur at the edge of either the left (7)a or the right constituent (7)b.[5]

If, for example, in the rule in (7)a D_j were the PhP, and D_i the IP, then the transformation A→ B would only take place if two consecutive PhPs that fulfill the required environment are contained by the same IP: $((\ldots\varphi\_\_)_{PhP}(\psi\ldots)_{PhP})_{IP}$. It would not occur if these two PhPs belonged to different IPs: $((\ldots\varphi\_\_)_{PhP})_{IP}((\psi\ldots)_{PhP})_{IP}$, or if the required environment $(\ldots\varphi\_\_)(\psi\ldots)$ was fulfilled at minor boundaries that are not the PhPs, for example at $(((\ldots\varphi\_\_)_{PWd}(\psi\ldots)_{PWd})_{PhP})_{IP}$. In other words, domain juncture rules are sensitive not only to the prosodic domain in which they operate, but also to the larger domain that contains it.

Lastly, **domain limit rules** apply to one or the other end of a prosodic domain, regardless of its relationship with other domains. These can apply at the right (8)a or left (8)b edge of a constituent. In abstract terms, domain limit rules have the form of (8)[6].

(8)

a. $A \rightarrow B \ / \ (\ldots\varphi\_\_)_{Di}$

b. $A \rightarrow B \ / \ (\_\_\varphi\ldots)_{Di}$ (adapted from Selkirk, 1980b: 112)

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[4] In fact, Selkirk's (1980b) original formulation includes three possible strings, with the original rule forms of (7) being $A \rightarrow B \ / \ (\ldots(\ldots\varphi\_\_\psi)_{Dj}\ (\omega\ldots)_{Dj}\ \ldots)_{Di}$, and $A \rightarrow B \ / \ (\ldots(\ldots\varphi)_{Dj}\ (\psi\_\_\omega\ldots)_{Dj}\ \ldots)_{Di}$. However, since in all the domain juncture rules discussed later in this chapter the string ψ of the original formulations is always ∅, I simplified the rule forms as shown in (7).

[5] Technically, juncture rules occur within one of the two neighboring D_j constituents, not between the two of them as unparsed or unaffiliated material. Throughout this thesis, especially when addressing the types of syntactic constituents and syntactic relations that condition Totonacan juncture epentheses, the discussion focuses on *between* what type of syntactic constituents junctures occur, although strictly speaking they would actually occur within one of the two constituents. In the case of FMT juncture rules, they occur within the constituent at the left side of the boundary.

[6] Similar to the rules in (7), Selkirk's (1984) original formulation includes an additional string, with the original forms of (8) being $A \rightarrow B \ / \ (\ldots\varphi\_\_\psi)_{Di}$ and $A \rightarrow B \ / \ (\varphi\_\_\psi\ldots)_{Di}$., but since in the rules discussed in this chapter the outermost string is always ∅, I simplified the rule forms as shown in (8).

In (8) the transformation (A → B) can only take place at one of the boundaries of a domain D_i. So, if for example, in (8)a D_i were the IP, the rule could only occur if the required environment is fulfilled at the right boundaries of an IP: $(\ldots\varphi\_\_)_{IP}$, but it would not occur at minor boundaries that are not simultaneously an IP boundary, for example at $((\ldots\varphi\_\_)_{PhP}(\ldots)_{PhP})_{IP}$.

In the study of Totonacan juncture phenomena that will be presented in the following sections, domain juncture and domain limit rules will be relevant.

2.3 Previous descriptions of juncture phenomena in Totonac languages

In this section I will summarize the descriptions and analyses of boundary phenomena in the Totonac of Filomeno Mata, Ozelonacaxtla, Coatepec, and Coahuitlán. The four analyses were carried out by different people, using different approaches and different terminologies and notations. In each subsection, I will summarize the processes described for each language using a unified notation for better comparison. At the end of this chapter, I will compare the rules proposed by the different authors for each language, and the relevant prosodic domains used in their formulation.

2.3.1 Filomeno Mata Totonac

In her doctoral dissertation, McFarland (2009) identified a series of postlexical phenomena that occur at word and phrase boundaries. These consist of three different types of epenthesis: nasal epenthesis, vowel epenthesis, and a glottal feature epenthesis. All three types of epenthesis are illustrated in the example in (9):

(9) [šaqačipaníi **n** tsamáɬ **i** xúuk**ʔi̥**]

š–aqa–čipa–nii	n	tsamáɬ	i	xúuki̲
PST–head–grab–PFT	J	DEM	J	deer

'He had grabbed the deer by its head'[7]

(#02)

[7] Note that in this example the nasal and vowel epentheses are glossed as J, *juncture*, and treated as elements that do not belong to the words they are phonetically attached to. On the other hand, the glottal feature epenthesis is not entirely being glossed as such, but rather as part of the word it is associated with it, as seen in the last word in (9). Although the status of this final glottal features (treated as lexical by some and as epenthetic by McFarland) is not central part of this thesis, I consider it lexical as the rest of the analyses presented below do. This does not change the fact that it only surfaces in the contexts where McFarland identified it as epenthetic.

McFarland notes that at word boundaries in connected speech, FMT has a preference for V-C transitions, unless the consonant is an oral stop, in which case the preferred transition is N-K (where K is an oral stop and N is a nasal homorganic with K). To fulfill these preferences, vowel epenthesis occurs at C-C word boundaries (10)a and nasal epenthesis occurs at V-K word boundaries (10)b. At word boundaries with C-K transitions, both vowel and nasal epenthesis occur (10)c. As C-K boundaries are a type of C-C boundary, there is first a vowel epenthesis, which then creates a V-K transition and enables a nasal epenthesis as well.

(10)

a.	tantím štán	→	tantím **i** štán	'one possum'
b.	paašawá qałtína	→	paašawá **ɴ** qałtína	'she happily answered'
c.	áł kiłtamakú	→	áł **iŋ** kiłtamakú	'time passed'

The epenthetic vowel can be either a lexical latent vowel or, if there is no latent vowel, an /i/. What McFalrand (2009) refers to as "latent vowels" are unstressed short final vowels that only surface in connected speech and get elided prepausally or at phrase boundaries. To differentiate those final vowels that are retained from those which are dropped, she analyzes the latter as latent segments—that is, segments that lack a root node and only surface in specific contexts.

The third type of epenthesis, glottal feature epenthesis, generally occurs as a constricted glottis [+cg] feature after sonorants (11)a, and as a spread glottis [+sg] feature after obstruents (11)b. This type of epenthesis occurs prepausally or at the right edge of a phrasal boundary (11), but not in connected speech (12).

(11)

a.	čičíʔ	'dog'
b.	lakastáp^{h}u̥	'green'

(12)

a.	čičí šmuksúmaa	'the dog was sniffing'
b.	lakastapu kayíw	'green eyes'

The example in (11)b also illustrates that in this same context where the glottal feature epenthesis occurs, latent vowels are devoiced, reduced, or elided, making the consonant that precedes it the final element and glottalizaing or aspirating it.

Table 4 summarizes the three different types of postlexical epentheses described by McFarland.

Process		Environment
Vowel epenthesis	Ø → V	/ (…C)$_{\text{Word}}$ __ (C…)$_{\text{Word}}$
Nasal epenthesis	Ø → N	/ (…V)$_{\text{Word}}$ __ (K…)$_{\text{Word}}$
Glottal epenthesis	Ø → [+cg], [+sg]	/ (…__)$_{\text{Phrase}}$

Table 4 Boundary phenomena in Filomeno Mata Totonac, based on McFarland (2009)

The present thesis will only focus on the first two rules of Table 4. The glottal feature epenthesis will be mentioned when relevant but will not be analyzed in detail.

In McFarland's early account, it is acknowledged that while these epentheses occur at most of the boundaries with one of the dispreferred transitions, they do not occur at all of them, and that they can also occur at some clitic boundaries. However, she does not elaborate any further or suggest regular patterns or contexts in which these junctures are or are not found. It is instead described as an optional process showing inter- and intra-speaker variation.

2.3.2 Ozelonacaxtla Totonac

For Ozelonacaxtla Totonac, Román Lobato (2008) identifies four main boundary-related phenomena: vowel epenthesis, vowel lengthening, deletion of unstressed short final vowels, and the occurrence of word-final glottal stops or aspiration of consonants. The first two occur between consecutive words and the latter two at the end of a phrase. The example in (13) shows vowel lengthening, vowel epenthesis and the surfacing of a final glottal stop:

(13) [lánk**aa** uníseni míɬ**ii** qutná**ʔ**]

lánka–a	uní–sen–i	mí–ɬi–i	qutná–ʔ
big–J	wind–rain–J	come–PFV–J	yesterday–ʔ

'Yesterday there was a big storm'

(Román Lobato, 2008:87)

In her analysis, Román Lobato refers to the prosodic hierarchy and to domain sensitive prosodic rules (see §2.2 above). She proposes that vowel epenthesis and vowel lengthening are Domain Juncture rules that occur at non-final word boundaries inside of a Phonological Phrase (PhP). In contrast, the end of a PhP or an IP is marked by the presence of a glottal stop or an aspiration after long or stressed final vowels, by the elision of short final vowels, and by the lack of juncture phenomena.

Although Román Lobato refers to Nespor and Vogel's (2007) prosodic hierarchy model, she does not necessarily use the strict definitions of its units. For example, she uses the term "Phonological Phrase" to refer to any given consecutive words within an IP at whose boundaries there is vowel lengthening or epenthesis, regardless of the syntactic relation between these words. She proposes that, because vowel lengthening and vowel epenthesis cannot happen in absolute final position, a minimal unit of two PWds is needed to host these processes, and in this analysis that unit is what is called a Phonological Phrase.

The junctures—vowel lengthening and vowel epenthesis—occur at the non-final PWd boundaries inside of a PhP. They occur as vowel lengthening if the word ends in a vowel or as vowel epenthesis if the word ends in a consonant. In contrast, at PhP and IP boundaries, no juncture occurs. Instead, if the word ends in a short unstressed vowel this gets elided, making the word end in a consonant, and if it ends in a stressed or a long vowel, then there is a final glottal stop, laryngealization, or an aspiration. These processes are summarized in Table 5:

	Process		Environment
Domain Juncture Rules	Vowel lengthening	V → V:	/ (…(…__)$_{PWd}$ (…)$_{PWd}$…)$_{PhP/IP}$
	Vowel epenthesis	Ø →V	/ (…(…C__)$_{PWd}$ (C…)$_{PWd}$…)$_{PhP/IP}$
Domain Limit Rules	Short vowel deletion	V → Ø	/(…C__)$_{PhP/IP}$
	Final glottal stops and aspirations[8]	Ø → ʔ, h	/(…V:__)$_{PhP/IP}$ /(…'V__)$_{PhP/IP}$

Table 5 Boundary phenomena in Ozelonacaxtla Totonac, based on Román Lobato (2008)

Román Lobato's account not only acknowledges that juncture vowel lengthening and epenthesis occur at some but not at all word boundaries, but it also provides a detailed report of at what type of word boundaries a juncture is more likely to occur. There are certain cases where juncture processes seem to be compulsory (e.g., between a verb and its noun arguments), others where they seem to be variable or irregular (e.g., between an adverb and the verb it modifies) and others where they simply

[8] According to this analysis, glottal stops and aspirations mark the end of a phrase, but it is unclear if they are entirely epenthetic or if, as in the analyses of §2.3.3-4, they are underlying features that can only surface phrase finally. Román Lobato (2008:36) proposes that there are no final modal vowels in Ozelonacaxtla; they are either laryngealized or aspirated, and in the contexts where Domain Juncture rules apply, these final vowels must first lose their laryngealization or aspiration in order to get lengthened. This suggests that aspirations, at least, are not really epenthetic, but this is not clearly spelled out.

do not occur (e.g., at clitic boundaries). In some of the cases where the juncture seems to be variable, the occurrence of a juncture has implications for the syntactic analysis. For example, between an adverb and its verb, juncture rules may or may not apply; when they do not, the adverbs are analyzed as being part of a complex predicate along with the verb they modify, and when they do have a juncture, then they are analyzed as secondary predicates. In this case, the lack of juncture indicates a higher level of syntactic integration between the adverb and the verb (Román Lobato, 2008).

Román Lobato (2008) acknowledges that juncture processes are not always consistent and cannot always be predicted. However, the analysis reaches a few solid conclusions. Some of them are the following:

i. Domain juncture rules in Ozelonacaxtla Totonac can only occur at the right edge of *full semantic* words (i.e., content words), but not at the right edge of function words.

ii. The juncture processes, along with the stress assignment rules, are the main cues for identifying a phonological word.

iii. In predicates, the lack of juncture between constituents indicates a higher level of syntactic integration.

In this analysis, junctures—vowel lengthening and vowel epenthesis—have mainly a demarcating function (i.e., they mark PWd boundaries) and have access to the syntactic structure. This greatly differs from the account provided by McFarland (2009) for FMT, where the motivation behind the junctures was attributed to syllabic preferences at word boundaries.

2.3.3 Coatepec Totonac

Levy (2015, 2020) working with the texts and recordings collected by Norman McQuown in Coatepec Totonac, develops a detailed analysis of several prosodic phenomena that McQuown had coded in his texts with a notation of his own. Levy observes that in these texts at least three different prosodic levels are represented, and that each of these levels corresponds to particular boundary phenomena. These prosodic levels were originally coded by McQuown, but the labeling and interpretation of these levels as presented here was developed by Levy (2015).

The largest prosodic level marked in the texts is the Intonational Phrase (IP). This level is associated with the retention of final glottal stops (which get elided at any other level), and the deletion of unstressed short final vowels. The smallest prosodic level is the Lex, equivalent to a

morphosyntactic word-form, and the boundary process associated with this level is final sonorant devoicing. Finally, the mid level is the Accentual Phrase (AP), which is the phrase with the most complicated definition. The AP is associated with two boundary processes: prenasalization of initial oral stops, and final vowel lengthening. These two processes occur at the AP boundaries when these are not IP final. APs have a wide range of sizes and compositions, and do not correspond to the AP proposed in previous literature or to any other prosodic unit previously formulated. This unit is unique to the description of the graphic representation of McQuown's transcriptions (Levy and Hernández-Green, 2018).

All these processes are illustrated in the examples in (14). The example in (14)a shows the processes of sonorant devoicing, prenasalization, and glottal stop retention. The example in (14)b shows vowel lengthening, prenasalization, and the weakening of a short final vowel:

(14)

a. [tunku**n̥** maːtlaːníːɬ **ⁿč**iškú**ʔ**][9]

(((tunku**n̥**)$_{Lex}$ (maːλaːniːɬ)$_{Lex}$)$_{AP}$ (**ⁿč**iškuʔ)$_{Lex}$)$_{AP}$)$_{IP}$

tunkun–̥ maː–tlaːn–iː–ɬi ⁿ–čiškuʔ

then–J CAUS–good–CAUS–PFV J–man

'The man agreed immediately'

(Levy, 2020: *Hombre y Gavilán*, line 15)

b. [w**á**˙ šlaqatiːq**úː**˙ šalakwán **ᵐp**uːkúštu̥]

(((wa)$_{Lex}$ ˙)$_{AP}$ ((šlaqatiːquː)$_{Lex}$ ˙)$_{AP}$ ((šalakwan)$_{Lex}$)$_{AP}$ (**ᵐp**uːkúštu̥)$_{Lex}$)$_{AP}$)$_{IP}$

waʔ š–laqatiː–quː–yaː ša–lakwan puː–kúštu

that PST–like–3PL–IMPF DTV–best LOC–clear.land

'Because they liked the best lands'

(Levy, 2020: *Guerra*, line 11)

Among the processes associated with a prosodic level, prenasalization is the only one that occurs at the left edge of a constituent—that is, at the beginning of an AP, as long as this AP is not IP initial. All the other processes occur at the right edge of constituents. Table 6 summarizes all these boundary phenomena, their environments, and the prosodic levels at which they occur:

[9] Note that in these examples vowel length is represented as V: when the vowel is phonemically long, and as V˙ or V:˙ when the lengthening is the result of a domain juncture rule.

	Process		Environment
Domain Limit Rules	Final glottal retention	ʔ, retained[10]	/ (…_)$_{IP}$
	Short vowel deletion	V → Ø	/ (…_)$_{IP}$
Domain Juncture Rules	Sonorant devoicing	W → W̥	/ (…(…_)$_{Lex}$ (…)$_{Lex}$…)$_{AP}$
	Prenasalization	K → ^{n}K	/(…(…)$_{AP}$ (_…)$_{AP}$…)$_{IP}$
	Vowel lengthening	V → V˙ Vː → Vː˙	/(…(…_)$_{AP}$ (…)$_{AP}$…)$_{IP}$

Table 6 Boundary phenomena in Coatepec Totonac, based on Levy (2020, 2015)

In this analysis the correspondence between the boundary processes and the prosodic domains is reciprocal. This means that the prosodic domains are not only hosting their associated boundary processes, but they are also being defined by them. This is especially noticeable with the AP; while the IP is additionally marked by pitch contours and the Lex is associated with morphosyntactic word-forms, the AP is not identifiable by any specific criterion other than the juncture processes themselves and McQuown's original annotations (Levy and Hernández-Green, 2021). This correspondence can be seen in the examples of (14), where all the APs are marked by either final vowel lengthening or prenasalization.

The AP that junctures demarcate in Coatepec can contain more multiple units with primary stress each (Levy and Hernández-Green, 2021)—that is, the AP is not the domain of stress assignment. It is possible that instead, it is the domain of a phrase level accent (Levy, 2015), but it is not clearly described yet what the acoustic manifestation of this accent would be.

Although juncture rules are the only diagnostic given for an AP, there is some consistency in the elements that can be grouped inside an AP. There are certain Lexes that seem to obligatorily form their own AP—that is, Lexes that always trigger a domain juncture rule at their boundaries. For example, the elements that make up a Noun Phrase generally form their own AP each. There are also Lexes that do not form their own AP—that is, Lexes that never trigger a domain juncture rule at their

[10] Levy (2015, 2020), and Levy and Hernández-Green (2015, 2021) analyze this rule as a Domain Limit rule of retention. That is, Lex final glottal stops are underlying segments that can only surface (or are retained) IP finally. There is no notation for *retention* rules, but rather for what the rule does wherever there is no retention: to elide. A rule of deletion of final glottal stops operating at non-IP-final boundaries would not be a domain limit rule, but a domain juncture one. This also applies for the analysis in §2.3.4. See §2.4 for further details.

boundaries. For example, preverbal adverbs generally do not form their own AP and instead they form part of a single AP with the verb they precede; this includes adverbs that only modify the verb, and adverbs that modify the whole sentence (Levy and Hernández-Green, 2021).

The question of what Lexes an AP can or cannot group with in Coatepec is very similar to the question in Román Lobato (2008) about what words can or cannot have a juncture vowel lengthening or epenthesis in Ozelonacaxtla. Although the two analyses take different approaches and have different implications, they both suggest that the elements that do not trigger domain juncture rules inside of an IP (i.e., the elements that make up a complex predication in Ozelonacaxtla, or the elements that can be grouped together in an AP in Coatepec) have a closer syntactic relation than the elements that do trigger domain juncture rules. Thus, in both analyses the domain juncture rules have a demarcating function; in the analysis of Ozelonacaxtla they demarcate the PWd, and in the analysis of Coatepec they demarcate APs.

In addition, the analysis of the AP in Coatepec led to further studies of the relation between juncture phenomena and foot reinforcement. While Coatepec's AP is not posited as the domain of foot formation or primary stress, the juncture processes associated to it reinforce the iambs of the PWds in AP-final position (Levy and Hernández-Green, 2021), conceding junctures not only a demarcating function, but also one of rhythm reinforcement. Finally, it is acknowledged that while the most obvious functions of the juncture phenomena are rhythm and demarcation, they seem to play a role in the syntax-phonology interface that needs further scrutiny.

2.3.4 Coahuitlán Totonac

Among the Totonacan languages discussed in this chapter, the boundary phenomena in Coahuitlán Totonac are the most similar to those found in FMT, although they are described in terms of the Prosodic Hierarchy following the analyses of Coatepec and Ozelonacaxtla (Moore, forthcoming). Like FMT, Coahuitlán Totonac shows nasal and vowel juncture epentheses at non-final boundaries, and short vowel weakening and the occurrence of glottal stops at phrase boundaries:

(15)

a. [y ášni**n** taštúči a̱qtími **i** šaqátå̱]

(((y)$_{PWd}$ (ášni)$_{PWd}$ **n**)$_{PhP}$ ((taštúči)$_{PWd}$)$_{PhP}$ ((a̱qtím)$_{PWd}$ **i**)$_{PhP}$ ((šaqátå̱)$_{PWd}$)$_{PhP}$)$_{IP}$

y	ašni–n	taštu–či	a̱q–tim–i	ša–qa̱ta̱
and	when–J	leave/appear–PROX	NC–one–J	DTV–big

'then there appeared a large one'

b. [čа̱ːtím**in** čį̱škṵ**ʔ**]

(((čа̱ːtím)$_{PWd}$ **in**)$_{PhP}$ ((čį̱škṵ**ʔ**)$_{PWd}$)$_{PhP}$)$_{IP}$

čа̱ː–tim–in	čį̱škṵʔ
NC–one–J	man

'(there was) a man'

c. [čį̱škṵ ikit]

(((čį̱škṵ)$_{PWd}$ (ikit)$_{PWd}$)$_{PhP}$)$_{IP}$

čį̱škṵʔ	ikit
man	I

'I am a man' (Moore, forthcoming)

The example in (15)a shows nasal and vowel juncture epenthesis, as well as short final vowel weakening. The example in (15)b illustrates a vowel and a nasal epenthesis co-occurring at the same boundary, and the retention of a final glottal stop. In (15)c we can see the same word that retained its final glottal stop in (15)b, *čį̱škṵʔ* 'man', losing it in a non final position.

