



UiT

THE ARCTIC
UNIVERSITY
OF NORWAY

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Hiatus Resolution in Mexican Spanish

An Optimality-Theoretic Approach

—

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Master thesis in Theoretical Linguistics

LIN-3990. November 2015



Acknowledgment

There are no words to describe how happy I feel to have completed this achievement in my academic life. I am deeply grateful to have had the magnificent opportunity to develop my knowledge in a great educational environment at the University of Tromsø. My sincere admiration and gratitude to my supervisors: Dr. Antonio Fábregas and Dr. Martin Krämer. I appreciate a lot the guidance, patience, valuable feedbacks, and the great mood they always showed during our meetings. I would also like to thank to those people that supported and encouraged me during this period: Pedro, Mónica, Carlos, Mtra. López, Dr. Ahumada, Timmi, Katya, Fernando, Ivan, Diego y Adriel.

Many thanks to my whole family, my mother, and my grandmothers for the love and moral support. A big and special thank to my father, Rubén Peralta, for his invaluable support since the beginning of this journey. I will be always happy and proud to have such a great person in my life.

Con amor, para mis padres.

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1- Introduction

A hiatus context is a situation where adjacent vowels are separated syllabically whether word internally or word boundary (Casali 1996). The central development of this thesis regards the processes that occur as the resolutions for hiatus contexts in word boundaries in Mexican Spanish. Principally, this thesis analyzes the behavior of the hiatuses in different morphosyntactic environments such as, article + nouns, root + affixes, verb + complement, and any other long-syntactic representation. Interestingly, the range of processes presents difficulties for its predictions; e. g., deletion does not apply consistently in similar environments. An assumption, which states that in Mexican Spanish, the range of processes is not absolutely dependent on the morphosyntactic conditions, but also depends on the vowels interacting in the hiatuses. Importantly, for purposes of handiness and limitations, the hiatus contexts in this study are restricted to the interaction of the vowel /a/ with the rest of the vowels of the Spanish language inventory /e i o u/. Additionally, the hiatuses are mainly examined within the framework of Optimality Theory (Prince & Smolensky 1993/2004).

As part of this introduction, we present a set of examples that will function as empirical bases for the central discussion of the thesis. Observe the table with some examples of the resolutions in this language in (1). The leftmost column contains the letter F(unction) and L(exical) divided by the hashtag symbol to represent the category of word in the boundaries. The second column indicates the underlying forms. The third represents the surface forms. Finally, the last two columns stand for the occurring processes and the glossary.

(1) Occurrences in different morphosyntactic environments and hiatuses

Morphosyntac. environment	Underlying form	Surface form(s)	Process(es) occurred	Glossary
A: F#L	/una#istoria/	[unistorja]	Deletion of V ₁	a story
B: F#L	/casi#abierta/	[kasjaβjerta]	Gliding of V ₁	almost opened
C: F#L	/extra-enmarkado/	[ekstranmarkaðo]	Deletion of V ₂	extra framed
D: L#F	/un#diesiocho-avo/	[undjesiotʃaβo]	Deletion of V ₁	an eighteenth
E: L#F	/un#diesisiete-avo/	[undjesisjeteaβo]	Maintenance of V ₁ and V ₂	a seventeenth
F: L#L	/persona#especial/	[personaspesjal] [personespesjal]	Deletion of V ₁ and deletion of V ₂	special person
G: L#L	/comediante#astuto/	[komeðjanteastuto]	Maintenance of V ₁ and V ₂	clever comedian

The examples in (1) show the interaction of /a/ with the four vowels /e i o u/ in different morphosyntactic environments. Note that, in all the hiatuses, the vowel /a/ occupies alternatively two positions; it is the final segment of the first word (henceforth V₁) or is the initial segment of the second word (hence V₂). The example (1.A) displays deletion of V₁ when /a/ precedes /i/ in the hiatus as /a#i/. Adversely, the opposite sequence, /i#a/, triggers gliding of /i/ as [j]. Interestingly, the hiatus of /a#e/ in (1.F) exhibits alternatively deletion of V₁ or elision of V₂. Nevertheless, when the reverse order derives /e#a/ in (1.G), both vowels /e/ and /a/ are preserved in the output level. Notably, the last two mentioned hiatuses display the sequence of /lexical#lexical/ words. It is based on the conditions of the last two environments, where the hypothesis of this study is strengthened; morphosyntactic conditions are not relevant to determine the resolutions of the different hiatus contexts. Otherwise, the occurrence of deletion in both (1.F) would occur in (1.G).

Moreover, we reinforce the hypothesis and state that the range of resolutions in this study are contingent to articulatory efforts, segmental features, syllabic positions, and the relative interaction of constraints to support such processes (Prince & Smolenksy 1993/2004, McCarthy & Prince 1995, de Lacy 2002, 2006, among others).

As a way of conclusion, we present an outline of the thesis divided as follows: Chapter 2 deals with the methodology which includes information regarding the participants, the procedure for the collection of the data, a set of examples from the examination, and a brief

generalization about the processes based on the results given. Chapter 3 presents the theoretical framework of Optimality Theory (Prince & Smolensky 1993/2004) and associated approaches for the development of the analyses. Chapter 4 describes the phenomena presented in the definite and indefinite nouns (§4.2. to §4.5) and other morphosyntactic environments (§4.7), based on the results from the data. This chapter also presents the generalization about the different resolutions as a way of summary. Chapter 5 goes through the Optimality Theoretic analyses of the most outstanding findings from the data. Finally, chapter 6 presents the conclusion.

2- Methodology

This chapter presents the information about the participants, the procedure for the collection of the data, some sentences of the material applied, and a scheme regarding the variety of resolutions.

2.1- The participants

For the examination, a total of twenty native speakers of Mexican-Spanish were selected. During the selection, we did not consider factors such as, profession, social class, educational level, or gender. However, we took into account that they were old enough to participate in the examination. The information about the speakers is presented in the following summary.

(2) Information of the participants

Speaker number	Gender	Age	State of origin
1	Male	26	Baja California
2	Male	22	Baja California
3	Male	28	Sonora
4	Female	25	Baja California
5	Male	27	Zacatecas
6	Male	12	Oaxaca
7	Female	18	Oaxaca
8	Female	35	Chihuahua
9	Male	29	Tabasco
10	Female	40	Michoacán
11	Male	14	Sonora
12	Female	31	Puebla
13	Female	42	Distrito Federal
14	Female	45	Distrito Federal
15	Male	10	Veracruz
16	Female	38	Veracruz
17	Male	22	Sinaloa
18	Female	25	Queretaro
19	Female	17	Sinaloa
20	Male	17	Tamaulipas

The speakers in the table were sorted according to the order in which they participated. As is observed in (2), the informants vary in age, gender, and geographical area of origin. This variation is important because it offers a wider conception to the investigation about the processes in this language. Importantly, the study was taken in the city of Tecate, Baja California; a northern-west area in Mexico.

2.2- Collection of the data

First of all, the main source form where the data was obtained consisted in the recordings of the speakers' speech and some written materials with the informant's syllabification evidence of several sentences. Our procedure was implemented as follows: we informed to all participants about the process but we did not mention its purpose. The technique used in the procedure was elicitation of short and long sentences. That is, the informants read aloud a document with a list of sentences while they were recorded with a digital voice recorder. Every participant read each sentence three times and in two manners: natural speed once and fast speed twice. Next, they were asked to syllabify all sentences according to their considerations. Eventually, this allowed us to compare the hiatuses from the recordings with those identified in the materials. Finally, the participants were remunerated and informed about the objective of the examination.

2.3- Examples of sentences and the resolutions

The written material consisted of two versions. The purpose of this division was to avoid the implementation of a long and tedious material for the participants. The first version included the settings of definite and indefinite nouns for the hiatuses /a#e/ and /a#i/. In these sequences, V₁ belonged to the indefinite and definite articles 'un-/l-, ' and the vowels /e i/ were the first segments of the nouns (V₂). The second version consisted of the same configuration as the previous. This time, the hiatuses consisted of /a#o/ and /a#u/. Importantly, both versions were complemented with a list of sentences which included a combination of different hiatuses in different morphosyntactic environments. The objective of such variation in the list was to detect if all the informants used the resolutions homogeneously. Some examples of the list are presented in (3) with their respective resolutions in a form of sentence below. For handiness, we indicate the hiatuses with slashes and the resolutions in square brackets.