Similar to Levy's analysis of Coatepec, Moore (forthcoming) describes the distribution of junctures in Coahuitlán in terms of prosodic units. In this account, nasal and vowel epentheses occur at Phonological Phrase (PhP) boundaries when these are not the last phrase of an Intonational Phrase (IP), but they also occasionally occur at Prosodic Word (PWd) boundaries. The IP boundary is associated with glottal stop retention, and with short final vowel weakening or deletion—except for hesitation IPs, where the associated rule is final vowel lengthening.[11] These processes, their segmental environment, and the prosodic units where they occur are summarized in Table 7:

[11] This vowel lengthening should not be confused with the vowel lengthening rules in Ozelonacaxtla and Coatepec Totonac, which do not occur at IP boundaries, but inside the IP. Unlike these latter varieties,

	Process		Environment
Domain Limit Rules	Short vowel devoicing	V → Ø, V̥, V̆	/ (…__)$_{IP}$
	Final glottal retention	ʔ, retained	/ (…__)$_{IP}$
	Vowel lengthening	V → V:	/ (…__)$_{IP(hesitation)}$
Domain Juncture Rules	Nasal epenthesis	Ø → N	/ (…(…V__)$_{PhP}$ (K…)$_{PhP}$…)$_{IP}$ and optionally: / (…(…V__)$_{PWd}$ (K…)$_{PWd}$…)$_{IP}$
	Vowel epenthesis	Ø → /i/	/ (…(…C__)$_{PhP}$ (C…)$_{PhP}$…)$_{IP}$ and optionally: / (…(…V__)$_{PWd}$ (K…)$_{PWd}$…)$_{IP}$

Table 7 Boundary phenomena in Coahuitlán Totonac, based on Moore (forthcoming)

In Moore's description, the junctures have a direct relation to the prosodic units, but they are not defined only by them. The IP is naturally defined by an intonational contour, and the PWd corresponds to a minimal morphosyntactic word plus clitics. The PhP, like the other mid-level units proposed so far in §2.3, does not follow Nespor and Vogel's or Selkirk's strict definitions, but is instead defined by a phrase-level accent. Although certain processes are associated with certain boundaries, the correspondence is not as absolute as it is in the analysis of Coatepec Totonac. For example, the processes associated with the PhP boundary can also occasionally occur at PWd boundaries and even at some hesitation IP boundaries, so they alone would not suffice to identify a prosodic unit. To properly identify all the prosodic units in the examples (15), junctures alone would not have provided enough information. For example, in (15)a the PWd *taštúči*, 's/he appeared there' forms its own PhP, but we could not have known that just by looking at it, because it does not provide us with the segmental context to evaluate the occurrence or absence of a juncture epenthesis (i.e., it is not followed by an oral stop, allowing nasal epenthesis, nor does it end in a consonant, allowing vowel epenthesis). Rather, this was identified as a PhP during transcription by a phrase-level accent. This phrase-level accent usually comes on the stressed syllable of the final PWd of the PhP.

Coahuitlán Totonac does not show vowel lengthening in the same context as vowel or nasal juncture epentheses. In this regard it is similar to FMT, which also does not show vowel lengthening inside an IP (see Table 8 in §2.4).

Despite the high degree of similarity between junctures in Coahuitlán and FMT, there are a few important differences regarding nasal and vowel epenthesis. In FMT, both types of epenthesis seem to have the same motivations (i.e., to fulfill segmental preferences at word boundaries), and in contexts where they both can co-occur—that is, at C-K boundaries as /in/—they always do (McFarland, 2009). In contrast, in Coahuitlán, at C-K boundaries where both vowel and nasal epentheses could potentially co-occur, they sometimes do, as in the example in (15)b, *čg̱:tím–**in** čį̱šḵú̱ʔ*, 'a man', but they sometimes do not, as in the example in (16):

(16) [y ašnin talg̱qtsin**i** **p**ų̱nčǵ̱m papǵ̱ʔ]

y	ašni–n	ta–lg̱qtsin–i	pų̱n–čg̱–n	papǵ̱ʔ
and	when–J	3PL.SBJ–see–J	rise–DIST–J	moon

'and when they see the moon rising'

(Moore, forthcoming)

In (16) there is a vowel epenthesis following the final consonant of *talg̱qtsin* 'they see', but there is no nasal epenthesis preceding the oral stop of the following word *pų̱nčǵ̱n* 'rising'.

One last thing to note is that unlike Coatepec, where prenasalization is associated with the left edge of a constituent, in Coahuitlán nasal epenthesis is associated with the right edge of a constituent. Consider for example the following comparison:

(17) 'a/one man'

a. Coatepec: ča:tám čiškúʔ → ča:tám **ⁿč**iškúʔ

b. Coahuitlán: čg̱:tím čį̱šḵú̱ʔ → čg̱:tím**in** čį̱šḵú̱ʔ

In Coahuitlán, the epenthetic nasal is part of the pitch contour of the word on the left, and it often occurs at the end of hesitation IPs where it can even be lengthened. This difference might also be due to the fact that in Coatepec vowel epenthesis is a not a regular juncture process,[12] while it is a regular process in Coahuitlán, most often enabling the resyllabification of epenthetic nasals as in (17)b.

Finally, Moore's (forthcoming) account also acknowledges that, while juncture epentheses are associated with certain prosodic constituents, there are several exceptions that remain to be explained in order to make better and more accurate predictions.

[12] Levy (2015) mentions the sporadic occurrence of *spurious* /i/ in a similar context to FMT and Ozelonacaxtla juncture vowel epentheses, that is, after a consonant at the boundary of non-IP-final APs. However, this is not a regular juncture process and it is not summarized along the other boundary related rules in Coatepec.

2.4 Totonac boundary processes as Domain Rules: a comparison.

The accounts of boundary phenomena presented in the previous sections that follow the Prosodic Hierarchy can be formalized as per Selkirk's (1980b) Domain Rules structures, specifically as in the Domain Juncture and Domain Limit type of rules.

In (18) I repeat the Domain Juncture rule structure from §2.2:

(18)

a. $A \rightarrow B \ / \ (\ldots(\ldots\varphi\_)_{Dj}\ (\psi\ldots)_{Dj}\ \ldots)_{Di}$

b. $A \rightarrow B \ / \ (\ldots(\ldots\varphi)_{Dj}\ (\_\psi\ldots)_{Dj}\ \ldots)_{Di}$ (adapted from Selkirk, 1980b: 112)

Following the structure in (18), we can now compare, in terms of domains, what the accounts in §2.3 propose for juncture rules—that is, we can now compare exactly what these accounts propose to be the D_i and D_j domains for similar juncture rules. The juncture rules in question are vowel epenthesis in Ozelonacaxtla and Coahuitlán Totonac, vowel lengthening in Ozelonacaxtla and Coatepec Totonac, nasal epenthesis in Coatepec and Coahuitlán Totonac, and sonorant devoicing in Coatepec Totonac. Table 8 is a summary of these rules according to what they propose as their juncture domains:

	$A \rightarrow B$ / Juncture Domains	Variant	D_i	D_j
Vowel epenthesis	$Ø \rightarrow V \ / \ ((\ldots C\_)_{Di}\ (C\ldots)_{Di})_{Dj}$	Ozelonacaxlta	PWd	PhP / IP
		Coahuitlán	PhP	IP
		Filomeno Mata	----	----
Vowel lengthening	$V \rightarrow V\text{ː} \ / \ ((\ldots\_)_{Di}\ (\ldots)_{Di})_{Dj}$	Ozelonacaxlta	PWd	PhP / IP
		Coatepec	AP	IP
Nasal epenthesis	$K \rightarrow nK \ / \ ((\ldots)_{Di}\ (\_\ldots)_{Di})_{Dj}$	Coatepec	AP	IP
	$Ø \rightarrow N \ / \ ((\ldots V\_)_{Di}\ (K\ldots)_{Di})_{Dj}$	Coahuitlán	PhP	IP
		Filomeno Mata	----	----
Sonorant devoicing	$W \rightarrow \underset{\circ}{W} \ / \ ((\ldots\_)_{Di}\ (\ldots)_{Di})_{Dj}$	Coatepec	Lex	AP

Table 8: Similar boundary rules in four Totonac languages as per Selkirk (1980b) Domain Juncture Rule structure, based on Levy, 2020; McFarland, 2009; Román Lobato, 2008; Moore, forthcoming.

Note that in the account of FMT junctures, no reference to the prosodic hierarchy was made, and therefore, we cannot yet assign a constituent to the D_i and D_j domains. One of the questions this thesis

tries to answer is, if we adopt the Prosodic Hierarchy to account for the boundary phenomena in FMT in the way previous analyses have done, what would the D_i and D_j domains be, and what else could be said to define these domains? For the juncture rules that FMT shares with other Totonacan languages (i.e., vowel epenthesis and nasal epenthesis), all the other analyses seem to agree in that the larger domain D_j is the IP, which is also a well-defined domain. It is the smaller domain D_i that needs the most analysis: not only does the name of this mid-level domain varies in different analyses (PWd, AP, PhP), but so does its composition, formation, and definition. Moreover, these proposed domains not only differ from each other but, especially in the analyses of Ozelonacaxtla and Coatepec Totonac, they are unique to the language they describe—that is, they do not correspond to any other prosodic domain previously described in the literature.

As for the processes that can be formulated as Domain Limit rules, the general structure of these rules is given in §2.2 and repeated here in (19):

(19)

a. $A \rightarrow B \; / \; {}_{Di}(\ldots\varphi\_)_{Di}$

b. $A \rightarrow B \; / \; {}_{Di}(\_\varphi\ldots)_{Di}$ (adapted from Selkirk, 1980b: 112)

Once again, following the rule structure of (19) we can now compare what the analyses in §2.3 propose for the D_i domain. The domain limit rules in question are the occurrence of final glottals at IP boundary, and deletion or weakening of unstressed short final vowels, also at the IP boundary. Table 9 summarizes these rules according to what they propose as their domain:

	A → B / Limit Domains	Variant	D_i
Word final glottal (retained or epenthetic)	ʔ, h: retained / (…__)$_{Di}$	Coatepec	IP
		Coahuitlán	IP
	Ø → ʔ, h / (…__)$_{Di}$	Ozelonacaxlta	IP
		Filomeno Mata	----
Unstressed short vowel weakening/deletion	V → Ø, V̥, V̆ / (…__)$_{Di}$	Coatepec	IP
		Ozelonacaxlta	IP
		Coahuitlán	IP
		Filomeno Mata	---

Table 9: Similar boundary rules in four Totonac languages as per Selkirk (1980b) Domain Limit Rule structure, based on Levy, 2020; McFarland, 2009; Román Lobato, 2008; Moore, forthcoming.

Note that the occurrence of glottal stops and aspirations at IP boundary has been analyzed as an epenthesis rule in FMT, and as a retention rule in Coatepec and Coahuitlán. It is not completely clear what the analysis in Ozelonacaxtla proposes in this regard. In Table 9 they are formalized as epenthetic following the interlinear glosses in the examples provided in Roman Lobato's (2008) thesis, where they seem to be epenthetic, although this is never clearly spelled out in her thesis.

It is interesting to note as well that if the occurrence of final glottals is analyzed as a domain limit rule of retention, its domain of application would simply be the IP, as presented in Table 9. Note, however, that there is no standard notation for *retention* rules, as there is for epenthesis or deletion rules. An alternative analysis of the same process would be to posit a rule of final glottal deletion instead. This rule would delete word final glottal stops whenever they are not IP final. This rule would still imply that final glottals are underlying segments or features, but in this case, the rule would no longer be a Domain Limit rule, but a Domain Juncture rule where the larger domain is the IP and the minor one the Lex (Coatepec) or the PWd (Coahuitlán) and its formal representation would be as in (16).

(20)

a. Coatepec: $ʔ \rightarrow Ø$ / (…(…_)$_{Lex}$ (…)$_{Lex}$ …)$_{IP}$

b. Coahuitlán: $ʔ \rightarrow Ø$ / (…(…_)$_{PWd}$ (…)$_{PWd}$…)$_{IP}$

Despite the differences in the analysis of the occurrence of final glottal stops and glottal features, what is most important to notice from Table 9 is the uniformity of D_i in all of the accounts. They all agree that both the occurrence of word final glottals and the weakening or deletion of unstressed short final vowels have as their domain of application the IP. This might also be the case for FMT, although this thesis will concentrate on the nasal and vowel juncture epenthesis, and the realization of word final glottals will not be studied in further depth in this analysis.

3. Methods

To evaluate the accuracy of McFarland's (2009) description of juncture epentheses, and to find out if these could be better described by using the Prosodic Hierarchy following other studies of Totonac prosody (§2.3.2-4), I annotated a corpus of textual data for prosodic features in order to test a specific set of hypotheses. These hypotheses are outlined in §3.1. In §3.2 I provide information about the data corpus and explain the prosodic annotation done on it, and in §3.3 I briefly explain the counts I made on the corpus and their relevance to the testing of my hypotheses.

3.1 Hypotheses to be tested

As we saw in §2.3.1, McFarland (2009) notes that FMT has a preference for certain segmental transitions at word and phrase boundaries. According to this description, two different postlexical epentheses take place at word boundaries to comply with these segmental preferences: vowel epenthesis and nasal epenthesis. Both epentheses occur only in connected speech; vowel epenthesis at C-C word boundaries, and nasal epenthesis at V-K word boundaries. At C-K word boundaries, both types of epentheses occur as /iN/. These epentheses do not occur at a *phrase* boundary. To evaluate these claims and to reconcile the analysis of FMT junctures with the other analyses of Totonacan languages that use the Prosodic Hierarchy, I equated the terms *word* and *phrase* used by McFarland to the levels of the PWd and the IP, respectively, and I equated the notion of *connected speech* to a non-pausal condition. After making these two equivalencies, we can infer that:

i. If post-lexical vowel and nasal epentheses occur at *word boundaries* in *connected speech*, then they occur at PWd boundaries when they are not at a pausal IP boundary.

ii. If V-C and N-K transitions are preferred at *word boundaries* in *connected speech*, then, most non-IP final PWd boundaries with dispreferred transitions (i.e., C-C or V-K transitions) will trigger a /i/, /n/ or /in/ epenthesis to create one of the preferred transitions (i.e., C-V or N-K transitions).

From these two inferences, two main hypotheses can be tested:

i. Hypothesis 1: if a juncture epenthesis occurs, it is at a non-IP-final PWd boundary.

ii. Hypothesis 2: if there is a non-IP final PWd boundary that is segmentally eligible for a juncture epenthesis (i.e., C-C or V-K or boundaries), in most cases, this triggers one.

Hypothesis 1 is partially supported by the analyses of other Totonac languages summarized in §2.3.2-4. While they do not agree at what type of boundary junctures occur (if at the PWd, AP, or PhP), they do agree that junctures do not occur at IP boundaries. Hypothesis 2 is less promising—in fact, McFarland's description already acknowledges that junctures do not occur at all of the eligible boundaries (i.e., C-C or V-K boundaries). She describes these epentheses as optional processes that occur in most but not all cases, without providing further details to narrow the scope of the predictions made by the hypothesis. Furthermore, all the analyses of other Totonac languages discussed in §2.3.2-4 had to resort to an additional prosodic level between the PWd and the IP to describe distribution of the junctures. Thus, from the outset, we might expect Hypothesis 2 not to be entirely accurate, although if it is correct, we should at least be finding junctures, if not at all, at *most* of the eligible word boundaries.

In addition to the two hypotheses inferred from McFarland's description, this thesis will also test whether the distribution of juncture epentheses corresponds to an additional prosodic level between the PWd and the IP, as the analysis from §2.3.2-4 claim for other Totonac languages. To do this, I will pay special attention to the cases that do not conform to Hypothesis 2 and evaluate if they actually conform to a mid-level prosodic domain.

3.2 Sources of data and prosodic annotation

The data on which this thesis is based were collected by Teresa McFarland during fieldwork conducted for her doctoral dissertation between 2003 and 2009. The recordings used are currently available to the public at the California Language Archive (García Cortés et al., 2020).

From the recordings and transcriptions available in McFarland's archival material, I chose at random sixteen recordings of spontaneous speech, varying in length from 1 to 9 minutes. Combined, they add up to a corpus of 40 minutes. These recordings are from three consultants, two male—Miguel Jerónimo Laureano (MJL) and José Santiago Francisco (JSF)—and one female—María Agustina García Cortés (MAGC)—who at the time of elicitation were between 18 and 30 years old. Some of these recordings are stories and others are conversations about recent events, future plans, and other everyday affairs. Table 10 below shows a list of these recordings and their metadata.

ID#	Title	Consultant	Recording Date	Archive Notebook	Notebook Page
#01	The construction of the road	MJL	Aug-30-2005	7	42
#02	Frog story	MJL	Feb-17-2005	6	44
#03	No title (a story similar to *The little red riding hood*)	JSF	Feb-23-2005	6	130
#04	My studies	JSF	Feb-19-2005	6	64
#05	The misfortune of the landslide	MAGC	Jun-24-2004	4	146
#06	Frog story	JSF	Feb-16-2005	6	37
#07	What I did yesterday	MAGC	Jul-08-2003	1	85
#08	The rainbow	MAGC	Jun-21-2004	4	117
#09	Story of confirmation	MAGC	Jun-16-2004	4	68
#10	The bridge of the devil	MJL	Feb-23-2005	6	148
#11	The August fair	MAGC	Jul-09-2003	1	98
#12	Agile Fire	MJL	Feb-23-2005	6	136
#13	Meteor shower	MJL	Feb-23-2005	6	121
#14	Christmas	MAGC	Jul-09-2003	1	96
#15	What José will do when he visits me	JSF	Jul-25-2006	8	85
#16	What they say about Tlacuache	JSF	Aug-10-2003	2	62

Table 10: Recordings information

Only recording #01, *The construction of the road*, had interlinear glosses available, published separately in Levy and Beck (2012:269–291). The rest of the recordings had only a transcription and a translation into Spanish. The original transcriptions in McFarland's notebooks were indispensable, as without them I would not have been able to proceed with the analysis; however, they were not focused on prosodic details, and the junctures themselves were often absent in these transcriptions. For that reason, I re-transcribed these 16 texts, but paying special attention to both junctures and prosodic constituents. The glosses of recordings #02–16 used in this thesis are thus my own, and the errors they might contain are mine as well.

It is not the purpose of this thesis to provide an exhaustive account of all the prosodic units relevant to the study of FMT prosody, but to give a detailed account of the distributions of the junctures. However, this distribution will tell us important things about some of these status of these units in the Prosodic Hierarchy, which will be discussed in the following chapters. Thus, it is important to note that because the annotation of these units was done before any actual analysis took place, the general guidelines I followed to mark them—which follow the literature reviewed in the

previous chapter—do not represent the final proposal of how these prosodic units are actually constituted in FMT.

The units I annotated and their symbols, ranked from largest to smallest, were the following:

Symbol		Prosodic units
Bullet points	**•…•**	Utterance (U)
Square brackets	**[…]**	Pausal Intonational Phrase (pausal IP)
Angle quotes	**«…»**	Non-pausal Intonation Phrase (non-pausal IP)
Single angles	**<…>**	Phonological Word (PWd)

Table 11: Prosodic annotation

As mentioned in §2.1, the U very often matches a full syntactic sentence, but in some languages and under certain conditions it can contain more than one. For this prosodic annotation, I adopted the broader definition that allows for more than one syntactic sentence to be parsed in one U. The reason why I initially followed this definition is that in McFarland's descriptions junctures are described as occurring in *connected speech*, which does not rule out the possibility of junctures occurring at syntactic sentence boundary as long as there is no pause between the sentences. Later in the analysis (§5.1) it will be shown that since junctures do not occur at a syntactic sentence boundary, a more restrictive definition (i.e., only one syntactic sentence per U) would yield a more consistent analysis.