(3) Sentences and their processes

A: Una person/a#e/special es un comediant/e#a/stuto

Una person[a]special es un comediant[e.a]stuto

Una person[e]special es un comediant[e.a]stuto

‘A special person is a clever comediant.’

B: L/a#e/rosión del suelo

L[æ]rosión del suelo

‘The erosion of the ground.’

C: Un/a#i/storia cas/i#a/bierta

Un[i]storia cas[ja]bierta

‘A story almost opened.’

D: Aqu/i#a/parece un espírit/u#a/ncestral

Aqu[ja]parece un espírit[wa]ncestral

‘An ancient spirit appears here.’

E: Un diecioch/o#a/vo y un diecisiet/e#a/vo

Un diecioch[a]vo y un diecisiet[e.a]vo

Un diecioch[o.a]vo y un diecisiet[e.a]vo

‘An eighteenth and a seventeenth.’

F: Extr/a#u/mectante

Extr[u]mectante

‘Extra-moisture.’

G: La person/a#o/perada maneja/a#i/ntensamente

La person[o]perada maneja[i]ntensamente

‘The operated person drives intensely.’

H: Un abogad/o#á/gil visita el Machu Picch/u#a/ntiguo

Un abogad[o.a]gil visita el Machu Picch[wa]ntiguo

‘An agile lawyer visits the ancient Machu Picchu.’

I: El planet/a#o/riginal

El planet[o]riginal

‘The original planet.’

J: Juan compr/a#u/nidades

Juan compr[u]nidades

‘Juan buys units.’

In a first evaluation of the former examples, five processes are distinguished: deletion of V₁, deletion of V₂, coalescence of V₁ and V₂, gliding of V₁, and heterosyllabification.¹ Notably, deletion of V₁ is the process that occurred frequently. Gliding of V₁ and heterosyllabification have also several appearances. Deletion of V₂ is also detected only in one example. Interestingly, we notice one occurrence of coalescence. We previously stated that the variation in our participants would be a crucial factor to have diversity in the processes; the former variation confirms the assumption. According to the instances in (3), the next resolution's schematization is presented in (4) without considering any morphosyntactic environment.

(4) Resolutions outline

Deletion of V₁: /CV₁#V₂C/ → [CV₂C]

Deletion of V₂: /CV₁#V₂C/ → [CV₁C]

Coalescence: /CV₁#V₂C/ → [CV₃C]

Gliding of V₁: /CV₁#V₂C/ → [CG₁#V₂C]

Heterosyllabification: /CV₁#V₂C/ → [CV₁.V₂C]

2.4- Chapter conclusion

This chapter presented a brief description regarding the speakers in a general way. It also described the procedure for obtaining the data. In addition, some examples of the sentences used during the collection of the information were presented. There was also an outline about the resolutions in different hiatuses. Nevertheless, all the former processes are covered in more detail in chapter four; the descriptions of the data, and chapter five; the O.T. analyses.

¹ Casali (1995) examined the process of heterosyllabification in the sequence of nasal-oral stop in Moghamo (Cameroon). In this language, a sequence of the mentioned cluster was not permitted. That is, he firstly used the terminology to support the instances where the language presented that cluster. Eventually, he adapted the same name to the sequences of vowels separated syllabically in cross-word boundaries (Casali 1996:1).

3- The theoretical approaches

This chapter is divided in the following way: section 3.1 displays the initial backgrounds related to the idea that certain vowels are universal and show established properties in many languages based on their frequency, articulations, and phonetic perceptions. The section 3.2 and the rest of them introduce the theories to motivate the arguments in the analyses of the surface forms in chapter five. Notably, the constraints for the analyses are not proposed in this chapter; instead, there is a brief discussion to highlight the importance of including the theories in the study. Section 3.3 concludes the chapter.

3.1- Early backgrounds

In a research made by Maddieson (1984), she found that 30% of the languages' systems consist mostly of the vowels /i u a/ (p. 125). The study of Lindblom (1986) covered an examination regarding languages with wide vowel systems that lack of contrasts in the production of particular vowels because of the insufficient use of the acoustic space. As a result of this inadequacy, certain vowels were misperceived and realized as one of the vowels /i u a/. This occurs because of the properties in the former segments are acoustically stable. That is, these vowels occupy positions that are completely distant from each other. As a result, the articulations are more precise due to the gestural movements required to produce these vowels. These characteristics diminished their chances of being phonetically confused with other vowels and, the same time, strength them to show phonological contrasts towards some phenomena (Crosswhite 2001). In a language with a limited system in vowels, like Spanish, the segments /i u a/ are complemented with /e o/, and systematically divided as “corner” (peripheral) and “non-corner” (non-peripheral) vowels (Lindblom 1986, Stevens 1989).

Moreover, as these five vowels are presented in a condition like fast speech, the probabilities of misperceiving /i u a/ with /e o/ are minimal because of their considerable distance in the acoustic space and articulatory requirements. Contrarily, /e o/ are vowel which distance does not make any contrast with /i u/. Actually, these vowels are susceptible to lose their properties since they are non-corner and instable vowels (Stevens 1989). The previous claim hints a reason why we find instances in which /e o/ undergo gliding to [j w]; phonetic representations associated to /i u/. However, chapter one in this study presented instances in which /a/ was elided in a position adjacent to /e/ or /o/. This type of paradox is what makes disputed the examination of the hiatuses in this language.

3.2- An Optimality-Theoretic perspective

When phonology considers the potential and illicit surface forms in a given language, it is essential to mention the theory that assess such representations. The central model for the analyses of this thesis is couched within the well-known framework in phonology: *Optimality Theory* (Prince & Smolensky 1993/2004). For purposes of explanations, we outline its definition and associated theories in the following sections.

3.2.1- Prince & Smolensky: Optimality Theory

Paul & Smolensky (2004) introduced the nature of *Optimality Theory* (henceforth O.T.) by stating:

[...] Universal Grammar consists largely of a set of constraints on representational well-formedness, out of which individual grammars are constructed. The representational system [...] supports two fundamental classes of constraints: those that assess output configurations *per se* and those responsible for maintaining the faithful preservation of underlying structures in the output. [...] The heart of the proposal is a means for precisely determining which analysis of an input *best satisfies* (or least violates) a set of confliction conditions. (p.2)

Similarly, Prince & Smolensky (ibid) based this proposal on the idea of Faithfulness, a perspective that worked in correlation with prosodic phonology as follows: in the phonetic, the level; the level in which prosodic phonology can access to, Faithfulness favors only the output structures that are as similar as possible to those segments in the input. For example, in a language where coalescence is the active process, if an input representation consists of four segment and, after coalescence, the phonetic representation displays only three, *Faithfulness* considers only the fact that there is a missing segment and not that two segments are represented as one (merged).

In addition, from the previous claim we can assume that processes are considered as the triggering motives for divergences in a language, which eventually require the use of O.T. constraints for their evaluation. Similarly, the constraints are divided in two main distinctions: *Faithfulness* now as “faithfulness constraints” and “markedness constraints”. The former type deals with the preservation of exact forms in a language, forms that show their canonical structures regardless the environment. Conversely, “markedness constraints” support the altered forms, those considered irregulars and exceptional, but not forbidden in a language. Correspondingly, the generator creates a number of possible output forms in order to motivate

the interaction of both “faithfulness” and “markedness constraints.” This would imply that as the number of generated output forms (candidates) increases, the number of both types of constraints increases as well.