The annotation of IPs was slightly more complicated. In the review in §2.1, we discussed the IP as a one level unit, as it is usually analyzed in the standard Prosodic Hierarchy; however, as shown in Table 11, I marked two different types of IPs in the corpus, each occupying different levels in the hierarchy: pausal and non-pausal IPs. The former has a clear audible pause, while the latter does not, but both show a distinctive intonational contour of their own. These two types of IP were marked as two different levels in the hierarchy for mere convenience in the analysis of the corpus—that is, for counting and visibility purposes only and, as will be shown in later discussion, I do not claim that two different levels of the IP are actually needed in the formal analysis.

There were two main reasons for making a distinction between pausal and non-pausal IPs. Firstly, it has been said that the IP boundaries coincide with the positions where a pause *could* be inserted, but it is important to note that while an IP boundary does not necessarily entail an audible pause, an audible pause does entail an IP boundary. Secondly, as we saw in §2.2, the Prosodic

Hierarchy has been used to account for juncture phenomena in other Totonac languages, but for FMT McFarland (2009) prosodic units are only described with terms like "connected speech," "word boundary," and "prepausal," without making direct reference to the Prosodic Hierarchy or its constituents. At the beginning of the analysis, I did not know what the strongest determining factor for the occurrence or absence of the juncture epentheses was—whether it was an IP boundary or a pause—and therefore I made a distinction between pausal vs non-pausal IPs.

An additional consideration for the annotation of IPs is that, while this constituent is naturally associated with certain syntactic constructions (e.g., parenthetical expressions are considered to obligatorily create their own IPs), I initially marked as IPs only phrases that have a clear and audible intonational contour. If, for example, a parenthetical expression was not uttered with a clearly distinctive intonation, I did not mark it as creating its own IP. There are not many cases in the corpus where a syntactic construction that is normally expected to create its own IP does not, but there were a few instances, mostly during rapid speech. The implications of this decision will be relevant for the analysis and will be discussed also in §5.1.

The next unit that I coded was the PWd. Strictly speaking, the formation of the PWd in FMT could very well be a study on its own involving several elements that were outside of the scope of this thesis, such as foot formation and primary stress assignment. To sidestep these complications, I provisionally equated the PWd with the morphosyntactic word—that is, a root plus all the elements that McFarland (2009) identifies as affixes—plus clitics, and assumed that both function and content words can form their own PWd as long as they carry primary stress. The only exception to this is the annotation of the relativizer and negation clitics, which are the only clitics previously described as triggering juncture epentheses. These all were initially annotated as independent PWd regardless of not always having primary stress (see §4.3.1.2 for further details).

Note that no mid-level unit between the PWd and the IP was marked. I had a few reasons for not doing so. Firstly, as discussed in the previous chapter, the mid-level unit between the PWd and the IP (or the unit between the Lex and the IP in Coatepec) is the phrase that shows the most variety in previous analyses, and its formation and composition differ in each of these accounts. None of these proposed mid-level units follow a strict definition from previous literature, but instead they are rather unique to their specific analysis. This mid-level unit is also the one that allegedly matches the

distribution of the junctures, but this distribution is exactly what this thesis intends to describe. If such a mid-level unit exists, its formation and composition will be part of the results instead of part of the initial methods of analysis. In Chapter 5, I will further elaborate on this hypothetical mid-level unit and its relevance to the analysis.

One last thing I annotated in the corpus was syntactic clauses. These were marked with curly braces {…}, which appear only on the second and third lines of interlinear glosses. Syntactic clauses are not part of the Prosodic Hierarchy and cannot be ranked as larger or smaller than any of the prosodic constituents, but they were relevant for the analysis. Syntactic clauses are composed of either a verb and its non-clausal complements, or of a non-verbal predicate and its complement.

My annotation of prosodic units conforms to the Strict Layering Hypothesis presented in §2.2, and therefore the larger domain boundaries are always marked outside of the smaller domain boundaries so that at the beginning of an example we find the sequence [«< but not «[<, <[«, or [<«.

Note that in this annotation the non-pausal IP is treated as a smaller unit than the pausal IP. This means that a non-pausal IP will always be contained by a pausal IP, and a pausal IP will contain at least one non-pausal IP; however, as noted above, differentiating the two IPs was done for convenience and no actual claim is being made about pausal and non-pausal IPs belonging to different levels in the hierarchy.

An example of how all these units were marked up is shown in the utterance in (21), which comes from the recording ID #02. In Figure 2, we can see a spectrogram, soundwave, and pitch tracing:

(21) • [«<šlaqkiɬʔámaa> <amá>»] ɴ [«<qawáača> <šwánqen>»] [«<wánqen>» «<ɬáa> <wíɬ>»] •

{š–laqkiɬʔá–maa amá n qawáača š–wánqen}

{PST–call–PRG this J boy 3POSS–frog}

wánqen {ɬáa wíɬ}

frog {where sit}

'The boy was calling his frog: frog, where are you?' (#02)

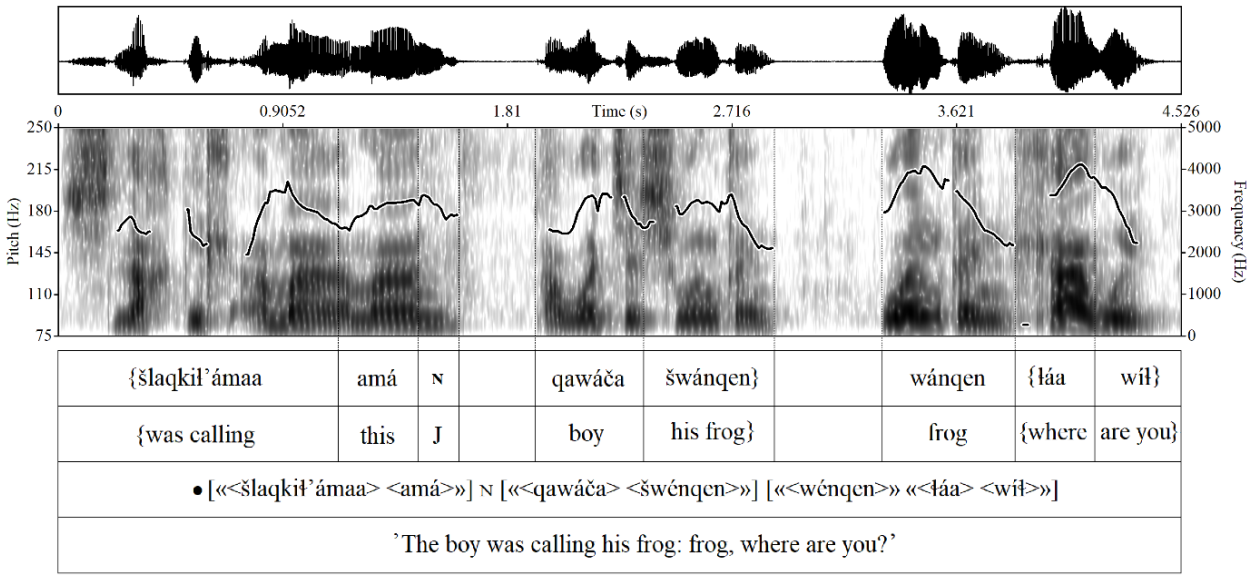

Figure 2: The boy was calling his frog: frog, where are you?

As we can see in the spectrogram in Figure 2, the juncture (glossed as ɴ)—in this case the epenthesis of a uvular nasal—is realized at the right edge of the unit that precedes it, the PWd *amá*, 'this'. In this regard, FMT junctures are more similar to those in Coahuitlán (Moore, forthcoming) than to Coatepec, where juncture nasal epentheses occur at the left edge of a unit as prenasalizations (Levy, 2020). Although phonetically, juncture epentheses occur at the right edge of a word, I place them outside the outermost boundary at which they occur instead of inside the PWd. Thus, for example, the juncture in (21) was transcribed as <…>»] ɴ [«<…> instead of <…ɴ>»] [«<…>. This was also done for visibility and counting purposes, and to distinguish the words that had received a juncture epentheses from the words whose lexical form ends with /i/, /n/ or /in/ before the addition of junctures.

Figure 2 also illustrates the phonetic difference between pausal and non-pausal IPs. The two non-pausal IPs *«<wánqen>»,* 'frog', and *«<łáa> <wíł>»,* 'where are you?' are not offset by an audible pause, but they still have a perceptible intonational contour of their own; in contrast, the pausal IPs within the square brackets, in addition to their own intonation contour, are offset by significant pauses. The pause between the first two pausal IPs corresponds to a short hesitation, and the pause between the second and third pausal IPs demarcates a direct speech IP.

In this example there are two clauses, one composed by two pausal IPs and one composed by one non-pausal IP. The annotation of syntactic clauses does not follow the same rules of exhaustive layering that the prosodic annotation does. In (21), for example, the vocative *wánqen,* 'frog', was left

out of the syntactic clause, but in the prosodic annotation nothing can remain outside of a prosodic unit.

One last thing that must be said about the prosodic annotation is that I only marked as juncture vowel epentheses those epentheses using /i/. We saw in §2.3.1 that in McFarland's initial description, juncture vowel epentheses could be either an /i/ or the surfacing of a latent vowel. However, in the present study I only counted and considered as juncture epenthesis the /i/ insertions, and not the latent vowels. This is because to know what vowels are latent, following McFarland's analysis, we need to have at least two instances of the same word (a word with an unstressed short final vowel), one in connected speech and another at absolute final position or prepausally. If the short final vowel gets elided in absolute final position or prepausally, then it is a latent vowel, if it remains fully voiced, then it is not. This test was possible for some words, for example, the word *qawáača* 'boy', in the following example:

(22)

a. • [«<šlaqatí:> <amá> N <**qawáača**> <wánqen>»] •

{š–laqatí amá n **qawáača** wánqen}

{PST–like this J boy frog}

'The boy liked the frog'

(#02)

b. • [«<čoo> n <támaa> <amá> N <**qawáač**>»]…•

{čoo n tá–maa amá n **qawáača**}

{PTC J INC–lie this J boy}

'The boy lays down'

(#02)

In (22)a we can see the full form of the word *qawáača* 'boy', while in (22)b the final vowel is elided. This is then a latent vowel. However, this test was not possible for all the vowels that could potentially be analyzed as latent; some words in the corpus were never found in absolute final position, and some other words were never found in connected speech, so making a comparison like that in (22) was not possible for all the words with short final vowels.

Only annotating /i/ epentheses as juncture vowel epentheses does not necessarily represent a hole in the analysis for two reasons. Firstly, because to find out what determines the occurrence or absence of juncture epentheses, I compared the contexts where there are junctures to the contexts where there are no junctures, but to make this comparison I only judged the boundaries that provide

the segmental environment for a juncture. For this analysis, words that end in any vowel, full or latent, are not considered as providing the segmental environment for a vowel epenthesis, so they are simply not judged as having or lacking a juncture vowel epenthesis and remain out of the comparison.

The other reason supporting the decision of only counting /i/ epentheses as junctures is much simpler, and that is that in the analyses of the other Totonacan languages in §2.3, the phenomenon exemplified in (22) is not treated as rule of vowel insertion in connected speech, but rather as a rule of vowel deletion in IP final position. I am following this alternative and simpler analysis.

3.3 Juncture counts in the corpus

After doing the prosodic annotation, I examined the corpus using regular expressions to determine:

1) The total number of Us, IPs, and PWds in the corpus.
2) The total number of vowel and nasal juncture epentheses.
3) The number of vowel and nasal epentheses per type of boundary (i.e., how many of these junctures occur at PWd, non-pausal IP, and pausal IP boundaries).
4) The total number of boundaries that provide the segmental environment for vowel or nasal juncture epenthesis (i.e., boundaries with consonant–consonant transitions for vowel epenthesis, and boundaries with vowel–oral stop transitions for nasal epenthesis).
    a. The number and types of these boundaries that had a juncture epenthesis.
    b. The number and types of these boundaries that did not have a juncture epenthesis despite providing the required segmental environment.

Count 3, the number of epentheses per type of boundary, was made to determine at what type of prosodic boundaries junctures occur or are more likely to occur—that is, to test Hypothesis 1, according to which junctures occur at IP-internal PWd boundaries, but not at IP boundaries.

Count 4 was done to determine how accurate Hypothesis 2 was. According to this hypothesis, most cases of 4 would have a juncture epenthesis—that is, the number of cases of 4a should significantly surpass the number of cases of 4b. Knowing from the outset that the Hypothesis 2 would be somewhat imprecise, I paid special attention to the two junctures counted in 4 to find out if the cases of 4b have something in common with the cases of 4a that could narrow the predictions made by Hypothesis 2, or if they are, as described by McFarland, merely variable processes. Additionally,

specifically looking at the cases of 4b, I tried to find out if whatever they have in common could be better systematized as a prosodic domain in a similar way the analysis of §2.3.2-4 did. These findings will be discussed in the following chapter.

4. Results

In the previous chapter I presented the hypotheses to be tested and explained the prosodic annotation and the counts done in the corpus to do so. In this chapter I will show the results of those counts and the observations made on the subset of data that most challenged the tested hypotheses, beginning in §4.1 with my most general results. In §4.2, I will report the counts made to test the accuracy of Hypothesis 1, which predicts that juncture epentheses occur at non-IP final PWd boundaries, but not at IP boundaries. The predictions made by Hypothesis 1 were mostly accurate, with only a few exceptions, which will be also briefly discussed. In §4.3 I will report the counts made to test the accuracy of Hypothesis 2, which predicts that most PWd boundaries with C-C or V-K transitions will receive a juncture epenthesis. As I will show, the predictions made by Hypothesis 2 were not as accurate, as there are a large number of exceptions. However, these exceptions are not arbitrary, but they do have things in common that can refine our predictions. In §4.3.1 I will present the most regular of these exceptions, and in §4.3.2 I give those that are more irregular or for which there is insufficient data to verify their regularity.

4.1 General results

The corpus contains 441 Us, 929 pausal IPs, 1,116 non-pausal IPs, and 2,805 PWds. It has a total of 672 epentheses: 453 of /n/, 142 of/i/ and 77 of /in/. Epentheses of /in/ can be considered simultaneous epentheses of both /i/ and /n/, so to simplify these numbers, if we add the occurrences of /in/ to the two other totals, there are in the corpus a final total of 530 epentheses of /n/ and 219 epentheses of /i/—that is, in the counts shown throughout this chapter, /in/ epentheses will always be included both in the counts of /n/ epentheses and in the counts of /i/ epentheses.

One last thing to report from the general results is that, aside from the exceptions addressed in §4.3.1.1, there are no cases of C-K word boundaries triggering only one of the two types of epentheses. They have either both, vowel and nasal epentheses, as in (23)a, or none, as in (23)b:

(23)

a. • …[«<šwí> <aqtí**m> iɴ <q**eestín>…»]…•
{š–wi aq–tím in qeestín}
{PST–sit NC–one J hill}
'There was a hill'
(#01)

b. • […«<aqtí**m> Ø <ts**iisní> <naliitlaawá>»]•
{aq–tím tsiisní na–lii–tlaawá}
{NC–one night FUT–INST–make:IMPF}
'He'll make it in one night'
(#10)

This suggests that in FMT, both types of juncture epenthesis share the same motivations, but that might not be the case in other Totonac languages. For example, at C-K word boundaries, Coatepec Totonac allows for nasal epenthesis without necessarily having a vowel epenthesis first (§2.3.3), and in Coahuitlán Totonac, C-K boundaries can sometimes trigger vowel epenthesis without necessarily being followed by a nasal epenthesis (§2.3.4). In FMT, C-K word boundaries can only have both types of epenthesis, or no epenthesis at all.

4.2 Prosodic boundaries at which the junctures occur

To test Hypothesis 1—that is, if a juncture epenthesis occurs, it is at a non-IP-final PWd boundary—I counted the occurrences of juncture epentheses at each type of prosodic boundary.

Of the total 530 /n/ epentheses, 87% occur at boundaries of PWds that are not IP final (i.e., in the context •…[…«…<…>_<…>…»…]…•), 5% at boundaries of non-pausal IPs that are not pausal IP final (i.e., in the context •…[…«…»_«…»…]…•), and 8% at boundaries of pausal IPs that are not U final (i.e., in the context •…[…]_[…]…•). The distribution of /i/ junctures is very similar, with 81% of the 219 epentheses occurring at PWd boundaries that are not IP final, 5% at boundaries of non-pausal IPs that are not pausal IP final, and 13% at boundaries of pausal IPs that are not U final. Figure 3 and Figure 4 illustrate these numbers:

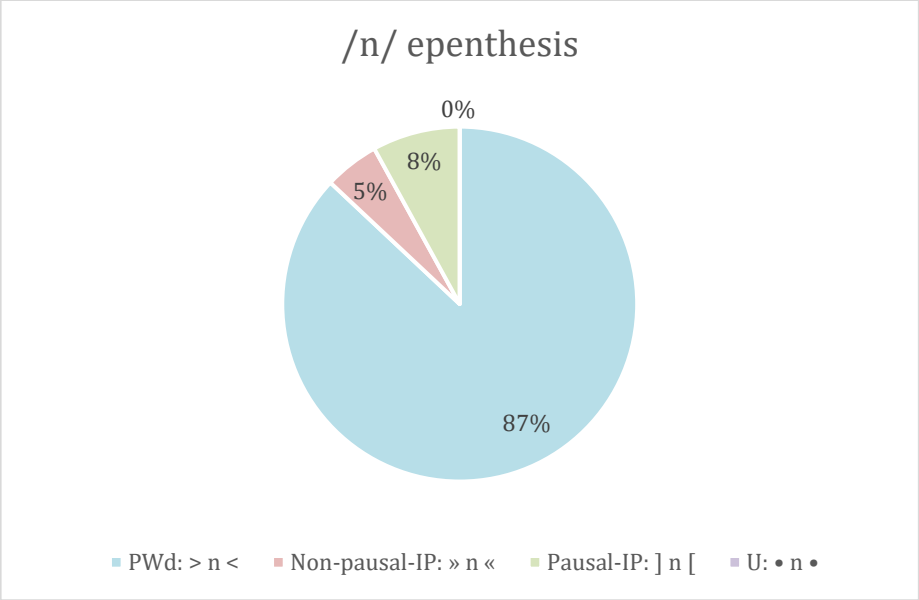

Figure 3: /n/ epentheses occurrences per boundary

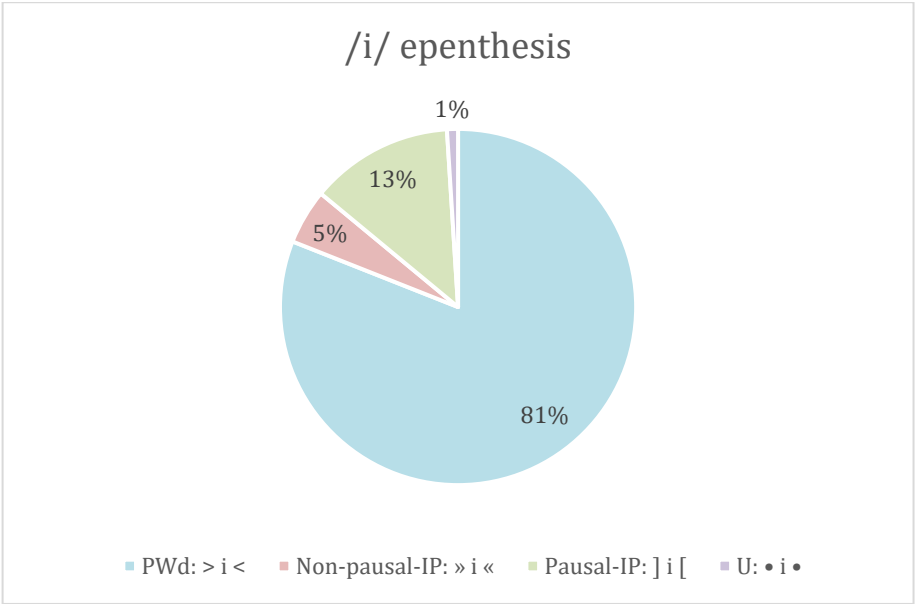

Figure 4: /i/ epentheses occurrences per boundary

From these numbers we can observe that both epentheses show a high preference for occurrence at non-IP final PWd boundaries, but there was also a considerable number of occurrences at both pausal and non-pausal IP boundaries. The U was the only boundary where /n/ epenthesis did not appear at all, and there was only one marginal example of /i/ epenthesis at the U boundary in the whole corpus. This was to be expected, since the U is the largest span of rule application, and domain juncture rules require the domain in which they apply to be inside another larger domain (see §2.2). These first results support Hypothesis 1 to some extent. We can confidently say that, from the prosodic units

annotated in the corpus, non-IP final PWd boundaries were the ones where the epentheses occurred the most; however, we cannot completely discard their occurrences at other types of boundaries.

Some examples of juncture epentheses occurring at each type of prosodic boundary are shown below. Figure 5 illustrates a juncture epenthesis at a PWd boundary, Figure 6 a juncture epenthesis at a non-pausal IP boundary, and Figure 7 a juncture epenthesis at pausal IP boundary.