3.2.2- Correspondence Theory

McCarthy and Prince (1995) followed Prince & Smolensky’s O.T. theory by proposing a model based on the relation between the input and the output: *Correspondence Theory*. Differently to O.T., an output form is evaluated according to its segmental correspondence with those in the input. Interestingly, *Correspondence Theory* conveyed more freedom than *Faithfulness Theory* in the examination of candidates. For instance, re-consider the example of coalescence. In the instance here, we stated that *Faithfulness* assigns a violation mark to a coalesced form like /a#e/ → [æ] because of the absence of two segments in the output form, *Correspondence Theory*, contrarily, does not do the same. In fact, it does not consider it as illicit form because both segments in the input have a unified correspondent in the output, that is, the coalesced output form has two correspondents in the output level that relate two segments in the input level. In the case of Mexican Spanish, we observe the process coalescence like /a₁#e₂/ → [æ_{1,2}].

In sum, since both *Faithfulness* and *Correspondence theories* perform in their own way, it is essential to contemplate which philosophy proposes the best set of constraints for O T. examinations in chapter five.

3.2.3- Markedness

Cross-linguistically, output structures are not required to be exact to the input structures in order to be acceptable forms. Occasionally, priorities are given to modified forms due to the ranking of constraints favoring structural variations in output levels. In § 3.2.1, we introduced “markedness constraints” as the motivating forces for those unfaithful structures.

De Lacy (2002, 2006) formalized a diverse perspective of *Markedness*. He asserted that *Markedness* would occur whenever ‘not expected’ conditions in a given language arise. In other words, these unexpected occurrences would involve a paradoxical behavior towards ‘standard’ issues in a language.

In addition, de Lacy accounted “Sonority” (Clements, 1990; Parker, 2002; Selkirk, 1984) to make motivate his assumptions regarding the conditions in the vowels due to their degree of sonority. In this observation, most sonorous elements would be less likely to undergo any phenomena. As a result, these elements displayed strong qualities against certain range of

phenomena. In the same fashion, he formalized a scale based on the sonority degree on segments displayed cross-linguistically. The sonority scale of the vowels is presented in (5).

(5) Sonority Scale in vowels

High central vowels	Mid central vowels	High peripheral vowels	Mid-high peripheral vowels	Mid-low peripheral vowels	Low peripheral vowels
i u	ə ɐ ə ø	i y u u	e ø ɤ o	ɛ œ ʌ ɔ	æ a œ ɑ ɒ

(de Lacy 2002:55, de Lacy 2006:286)

The scale in (6) shows the way in which the intensity of sonority goes from less sonorous elements on the left, to the most sonorous vowels on the right. Fundamentally, the scale emphasizes the condition in /a/ as the most sonorous element. In consideration of the former claim, we state that markedness is a crucial aspect in the resolutions of hiatus contexts in Mexican Spanish. For instance, if we follow the sonority scale in (2), then we would expect that the vowel /a/ showed the strongest contrasts towards the phenomena because of its sonorous intensity. However, we previously mentioned that Mexican Spanish presents particularities in the solution of its hiatuses that ignore morphosyntactic environments, and in this case, the sonority perspective as well. As a result, we observe how deletion of V₁ affects /a/ no matter its degree of sonority. With respect to the former, Prince & Smolensky (2004) noted that, “[...] colloquial language simplifies prosodic structures, rendering them in closer accord with universal *structural markedness* constraints, subordinating *faithfulness*” (p.71). We can therefore assume that the vowel /a/ represents an unmarked status for its deletion, and the other vocalic elements denote a marked status for the process of deletion.

3.2.4- Beckman's Positional faithfulness

Beckman (1998) proposed *Positional Faithfulness*. This ideology involved an examination of phonological contrast affecting target-syllabic positions within morphological structures. The idea of having two distinctions like “privileged positions” and “non-privileged positions” was determined on the frequency in which the different phonological processes affect segments cross-linguistically. In addition, Beckman (ibid) specified that the prominence of one group of positions over the other involved psycholinguistic and phonetic factors during the perception and production of the speech. From the former points we can assume that, if the frequency of processes that affect particular syllabic positions, is what renders the categories to these positions, then Mexican Spanish contradicts this notion. This happens because the study presents instances where the speakers prefer to preserve elements in “non-privileged positions,” such as “Non-initial position” (final unstressed syllable), over those that are considered “privileged;” “Root-initial syllables.” For example, consider the word /a#e/legante “the elegant (person).” Each of the vowels in the hiatus /a#e/ located in a “non-privileged position” (/a/) and a “privileged position” (/e/). Nonetheless, the data (ch.4) presents instances where deletion of V₂ is fairly common in this particular instance. Therefore, the deletion of V₂ denotes that this theory is not totally strict. At least in the cases to be discussed.

The terms “privileged” and “non-privileged positions” are listed in (6) according to Beckman's considerations in perceptual grounds:

(6) Privileged and non-privileged positions

Privileged positions

- Root-initial syllables
- Stressed syllables
- Syllable onsets
- Roots
- Long vowels

Non-privileged positions

- Non-initial syllables
- Unstressed syllables
- Syllable codas
- Affixes, clitics, function words
- Short vowels

(Beckman 1998:1)

Similarly, Beckman stressed the idea of other unities besides the functional grounds that also function as privileged positions. In this respect, she postulated three asymmetries within the grounds of phonology. These grounds are shown in (7).

(7) Phonological asymmetries diagnostic of positional privilege

- Positional maintenance of contrasts that are neutralized elsewhere.
- Positional triggering of phonological processes.
- Positional resistance to processes which apply elsewhere.

(ibid)

3.3- Chapter conclusion

In this chapter we presented the relevant theories for the forthcoming analyses. Note that, even though this chapter did not present the constraints that will be used for the analyses, we presented some of the paradoxes that may denote the types of constraints needed. The next chapter deals with the description of the phenomena related to the interactions of vowels when they appear in different morphosyntactic environments in word margins.

4- The facts in cross-word boundaries: phonetic representations

This chapter describes the resolutions of the hiatuses in word-margins based on the information collected from the data. Four main sections organize this chapter. §4.1 shows a table about the resolutions presented among the participants focused on the environments of indefinite and definite nouns. Subsequently, this section describes the resolution of the hiatuses where /a/ is the first vowel in the indefinite/definite article: §4.1.1 /a#e/, §4.1.2 /a#i/, §4.1.3 /a#o/, and §4.1.4 /a#u/. In addition, §4.1.5 includes a middle summary and a bar chart focused on the resolutions. The second section displays a table regarding the resolutions presented among the speakers in different morphosyntactic environments (§4.2). Next, it describes the resolutions of the hiatuses that consist of the reverse sequence from those in the former section. This section then is divided as follows: §4.2.1 /e#a/, §4.2.2 /i#a/, §4.2.3 /o#a/, and §4.2.4 /u#a/. Furthermore, these sections present and sort the example sentences from the materials of the study according to the resolutions. §4.3 displays a general bar-chart regarding all the former hiatus contexts, morphosyntactic environments and the resolutions as a way of summary. §4.4 concludes the chapter.

4.1- The hiatuses of /a#V₂/ and the resolutions

As mentioned in previous chapters, Mexican Spanish does not consider morphosyntactic categories for the resolutions of the hiatuses. It is therefore, this type of impartiality what prevents the formalization of a consistent hypothesis to predict the occurrences since the resolutions vary from person to person. That is, there is a free variation among the speakers (Anttila 2002, 2007). The table (8) displays the output forms presented in the indefinite and definite settings based on the results from the data. In the first row, the segment /a/ (V₁) pertains to the indefinite and definite article ‘una/la’ an/ *the*, while the second vowel (V₂) belongs to the initial segment in a noun.