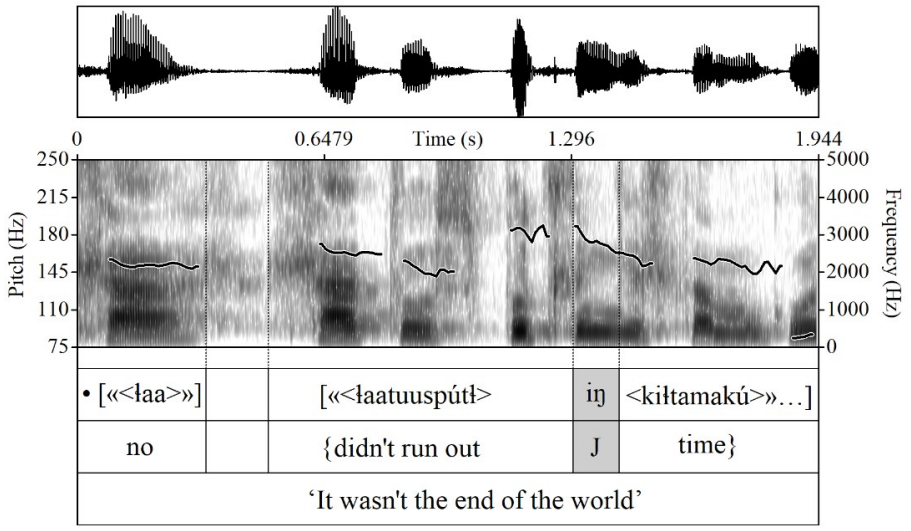

Figure 5 Juncture epenthesis at PWd boundary.

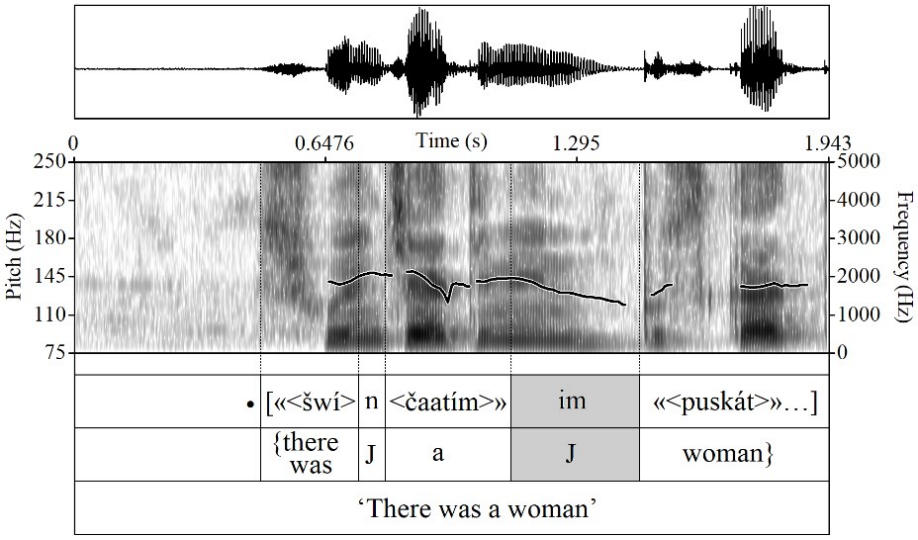

Figure 6: Juncture epenthesis at non-pausal IP boundary.

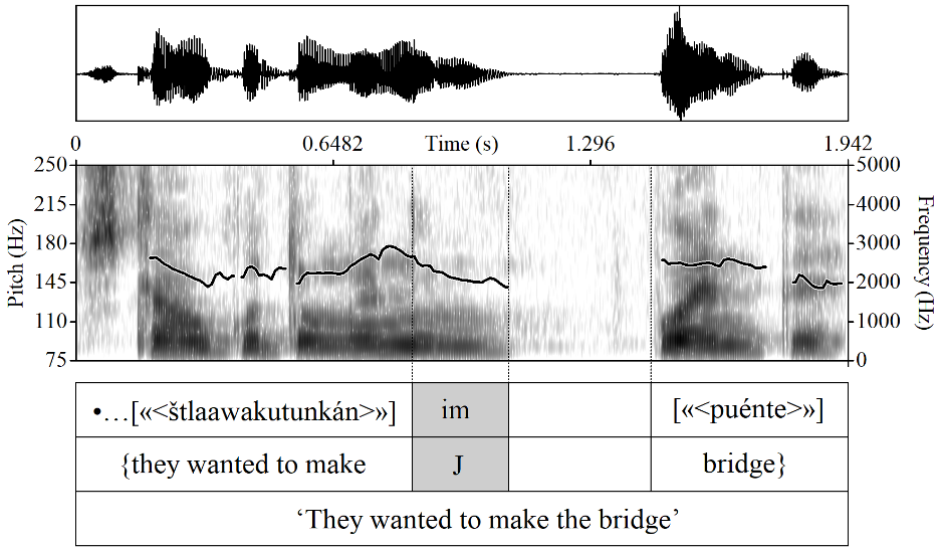

Figure 7 : Juncture epenthesis at pausal IP boundary.

Epentheses at IP boundaries often belong to hesitations or emphatic IPs, but not all hesitation or emphatic IPs had juncture epentheses. Given the nature of hesitations and spontaneous speech, this last observation may not add much to the predictive value of the hypothesis and remains merely an observation, but it is worth mentioning as it suggests that one of the functions of juncture epentheses is also to maintain speech cohesion.

An additional observation about juncture epentheses occurring at IP boundaries is that they generally had a more prominent duration than the epentheses at IP internal PWd boundaries. However, no strong claim can be made yet on this matter as I did not systematically measure or analyze the duration of all the junctures. Figures 4 to 6 were drawn in a similar time window (1.94s) to illustrate, in at least these examples, the length of the junctures at IP boundaries in comparison to those at the PWd boundaries.

4.3 Preferred transitions at word boundaries

In the last section I tested and partially supported the first Hypothesis 1. Now in this section I will test Hypothesis 2—that is, that most PWd boundaries with C-C or V-K transitions trigger juncture epenthesis to create the preferred V-C or N-K transitions. As shown in §4.2, juncture epentheses show a strong tendency of occurrence at IP internal PWd boundaries, so to evaluate how accurate the second hypothesis is, I will only focus on non-IP final PWd boundaries.

At the IP internal PWd boundary level, there are 760 instances in the corpus where the PWd to the right starts with an oral stop (> <K). This means that there are 760 boundaries eligible for nasal epenthesis, either as /n/ in V> <K transitions, or as /in/ in C> <K transitions. This number includes the boundaries where the last consonant of the left constituent is a nasal, as these boundaries can also show /in/ epenthesis (see §4.3.2.1). Only 461 out of these 760 boundaries (61%) have nasal epentheses. At the same level, there are 392 boundaries in the corpus where the PWd to the left ends in a consonant and the PWd to the right also starts with a consonant (C> <C). This means that there are 392 boundaries eligible for vowel epenthesis, either as /iN/ in C> <K transitions, or as /i/ in C> <C transitions where the consonant to the right side of the boundary is not an oral stop. Out of these 392 boundaries only 177 (45%) have vowel epentheses. These results are illustrated in Figure 8.

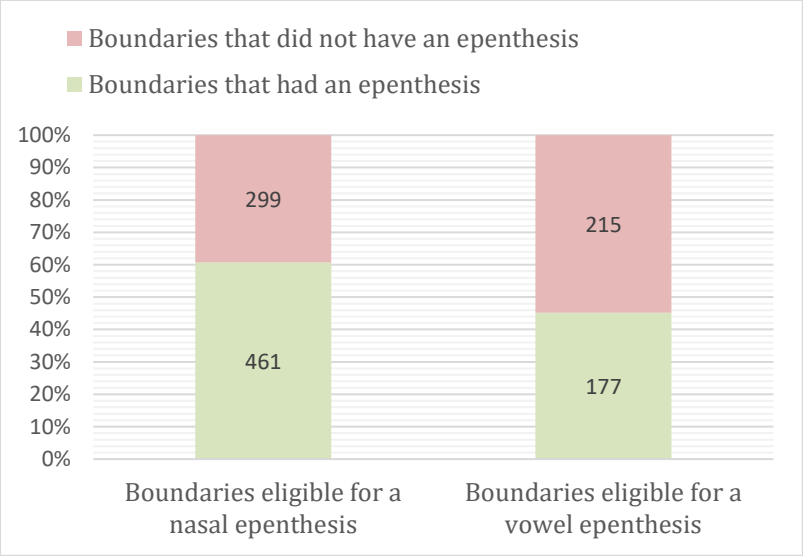

Figure 8: Boundaries where a juncture epenthesis was expected

From these first results, we can observe that Hypothesis 2 by itself has barely any predictive value and is not really supported by the data. However, looking at the exceptions to this hypothesis—that is, C> <C and > <K boundaries that do not trigger any juncture epenthesis—it turns out that these exceptions are not arbitrary, but rather occur in a specific set of conditions. and can be subcategorized as regular and irregular exceptions. The exceptions categorized as regular are those for which the conditions, often syntactic, under which junctures never occur have an evident pattern and can therefore be predicted. The exceptions categorized as irregular are those in which the contexts that seem to inhibit the occurrence of junctures do not do so consistently. Irregular

exceptions might also follow a regular that allows us to predict them, but if they do, it is not possible yet to draw it from the current data. Most of these exceptions belong to the latter category: irregular exceptions. Figure 9 shows a reviewed count of the PWd boundaries eligible for juncture epenthesis considering the number of regular and irregular exceptions.

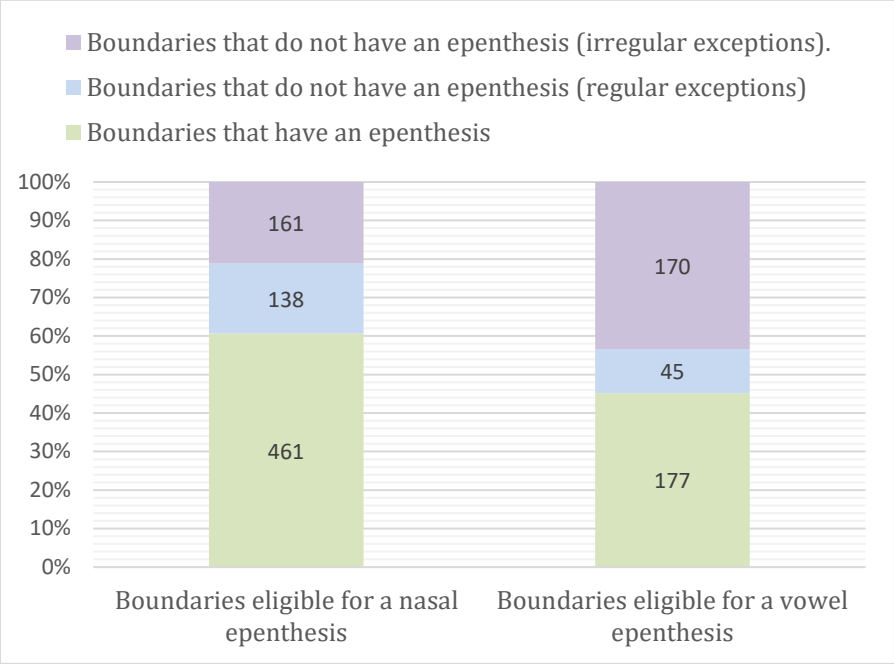

Figure 9: PWd boundaries eligible for epenthesis per occurrence and exception type.

The predictive value of Hypothesis 2 slightly improves after considering regular exceptions, accurately predicting 79% of the nasal epentheses, and 57% of the vowel epentheses. Regular exceptions specially improve the predictability of nasal epentheses, since two of those exceptions (§4.3.1.1, §4.3.1.2) do not target vowel epentheses.

In the following sections, I will go through all of these exceptional cases where the expected epentheses do not occur, beginning in §4.3.1 with the regular exceptions, and then turning in §4.3.2 to the ones that showed more variation.

4.3.1 Regular exceptions

In the following sections of this chapter, I refer to the non-IP final PWd boundaries that, according to Hypothesis 2, are eligible to receive a juncture but do not as "exceptions". These exceptions are not random, showing that there are other phonological, morphological, and syntactic motivations for a PWd boundary receiving, or not receiving, a juncture epenthesis. I will first describe the most regular of these exceptions: locative, first-person and past-tense prefixes (§4.3.1.1), negations (§4.3.1.2),

borrowed function words (§4.3.1.3), direct speech (§4.3.1.4), and non complement or adjunct clause boundaries (§4.3.1.5). These regular exceptions constitute 46% of the exceptions for nasal epenthesis and 21% of the exceptions for vowel epenthesis. If added to our initial predictions, we can accurately predict 79% of the nasal epentheses, and 57% of the vowel epentheses.

4.3.1.1 Locative, first person and past prefixes

When a velar stop [k] belongs to the first-person subject prefix /k-/ (24)a, the locative /k-/ (24)b, or the /k/ allomorph of the past tense prefix /š-/ which precedes a sibilant (24)c, it will not trigger nasal epenthesis in any prosodic context:

(24)

a. •[«<łaaluutúwa> **Ø** <**k**laaqtsín>…»]•
{łaa=luu=túwa **k**–laaqtsín}
{NEG=very=difficult 1SBJ–see:IMPF}
'I don't see it as very difficult'
(#04)

b. •[«<lée> **Ø** <**k**ščík>»]•
{leen–Ø **k**–š–čík}
{take–PFV LOC–3POSS–house}
'He took it home'[13]
(#02)

c. •[«…<łáa> **Ø** <**k**łtatámaa>»]•
{łáa **š**–łtata–maa}
{REL.PLC PST–sleep–PRG}
'Where he was sleeping'
(#02)

In most cases, when an initial /k/ corresponds to one of these morphemes, it creates a complex onset, as the examples in (24); however, even when these morphemes do not create a complex phonetic onset there is no epenthesis (25).

[13] The most common allomorph of the perfective aspect suffix –li is segmentally Ø. In most cases this aspect is only recognizable by a non-final stress pattern. See McFarland (2009:55) for further details.

(25) •[«…<tawáka> **Ø** <**k**aqatím> iŋ <kíwʔ>»]•

{ta–wáka–Ø **k**–ʔaqa–tím in kíwʔ}

{INC–up–PFV LOC–NC–one J tree}

'He climbed a tree'

(#06)

There are 72 instances of V-[k] transitions where the [k] corresponds to one of these three morphemes. None of them had a nasal epenthesis.

These three morphemes only prevent /n/ epentheses when there is a V-[k] transition, but they do not constrain /i/ epentheses at C-[k] boundaries. See, for example, the two /i/ junctures in example (26).

(26) •[«<kankutún>»] **i** [«<kpáš> **i** <kpupunúʔ>»]…•

{k-ʔan-kutún} i {k–páš i k–pupunúʔ}

{1SBJ–go-DES:IMPF} J {1SBJ–bathe:IMPF J LOC-ocean}

'I want to go and swim in the ocean'

(#15)

Similarly, Levy and Hernández-Green (2021) also note that in Coatepec Totonac first person and locative morphemes do not get prenazalised. They suggest that the reason these [k]s do not get prenasalizations is because the underlying forms of the morphemes to which they belong do not begin with /k/, /nak=/ being the underlying form of the locative and /ik-/ the underlying form of the first-person prefix. In FMT the forms /ik-/ and /nak=/ are not reported in McFarland (2009) as synchronic allomorphs, nor are they found in the corpus.

4.3.1.2 Negatives

There is a set of morphemes (Table 12) that McFarland (2009) described as both relativizers and negative intensifiers. These all are categorized as proclitics (McFarland, 2009: Appendix B), but as proclitics that can allegedly receive juncture epentheses at their right edge. These were the only clitics that were provisionally marked as forming their own PWd during the prosodic annotation.

	Relativizer		Negative, Negative Intensifier	
Negation			łaa=	Basic negation, 'not'
Place	łaa	'where'	łaa=łaa	'nowhere'
Non-human	tuu	'that'	łaa=tuu	'nothing'
Human	tii	'who'	łaa=tii	'nobody'
Manner	čii	'how'	łaa=čii	'no way'

Table 12: Relativizers and Negative Intensifiers. Based on McFarland (2009)

Relativizers are homophonous with the forms that appear in negation, but they show different behaviour with respect to juncture. Consistently throughout the corpus, negatives fail to trigger /n/ epenthesis on their right edge, while relativizers, whenever given the chance, always have a juncture.

The negative morpheme *łaa* on its own precedes verbs (27)a, nouns (27)b, adjectives (27)c and adverbs (27)d, and in none of these scenarios is linked by a juncture:

(27)

a. •[« … <per> <**łaa**> **Ø** <katsiiyáa>»]…•
{per łaa=katsii–yáa–wa}
{but NEG=know–IMPF–1PL}
'But we don't know'
(#13)

b. •[«<**łaa**> **Ø** <kíwi>… »]•
{łaa=kíwi}
{NEG=tree}
'It wasn't a tree'
(#02)

c. •[«<**łaa**> **Ø** <puułmáan> in <čúčut>… »]•
{łaa=puułmáan in čúčut}
{NEG=deep J water}
'The water wasn't deep'
(#06)

d. •[«<akatúnu>»] [«<**łaa**> **Ø** <tse> <šakpuuwan>»]…•
{akatúnu łaa=tse š–k–puuwan}
{sometimes NEG=well PST–1SBJ–think}
'Sometimes I didn't feel good'
(#04)

The morphemes *tuu* and *tii* are combined with *łaa* to form the negative words *łaatuu* and *łaatii*, 'nothing' and 'nobody', respectively. Neither *łaatuu* (28)a nor *łaatii* (28)b have junctures at their right edge.[14]

(28)

a. •[«<**łaatuu**> **Ø** <kaatitsanqán> i <mintsumuxát>»]…•
{łaatuu=ka–ti–tsanqán i min–tsumuxát}
{NEG=NEG.NH=IRR–CNTR–lack J 2POSS–girl}
'Your daughter wouldn't lack anything'
(#10)

b. •[«…<**łaatii**> **Ø** <katsíi>… »]•
{łaatii=katsíi}
{NEG=NEG.H=know:IMPF}
'Nobody knows'
(#12)

Relativizers, on the other hand, always have a juncture nasal epenthesis at their right edge when preceding an oral stop (29).

(29)

a. •[«<łaa> <škátsii> n <**číi**> **n** <tláawa>… »]•
{łaa š–kátsii–Ø} n {číi n tláawa–Ø}
{NEG PST–know–PFV} J {REL.MAN J make–PFV}
'Who knows how he made it'
(#10)

b. •[«<talakáyii> n <**túu**> **ŋ** <kaawaník>»]•
{ta–lakayii} n {túu n kaa–wan–ni–kan}
{3PL.SBJ–believe} J {REL.NH J OBJ.PL–say–DAT–IDF:PFV}
'They accepted what they were told'
(#01)

c. •[«<aqsqawiní> <mát> in <**tíi**>» **n** «<taštúči>… »]•
{aqsqawiní? mát in tíi n ta–štú–či}
{devil CIT J REL.H J INC–out–PROX}
'A devil, they say, who came out here'
(#01)

[14] There were plenty of instances in the corpus of *łaatuu* and *łaatii* preceding an oral stop, but none of *łaačii* or *łaałaa* in this context. They would presumably behave the same way, as noted in some of the examples provided in McFarland's notebooks, but I currently have no examples in the corpus to corroborate this.

Combined, there is a total of 68 instances of these negative morphemes in the corpus, of which 39 precede an oral stop within a non-pausal IP. None of these 39 had nasal epentheses. In contrast, there is a total of 149 relativizers, of which 31 precede oral stops and are not IP final. All these 31 instances had nasal epentheses. Moreover, of the negative morphemes, only the simple negation *łaa*= occurs in IP final position; there are only 4 of these occurrences in the corpus and they all correspond to hestitations. In contrast, all of the relativizers are found in IP final position a few times, as in the example in (29)c. There are in total 33 occurrences of relativizers at IP (pausal and non-pausal) final position in the corpus. In these cases, they do not always receive nasal epenthesis when preceding an oral stop, but as shown in §4.2, junctures are much more likely to occur IP internally than IP finally.

This might indicate that, despite being homophonous, relativizers and negatives have different prosodic statuses. When studying the junctures, it is not problematic to treat relativizers as their own PWds, but negatives are better analyzed as being part of the PWd they are attached to. In other words, negations might actually be clitics while relativizers are not.

4.3.1.3 Function words borrowed from Spanish

Similar to what Román Lobato (2008:95) reported for Ozelonacaxtla, borrowed function words do not trigger juncture epenthesis (30). In contrast, borrowed content words do receive juncture epenthesis regularly (31).