(8) The occurrences presented among the participants

Speaker number, gender & age	/a#e/ indef.	/a#e/ defin.	/a#i/ indef.	/a#i/ defin.	/a#o/ indef.	/a#o/ defin.	/a#u/ indef.	/a#u/ defin.
1 M: 26	[e]	[e]	[i]	[a.i]	[o]	[a.o]	[u]	[a.u]
2 M: 22	[e]	[e]	[i]	[i]	[o]	[o]	[u]	[u]
3 M: 28	[e]	[e]	[i]	[i]	[o]	[a.o]	[u]	[a.u]
4 F: 25	[e]	[e]	[i]	[a.i]	[o]	[o]	[u]	[u]
5 M: 27	[e]	[æ]/[e]	[i]	[i]	[o]	[a.o]	[u]	[a.u]
6 M: 12	[a]/[e]	[a]/[e]	[a.i]	[a.i]	[a.o]	[a.o]	[u]	[u]
7 F: 18	[a]/[e]	[a]/[e]	[i]	[i]	[a.o]	[a.o]	[a.u]	[a.u]
8 F: 35	[e]	[e]	[i]	[i]	[o]	[a.o]	[u]	[u]
9 M: 29	[a]/[e]	[a]/[e]	[i]	[i]	[o]	[o]	[u]	[a.u]
10 F: 40	[a]/[e]	[a]/[e]	[i]	[a.i]	[o]	[a.o]	[a.u]	[a.u]
11 M: 14	[e]	[æ]/[e]	[a.i]	[a.i]	[o]	[a.o]	[u]	[u]
12 F: 31	[e]	[e]	[i]	[i]	[o]	[a.o]	[u]	[a.u]
13 F: 42	[e]	[e]	[i]	[i]	[o]	[o]	[u]	[a.u]
14 F: 45	[e]	[e]	[a.i]	[a.i]	[o]	[o]	[a.u]	[u]
15 M: 10	[e]	[æ]/[e]	[i]	[i]	[a.o]	[a.o]	[a.u]	[a.u]
16 F: 38	[a]/[e]	[a]/[e]	[i]	[a.i]	[o]	[o]	[u]	[a.u]
17 M: 22	[e]	[e]	[i]	[a.i]	[o]	[a.o]	[u]	[a.u]
18 F: 25	[e]	[e]	[i]	[i]	[o]	[a.o]	[u]	[a.u]
19 F: 17	[a]/[e]	[a]/[e]	[i]	[i]	[o]	[a.o]	[u]	[a.u]
20 M: 17	[e]	[e]	[i]	[a.i]	[a.o]	[o]	[a.u]	[a.u]
Quantitative frequency	[a.e]:0 [a]:6 [e]:14 (20) [æ]:0	[a.e]:0 [a]:6 [e]:11 (20) [æ]:3	[a.i]:3 [a]:0 [i]:17	[a.i]:9 [a]:0 [i]:11	[a.o]:4 [a]:0 [o]:16	[a.o]:13 [a]:0 [o]:7	[au]: 5 [a]:0 [u]:15	[au]:14 [a]:0 [u]:6

It is worth indicating that the number of phonetic forms (examples) is independent from the number of speakers. For example, as the table in (8) displays, the speakers 6, 7, 9, 10, 16, and 19 are indicated with [e]/[a]. Nevertheless, this [e] refers that these participants presented the case of deletion of V₂ in this example and many other; e. g., /a#e/ntrada → l[a]ntrada. However, they also presented deletion of V₁ in other cases, that is why we also added ‘[a]’ adjacently. The same convention is applied for the speakers indicated with two output representations as ‘[]/[].’ At first examination, the table shows arbitrariness; the participants do not expose the same type of resolution in the hiatus contexts. For instance, in the case of /una#embajada/ which surface form is alternatively as [unambaxaða] and [unembaxaða], the speakers 6 and 10 exhibited an asymmetrical process of deletion for /a#e/. On the one hand, the speaker 4 elided /a/ (V₁) in favor of /e/ (V₂). On the other hand, the speaker 10 elided /e/ in

the same setting. Much puzzling, however, is that both participants shown the reverse conditions in the definite contexts. This time, the speaker 6 deleted /a/ while the speaker 10 elided /e/.

In the context of /a#i/, deletion and heterosyllabification occurred arbitrarily. We consider as examples the speakers 6 and 7. Here, the participant 7 exhibited the sole deletion of V₁ for both indefinite and definite settings in word-margins. Adversely, the speaker 6 maintained both input segments [a.i] in the two environments. This situation becomes more ambiguous when we observe the resolutions from speaker 1. This participant exposed the deletion of V₁ for the indefinite setting and the hiatus maintenance for the definite environment. Once again, the hypothesis in this study confirms that Mexican Spanish does not respect morphosyntactic distinctions; we observe the arbitrariness as the evidences.

Note that, in the majority of the speakers, deletion of V₁ is presented. This process associates Casali's (1996) cross-linguistic examination in which elision of V₁ is the most common and productive process. For this, Casali (ibid)commented that, "[...] V₁ Elision is far more common and productive than Elision of V₂. [...] every language in the survey with V₂ Elision also has V₁ Elision in at least some contexts" (p.11).

Crucially, during the descriptions regarding the resolutions of hiatus in indefinite and definite environments in the next section, we list the examples from the materials in a table form. In these tables, the leftmost column contains the underlying forms, the column in the middle involves the surface forms, and the rightmost columns contains the English translations. We describe the resolutions first and then we divide the examples in small groups according to the resolutions presented among the speakers. For instance, if the speakers presented deletion of V₁ and heterosyllabification in word-margins for the hiatus /a#o/, we make a group for each resolution. In the cases in which the examples show alternations in deletion V₁ or V₂ deletion, we sort them into a single group. But in cases where we observe only V₁ elision or only V₂ elision, then we make two groups.

4.1.1- Hiatus of /a#e/

This section describes the occurrences presented in the hiatus of /a#e/ in indefinite and definite environments. Both environments and the resolutions are described in §4.1.1.1 and §4.1.1.2.

4.1.1.1- Hiatus of /a#e/ in indefinite settings

Cross-linguistically, Casali (1996) proposed that V_1 is the segment selected for elision as the usual alternative to resolve a hiatus context. The table in (9) displays the set of indefinite nouns that involves the hiatus /a#e/ in word margins. Note that, only orthographically accented vowels are indicated with the acute accent ‘’ and lexically stressed vowels are marked in bold in both underlying and surface nouns. The same is applied for all set of examples in the first part of this chapter (§4.1.1-§4.1.4.2).

(9) The indefinite forms

Underlying form	Surface form	Glossary
A: /una#ebanistería/	[uneβanistería]	A carpenter’s shop
B: /una#ecología/	[unekoloxía]	An ecology
C: /una#editorial/	[uneðitorjal]	A firm
D: /una#efeméride/	[unefemériðe]	A day’s anniversary
E: /una#egipcia/	[unexipsja]	An Egyptian (person)
F: /una#ejecutiva/	[unexekutiβa]	An executive (person)
G: /una#elegante/	[unaleyante]	An elegant (person)
H: /una#embajada/	[unembaxaða], [unambaxaða]	An embassy
I: /una#entrada/	[unentraða], [unantraða]	An entrance
J: /una#epentesis/	[unepentesis]	An epenthesis
K: /una#erosión/	[unerosjón]	An erosion
L: /una#escuela/	[uneskwela], [unaskwela]	A school
M: /una#eternidad/	[uneterniðað]	An eternity
N: /una#existencia/	[uneksistensja]	An existence

It is observed that the examples in table (9) display two resolutions: deletion of V_1 and deletion of V_2 . These occurrences are divided in three groups according to the way in which the speakers presented these forms: the instances of deletion of V_1 (10), the examples alternating V_1 elision and V_2 elision (11), and the deletion of V_2 (12).

(10) Elision of V₁

Underlying form	Surface form	Glossary
A: /una#ebanistería/	[unεβanistería]	A carpenter's shop
B: /una#ecología/	[unekoloxía]	An ecology
C: /una#editorial/	[uneðitorjal]	A firm
D: /una#efeméride/	[unefemériðe]	A day's anniversary
E: /una#egipcia/	[unexipsja]	An Egyptian (person)
F: /una#ejecutiva/	[unexekutiβa]	An executive (person)
G: /una#elegante/	[unaleyante]	An elegant (person)
J: /una#epentesis/	[unepentesis]	An epenthesis
K: /una#erosión/	[unerosjón]	An erosion

The instances in (10) confirm Casali's (1996) assumption and V₁ is the segment that undergoes elision. We can expand the perspective and state that this process is subject to articulatory requirements that favor /e/ as an easy-to-produce element, and the ranking of certain markedness constraints that favor these output forms. This environment is complemented when we observe instances of the alternation between deletion of V₁ and V₂ elision. The examples are displayed in (11).