(30)

a. •[«<číi> **Ø** <**pos**> **Ø** <łaatuutatatséye> n <kamán>» «<**maski**> **Ø** <kaaléenka>»] [«<kklínika>»]•

{číi pos łaa=tuu=ta–ta–tséye–Ø n kamán}
{then? so NEG=NEG.NH=3PL.SBJ–INC–heal–PFV J children}

{máski kaa–lii'an–kan–Ø k–klínika}
{although OBJ.PL–take–IDF–PFV LOC–clinic}

'The girls did not recover, even though they took them to the clinic' (#05)

b. •[«…<naktlaawaní> **Ø** <**pero**> **Ø** <kakimíški> <šliikána> <štsumuxát>»]•

{na–k–tlaawa–ni} {péro ka–kin–míški šliikána š–tsumuxát}
{FUT–1SBJ–make–DAT:IMPF} {but IRR–1OBJ–give really 3POSS–girl}

'I'll do it for him but (if) he really gives me his daughter' (#10)

(31)

a. •[«<aqtím> i <**šamana**> **n** <tawiláa> m <páškwa>»]•

{aq–tím i šamana n ta–wilá n páškwa}

{NC–one J week J INC–sit:IMPF J fair}

'One week there is a fair'

(#11)

b. •[«<naktlaawaniyáani> <mim**puénte**> **n** <túu>» …]•

{na–k–tlaawa–ni–yáa–ni min–puente} n {túu … }

{FUT–1SBJ–make–DAT–IMPF–2OBJ 2POSS–bridge} J {REL.NH …}

'I will make your bridge that (you've been trying to do)'

(#10)

The most frequent borrowed function words are *pos* from Spanish *pues* 'well then', and *per*, *par*, and *pero* from Spanish *pero* 'but'. The Spanish borrowing *kúmu* 'because/since', was also very frequent, but it never preceded an oral stop within the same IP in the corpus, so we do not know yet for sure whether it would receive juncture or not. The function word *maski* 'although' might have been borrowed from Nahuatl, which in turn might have borrowed it from Spanish (*más que*—Flores Farfán, 2017), and it also receives no juncture in any of its instances. Combined, there were 68 instances of *maski*, *pos*, and *pero* (and its variations), of which 32 met the conditions to expect an epenthesis and none of which had one.

For nominal borrowings, I was only able to recognize 5 that met the conditions for an epenthesis at their right edge, and all 5 did. However, these were only the Spanish borrowings that were transparent enough for me to recognize without further investigation, so the actual number could be higher.

4.3.1.4 Direct speech

In contrast to what Román Lobato (2008:111) found in Ozelonacaxtla, direct speech is not linked or introduced by any juncture epenthesis in FMT (32).

(32)

a. •[… «<naatsekwáa> <xalánat> **Ø** <wán>»]•

{naa=tse=k–wáa xalánat} {wán}

{too=POT=1SBJ=eat ember} {say}

'"I can eat embers too", he says'

(#12)

b. •[«<kúmu> <úu> n <tsumuxát> **Ø** <waní> **Ø** <pára> <núntsa> <puuwán>»
«<kimpuuwaní?>»] [«<nataačiwiinán> iŋ <kintéeko>»]•

{kúmu úu n tsumuxát wan–ni} {pára núntsa puuwán}
{because s/he J girl say–DAT} {if so think}

{kim–puuwaní–ʔ} {na–taa–čiwii–nán in kin–téeko}
{1OBJ–want–2SBJ} {FUT–COM–speak–IO J 1POSS–father}

'Because the girl told him "if you think so, (if) you want me, you'll talk to my father."'

(#10)

On the other hand, indirect speech behaves like other complement clauses (see §4.3.1.5) and, in eligible contexts, it is linked by a juncture epenthesis (33).

(33)

a. • [«<nakwaní> <štéeko> **m** <pára> <lakaskín> i <špuénte> <naktlaawaní>… »]•

{na–k–wan–ni š–téeko} n {pára
{FUT–1SBJ–say–DAT 3POSS–father} J {if

laka–skín i š–puénte} {na–k–tlaawa–ni}
face–request J 3POSS–bridge} {FUT–1SBJ–make–DAT}

'I'll tell her father that if he wants his bridge, I'll do it for him'

(#10)

b. •[«<štapučawámaa> <wán>»] **i** [«<škukustáʔ>»]…•

{š–tapučawá–maa {wán} i š–kukustáʔ}
{PST–get.married?–PRG {say} J 3POSS–brother.in.law}

'He says that his brother-in-law was getting married'

(#13)

This distinction between direct and indirect speech is consistent throughout the corpus, though the large majority of direct speech instances were, unsurprisingly, in a different IP from their speech verb. Of the 41 instances of direct speech, 12 had their own non-pausal IP, and 22 their own pausal IP. None of these had an epenthesis. Of the 7 instances where the quote and the speech verb were in the same non-pausal IP, 6 were eligible for a juncture epenthesis, but none had one.

Indirect speech was much less frequent in the corpus, with only 16 instances, of which only 5 were at PWd boundaries eligible for an epenthesis. All 5 had juncture epentheses. There were also 2

instances in which the speech verb and the reported speech were in different pausal IPs and in which they still had an epenthesis; the example in (33)b is one of them.

4.3.1.5 Syntactic clause boundaries: non complement or adverbial clause boundaries

Juncture epentheses can occur at syntactic clause boundaries when the prosodic and segmental conditions are met. However, they do not occur at every clause boundary meeting these conditions. Their occurrence also depends on the relationship between the clauses sharing the eligible boundary. In the corpus, when two syntactic clauses, or parts of two different clauses, are contained in the same non-pausal IP and create a boundary eligible for a juncture we find:

(34)

a. Between main and complement clauses, there is always a juncture.
b. Between main and adverbial clauses, there sometimes is a juncture
c. Between clauses that stand in any other type of relationship, or that belong to different sentences, there is no juncture.

The cases in (34)a conform to our initial predictions, that is, they are not exceptions. In contrast, the cases in (34)b and (34)c are not predicted by Hypothesis 2. The cases in (34)b show some variation and will therefore be addressed under the less regular exceptions in section §4.3.2.2.

The cases in (34)c are very consistent in the corpus: at the boundaries of syntactic clauses that do not have a direct complement or adverbial relation there is no juncture epenthesis even if these boundaries are uttered in what seems to be the same non-pausal IP. This includes the boundaries of clauses that belong to different sentences. Consider the following examples:

(35)

a. •[«<ášni_> <kłtatámaa> <amá> N <qawáač> <puutím> i <ščičí'> <štaałtatámaa>»] [«<amá> <wánqen>»] … [«<tsaalatáštu>»]•

{ášni	š–łtata–maa	amá	n	qawáač**}**	**Ø**	**{**puu–tím	š–čičí'
{when	PST–sleep–PRG	this	J	boy**}**	**Ø**	**{**NC–one	POSS–dog

š–taa–łtata–maa}	{amá	wánqen	tsaala+ta–štu–Ø
PST–COM–sleep–PRG}	{this	frog	flee+INC–out–PFV}

'When the boy was sleeping, he was sleeping with his dog, the frog escaped' (#02)

b. •[«<čoo> n <tsúku> m <putsá> <łáa>»] [«<łáa> <kščík**> Ø <**łáa> <kłtatámaa>»]•

{čoo n tsuku n putsá łáa} {łáa

{then J begin J look.for:IMPF REL.PLC} {REL.PLC

k–š–čík} Ø {łáa š–łtata–maa}

LOC–3POSS–house} Ø {REL.PLC PST–sleep–PRG}

'Then he started looking (for his frog) at his house, where he was sleeping'

(#02)

In the example in (35)a there is no juncture between the adverbial clause 'when the boy was sleeping' and the parenthetical clause 'he was sleeping with his dog'. In the example in (35)b no juncture links the relative clause 'where he was sleeping' to the noun preceding it. Most relative clauses in the corpus are linked by a juncture to the noun or the clause they follow. The example in (35)b is the only relative clause that is not. This is likely because it is a non-restrictive or appositional relative that is providing additional information about the main clause ('he started looking…') instead of modifying the preceding noun 'his house'.

Some of clauses conforming the cases of (34)c coincide with constructions that are expected to obligatorily create their own IPs: appositions, parenthetical expressions, and nonrestrictive relative clauses (Nespor and Vogel, 2007). It is very possible that in more careful speech, clauses like those in (35) would have indeed created their own IPs with clearer intonational contours, just as most of the clauses of their type in the corpus do.

Any other type of clause boundary in the corpus that does not have a direct subordination relation with its neighboring clause is not linked by juncture epenthesis even if they are contained in the same IP:

(36) •[«<aqkítsis> <pušám> i <lakaskíni> <ʔaqšáaq>» «<šaqšáaqa> <karastiánu>»] [«<láaki> n <tsé> <nataštú> n <tsamá> n <tíx> Ø <łaałłkatitatsánqa> <mákina>»]•

{aq–kítsis–pušám i lakaskí–ni ʔaqšáaqa} š–ʔaqšáaqa karastiánu
NC–five–twenty J ask–DAT head 3POSS–head person

{láaki n tse na–ta–štú n tsamá n tíx} Ø
{for J well FUT–INC–out J this J road} Ø

{łaa=ał=ka–ti–ta–tsánqa mákina}
{NEG=anymore=IRR–CNTR–INC–lack machine}

'(The devil) asked for a hundred heads, human heads, for the road to come out well, the machines wouldn't go missing anymore'

(#01)

In the example in (36) the clause 'the machines wouldn't go missing anymore' is not linked by a juncture epenthesis to the clause preceding it. These two clauses have no direct relation; they could be coordinated adverbial clauses of purpose subordinated to the main clause 'the devil asked for a hundred heads', or they could simply belong to two different sentences. Either way, there is no subordination between the two of them and there is no juncture epenthesis linking them.

Note, too, in the example in (36) that the second non-pausal IP, *šaqšáaqa karastiánu* 'human heads', corresponds to an apposition which, unlike the apposition in (35)b, does create a clear and audible IP. In addition to a clear intonation change, the PWd preceding the appositional IP drops its short final vowel despite there being no pause between the two of them. This supports the hypothesis of short final vowels being deleted IP finally, instead of McFarland's hypothesis of latent vowels being epenthetized in *connected speech*.

Overall, there were very few instances in which two sentences, or parts of two different sentences, were uttered within what seemed one non-pausal IP, or at the very least as part of the same breath group without a distinctive intonational contour for each. Consider the example in (37) and its prosodic realization in Figure 10. The first sentence ends with the PWd *qawáač* 'boy 'and the second one starts with the PWd *taalámaa'* 'lives with'. These two PWds seem to be in the same non-pausal IP, but there is no juncture between them:

(37) •[«<kaqtím> in <čík> i <wí> n <čaatím>» in «<qawáač> **Ø** <taalámaą>»] [«<tantím> i <ščičí?>»]•

{k–aq–tím	in	čík	i	wi	n	čaa–tím	in	qawáača}
{LOC–NC–one	J	house	J	sit	J	NC–one	J	boy}

Ø	{taa–lá–maa	tan–tím	i	š–čičí?}
Ø	{COM–live–PRG	NC–one	J	3POSS–dog}

'In a house there is a boy, he lives with his dog'

(#06)

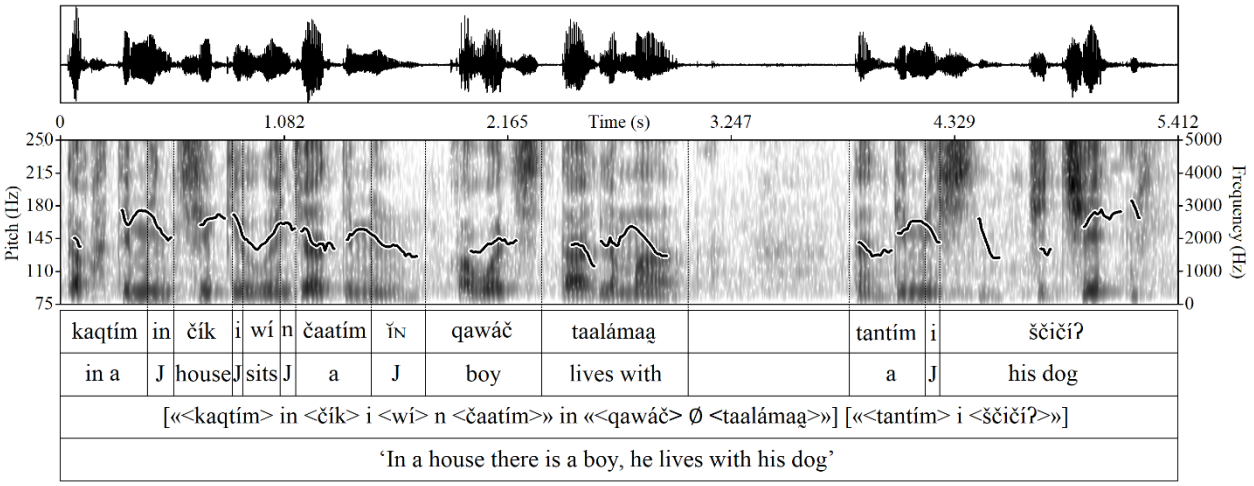

Figure 10: Two sentences, one IP.

Generally, different sentences were uttered in different IPs or in different Us altogether, but the few instances in which two sentences, or parts of two different sentences, were uttered in what seemed to be one single IP, do not have a juncture epenthesis. This suggests that in these instances, syntactic boundaries prevail over the notion of connected speech initially suggested by McFarland and that, additionally, when there is a weak intonation or an unclear IP break at boundaries where we could generally expect one, the lack of juncture can be interpreted as the acoustic cue for an IP break.

There are in total 21 instances in the corpus of clause boundaries where the relation of the neighbouring clauses is not that of complement, adverbial, or relative (i.e., the cases summarized under (34)c above). None of these had juncture epenthesis. These 21 instances include the boundaries of clauses that belong to different sentences.

In contrast to these clause boundaries, the cases of (34)a, complement clauses sharing a boundary eligible for juncture epenthesis, always trigger one, both when the complement precedes the main clause (38)a, and when the main clause precedes the complement (38)b–c.

(38)

a. •[«<máaš> <ántsa> n <tanuúmaa> <šwánqen> **im** <puuwán>»]•

{máaš ʔántsa n ta–nuu–maa š–wánqen} **in** {puuwán}

{might there J INC–in–PRG 3POSS-frog} **J** {think}

'He thinks that maybe his frog is inside there'

(#02)

b. • [«<kkatsiikutún> **im** <pára>»] [«<šliikána> <nakintaalakašláyʔa>…»]•

{k–katsii–kutún} **in** {pára šliikána na–kin–taa–lakašláyʔa}

{1SBJ–know–DES:IMPF} **J** {if really FUT–1OBJ–COM–make.deal}

'I want to know if you will really make a deal with me'

(#10)

c. •[«<łaašaklaqatí>» **ŋ** «<kisákstu> <šaktawilá>»]•

{łaa=š–k–laqatí} **n** {ki–sákstu ša–k–ta–wilá}

{NEG=PST–1SBJ–like:IMPF} **J** {1SBJ–alone PST–1SBJ–INC–sit:IMPF}

'I didn't like to be alone'

(#04)

Of the 19 complement clauses that lined up with a PWd boundary eligible for a juncture, all 19 showed juncture epenthesis. This also applies to indirect speech clauses (see §4.3.1.4). A juncture between main and complement clauses may even occur at IP boundaries, as in the example in (38)c, although only sporadically.

As discussed in §3.2, during the prosodic annotation, I followed the most comprehensive definition of Utterance, which under certain conditions can include more than one syntactic sentence. However, the results in this section suggest that it might be more practical for the analysis to restrict this domain to contain at most one full syntactic sentence. This will be further discussed in the following chapter.

4.3.2 Less regular exceptions

In the following subsections I will describe some other instances of boundaries that, according to Hypothesis 2, seem to be eligible to have a juncture epenthesis but do not. However, this set of exceptions is not as regular as those discussed in the previous subsections. These exceptions are: PWds with final /n/ (§4.3.2.1), syntactic clause boundaries (§4.3.2.2), numerals (§4.3.2.3), adverbials (§4.3.2.4), adjectives (§4.3.2.5), possessives (§4.3.2.6), the auxiliary verb *tsuku* (§4.3.2.7), and fronted subjects (§4.3.2.8).

4.3.2.1 PWds with final /n/

PWds that end in /n/ show a lesser tendency to trigger juncture epentheses. They often do not receive any juncture, as the examples in (39), but they sometimes do, as the examples in (40).

(39)

a. •[«<amá> n <tíi> <šlá> <maasputukutú**n> Ø <**kaačikín>»]…•

{amá n tíi šlá maa–sput–ii–kutún kaačikín}

{this J REL.H s/he CAUS–end–TRN–DES:IMPF town}

'This, the one that wants to end the town'

(#12)

b. •[«<čoo>» «<tlawaká**n> Ø <**ščik> <sikulán>»…]•

{čoo tlawa–kán š–čik sikulán}

{PTC make–IDF:IMPF 3POSS–house church}

'They make the church's house'

(#14)

(40)

a. •[«… <wá**n**> **iŋ** <kintéeko>»]•

{wán in kin–téeko}

{say J 1POSS–father}

'My father says'

(#12)

b. •…[«<łaašmiškikutú**n> i <**štsumuxát>»]•

{łaa=š–miški–kutún i š–tsumuxát}

{NEG–PST–give–DES:IMPF J 3POSS–girl}

'He didn't want to give him his daughter'

(#10)

In the corpus, there are 144 PWds that end in /n/, precede a PWd with an initial consonant, and are not IP final. Of those 144 PWds, 84 did not have any juncture epentheses and 60 did.

In McFarland's (2009) description, juncture epentheses are analyzed as postlexical processes that occur to satisfy certain segmental preferences at word boundaries, and one of the preferred word boundary transitions is N-K. We might think initially that this is why many PWds that end in /n/ do not show any juncture epentheses, because they might already constitute a N-K transition without the need of a juncture. However, this would only explain the cases where the following PWd has an initial oral stop, like the example in (39)a, but not the cases where the following PWd does not have an initial oral stop, like the example in (39)b. In the example in (39)b the PWd that ends in /n/

does not create a N-K transition, but it still does not receive a juncture epenthesis and remains with a "dispreferred" transition.

Of the 144 IP internal PWd boundaries that end in /n/, 81 precede an oral stop; out of those 81, 52 do not have any epenthesis and 29 do. The other 63 PWd boundaries that end in /n/ precede PWds whose initial segment is not an oral stop; out of those 63, 32 do not have any epenthesis, and 31 do. This suggests that junctures do have a slightly higher tendency to occur at boundaries with dispreferred transitions than at boundaries that already have one of the preferred transitions. However, the 32 cases in which a PWd that ends in /n/, precedes a consonant other than an oral stop, and still does not have juncture epenthesis, also suggest that despite the type of transition it creates, a word-final /n/ lessens the chances of a word receiving a juncture epenthesis.

This is also an interesting exception because throughout the corpus there are certain types of boundaries that almost always have juncture epenthesis, and the only cases where the predicted epenthesis does not occur are cases where the PWd on the left has a final /n/. For example, the large majority of boundaries between a noun phrase and a relativizer (41)a, between a verb and its object (41)b, and between a verb and its subject (41)c have a juncture:

(41)

a. •[«…<amá>»] n [«<tsumuxáti**> n <**tíi> <laqatí> <aqsqawaníʔ>»]•

{amá	n	tsumuxát}	in	{tíi	laqatí	aqsqawaníʔ}
{this	J	girl}	J	{REL.H	like:IMPF	devil}
		NP	**J**	REL		

'(where) this girl the devil liked (lived)'

(#10)

b. •[«<čoo> <áɬ> i <maqtayáa**> n <**tsumuxátl̥>»]•

{čoo	an–li	i	maqtayaá	n	tsumuxát}
{PTC	go–PFV	J	help:IMPF	J	girl}
			V	**J**	O

'He went to help the girl'

(#03)

c. •[«<čoo> <wampá> **n** <tsumuxát>»…]•

{čoo wan–pá n tsumuxát}

{PTC say–IT:IMPF J girl}

V **J** S

'The girl said again…'

(#03)

However, if the PWd on the left ends in /n/ the juncture is sometimes missing. The examples of (42) illustrate boundaries similar to those in (41) where we could also expect juncture epentheses, but where the PWd at the left has a final /n/ and no juncture occurs. (42)a shows a boundary between a noun phrase and a relativizer, (42)b a boundary between a verb and its object, and (42)c a boundary between a verb and its subject:

(42)

a. •[«<šwí>»] [«<lakčiškuwí**n> Ø <**tíi> <štakatsiikutún>… »]•

{š–wi lak–čiškuwín} {tíi š–ta–katsii–kutún}

{PST–sit PL–men} {REL.H PST–3PL.SBJ–know–DES:IMPF}

NP **Ø** REL

'There were men who wanted to know'

(#10)

b. •…[«<tsukúka> ŋ <kaamaaštukán**> Ø <**lakamanán>»]•

{tsuku–kan–Ø kaa–maa–štu–kan lak–kamanán}

{begin–IDF–PFV OBJ.PL–CAUS–out–IDF PL–child:PL}

V **Ø** O

'They started letting the children go out'

(#01)

c. •[«<štaʔá**n> Ø <**lakamanán>»…]•

{š–ta–ʔán lak–kamanán}

{PST–3PL.SBJ–go:IMPF PL–child:PL}

V **Ø** S

'The children went (out)'

(#01)

Of the 70 instances of verb-subject sequences where a juncture epenthesis is possible, 65 have one and 5 do not. Of the 5 that do not, 4 have a PWd with final /n/ on the left side of the boundary. Of the 82 instances of verb-object sequences where a juncture epenthesis is possible, 66 have one and 16

do not. Of the 16 that do not, all 16 had a PWd with final /n/ on the left side of the boundary. Of the 60 instances where the boundaries between a noun phrase and its modifying relativizer are eligible for juncture epentheses, 56 have one and 4 do not. Of the 4 that do not, all 4 had a PWd with final /n/ on the left side of the boundary.