(11) Elision of V₁ or elision of V₂

Underlying form	Surface form	Glossary
H: /una#embajada/	[unembaxaða], [unambaxaða]	An embassy
I: /una#entrada/	[unentraða], [unantraða]	An entrance
L: /una#escuela/	[uneskwela], [unaskwela]	A school

Here, the set of examples exhibits two resolutions. Consequently, we divide the examples in two sub-groups: the sub-group that deleted /a/ in favor of /e/, that is, those presenting the 'common' process. The second group entails a small number of participants that maintained /a/, a situation which suggests that this segment was preserved due to its salient and sonorous properties.²

Notably, the deletion of V₂ occurred in the examples where an alveolar consonant /s/ or /n/ or a bilabial /m/ followed the second vocalic element; the presence of surrounding segments as possible trigger. This observation, however, cannot be generalized since in

² After the application of elicitation, the participants were asked about the way how they would pronounce the vowels in word margins. Notably, the speakers that deleted V₁ did not consider acceptable the forms with V₂ elision. Contrarily, the speakers that presented V₂, accepted the forms with V₁ elision as well.

examples like (9.C) and (9.M), where the alveolars /t/ and /d/ follow /e/, elision of the second vowel is not exhibited. The characteristics of the phonetic structures that present elision of V₂ suggest that other phonological domains are the factors that trigger this process, and not morphological ones.

Finally, there is one example where some of the speakers presented deletion of V₂.

(12) Deletion of V₂

Underlying form	Surface form	Glossary
G: /una#eleyante/	[unaleyante]	An elegant (person)

In this particular instance, the participants solved the hiatus by eliding V₂ as the alternative. Deletion of V₂ is produced due to the presence of gender information in /a/ which is carried by the indefinite article ‘la’ *the*. In Spanish, determiners and nouns agree in gender and number. The preservation of /a/ in ‘una’ *a/an* relates to the fact that this element specifies the gender of the noun. The word ‘elegante’ elegant belongs to a class of nouns that do not provide any overt clue regarding its gender: neutral nouns (Bermúdez-Otero 2013).

We can therefore conclude that two processes were identified in the set of examples in (9):

A) Deletion of V₁: more general, used by all speakers in examples from (10) and some in (11).

B) Deletion of V₂: less general, not attested with all examples from (9) but exhibited in limited instances in (11). In addition, presented in (12).

4.1.1.2- Hiatus of /a#e/ in definite settings

The next examples consist of the combination of a definite article ‘la’ *the*, and a noun. Similarly to the examples in (9), deletion has two alternatives: elision of V₁ and elision of V₂ respectively. Remarkably, the definite environment exhibits the occurrence of coalescence as [æ], a resolution not presented in the previous examples.

(13) The definite forms

Underlying form	Surface form	Glossary
A: /la#ebanistería/	[leβanistería]	The cabinetmaking
B: /la#ecología/	[lekoloxía]	The ecology
C: /la#editorial/	[leðitorjal]	The firm
D: /la#efeméride/	[lefemériðe]	The day’s anniversary
E: /la#egipcia/	[lexipsja]	The Egyptian (person)
F: /la#ejecutiva/	[lexekutiβ]	The executive (person)
G: /la#elegante/	[laleyante]	The elegant (person)
H: /la#embajada/	[lembaxaða], [lambaxaða]	The embassy
I: /la#entrada/	[lentraða], [lantraða], [læntraða]	The entrance
J: /la#epentesis/	[lepentesis]	The epenthesis
K: /la#erosión/	[lærosjón]	The erosion
L: /la#escuela/	[leskwela], [laskwela]	The school
M: /la#eternidad/	[leterniðað]	The eternity
N: /la#existencia/	[leksistensja]	The existence

The set of examples in (13) exhibit deletion of V₁, deletion of V₂, and coalescence of V₁ and V₂; these resolutions are in accordance with the information from the speakers’ phonetic forms. Thus, we divide the form from (13) in four groups:

(14) Deletion of V₁

Underlying form	Surface form	Glossary
A: /la#ebanistería/	[leβanistería]	The cabinetmaking
B: /la#ecología/	[lekoloxía]	The ecology
C: /la#editorial/	[leðitorjal]	The firm
D: /la#efeméride/	[lefemériðe]	The day’s anniversary
E: /la#egipcia/	[lexipsja]	The selfish (person)
F: /la#ejecutiva/	[lexekutiβa]	The executive (person)
G: /la#elegante/	[laleyante]	The elegant (person)
H: /la#embajada/	[lembaxaða], [lambaxaða]	The embassy
I: /la#entrada/	[lentraða], [lantraða], [læntraða]	The entrance
J: /la#epentesis/	[lepentesis]	The epenthesis
K: /la#erosión/	[lærosjón]	The erosion

In (14), the examples follow the productive elision process according to Casali's (1996) assumption, a resolution where /a/ was omitted in the surface representation. We suggest that this occurrence is correlated to articulatory and sonorous effects from /a/.

Once again, some speakers solved the hiatus by presenting elision of V₁ or elision of V₂.

(15) Deletion of V₁ or V₂

Underlying form	Surface form	Glossary
H: /la#embajada/	[ləmbaxaða], [ləmbxaða]	The embassy
I: /la#entrada/	[ləntxaða], [ləntxaða]	The entrance
L: /la#escuela/	[ləskwela], [ləskwela]	The school

The alternation for the deletion process is presented in a similar way as the indefinite forms displayed in (9). Conspicuously, the frequency in which /e/ appears in the phonetic forms is lower compared to its frequency in the indefinite forms. Observe the information in (16). Notably, Jenkins (1999) and Vuskovich (2010) found patterns where deletion of V₂ was also attested in definite setting; e. g., /la#eskuela/ → [ləs.kwe.la].

(16) Frequency of alternations between deletion of V₁ and deletion of V₂ in indefinite and definite environments for certain examples.

Hiatus	/a#e/ indef.	/a#e/ def.
Deletion of V ₁	✓	✓
Deletion of V ₂	✓	✓
Frequency of occurrence	[a]: 30% [e]: 70% (100%) [æ]: 0%	[a]: 30% [e]: 55% (100%) [æ]: 15%

According to the information in (15) the participants have a preference towards the deletion of V₂ in the definite forms (70% vs 55%); however, this predilection varies slightly. Note that, '[e]' is indicated with (100%) because a speaker presented deletion of V₁ in all the cases except for very particular cases (to be presented below). Moreover, the percentage that indicates neither deletion of /e/ nor deletion of /a/, indicates coalescence (15%). In one form, the speakers elided the second vowel. Observe the example in (17).

(17) Deletion of V₂

Underlying form	Surface form	Glossary
L: /la#elegante/	[laleyante]	The elegant (person)

Finally, some participants presented coalescence for two particular instances, these forms presented in (18).

(18) Coalescence of V₁ and V₂

Underlying form	Surface form	Glossary
N: /la#entrada/	[læntɾaða]	The entrance
R: /la#erosión/	[lærosjón]	The erosion

The process of coalescence is a restricted resolution presented by the speakers in this definite setting. Its frequency is relatively low compared to the processes of V₁ elision and V₂ elision; however, it is not prohibited as a potential resolution. This merging form is not arbitrary, though. Coalescence is subject to the types of features presented within the combined segments and the compatibility that these characteristics display in order to create proper unions (de Haas 1987). Thus, it is necessary to examine which characteristics are those giving this compatibility, and if it is in fact this what triggers coalescence.

According to the presented descriptions, three processes were exhibited from the set of examples in (12):

A) Deletion of V₁: once again general and frequently used by all speakers in examples in (14) and part of the speaker from (15).

B) Deletion of V₂: less general than deletion of V₁.

C) Coalescence of V₁ and V₂: presented only in two instances and three participants.

Until now, we have described the phenomena presented among the speakers for the indefinite and definite forms in the hiatus of /a#e/. Now, we examine other hiatus contexts to make sure if these occurrences are exclusive of the former hiatus, or other hiatuses also present them.

4.1.2- The hiatus of /a#i/

This section describes the resolutions presented by the speakers in the hiatus of /a#i/ in word boundaries. §4.1.2.1 discusses the indefinite setting, and §4.1.2.2 explains the facts for the definite forms.

4.1.2.1- Hiatus of /a#i/ in indefinite settings

The set of examples for the indefinites setting are presented in (19) as follows:

(19) The indefinite forms

Underlying form	Surface form	Glossary
A: /una#ibérica/	[uniβérika]	An Iberian
B: /una#iconografía/	[unikonoyrafía]	An iconography
C: /una#idea/	[uniðea], [una.iðea]	An idea
D: /una#iglesia/	[uniɣlesja]	A church
E: /una#ijastra/	[unixastra]	A stepdaughter
F: /una#ilustración/	[unilustrasjón], [una.ilustrasjón]	An illustration
G: /una#imajen/	[unimaxen]	An image
H: /una#inscripción/	[uninskripsjón]	A registration
I: /una#ipótesis/	[unipótesis]	A hypothesis
J: /una#ironía/	[unironía], [una.ironía]	An irony
K: /una#istoria/	[unistorja]	A story
L: /una#italiana/	[unitaljana]	An Italian
M: /una#iguana/	[uniɣwana]	An iguana

The set of examples in (19) displays two resolutions: the already known deletion of V₁, and the maintenance of both input segments in the surface form (heterosyllabification or hiatus maintenance). This time, the former process does not have an alternation in deletion; the participants did not present V₂ elision. Henceforth, we distinguished two groups: the forms that display deletion of /a/ (20), and the examples with heterosyllabification (21).

(20) Deletion of V₁

Underlying form	Surface form	Glossary
A: /una#ibérica/	[uniβérika]	An Iberian
B: /una#iconografía/	[unikonoɣrafía]	An iconography
C: /una#idea/	[uniðea]	An idea
D: /una#iglesia/	[uniɣlesja]	A church
E: /una#ijastra/	[unixastra]	A stepdaughter
F: /una#ilustración/	[unilustrasjón]	An illustration
G: /una#imagen/	[unimaxen]	An image
H: /una#inscripción/	[uninskripsjón]	A registration
I: /una#ipótesis/	[unipótesis]	A hypothesis
J: /una#ironía/	[unironía]	An irony
K: /una#historia/	[unistorja]	A story
L: /una#italiana/	[unitaljana]	An Italian
M: /una#iguana/	[uniɣwana]	An iguana

The first group of examples presents elision of V₁. Deletion occurred whenever two adjacent vowels differ [high]; V₁ as [+low] and V₂ as [+/-high] (Baković 2006). Now with this under consideration, we can adopt the assumption that features are important factors to trigger this resolution.

(21) Maintenance of V₁ and V₂ (heterosyllabification)

Underlying form	Surface form	Glossary
C: /una#iðea/	[una.iðea]	An idea
F: /una#ilustración/	[una.ilustrasjón]	An illustration
J: /una#ironía/	[una.ironía]	An irony

Heterosyllabification is presented in the second group of examples. This resolution, however, is less frequent than deletion of V₁. Importantly, we observed that this process was presented among the speakers as a way to make distinctions between the words. Despite the speech in use was fast speech, the speaker still making this minimal limitation. The former types of resolution are presented in (22) in ratio terms.

(22) The frequency of occurrence in [i] and [a.i]

Hiatus	/a#i/ indef.
Deletion of V ₁	✓
Deletion of V ₂	x
Maintenance	✓
Frequency of occurrence	[a]: 0% [i]: 85% [a.i]: 15%

It is important to compare the frequency of occurrence of the hiatus resolutions in the definite environment in order to make a robust generalization.

4.1.2.2- Hiatus of /a#i/ in definite settings

The set of examples of the definite forms for the hiatus /a#i/ in word-margins are presented in (23).

(23) The definite forms

Underlying form	Surface form	Glossary
A: /la#ibérica/	[libérika]	The Iberian
B: /la#iconografía/	[likonografía]	The iconography
C: /la#idea/	[liðea] and [la.iðea]	The idea
D: /la#iglesia/	[liylesja]	The church
E: /la#ijastra/	[lixastra]	The stepdaughter
F: /la#ilustración/	[lilustración], [la.ilustración]	The illustration
G: /la#imagen/	[limaxen]	The image
H: /la#inscripción/	[linskripsjón], [la.inskripsjón]	The registration
I: /la#ipótesis/	[lipótesis]	The hypothesis
J: /la#ironía/	[lironía], [la.ironía]	The irony
K: /la#historia/	[listorja], [la.istorja]	The story
L: /la#italiana/	[litalijana]	The Italian
M: /la#iguana/	[liywana]	The iguana

The definite forms in (23) do not differ considerably from their indefinites counterparts in (19); two resolutions are also presented. We distinguish the processes of elision of V₁ and heterosyllabification. Therefore, we can undoubtedly make two configurations as follows:

(24) Deletion of V₁

Underlying form	Surface form	Glossary
A: /la#ibérica/	[libérika]	The Iberian
B: /la#iconografía/	[likonoɣraffa]	The iconography
C: /la#idea/	[liðea]	The idea
D: /la#iglesia/	[liylesja]	The church
E: /la#ijastra/	[lixastra]	The stepdaughter
F: /la#ilustración/	[lilustrasjón]	The illustration
G: /la#imajen/	[limaxen]	The image
H: /la#inscripción/	[linskripsjón]	The registration
I: /la#ipótesis/	[lipótesis]	The hypothesis
J: /la#ironía/	[lironía]	The irony
K: /la#istoria/	[listorja]	The story
L: /la#italiana/	[litalijana]	The Italian
M: /la#iguana/	[liywana]	The iguana

According to the instances in (24), elision of /a/ is exhibited similarly as in the indefinites; however, the frequency of this process is minor. Likewise, we submit that the articulatory complexities in /a/ make the participants omit this element due to the limitations of fast speech and the short structure provided in the definite article ‘la’ *the*. Nevertheless, the next resolution contradicts the perspective regarding articulation.

(25) Heterosyllabification

Underlying form	Surface form	Glossary
C: /la#iðea/	[la.iðea]	The idea
F: /la#ilustración/	[la.ilustrasjón]	The illustration
H: /la#inscripción/	[la.inskripsjón]	The registration
J: /la#ironía/	[la.ironía]	The irony
K: /la#istoria/	[la.istorja]	The story

In (25) we observe that two vowels differing in height are preserved. We notice that the preservation of both input vowels /a/ and /i/ in the definite environment is preferred in a higher frequency than in the indefinite setting.

In summary, we identified two resolutions from the indefinite and definite setting in the hiatus of /a#i/:

A) Deletion of V₁: emerged again as the most common process; yet, in a lesser frequency compared with the previous hiatus (/a#e/).

B) Maintenance of V₁ and V₂: this resolution occurred in both environments; yet, the indefinite setting presented slightly higher than the indefinite. We assume that this hiatus

preservation is a form presented among the speakers that prefer to make a somewhat distinction between the words.

Observe the table in (26) for a comparison between the former resolutions in both types of environments, and thus confirm the mentioned generalizations.

(26) Frequency of occurrences for V₁ deletion and heterosyllabification in both indefinite and definite environments.

Hiatus and environment	Indefinite /a#i/	Definite /a#i/
Deletion of V ₁	✓	✓
Heterosyllabification	✓	✓
Frequency of occurrence	[a]:0% [i]: 85% [a.i]: 15%	[a]:0% [i]: 55% [a.i]: 45%

As observed in (26), deletion of V₁ is prominent in the indefinite environment, but decreases in the definite setting. Instead, heterosyllabification became slightly more frequent. We turn now our attention to describe the resolutions presented in the hiatus of /a#o/ for the settings previously mentioned.