These exceptions discussed under this section are the weightiest ones; they account for 39% of the total exceptions of /i/ epenthesis and for 24% of the total exceptions of /n/ epenthesis. However, the number of these exceptions cannot simply be added to our initial predictions, not only because this is an irregular type of exception, but also because, being the only exception that is exclusively phonologically driven, it sometimes overlaps with some of the other exceptions. We can at least conclude that an n-final PWd on the left side of the boundary does not completely block the occurrence of a juncture epenthesis, but it does noticeably decrease the chances of it occurring.

4.3.2.2 Syntactic clause boundaries: adverbial clauses

In §4.3.1.5 I mentioned that when syntactic clause boundaries meet the prosodic and segmental conditions for a juncture epenthesis to occur, the occurrence of junctures depends on the relationship between the clauses that share the eligible boundary. As summarized earlier in (34), the boundaries of main and complement clauses always receive a juncture; the boundaries of non complement or non adverbial clauses, regardless of being uttered in the same IP, never trigger a juncture; and the boundaries of adverbial clauses sometimes have and sometimes do not have junctures. This section deals with that latter type of boundaries.

The boundaries of adverbial clauses sometimes have (43)a and sometimes do not have junctures (43)b. This excludes adverbial clauses introduced by relativizers.[15]

[15] All relative clauses that immediately follow the noun or verb phrase they modify are linked by a juncture. See §4.3.1.2 for examples.

(43)

a. •[«…<nakliitlaawaniyáani> <mimpuénte> **m** <pára>»] [«<wíši> <nakimiškiyáa> n <talaakaskín>…»]•

{na–k–lii–tlaawa–ni–yáa–ni min–puénte**}** **n** **{**pára wíši

{FUT–1SBJ–INST–make–DAT–IMPF–2OBJ 2POSS–bridge**}** ɲ **{**if you

na–kin–miškiyáa n talakaskín}

FUT–1OBJ–give.2SBJ.IMPF ɲ permission?}

'I will make your bridge for you if you give me permission (to marry your daughter)' (#10)

b. •[«<kámaa> <miškí> <líiwat>»] iŋ [«<kintáq> **Ø** <špaalakáta> n <tatatlámaa>»]•

{k–an–maa miški líiwat in kin–táqu**}** **Ø** **{**špaalakáta

{1SBJ–go–PRG give food ɲ 1POSS–grandmother**}** **Ø** **{**because

n tatatla–maa}

ɲ be.sick–PRG}

'I'm going to give food to my grandma because she's sick' (#04)

In (43)a the adverbial clause 'if you give me permission' is linked to the main clause by a juncture epenthesis, while in (43)b the adverbial clause 'because she is sick' is not. In total, at eligible boundaries, there are 9 instances of adverbial clauses linked to their main clause by a juncture epenthesis and 16 instances in which they are not. Adverbial clauses of cause and motive introduced by *kúmu* and *špaalakáta* 'because' are never linked to their main clause by a juncture, while time, purpose and condition clauses sometimes are and sometimes are not. It remains to be determined with a larger corpus if the type of adverbial clause or its position with respect to the main clause has an influence on the occurrence of juncture.

4.3.2.3 Numerals

Numerals also show inconsistent behaviour. In most instances, numerals larger than 1 do not receive any juncture (44):

(44)

a. •[«<aqtú> **Ø** <káta>»] [«<áɬ>»]•

{aq–tú? káta an–li}

{NC–two year go–PFV}

'Two years went by'

(#04)

b. •[«<kiitaštúči> <šlá> <šliaqtáti> **Ø** <kiłtamakú>»]…•

{kii–ta–štú–či–Ø šlá š–li–aq–táti kiłtamakú}

{RT–INC–out–PROX–PFV s/he 3POSS–GEN–NC–four day}

'He came out on the fourth day'

(#12)

Out of the 7 instances of numerals larger than 1 that precede a noun at PWd boundaries eligible for an epenthesis, 6 do not show any juncture. The only instance that does is that in (45)a below, which is also the only instance where the numeral is marked for plural possessor. Beyond this, there is only one more instance in the corpus of a number receiving a juncture (45)b, however, this was uttered in a different pausal-IP and is not considered in the total number of exceptions discussed in Figure 8. IP-final juncture epentheses are less common that IP internal epentheses but, as previously discussed, they seem to have more of a cohesive function.

(45)

a. •[«<tánii> <ščaatukán> **iŋ** <kamán>»]•

{ta–nii–Ø š–čaa–tu?–kán in kamán}

{3PL.SBJ–die–PFV 3POSS–NC–two–PL.POSS J children}

'The two of the girls died'

(#05)

b. •[«<aqkitsispušám>»] **i** [«<aqšáaqa> <natamaastá?>»]•

{aq–kítsis–pušám i aqšáaqa na–ta–maastá}

{head–five–twenty J head FUT–3PL.SBJ–deliver}

'They have to deliver 100 heads'

(#01)

The numeral 1 behaves differently from the rest of the numerals and has juncture in the vast majority of cases (46). In all those cases where it has an epenthesis, the numeral 1 seems to introduce an indefinite noun, while in the few instances where it does not have juncture (47) it seems to function as an actual numeral.

(46)

a. •…[«<taštúči> n <tantím> **i** <xúuk?>»]•

{ta–štú–či–Ø n tan–tím i xúuk}

{INC–out–PROX–PFV J NC–one J deer}

'A deer came out' (#06)

b. •[«… <qášmatł>»] in [«<čaatím> **in** <čiškú>…»]•

{qášmat–li in čaa–tím in čiškú?}

{hear–PFV J NC–one J man}

'He heard a man' (#03)

(47)

a. •[«<tsamáni>»] [«<aqtím> **Ø** <káata> <kqałtawáqa> <kkinkačikín>»]•

{tsa–máni aq–tím káata k–qałtawáqa–Ø k–kin–kaačikín}

{just–only NC–one year 1SBJ–study–PFV LOC–1POSS–town}

'I only studied one year in my town' (#04)

b. •[«<aqtím> **Ø** <tsiisní> <nakliitlaawaniyáani> <mimpuénte>…»]•

{aq–tím tsiisní na–k–lii–tlaawa–ni–yáa–ni min–puénte}

{NC–one night FUT–1SBJ–INST–make–DAT–IMPF–2OBJ 2POSS–bridge}

'I'll do your bridge in one night' (#10)

There are 40 instances of the numeral one that have a juncture epenthesis and 6 that do not. In these instances, there seems to be a functional distinction, in which the numerals that behave like indefinites always receive a juncture and the ones that behave as numbers do not.

4.3.2.4 Adverbials

McFarland (2009:192) reports that several monosyllabic adverbs tend to lose their stress and procliticize to the verb. In the corpus, many of the monosyllabic adverbs that precede a verb are indeed unstressed and do not have juncture epentheses (48), but there are also some that do, as in the examples in (49).

(48)

a. •…[«<amá> <wánqen>» «<**tseeq**tákutɬ>»]•

{amá n wánqen tseeq=ta–kut–li}

{this J frog secretly=INC–out–PFV}

'The frog secretly got out'

(#06)

b. • [«… <**ɬaaɬ**katitatsánqa> <mákina>»]•

{ɬaa=aɬ=ka–ti–ta–tsanqa mákina}

{NEG=anymore=IRR–CNTR–INC–lack machine}

'The machines won't go missing anymore'

(#01)

(49)

a. •[«<páks> in <tíi> n **<tsé> n** <tatasiyú>»]…•

{páks in tíi n tsé n ta–ta–siyu}

{all J REL.H J well J 3PL–INC–show}

'All the men who can (have superpowers) look like that'

(#12)

b. •[«<túu> <ɬaa**tánks> i** <nawána>»]…•

{túu ɬaa=tánks i na–wana}

{REL.NH NEG=right J FUT–say.2SBJ}

'What you don't say right'

(#04)

The proclitic adverbs *naa* 'too', 'yet', and *ɬáaɬ* 'not anymore' (*ɬáa=aɬ=*, 'NEG=anymore=') are the most frequent monosyllabic adverbs in the corpus. Combined, they have 26 occurrences, none of which has a juncture. There are only a few other monosyllabic adverbs with fewer or unique occurrences of which 6 have a juncture epenthesis and 9 do not.

On the other hand, longer adverbs are more likely to be linked by junctures:

(50)

a. •…[«<**palána**> **n** <táštu> <amá> n <tsumuxátɨ̥>»]•

{palána n ta–štu–Ø amá n tsumuxát}

{quickly J INC–out–PFV this J girl}

'The girl quickly went out'

(#03)

b. •[«<**akalistáł**> **in** <tatáštu>»]…•
{akalistáł in ta–ta–štu–Ø}
{later J 3PL.SBJ–INC–out–PFV}
'They went out later'
(#06)

Only a few adverbs of more than one syllable are found without a juncture (51)a, but even these adverbs have counterparts within the corpus where they do have juncture (51)b.

(51)

a. •[«<čoo> m <**púlana**> **Ø** <čáʔa>»]•
{čoo n púlana ča–ʔan}
{PTC J first there–go}
'He arrived there first'
(#03)

b. •[«<**púlana**> **n** <tsúku> **Ø** <taputsá>»] [«<kščík>»]•
{púlana n tsúku–Ø ta–putsá k–š–čík}
{first J begin–PFV 3PL.SBJ–look.for LOC–3POSS–house}
'First, they started looking at his house'
(#06)

Román Lobato (2008:87) makes a similar observation for Ozelonacaxtla Totonac, suggesting that the adverb+verb complex has a variable behaviour. She analyzes the instances in which there is no juncture between these elements as complex predicates. On the other hand, Levy and Hernández-Green (2021) report that in Coatepec Totonac, preverbal adverbs are grouped along with the verb they precede inside the same AP—that is, they simply do not receive juncture epentheses, whether or not they only modify the verb or their scope is the full clause.

There are in total 24 eligible occurrences of non-monosyllabic adverbs preceding a verb in the corpus that receive a juncture, and 9 occurrences in which they do not. This variable behaviour exhibited by the adverbs in the corpus is also observed in adverbial clauses (see §4.3.2.2).

4.3.2.5 Adjectives

There are very few adjectives in the corpus, and their behaviour is not very consistent. Some adjectives do not receive juncture epenthesis (52), while others do (53):

(52)

a. •[«<tawáka> <**klánka**> **Ø** <číwiš>»]…•

{ta–wáka–Ø k–lánka číwiš}

{INC–up–PFV LOC–big stone}

'He climbed on a rock'

(#02)

b. •[…«<tíi> N <qáši> n <čaatím> <wampará> **<stíp> Ø** <sqóno>»]•

{tíi n qáši–Ø n čaa–tím wampará stíp sqóno}

{REL.H J punch–PFV J NC–one other agile fire}

'(the one) who beat the other *agile fire* (a man with superhuman powers)'

(#12)

(53)

a. •[…«<šlá> <liiwána> <laqooníi> m <puénte>» «<**łmáan**> **im** <puénte>»]•

{šlá liiwána laqoo–nii n puénte} łmáan in puénte

{s/he well finish–PFT J bridge} long J bridge

'The bridge had turned out well, it was a long bridge'

(#12)

b. •[«<máski> <luu**qawíw**> **in** <čúčut>»]•

{máski luu=qawíw in čúčut}

{although very=cold J water}

'(I want to swim in the ocean) even if the water is cold'

(#15)

Levy and Hernández-Green (2021) suggest that to properly assess this question in Coatepec Totonac, the difference between compounds and adjectival phrases should be discussed first. This might also be the case for FMT. Some of the instances in which there is no juncture between the adjective and the noun are probably compounds, like the example of (52)b, in which *stíp sqóno* 'agile fire' refers to a man with superhuman powers, who is also the main character in the story, and it is frequently mentioned. Additionally, differentiating between adjectival phrases and adjectival predicates in sentences like (48a) might also be helpful in the discussion.

There are very few adjectives in the corpus that could be used to evaluate the pattern of occurrence of junctures. In total, there are 22 instances of adjectives preceding a noun at PWd boundaries eligible for a juncture epenthesis, of which 10 do and 12 do not show juncture. However, those 22 instances correspond to only 10 different adjectives, *lánka* 'big' being the most frequent one

with 6 occurrences, of which none has a juncture epenthesis. No solid conclusions can be drawn yet from the current data.

4.3.2.6 Possessives

There were not many instances of two full noun phrases in a possessive relation in the corpus. Only one of these instances had a juncture between the noun phrases (54), and the rest did not, as exemplified in (55):

(54) •[«…<wánii> <štéeko> n <tsumuxát>»]…•
{wán–ni–Ø š–téeko n tsumuxát}
{say–DAT–PFV 3POSS–father J girl}
'The girl's father said (to the devil)' (#10)

(55)

a. •…[«<łáa> <yáa_> <ščík> Ø <štáqǫ>»]•
{łáa yáa š–čík š–táqo}
{REL.PLC stand 3POSS–house 3POSS–grandmother}
'Where her grandmother's house was' (#03)

b. •[«<aqkítsispušám> i <lakaskíni> <'aqšáaq>» «<šaqšáaqa> Ø <karastiánu>»]•
{aq–kítsis–pušám i laka–skín–ni aqšáaq š–aqšáa qakarastiánu}
{NC–five–twenty J face–request–DAT head 3POSS–head person}
'He asked for a hundred heads, heads of humans' (#01)

In total, there are only 8 instances of noun-noun possessive constructions where the boundaries are eligible for a juncture epenthesis. Only the instance in (54) had a juncture, and the other 7 did not. However, of the 7 instances that do not have a juncture, 4 have a final /n/ on the left PWd edge, which, as shown in §4.3.2.1, highly decreases the chances of epenthesis.

4.3.2.7 Auxiliary *tsuku*

Tsuku, when used as an auxiliary verb in the construction *tsuku*+Verb, 'begin (to verb)', sometimes receives juncture (56)a, and sometimes does not (56)b:

(56)

a. •…[«<tsúku> **n** <tapeekwán>»]•

{tsuku n ta–peekwán}

{begin J 3PL.SBJ–fear}

'They began to be fear'

(#12)

b. •[«<púlana> n <tsúku> **Ø** <taputsá>»] [«<kščík>»]•

{púlana n tsuku ta–putsá k–š–čík}

{first J begin 3PL.SBJ–look.for LOC–3POSS–house}

'First, they started looking at his house'

(#06)

The instances in which the auxiliary *tsuku* takes no juncture are also instances in which it has a very low phonetic prominence in comparison to its complement. Compare for example the two following spectrograms. Figure 11 corresponds to the example in (56)a, where *tsuku* receives a juncture, and Figure 12 corresponds to the example in (56)b, where it does not.

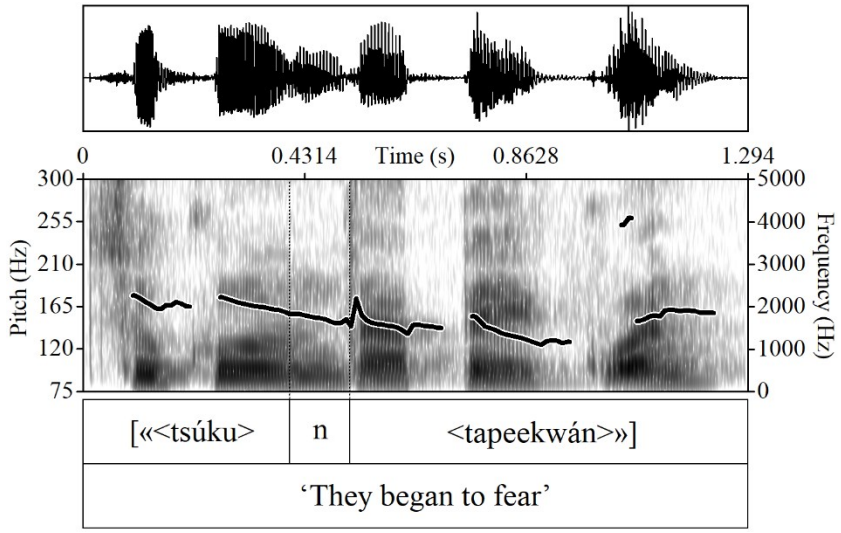

Figure 11: auxiliar tsuku, with juncture

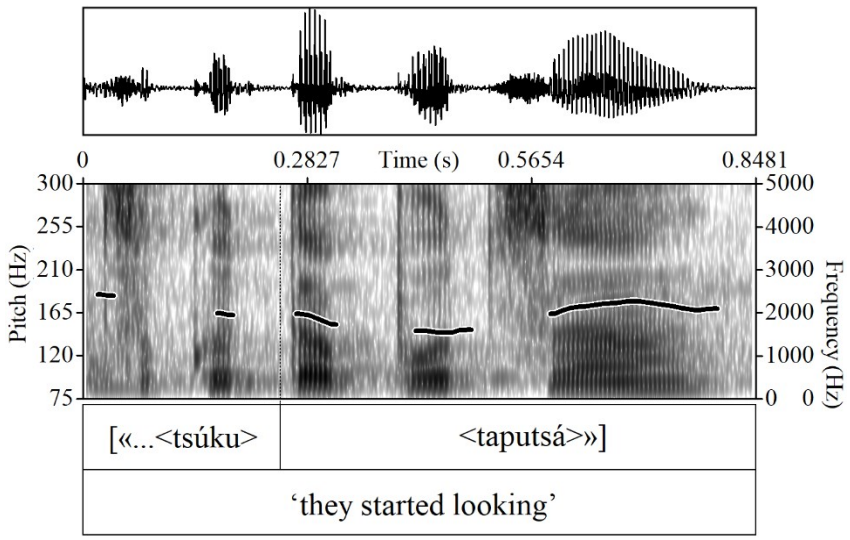

Figure 12: auxiliar tsuku, without juncture

Generally, as the figures above illustrate, the phonetic prominence of *tsuku* is noticeably higher when it has a juncture epenthesis than when it does not, although there are only a few instances of the latter in the corpus.

Of the 19 instances in which *tsuku* precedes an oral stop, 12 have nasal epenthesis and 7 do not. All 7 were produced by the same speaker, suggesting this might also vary from speaker to speaker. A similar variation was found in Román Lobato (2008:88) for Ozelonacaxtla Totonac.

4.3.2.8 Fronted Subjects

In the unmarked constituent order, VS, there is almost always juncture epenthesis between the verb and its subject, the only exceptions being those presented in §4.3.2.1. In contrast, when a subject precedes its verb (SV), most often there is no juncture between these two constituents (57)a. There are only a few cases where fronted subjects receive a juncture (57)b:

(57)

a. •[«<amá> N <qawáač> **Ø** <tawáka>»] [«<kíw'>»]•

{amá n qawáača ta–wáka–Ø k–kíw'}

{this J boy INC–up–PFV LOC-tree}

'The boy climbed a tree'

(#02)

b. •[«<lánka> <sain> **i** <miɬ>»] [«<kaatsís>»]•

{lánka saʔin i min–li kaa–tsís}

{big rain J come–PFV PLC–night}

'It rained a lot at night (*a big rain came at night*)'

(#05)

Out of the 14 instances of the order SV that meet the conditions for a juncture epenthesis, only 4 show juncture epenthesis. Additionally, there are 13 instances of fronted subjects in which the subject is in its own pausal IP; none of these instances had junctures either.

A similar phenomenon was noted in Ozelonacaxtla Totonac (Román Lobato, 2008), where fronted subjects that do not receive a juncture epenthesis are analyzed as external topics that create their own IP. Similarly, Juárez Esteban (2020) proposes that in Tuxtla Totonac junctures make a distinction between fronted subjects that function as topic and those that function as focus; among other differences, foci do not create their own IPs and can receive junctures, while external topics create their own IP and cannot receive junctures.