4.1.3- The hiatus of /a#o/

This section describes the resolutions regarding the hiatus of /a#o/ in word boundaries. In this context, deletion of V₁ and heterosyllabification are the resolutions presented. §4.4.1 gives a description of the resolutions for indefinite setting. §4.4.2 discusses the resolutions presented in the indefinite environment. Similarly, as the former sections a group is made for each resolution.

4.1.3.1- Hiatus of /a#o/ in indefinite settings

The hiatus of /a#o/ in word-margins for the indefinite setting presents two solutions: the elision of /a/ (V₁) and the maintenance of the hiatus /a#o/ as [a.o]. A set of examples for the indefinite forms is presented in (27).

(27) The indefinite forms

Underlying form	Surface form	Glossary
A: /una#obsesión/	[unobsesjón], [una.ɔbesjón]	An obsession
B: /una#ochaba/	[unotʃaβa]	A building's corner (architecture)
C: /una#odisea/	[unoðisea]	An odyssey
D: /una#ofrenda/	[unofrenða], [una.ofrenða]	An offering
E: /una#oguera/	[unoyera]	A bonfire
F: /una#ojeada/	[unoxeaða]	A look (into a book)
G: /una#oleada/	[unoleaða]	A wave
H: /una#omega/	[unomeya], [una.omeya]	An omega
N: /una#onceava/	[unonseaða]	An eleventh (division)
Ñ: /una#oñeta/	[unopeta]	An Oteñan ³
P: /una#operación/	[unoperasjón], [una.operasjón]	An operation
R: /una#oruga/	[unoruɣa]	A caterpillar
S: /una#ostilidad/	[unostiliðað]	A hostility
T: /una#otomí/	[unotomí], [una.otomí]	An Otomí ⁴
Y: /una#ojente/	[unojente]	A listener (person)

In (27), both types of resolutions are presented in an apparent-arbitrary manner. This occurs because in the previous section we stipulated that deletion of V₁ was conceived due to the articulatory complexities in /a/ that compelled to the speaker to its elision. Second, we

³ A person from Oteña municipality in the Basque region, Spain.

⁴ A person belonging to Otomi autochthonous people which locations embrace several parts in central-Mexico.

observed that preservation of the hiatus was a way to make word-margin distinction phonetically speaking; there was a minimal stop between the words.

Consequently, two groups were identified: those deleting V_1 and those preserving both vowels from the hiatus /a#o/. The next table displays the instances that presented V_1 elision.

(28) Deletion of V_1

Underlying form	Surface form	Glossary
A: /una#obsesión/	[unobsesjón]	An obsession
B: /una#ochaba/	[unotʃaβa]	A building's corner (architecture)
C: /una#odisea/	[unoðisea]	An odyssey
D: /una#ofrenda/	[unofrenða]	An offering
E: /una#oguera/	[unoyera]	A bonfire
F: /una#ojeada/	[unoxeaða]	A look (into a book)
G: /una#oleada/	[unoleaða]	A wave
H: /una#omega/	[unomeya]	An omega
N: /una#onceava/	[unonseañ]	An eleventh (division)
Ñ: /una#oñeta/	[unopeta]	An Oteñan
P: /una#operación/	[unoperasjón]	An operation
R: /una#oruga/	[unoruɣa]	A caterpillar
S: /una#ostilidad/	[unostiliðað]	A hostility
T: /una#otomí/	[unotomí]	An Otomí
Y: /una#ojente/	[unojente]	A listener (person)

As the examples in (28) show, deletion of V_1 is the most usual and feasible resolution. We found that 16 of the participants preferred this resolution because of the speech in use.

The next group of examples in (29) presents the group of examples in which the speakers presented heterosyllabification.

(29) Maintenance of V_1 and V_2

Underlying form	Surface form	Glossary
A: /una#obsesión/	[una.obsesjón]	An obsession
D: /una#ofrenda/	[una.ofrenða]	An offering
H: /una#omega/	[una.omeya]	An omega
P: /una#operación/	[una.operasjón]	An operation
T: /una#otomí/	[una.otomí]	An Otomí

The forms with heterosyllabification are not higher in occurrence than those in which deletion of V_1 was presented. We maintain the idea that speaker presented this forms as way to indicate the boundaries between words, and that vowel /a/ is an element sonorous enough to

be preserved. The latter claim relates a situation similar to the previous hiatus /a#i/, but not presented in /a#e/.

4.1.3.2- Hiatus of /a#o/ in definite settings

The table in (30) shows the examples of the definite forms.

(30) The definite forms

Underlying form	Surface form	Glossary
A: /la#obsesión/	[laobsesjón], [la.obsesjón]	The obsession
B: /la#ochaba/	[lotʃaβa]	The building's corner (architecture)
C: /la#odisea/	[loðisea]	The odyssey
D: /la#ofrenda/	[lofrenða], [la.ofrenða]	The offering
E: /la#oguera/	[loɣera]	The bonfire
F: /la#ojeada/	[loxeaða]	The look
G: /la#oleada/	[loleaða], [la.oleaða]	The wave
H: /la#omega/	[lomeɣa], [la.omeɣa]	The omega
N: /la#onceava/	[lonseaβa], [la.onseaβa]	The eleventh (division)
Ñ: /la#oñeta/	[loɲeta]	The Oteñan
P: /la#operación/	[loperasjón]	The operation
R: /la#oruga/	[loruɣa]	The caterpillar
S: /la#ostilidad/	[lostiliðað]	The hostility
T: /la#otomí/	[lotomí], [la.otomí]	The Otomí
Y: /la#ojente/	[lojente]	The listener

From the examples in (30), two resolutions are distinguished: deletion of V₁ and heterosyllabification. The following table displays all the instances in which deletion of V₁ is presented; yet, some of them have also hiatus maintenance. Observe the table in (31).

(31) Deletion of V₁

Underlying form	Surface form	Glossary
A: /la#obsesión/	[laobsesjón]	The obsession
B: /la#ochaba/	[lotʃaβa]	The building's corner (architecture)
C: /la#odisea/	[loðisea]	The odyssey
D: /la#ofrenda/	[lofrenða]	The offering
E: /la#oguera/	[loyera]	The bonfire
F: /la#ojeada/	[loxeaða]	The look
G: /la#oleada/	[loleaða]	The wave
H: /la#omega/	[lomeya]	The omega
N: /la#onceava/	[lonseaβa]	The eleventh (division)
Ñ: /la#oñeta/	[loɲeta]	The Oteñan
P: /la#operación/	[loperasjón]	The operation
R: /la#oruga/	[loruɣa]	The caterpillar
S: /la#ostilidad/	[lostiliðað]	The hostility
T: /la#otomí/	[lotomí]	The Otomí
Y: /la#ojente/	[lojente]	The listener

Once again, the first group of examples displays the elision of /a/ as the first vowel. Nonetheless, its frequency decreased considerably compared to its number of occurrence in the indefinite setting. The comparison is shown in (32).

(32) Frequency of elision of V₁ in indefinite and definite settings

Hiatus and environments	Indefinite /a#o/	Definite /a#o/
Frequency of V ₁ deletion	[o]: 80%	[o]: 35%

As observed in (32), the speakers favored the non-deletion of /a/ (preferring hiatus maintenance), and thus, its occurrence decreased more than 50%. We therefore submit that the hiatus of /a#o/ in the definite setting is preferred. This can be attributed by the fact that both /a#o/ do not differ considerable in [height]; /a/ is [+low] and [-high] while /o/ is [-high]. In addition, both vowels are [+back], so they share some featural similarities that motivate their preservation in the output level. Observe the group of examples with hiatus preservation in (33).