It is possible that in FMT junctures make a similar distinction. External topics are typically expected to have their own IP (Nespor and Vogel, 2007). In such cases when, as expected, an external topic creates its own IP, the lack of juncture would no longer be exceptional, since junctures are much less likely to occur at IP boundaries. However, in several cases in the corpus, fronted subjects that do not receive a juncture do not seem to have a distinctive intonation curve, or this was not as clear as other IPs in the corpus. Consider the fronted subjects in Figure 13 and Figure 14*:*

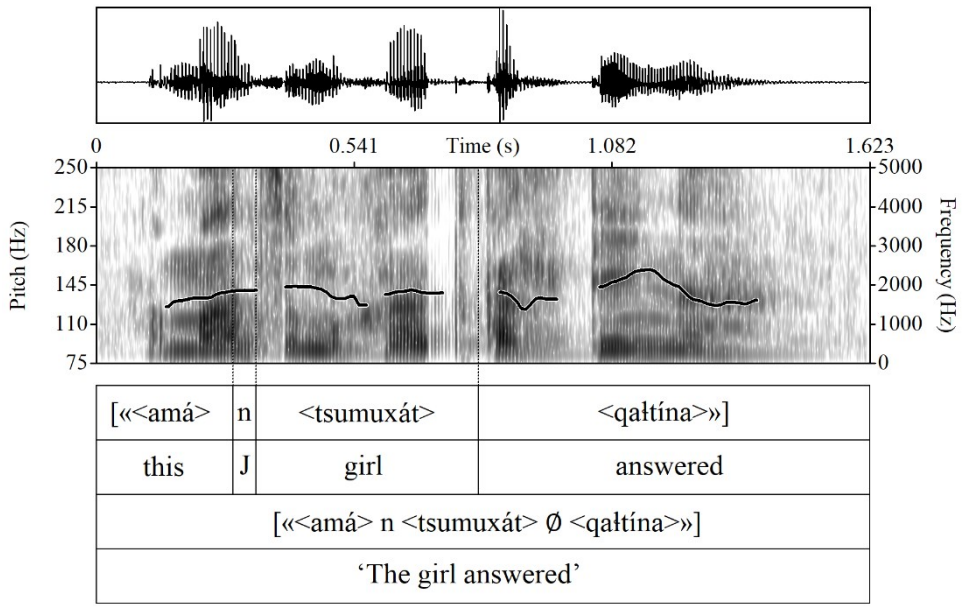

Figure 13: fronted subject without its own IP.

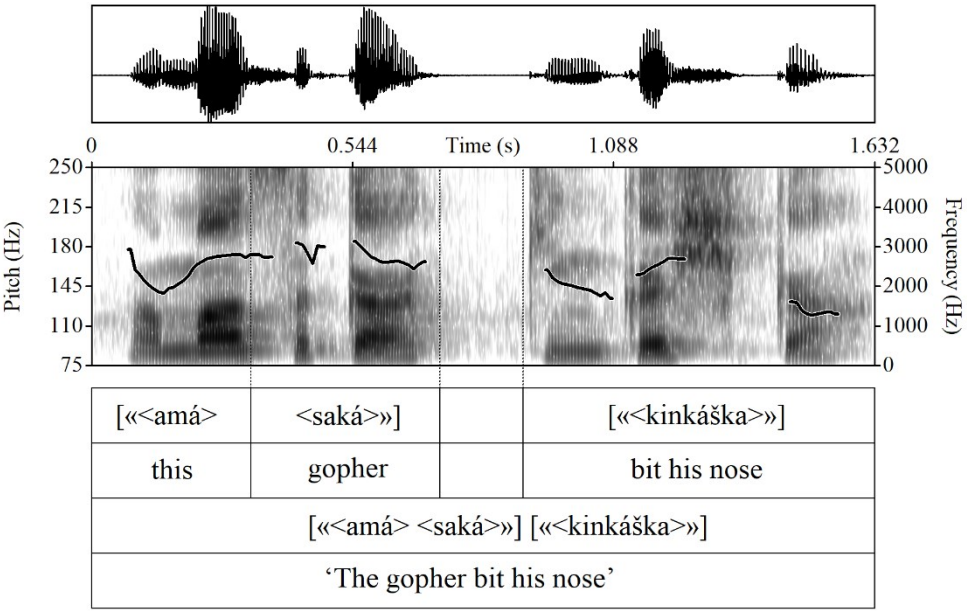

Figure 14: fronted subject with its own IP.

Figure 13 illustrates a fronted subject, *amá tsumuxát* 'this girl', that does not show a sharp intonational contour but that, nevertheless, does not have juncture epenthesis. Figure 14, on the other hand, illustrates a fronted subject, *amá saká* 'this gopher', that does create its own pausal IP and does not have juncture epenthesis either. It is possible that in more careful speech the fronted subject in Figure 13 would indeed have a clear IP of its own, reasserting that it is an external topic, but as it was actually uttered, the only prosodic cue to analyze it as such might be precisely the lack

of juncture. It remains to be studied in further detail how junctures can correlate with information structure in FMT, but it is clear that they are to some extent related.

5. Discussion

In the previous chapters, I presented previous accounts of juncture phenomena in FMT and other Totonac languages and the two main hypotheses that could be formulated based on them:

i. Hypothesis 1: if a juncture epenthesis occurs, it is at a non-IP-final PWd boundary.

ii. Hypothesis 2: if there is a non-IP final PWd boundary that is segmentally eligible for a juncture epenthesis (i.e., C-C or V-K or boundaries), in most cases, this triggers one.

I then evaluated how these hypotheses and their predictions fit the data studied for this thesis. In §4.2 I showed that Hypotheses 1 is mostly but not entirely accurate: 87% of the /n/ epentheses and 81% of the /i/ epentheses occur in non-IP-final position. The exceptions to this hypothesis—that is, juncture epentheses occurring at IP boundaries—correspond mostly to hesitations and emphatic IPs. In §4.3, I showed that Hypothesis 2 was not as accurate; it only predicts 61% of the /n/ epentheses and 45% of the /i/ epentheses. However, I also showed that the cases that were not predicted by Hypothesis 2—that is, eligible PWd boundaries that do not receive a juncture—are not arbitrary, but they occur under certain lexical and syntactic conditions, which were all presented in the last chapter. The exceptions to Hypothesis 2 can be classified as regular and irregular. Regular exceptions (§4.3.1) are entirely predictable in the corpus and constitute 46% of the total exceptions of nasal epenthesis, and 21% of vowel epentheses. If added to the initial predictions, they increase the predictability of nasal epenthesis to 79% and vowel epenthesis to 57%. Irregular exceptions show some variations that cannot be explained yet with much certainty based on the current data.

These findings leave us with the problem of finding the best analysis of the cases unaccounted for by the initial hypotheses (i.e., the regular and irregular exceptions) and whether to analyze them using further prosodic conditions (e.g., an additional mid-level prosodic unit), or through conditions of a different nature, (e.g., lexical, or syntactic). In this chapter, I will assess the two alternatives and suggest that, for the moment, the latter is more promising.

In §5.1 I will present the purely prosodic and phonologic generalizations that can be drawn from the results, propose some prosodic alternatives to refine the tested hypotheses, and evaluate the addition of a hypothetical mid-level prosodic unit to the analysis—a unit larger than the PWd and smaller than the IP. In §5.2 I will present the non-prosodic features relevant to the distribution of the junctures, and in §5.3, I will discuss the advantages and disadvantages of both possible analyses.

5.1 Prosodic generalizations

Following previous descriptions and analyses, the initial hypotheses to test posited that juncture epentheses would occur at most of the eligible non-IP-final PWd boundaries and that they would not occur at IP boundaries. I showed that while they are a minority of the cases, juncture epentheses do occur at IP boundaries: 13% of nasal epentheses and 19% of vowel epentheses occur at IP boundaries. I also showed that junctures occur at *many* but not at *most* of the eligible PWd boundaries: only 61% of the boundaries eligible for nasal epenthesis and 45% of the boundaries eligible for vowel epenthesis have one.

In order to increase the accuracy of the tested hypothesis, it is necessary to refine them. In the following subsections I will propose simple prosodic alternatives based on the results to do so. In §5.1.1 I will address the modifications that can be done on Hypothesis 1, in §5.1.2 the modifications that be done on Hypothesis 2, and in §5.1.3 I will evaluate an additional alternative of prosodic analysis which consists in the addition of a mid-level prosodic unit.

5.1.1 Refining Hypothesis 1: prosodic loci at which junctures do not occur

Hypothesis 1 does not predict where junctures occur as much as it predicts where they do not: at IP-final PWd boundaries. This hypothesis held in the majority of the cases, but it was not entirely accurate. The cases that were not predicted by it (13% of the /n/ epentheses and 18% of the /i/ epentheses) correspond mostly to hesitations and emphatic IPs, and to long subordinate clauses. Other than that, they do not have anything else in common. It is very possible that the number of these cases would drastically diminish in more careful or non-spontaneous speech. These juncture epentheses also suggest that one of the functions of junctures is to keep cohesion and to link the parts of a sentence when they are distributed in more than one IP due to factors unrelated to the linguistic structure (e.g., hesitations or running out of breath). In these cases, the junctures are thus keeping things together within an Utterance, the prosodic domain that contains hesitations and non-meaningful pauses (Hayes, 1989).

Given the nature of hesitations and spontaneous speech, there is not much we can add to predict the juncture epentheses occurring at IP boundaries. There are, however, a couple of solid prosodic generalizations about where juncture epenthesis never occur that hold consistently throughout the corpus: inside of the PWd, and at U boundaries. These are absolute the limits of its application.

At this point it is worth remembering that McFarland (2009) does not employ the IP or any prosodic unit in her description of juncture epentheses. Instead, she employs the notion of *connected speech*. The main reason to posit the IP as the limit of juncture application in Hypothesis 1 was the equivalence done between these concepts to conciliate McFarland's description with the analysis of similar Totonac juncture phenomena that employ the Prosodic Hierarchy, but strictly speaking, *connected speech* and IP have different implications in rule formulation.

During prosodic annotation, two different types of IPs were marked—pausal and non-pausal. This distinction was made precisely because at the moment of the annotation it was not clear what the stronger determining factor for juncture occurrences was whether they occurred at boundaries in *connected speech* (as described by McFarland, 2009), or whether they occurred at non-IP-final boundaries—as proposed by the accounts that employ the Prosodic Hierarchy. Although they make similar predictions, the two descriptions require different formulations. An example of a rule applying to *connected speech* is that described by Harris (1969:60) for voicing assimilation in Mexican Spanish shown in (58):

(58) Voicing assimilation in Mexican Spanish: s → z / __ $C_{[+voiced]}$ in connected speech
Los dos. Dámelos 'Both of them. Give them to me'
a. Two intonational contours, no pause: [«loz ðoz»↓ «dámelos»↓]
b. Two intonational contours, with a pause: [«loz ðos»↓] [«dámelos»↓]
(Based on Harris, 1969:60)

Both instances in (58) are composed by two IPs each, both with a falling intonation marked as "↓", but voicing assimilation only occurs when there is no pause between these two IPs. What motivates the rule is non-pausal adjacency, so the rule is disrupted by pauses but not necessarily by the purely intonational breaks. In contrast, an example of a rule applying only inside of an IP is that described by Nespor and Vogel (2007:213) for /s/ voicing in Greek (59):

(59) /s/ voicing in Greek: s → z / __ $C_{[+voiced]}$ inside of the IP

Εκείνος ο άνδρας, μάρτυσμου ο θεός, δεν θα μπεί ποτέ στο σπίτι μου. '

This man, God be my witness, will never enter my house'

No specified pauses: «ekínos o ánðra**s**» «m<u>á</u>rti**z** mu o θeó**s**» «ð<u>e</u>n θa bi poté sto spíti mu»

(Based on Nespor and Vogel 2007:213)

In (59) it is not the pause that disrupts the rule, but the intonation break that does, regardless of if this intonation breaks is accompanied by a pause or not.

If the domain of application of juncture epentheses were the IP, as proposed by the accounts in §2.3.2-4, IP breaks of any kind—pausal or non-pausal—would disrupt the application of the rule, operating just like the rule in (59) does. If its domain of application were *connected speech*, as initially described by McFarland (2009), non-pausal adjacency inside U would be a sufficient condition for juncture regardless of intonational breaks (and the syntactic boundaries sometimes associated to them), as in the rule in (58). Neither type of rule is completely supported by the data because junctures can occur at IP breaks (60)a, and can also be absent in connected speech (60)b:

(60)

a. •[«<péro> <ášni> n <tsúku>**»] n [«**<tliiwéqe> n <kaawaní>…»]•

{pero ášni n tsúku–Ø n tliiwiqi n kaa–wan–ní}

{but when J begin–PFV J strong J OBJ.PL–say–DAT:IMPF}

'But when he started to tell them loudly…'

(#12)

b. •[«<ášni>»] n [«<tawilačáą**> Ø <**qášmatli>…»]•

{ášni n ta–wila=čaá'} {qášmat–li}

{when J INC–sit=there} {hear–PFV}

'When they were sitting there, they heard…'

(#02)

The example of (60)a shows that junctures are not always disrupted by IPs, and the example of (60)b shows that junctures can be absent at certain syntactic boundaries regardless of whether they are uttered in *connected speech*, without a pause. This shows that for the application of juncture in FMT, certain syntactic structures can sometimes override IP breaks, and also that syntactic boundaries can override adjacency in connected speech. This suggests that the domain of application of junctures is not simply the IP, nor it is *connected speech*.

That the IP is not the strict limit of the application of juncture does not mean it is not a relevant unit in the formulation of juncture rules. Not only is there a strong tendency for junctures not to occur at IP boundaries, but also, junctures occurring at IP boundaries correspond to a specific set of conditions (hesitations, emphatic IPs, running out of breath). We cannot predict at what IP boundaries junctures will occur, but we can predict that junctures at IP boundaries occur under these conditions. Additionally, in the refining of Hypothesis 2 (§5.1.2), and the presentation of the lexical and syntactic generalizations of junctures (§5.2) the IP will also be necessary.

5.1.2 Refining Hypothesis 2: prosodic loci at which junctures are expected

While Hypothesis 1 tries to predict where junctures do not occur, Hypothesis 2 tries to predict where they do. However, unlike Hypothesis 1, Hypothesis 2 proved not be as accurate, leaving 39% of the boundaries eligible for nasal epentheses and 55% of the boundaries eligible for vowel epentheses unaccounted for. Phonologically speaking, the cases where the IP internal PWd boundaries seemed to be segmentally eligible for an epenthesis but did not receive one—that is, the exceptions to Hypothesis 2—do not have much in common. The only exceptions that are clearly and exclusively phonologically motivated are the ones addressed in §4.3.2.1: PWds with final /n/, which are less likely to trigger junctures, but this is an irregular type of exception. Beyond that, the excptions to Hypothesis 2 can have different lengths and shapes; they can have one or multiple syllables, and different syllable weight and stress patterns. Most of the things they have in common are syntactic, but there is a small subset of these instances that can be narrowed down directly through simple additional prosodic considerations. These are the instances in which a structure that is usually expected to create its own IP does not. Consider the example in (61).

(61) •[«<čoo> <nóo> <wíš>»] [«<nakimiškiyáa> <mintsumuxát> ∅ <wáni>»]•
{čoo nóo wíš na–ki–miški–yáa min–tsumuxát**}** **∅** **{**wán–ni–∅}
{ptc now you FUT–1OBJ–give.2SBJ.IMPF 2POSS–girl**}** **∅** **{**say–dat–pfv}
'"Now you will give me your daugher", he said'
(#10)

In cases like exemplified in (61) there is no juncture between two PWds that are usually expected to be uttered in two different IPs, but that instead seem to be uttered in a single IP due to a high speech tempo or weak acoustic cues. The example of (61) corresponds to a direct speech clause, but this also applies for parenthetical expressions, non-restrictive relatives, some moved elements, and sentence

boundary. If we consider the lack of juncture at clause boundaries as the acoustic cue for an IP boundary, then cases like those exemplified in (61) would no longer be exceptional, since the lack of juncture would be IP final and not IP internal.

The cases of sentence boundaries that share an IP-internal PWd boundary can also be removed from the exceptions to Hypothesis 2 by simply reconsidering the U formation. As explained in §3.2, during the prosodic annotation of the corpus, I adopted the broader definition of the U which, under certain conditions, allows for more than one sentence to be contained by one single U. Following those criteria, cases like the one exemplified in (62) were annotated as a single U despite containing two different sentences:

(62) •[«<áł> in <kiłtamakú> Ø <tsíiswa>»]•

{an–li in kiłtamakú**}** **Ø** **{**tsíis–wan–Ø}

{go–PFV J time**}** **Ø** **{**night–be–PFV }

'The time went by, the night fell'

(#10)

However, just like exemplified in (62), at sentence boundary junctures never occur even if they are uttered in connected speech. This means that junctures do not provide any evidence of the U being able to comprise more than one sentence, so it might be more convenient to adopt a less comprehensive U structure: one that only allows one sentence per U. If we adopt this constraint and only allow one syntactic sentence per U, this type of cases (i.e., no juncture at sentence boundary) would no longer be exceptional, since, for example, we would consider the case of (62) as two different Us instead of a single one.

If we add these two prosodic considerations—the lack of juncture at clause boundary signals an IP break, and the U can only comprise one sentence—the number of exceptions to Hypothesis 2 slightly decreases, but not by much, leaving still as exceptions, regular and irregular, 35% of the boundaries eligible for nasal epenthesis, and 49% of the boundaries segmentally eligible for vowel epenthesis (compare them to the previous 39% and 55%, respectively). This remaining set of unaccounted data will be further analyzed in the following subsections.

5.1.3 Adding a mid-level unit: the Accentual Phrase

The exceptions to Hypothesis 2—that is, IP internal PWd boundaries that do not receive a juncture—do not have much in common phonologically speaking. Most of the things these exceptions have in

common are lexical and syntactic and cannot be captured by exclusively employing the prosodic units that were used in the initial annotation (U, IP, PWd). One way to deal with this kind of problem is through the addition of a new level to the Prosodic Hierarchy: for previous analyses of Totonac, this is the PhP in Ozelonacaxtla and Coahuitlán, and the AP in Coatepec. Recall that in the analyses of §2.3.2-4 this additional unit (AP, PhP) is defined by junctures and therefore it always matches their distribution; this is shown in an example from Coatepec in (63). Note that in this example the IP is marked with angle quotes, the AP with curly braces and the Lex with single angles:

(63) [w**á**ˑ šlaqati:q**úː**ˑ šalakwán **ᵐp**u:kúšt**ᵾ**]

«**{**<wa>ˑ**} {**<šlaqati:qu:>ˑ**} {**<šalakwan>**} {ᵐ**<**p**u:kúštu>}»

waʔ	š–laqati:–qu:–ya:	ša–lakwan	pu:–kúštu
that	PST–like–3PL–IMPF	DTV–best	LOC–clear.land

'Because they liked the best lands'

(Levy, 2020: *Guerra*, line 11)

In Coatepec, juncture rules of final vowel lengthening and initial oral stop prenasalization have as their prosodic domains of application the AP and the IP. This means that these junctures occur at the IP internal AP boundaries, but not at the boundaries of units smaller than the AP or at IP boundaries (Levy, 2020). If, in a similar way, we consider the juncture epentheses in FMT to demarcate an AP, the prosodic parsing of Utterances would be like those in (64). Note that this example uses the annotation used for FMT data throughout this thesis but with two differences: only one type of IP is being marked (with angle quotes), and now the curly braces demarcate the hypothetical AP:

(64)

a. •«**{**<łaapuułmán>**} in {**<čúčut>**} i {**<łáa>**} n {**<tataxuučáʔ>**}**»•

łaa=puułmán	in	čúčut	i	łáa	n	ta–ta–xuu=čáʔ
NEG=deep	J	water	J	REL.PLC	J	3PL–INC–in=there

'The water they get in is not deep' (#06)

b. •«**{**<klánka> <kíwi>**} n {**<tawáka>**}**…»•

k–lánka	kiwi	n	ta–wáka–Ø
LOC–big	tree	J	INC–up–PFV

'He climbed a big tree' (#02)

In the example of (64)a, each PWd is also forming its own AP, and each non-IP final AP is being marked by a juncture epenthesis. In contrast, in the example in (64)b, the PWds *klánka*, 'big' and *kíwi*

'tree' are not linked by a nasal epenthesis and therefore belong to the same AP. What this analysis implies is that the elements at the inside of an IP that are not linked by a juncture epenthesis create a different level in the hierarchy. So, instead of proposing—like Hypothesis 2 does—that most PWd with eligible transitions receive a juncture, this posits that it is not the PWd boundaries, but the AP boundaries that receive a juncture epentheses when they are not IP-final. This would leave no exceptions, because the junctures themselves would be the only tool to identify the AP. Instead of studying exceptional cases, this approach would allow and require us to directly study AP formation—that is, to analyze what a AP can and cannot group together.

This was the approach taken by previous analyses of Totonac: they begin by allowing the junctures to demarcate a phrase and then focus on its composition. In Ozelonacaxtla, most word boundaries are segmentally eligible for one type of juncture: after a consonant, vowel epenthesis, and after a vowel, lengthening. On the other hand, in the analysis of Coatepec, the AP matches the distribution of the junctures, but it was actually based on the annotations made by Norman McQuown (Levy, 2015), who did not name, define or describe this unit, but consistently annotated it using his own annotation conventions. Thus, both in Ozelonacaxtla and Coatepec, it seems convenient to start from the demarcation of the phrase, based on the occurrence of junctures, and, once it is marked, proceed to analyze its composition and the phenomena associated to it.

In FMT, however, this approach is not as convenient because fewer transitions between words are eligible for juncture epenthesis. FMT does not show final vowel lengthening as a juncture phenomenon, so unless there is an oral stop at the right side of the boundary, words that end in a vowel are not segmentally eligible for juncture epenthesis. As a result, while we have a few instances like the ones in (64) where all the boundaries were segmentally eligible for juncture epentheses, allowing us to mark all the APs in the U, we also end up with many long sequences of PWds whose transitions do not show juncture epenthesis because they do not provide the segmental environment to do so. This is the case in (65):

(65) •…«<kumu> <lakpáqɬni> <šluméte> <ɬáa> <šmakí> <šwénqen>»•

'Because he broke his bottle where he had put his frog' (#02)

Note that none of the boundaries in (65) can be judged as having or lacking juncture epenthesis. From the beginning, during the prosodic annotation, it was clear that if an AP was to be marked, it was first

necessary to find another way to demarcate it and define it besides the junctures themselves. As long as junctures remain the only diagnostic for positing AP boundaries, AP boundaries simply cannot be detected in many utterances.

In this thesis, the equivalent to the discussion of what an AP can comprise and how it is defined, aside from the occurrence of junctures, is the examination of the exceptions to Hypothesis 2—that is, the examination of IP internal PWd boundaries that are segmentally eligible for a juncture but do not receive one. The results in the previous chapter show that this group of exceptions shares mostly lexical and syntactic constraints, but not much of a phonological pattern. In previous accounts (§2.3.3) it was suggested that the AP might be the domain of a phrase level accent, but so far, in this thesis, no evidence has been found yet of how such phrase level accent would manifest FMT, since no pitch, intensity, or length pattern has been found yet to support it.

The non-phonological constraints associated to the exceptions of Hypothesis 2 will be discussed in §5.2, and then in §5.3 I will further discuss the advantages and shortfalls of an analysis that employs an additional prosodic domain in the formulation of juncture rules.

5.2 Lexical and syntactic generalizations

In the last sections I presented the prosodic generalizations that constrain the application of juncture epentheses. In this section I present the lexical and syntactic conditions that determine their application within these phonological constraints based on the results of Chapter 0. The conditioning contexts found so far are summarized in *Table 13* below:

		Inside the syntactic clause		At syntactic clause boundary
Compulsory[16]		‣ Demonstrative __ Noun ‣ *–tim* ('one/a') __ Noun (if functioning as an indefinite marker) ‣ Verb __ Noun (complement) ‣ Noun __ Noun (if complements of the same verb) ‣ Noun __ Relativizer ‣ Relativizer __ Verb[17] ‣ *an, min* ('go, come') __ Verb ‣ Verb __ Adverb		‣ Main clause __ Complement Clauses ‣ Main clause __ Relative Clause
Variable[18]	*Accentual Phrase*	‣ *tsuku* __ Verb ('begin to') ‣ Adverb __ Verb ‣ Numeral __ Noun ‣ Adjective __ Noun ‣ Noun __ Noun (if in a Possessed-Possessor relation)	Generally uttered in different IPs	‣ Main clause __ Adjunct Clause ‣ Adjunct clause __ Adjunct clause (to the same verb)
Disallowed		‣ Borrowed function words__ ‣ __ k– (1SBJ, LOC, PST)		‣ Main clause __ Direct speech clause ‣ Topic __ Verb ‣ Noun __ Relative Clause (non-restrictive) ‣ __ Parenthetical expressions ‣ Clause A __ Clause B (if belonging to different sentences)

Table 13: Juncture rules application by lexical and syntactic information.

In most cases, for two elements to be linked by a juncture there must be a syntactic dependency between them, the only exception being the juncture at the boundary of two nouns that function as complements of the same verb (cf. top row labelled *compulsory* in Table 13). However, not all elements linked by a dependency show juncture: in the cases where the occurrence of junctures is *variable*, there is also syntactic dependency. Also, the cases classified as *disallowed* inside the clause may or may not have a syntactic dependency relationship with the elements adjacent to them (which are not specified in *Table 13*), but they never receive junctures. Furthermore, in some of the cases

[16] These cases were always linked by juncture epentheses, with the only exceptions being those discussed in §4.3.2.1.

[17] This assumes that relativizers, unlike their unstressed homophones (the negative adverbs), are not clitics and can form their own PWd.

[18] These configurations are in some cases joined by a juncture, and in some other cases they are not, but the data is not sufficient yet to determine if there is a pattern of occurrence or if it the application of the rule is optional or if it depends on a context.

where the occurrence of junctures is *variable*, not only there is syntactic dependency but, following the analyses of §2.3.2-3, the syntactic relationship between these elements is even tighter than between the elements linked by a juncture, which is why, arguably, inside an IP, junctures have more of a demarcating function than a joining one (see §2.3.2-3).

It is important to note that the conditions presented *Table 13* are still subject to prosodic constraints. First of all, juncture cases classified as variable and compulsory are only truly so at IP internal PWd boundaries (or at IP internal AP boundaries if such unit is employed), although they might occasionally occur at IP boundaries when cohesion is needed. In addition to this constraint, if we consider the additional prosodic generalizations proposed in §5.1.2 (i.e., no juncture at syntactic clause boundaries signals an IP break, and the U can only comprise one sentence), then it is no longer necessary to specify the cases classified in Table 13 as *variable* and *disallowed* at clause boundary (shadowed in gray).

For the cases in Table 10 that remain after the addition of the prosodic generalizations discussed in §5.1.2, the cases classified as *variable* inside the syntactic clause correspond to the hypothetical AP presented in §5.1.3. These cases are also similar to the elements that Román Lobato (2008:85) reports as *sometimes* having junctures in Ozelonacaxtla (numerals, quantifiers, adverbs, and phasal auxiliars), and in the case of verbal constructions she also attributes this variation to their syntactic proximity, proposing that when no juncture links quantifiers, adverbs, and phasal auxiliars to their verb, they form a complex predication that is treated as a single unit.

Finally, based on the lexical, syntactic, and prosodic generalizations made in the last sections, we can also propose that some of the functions of juncture epentheses are:

a. Cohesion: junctures epentheses occurring at IP breaks keep together elements that belong to the same sentence.
b. Demarcation: juncture epentheses occurring inside a clause can delimit its constituents (PWds or APs). Additionally, the lack of juncture epenthesis at syntactic clause boundaries demarcates an IP boundary.
c. Phonotactics: to some extent, junctures seem to be motivated by segmental preferences of the language at word boundaries—as initially proposed in McFarland's (2009) description, and supported by the instances discussed in §4.3.2.1.

In addition to these functions, it is possible that inside the syntactic clause the occurrence or lack of juncture has a syntactic function similar or related to that described by Román Lobato (2008) in Ozelonacaxtla (§2.3.2).

5.3 Advantages and disadvantes of different types of analyses

The shortcomings of the standard Prosodic Hierarchy have been a topic of discussion since its formulation. For example, Nespor and Vogel (2007) acknowledge that a distinction has to be made between the phonological rules that can be approached exclusively by the phonology and those that also need to take into consideration very specific nonphonological information. Some examples of the latter type of rules are those proposed by Hayes (1990) for Ewe and Hausa:

(66)

a. Ewe: A high tone verb acquires rising tone following high or rising tone if the immediately following noun root bears Mid or Low tone on its first syllable.

b. Hausa: A verb-final long vowel is shortened immediately before an object NP.

(Hayes, 1990:87)

The rules in (66) fall outside of the scope of the Prosodic Hierarchy since they make reference to very specific syntactic information that could hardly be accounted for through exclusively phonological phrasing. Compare these rules to the following:

(67)

a. Italian: At word boundaries inside the PhP domain, the initial consonant of the second word is lengthened if it is followed by a non-nasal sonorant and if the first word ends in a stressed vowel.

b. Sanskrit: In a sequence of two obstruents at word boundaries inside of the U domain, the voicing of the first obstruent is determined by the voicing of the second one.

(Nespor and Vogel, 2007)

Rules like those in (67) support the Prosodic Hierarchy because they are formulated by associating a phonological rule to a prosodic domain. This prosodic domain can be influenced by syntactic structures but is not defined by them nor does it make direct reference to specific syntactic constituents or categories. In this regard, FMT juncture rules resemble the rules in (66) more than those in (67).

The fact that a prosodic domain cannot be defined by referring to specific syntactic constituents and categories does not mean that it cannot employ syntactic notions in its formulation. For example, the rule in (67)b, known as *Raddoppiamento Sintattico* in Italian, has as its prosodic domain of application the Phonological Phrase, whose definition is based on syntactic notions:

(68) PHONOLOGICAL PHRASE: domain consisting of a lexical head (X) and all the elements on its non-recursive side up to next lexical head outside of the maximal projection of X'.

In this case, the Phonological Phrase of (68) is defined in syntactic terms but generalizing across X'; it does not refer to any syntactic constituent in particular. This PhP does not specify what syntactic elements have to be inside of the phrase along with a lexical head, because what matters is the *position* of the elements, not their category. In Italian, the PhP used in the formulation of *Raddoppiamento Sintattico* comprises everything *to the left* (Italian's non-recursive side) of a lexical head up to another head outside of the maximal projection of X', regardless of the syntactic category of these elements. Also, in the phrasing of IPs into PhPs what sets the limits of the PhPs are the lexical heads, a notion unspecific enough to be found with certain regularity within an IP, which makes the phrasing into PhPs to have some consistency; since almost all IPs can be expected to contain lexical heads, it is possible to determine PhP boundaries consistently in any IP. It is the fact that what matters is the position and size of the phrase, and not their specific syntactic category, and that there is no isomorphism between this phrase and a specific syntactic phrase what makes this to be a prosodic domain and not a syntactic one.

Another thing to consider about the rules that use the Prosodic Hierarchy in their formulation is that they associate a phonological rule to a prosodic domain. To make this association there must be first a self-contained definition of both of the rule and the domain. In the case of previous accounts of Totonacan junctures, this has not been completely clear because the definitions of the domain and the rule are conflated—that is, the prosodic domain (the AP in Coatepec, the PhP in Ozelonacaxtla) that serves as the domain of application of the juncture rules is defined and demarcated by the junctures themselves. The reason why it is important to be able to separately identify both the rule and the prosodic domain is because it is precisely the association of these two that validates a prosodic domain as existing or being relevant in a particular language. Recall that in the Prosodic Hierarchy theory a prosodic domain is justified on the grounds of being needed in the formulation of

a phonological rule (Nespor and Vogel, 2007), at the same time that the Prosodic Hierarchy itself is justified by the existence of those rules whose domain of application is not syntactic, but prosodic.

When trying to associate juncture epentheses to a prosodic domain, there are thus two options. We can consider juncture epentheses as either the output of the rule or the domain, but not both at the same time. If junctures are the output of the rule associated to a domain, then what is missing is the definition of the domain with which it is associated—that is, an independent definition of the AP. If on the other hand junctures are what define the AP, then what is missing is a rule to associate it with. Both cases are problematic for different reasons.

a) Junctures are the output of the rule associated to a domain:

In this case, the AP would be the domain of application of juncture epenthesis rules. If junctures are the output of the rule, then what is missing is a self-contained definition of the AP—that is, one not defined by the junctures. It was mentioned earlier that what ultimately conditions what can be grouped or not by an AP is the set of syntactic conditions presented in *Table 13*. From *Table 13* we can retrieve the cases corresponding to the AP as follows:

(69)
- Adverb __ Verb
- *tsuku* __ Verb ('begin to Verb')
- Numeral __ Noun
- Adjective __ Noun
- Noun __ Noun (if in a Possessed Possessor relation)
- (Borrowed function words__)

The elements in (69) are what the definition of the AP should be able to cover. This means that unlike the PhP defined in (68) that generalizes across X' and does not need to specify the syntactic category of the elements that it groups, this AP would not be able to do so. For example, juncture rules apply between a demonstrative and a noun (70)a, but rarely between a numeral and a noun (70)b:

(70)

a. amá n čiškú?
   this J man
   'This man'

b. aqtú Ø káata
   two year
   'Two years'

For a prosodic unit to account for cases like the exemplified in (70), it would have to be sensitive not only to the position of its elements, but also to their lexical and syntactic categories. Furthermore, this hypothetical unit would also have to be sensitive to other types of syntactic relations. For example, juncture rules apply between two nouns that are complements to the same verb (71)a, but they do not always apply between two nouns in a relation of possession (71)b:

(71)

a. láqpaqɬ i amá luméte **n** čičí'
broke J this bottle **J** dog
'The dog broke the bottle'

b. ščík štáqo
her house **Ø** her grandmother
'Her grandmother's house'

How specific these syntactic structures are and how sensitive to them the AP must be is what challenges the formulation of the AP as a prosodic domain.

b) The AP is defined by the junctures:

In this alternative, a prosodic domain defined and demarcated by the application of junctures is only justified, like any other prosodic domain, if there is at least one phonological rule or process in the language that needs it in their formulation. For example, in Italian, the fact that the formulation of *Raddoppiamento Sintattico* requires the PhP in its formulation motivates and justifies the inclusion of such phrase in its hierarchy. In other words, *Raddoppiamento Sintattico* is evidence of the existence of the PhP in Italian. That means that if the AP is a prosodic domain *defined* by the occurrence of junctures, this domain should ideally be required in the formulation of a phonological rule, or at least be related to it. So far, I have not found any other phonological rule or process that correlates to the phrase that juncture rules would demarcate. This is not necessarily the case in other Totonac languages. For example, in the analysis of Coatepec (Levy and Hernández-Green, 2021), there is an association between the phrase demarcated by the junctures—the AP—and a consistent process of iamb reinforcement. In Coatepec, the AP is not the domain of iamb formation, but all junctures associated with the AP reinforce final prominence in some way. In FMT, there is no parallel for this iamb reinforcement process. In FMT, juncture epenthesis of /n/ can add final prominence to the PWd

to its left by making its last syllable heavier, but juncture epenthesis of /i/ does the opposite: it turns a final closed syllable in two, disrupting the final prominence.

In the light of these challenges, it is worth reconsidering if a *prosodic* unit like the AP is the most adequate way to analyze juncture epentheses in FMT. Junctures epentheses have prosodic constraints that so far provide evidence of three prosodic units in FMT: the U, the IP and the PWd, but not the AP. When the segmental and prosodic requirements are met, what ultimately determines the application of junctures is not of a phonological nature.

Even in the absence of enough evidence to support an AP, juncture epenthesis rules can still be formulated as per Selkirk's (1980b) Domain Juncture rule structure:

(72) /n/ epenthesis $\emptyset \rightarrow n \; / \; (\ldots(\ldots V\_)_{PWd} \; (K\ldots)_{PWd} \; \ldots)_{U}$

/i/ epenthesis $\emptyset \rightarrow i \; / \; (\ldots(\ldots C\_)_{PWd} \; (C\ldots)_{PWd} \; \ldots)_{U}$

However, in order for the rules in (72) to cover the entirety of the instances and to enhance their predictive value these rules should be applied in conjunction with the lexical and syntactic conditions presented in Table 13, conditions that are only strict inside the IP.

It has long been recognized that some phonological rules fall outside of the scope of the Prosodic Hierarchy, for example, the rules presented in (66) which I repeat here in (73):

(73)

a. Ewe: A high tone verb acquires rising tone following high or rising tone if the immediately following noun root bears Mid or Low tone on its first syllable.
b. Hausa: A verb-final long vowel is shortened immediately before an object NP.

(Hayes, 1990:87)

The acknowledgment of these rules has not been unproblematic. For Hayes (1990), for example, these rules represent a hole in the Prosodic Hierarchy, and to amend it, he developed a theory of Precompiled Phrasal Phonology, in which the residue left unaccounted by the Prosodic Hierarchy was analyzed as precompiled rules from the lexicon. It is not the purpose of this section to subscribe to Hayes' (1990) Precompiled Phrasal Phonology, but it is to point out that this type of rule, in which the Prosodic Hierarchy can only give a partial or limited account of the data, has been previously identified in the literature. In general, the whole syntax-prosody interface has long been a subject of debate, and rules like these are not the only contentious shortcoming of the standard Prosodic Hierarchy.

In the standard theory of the Prosodic Hierarchy, as initially conceived, it is acknowledged that syntax can impose several constraints on prosodic phrasing, but it is assumed that there is no inherent relation between prosodic and syntactic category types. This theory is further supported by evidence that suggests that, unlike syntactic phrasing, prosodic phrasing abides by the Strict Layer Hypothesis (5), and that it is this fundamental difference in their structural relations that causes prosodic and syntactic constituents to be systematically non-isomorphic. This type of approach to the syntax-prosody interface is often referred as an *indirect reference* approach (Elfner, 2018; Nespor & Vogel, 2007; Selkirk, 1980b). However, as the relation between prosodic and syntactic phrasing is being debated, the tenets of the indirect reference approaches are often questioned. This has resulted in the surge of alternative analyses. Some of these are, for example, the *direct reference* type of approaches which, broadly speaking, allow phrasal domains to be directly derived from syntactic structures; or analyses that allow prosodic phrasing to stray from the Strict Layer Hypothesis, to display recursivity, or to undergo cyclic spell-out (see Elfner, 2018 for a detailed overview of these approaches). These are all alternative analysis that, while not developed in this thesis, are worth considering for future analyses.

6. Conclusions

FMT shows nasal and vowel epentheses occurring at word boundaries. These epentheses occur when certain segmental transitions are created at word boundaries: nasal epenthesis occurs at vowel-oral stop boundaries, and vowel epenthesis occurs at consonant-consonant boundaries. In the corpus studied in this thesis, both have the same distribution, and when they both can occur at the same boundary (that is, at consonant-oral stop boundaries), either both occur or neither of them does. These epentheses were initially described by McFarland (2009) as optional post-lexical processes motivated by the segmental preferences of the language. However, the hypotheses that can be inferred from McFarland's description were only partially supported by the data. What the data show is that the function and application of these epentheses are due to more complicated factors than only segmental preferences.

Analyses of similar phenomena in other Totonac languages have proposed that juncture epentheses demarcate an additional level in the Prosodic Hierarchy between the PWd and the IP. Although this type of analysis has made it possible to systematize the occurrences of junctures, in FMT a similar analysis has major deficiencies and little predictive value. Part of the problem is that in the standard operation of phonological rules whose formulation is strictly in terms of prosodic domains, there is always a self-contained definition for both the phonological rule and the prosodic domain that hosts it. This allows the association between rule and domain to be falsifiable and allows us to make predictions about the application of the rule. In the case of juncture epentheses, both the phonological rule and the prosodic domain are conflated. If we analyze juncture epenthesis as the output of the rule to be associated to a prosodic domain, such a prosodic domain would have to be highly sensitive to very specific lexical and syntactic categories and relations, in a way prosodic domains usually are not. If we analyze junctures as what purely demarcates a prosodic domain, then this domain should be needed in the formulation of at least one other phonological rule for it to be justified as an actual domain in the hierarchy.

Nevertheless, despite the fact that juncture rules cannot be explained exclusively through prosodic domains following the restrictions of the Prosodic Hierarchy, their description and formulation does require the use of certain prosodic units—the U, the IP and the PWd. The U and the PWd function as the limits of the application of juncture epenthesis rules, and the IP serves as the

unit within which they can be considered to be compulsory, variable, or disallowed according to the syntactic context. Additionally, the absence of juncture epentheses at certain clause boundaries seems to function as an indicator of an IP break when the other acoustic cues of the IP break are weak. Thus, despite the fact that juncture epentheses cannot be exclusively accounted for by appealing to prosodic domains, they are still subject to prosodic constraints and clearly play a role in the prosody-syntax interface.

McFarland (2009) described junctures rules as optional processes that showed intra- and inter-speaker variation; however, based on the corpus studied in this thesis, it can only be said with certainty that, depending on the syntactic context, juncture epentheses can be mandatory, variable or disallowed. The relevant syntactic contexts were summarized earlier in Table 13. The cases in which junctures are variable are the ones that need the most follow-up analysis, since it is still unclear if this variation corresponds to a pattern that, due to the limitations of the corpus, it is not yet clear or if they are merely optional.

The present study was based on a spontaneous speech corpus made up of only three young adults. A study of a larger corpus with greater diversity and focused precisely on the cases in which junctures are variable (i.e., between the adverb and the verb, between the adjective and the nominal, between the numeral and the nominal, and between two nominals in relation of possession) could tell us more about the syntactic nature of these epentheses. Also, a more rigorous examination of some of the factors that were left out of this study (e.g., intonation types, or the process of final glottal stop deletion) could also enhance the prosodic analysis of juncture phenomena. What is clear is that in the application of junctures epentheses in FMT several parts of the grammar are involved.

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