(33) Maintenance of V₁ and V₂

Underlying form	Surface form	Glossary
A: /la#obsesión/	[la.obsesjón]	The obsession
D: /la#ofrenda/	[la.ofrenða]	The offering
G: /la#oleada/	[la.oleaða]	The wave
H: /la#omega/	[la.omeya]	The omega
N: /la#onceava/	[la.onseaβa]	The eleventh (division)
T: /la#otomí/	[la.otomí]	The Otomí

The participants here, presented the preservation of both vowels in the surface form. Note that, the maintenance of the hiatus is more frequent in the definite setting than in the indefinite setting. According to the data, 13 speakers presented [a.i] for the definite, and only 4 speakers presented [a.i]. These results suggest two points to consider. First, the type of environments promotes one type of resolution over the other. Second, some faithfulness constraints are active in the language to promote this resolution.

As conclusion of this section, we have briefly summarized the following:

A) Deletion of V₁: presented in both indefinite and definite environments, but less frequent in the definite setting.

B) Maintenance of V₁ and V₂: highly prominent in the definite setting and promoted by the similarities in features in /a/ and /o/.

The next section deals with the hiatus contexts of /a#u/ for the same type of environments.

4.1.4- Hiatus of /a#u/

The hiatus of this section comprehends two segments that show asymmetries in features. The first vowel /a/ [+low, +back] differs significantly from /u/ [+high, -back]. Consequently, such discrepancies are expected to convey phonological consequences; i.e., the absolute deletion of the segment with the most complex features in articulation and sonority for the type of speech in use: /a/. Nevertheless, the maintenance of two very contrasting vowels arises paradoxes towards this condition. The hiatus of /a#u/, as observed in previous hiatus, offers two groups: deletion of V₁ and heterosyllabification.

4.1.4.1- Hiatus of /a#u/ in indefinite setting

The following set of examples conveys the indefinite forms for /a#u/ in word margins.

(34) The indefinite forms

Underlying form	Surface form	Glossary
A: /una#ubicación/	[unubikasjón], [una.ubikasjón]	A location
B: /una#ucraniana/	[unukranjana]	A Ukrainian
C: /una#ufología/	[unufoloxía], [una.ufoloxía]	An ufology
D: /una#utilidad/	[unutiliðað]	An utility
E: /una#umedad/	[unumeðað], [una.umeðað]	A humidity
F: /una#unidad/	[ununiðað]	A unity
G: /una#uña/	[unuɲota]	A big nail
H: /una#uruguaya/	[unuruɣwaja], [una.uruɣwaja]	An Uruguayan
I: /una#usurpadora/	[unusurpaðora], [una.usurpaðora]	A squatter
J: /una#utopía/	[unutopía], [una.utopía]	An utopia

The set of examples in (34) evidences the two mentioned distinctions: V₁ elision and hiatus maintenance. Clearly, the alternation between the two resolutions is more varied than in other contexts. According to the data, the participants that preferred the elision of V₁ stated that they would present also the maintenance of /a i/, and the speakers that presented hiatus, would also prefer V₁ elision because of the easiness in production.

The following table displays the examples in which V₁ elision occurred.

(35) Deletion of V₁

Underlying form	Surface form	Glossary
A: /una#ubicación/	[unubikasjón]	A location
B: /una#ucraniana/	[unukranjana]	A Ukrainian
C: /una#ufología/	[unufoloxía]	An ufology
D: /una#utilidad/	[unutiliðað]	An utility
E: /una#umedad/	[unumeðað]	A humidity
F: /una#unidad/	[ununiðað]	A unity
G: /una#uñota/	[unuɲota]	A big nail
H: /una#uruguaya/	[unuruɣwaja]	An Uruguayan
I: /una#usurpadora/	[unusurpaðora]	A squatter
J: /una#utopía/	[unutopía]	An utopia

As mentioned before, the participants favored this occurrence as an effect of articulatory easiness. Moreover, this occurrence is also determined by the syllabic position of V₂, where /a/ is placed in a final unstressed location “non-privileged position” and /u/ occupies a “privileged position” (initial syllable in a root) (Beckman 1998).

In quantitative matters, 15 out of 20 speakers preferred to elide /a/, which in turn conveyed that only 5 participants favored maintenance; deletion of V₁ (75%) versus maintenance of V₁ and V₂ (25%). However, it is important to take a look at the instantiations where maintenance was preferred so we can adopt a strong viewpoint. The examples with heterosyllabification are shown in (36).

(36) Heterosyllabification

Underlying form	Surface form	Glossary
A: /una#ubicación/	[una.ubikasjón]	A location
C: /una#ufología/	[una.ufoloxía]	An ufology
E: /una#umedad/	[una.umeðað]	A humidity
H: /una#uruguaya/	[una.uruɣwaja]	An Uruguayan
I: /una#usurpadora/	[una.usurpaðora]	A squatter
J: /una#utopía/	[una.utopía]	An utopia

At first examination, it can be assumed that the maintenance of both vowels is more prominent than V₁ deletion, considering the number of instances expressed in (34). It is, however, worth noting that the number of uttered forms is independent from the number of speakers. Observe the information in the table in (37) from (8) where the speakers and the results are shown.

(37) Resolutions for /a#u/ in indefinite settings

Speaker number, gender & age	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
	M	M	M	F	M	M	F	F	M	F	M	F	F	F	M	F	M	F	F	M	
	26	22	28	25	27	12	18	35	29	40	14	31	42	45	10	38	22	25	17	17	
Indefinite /a#u/ indef.	[ɐ]	[ɐ]	[ɐ]	[ɐ]	[ɐ]	[ɐ]	[a.u]	[ɐ]	[ɐ]	[a.u]	[ɐ]	[ɐ]	[ɐ]	[a.u]	[a.u]	[ɐ]	[ɐ]	[ɐ]	[ɐ]	[a.u]	[a]:0 [u]:15 [a.u]:5

For instance, the table (37) demonstrates that only five speakers presented heterosyllabification. Nevertheless, from the set of examples applied in the study, the former resolution is presented in many examples. This relates that the speakers 7, 10, 14, 15, and 20 from (37) were those that presented the former resolution only on these examples. Importantly, this maintenance is not presented arbitrarily. The participants that exhibited this occurrence are related by their differences in ages. For instance, all the speakers mostly embrace early ages, 10, 14 and 18 (speaker 15, 11, and 7) or mature ages 40 and 45 (speaker 10 and 20). This may denote that young and mature enough people are concern about the proper pronunciation of a two asymmetrical vowel in a sequence, or at least this could denote an intuition about the triggering reasons or this resolution.

Now, we turn the attention to examine the definite environment to see if maintenance still happening in the same frequency as in the just-discussed section.

4.1.4.2- Hiatus of /a#u/ in definite setting

The examples for the definite settings are presented in (38).

(38) The definite forms

Underlying form	Surface form	Glossary
A: /la#ubicación/	[lubikasjón], [la.ubikasjón]	A location
B: /la#ucraniana/	[lukranjana]	A Ukrainian
C: /la#ufología/	[lufoloxía], [la.ufoloxía]	An ufology
D: /la#utilidad/	[lutiliðað], [la.utiliðað]	The utility
E: /la#umedad/	[lumeðað], [la.umeðað]	A humidity
F: /la#unidad/	[luniðað]	A unity
G: /la#uña/	[lunota]	A big nail
H: /la#uruguaya/	[luruywaja], [la.uruywaja]	An Uruguayan
I: /la#usurpadora/	[lusurpaðora], [la.usurpaðora]	A squatter
J: /la#utopía/	[lutopía], [la.utopía]	An utopia

In this setting, two already-known occurrences are identified and divided into the following groups: the examples with deletion of V₁ conform one group and the examples with heterosyllabification conform the second group. The first group is displayed in (39).

(39) Deletion of V₁

Base form	Underlying form	Surface form
A: /la#ubicación/	[lubikasjón]	A location
B: /la#ucraniana/	[lukranjana]	A Ukrainian
C: /la#ufología/	[lufoloxía]	An ufology
D: /la#utilidad/	[lutiliðað]	The utility
E: /la#umedad/	[lumeðað]	A humidity
F: /la#unidad/	[luniðað]	A unity
G: /la#uña/	[lunota]	A big nail
H: /la#uruguaya/	[luruywaja]	An Uruguayan
I: /la#usurpadora/	[lusurpaðora]	A squatter
J: /la#utopía/	[lutopía]	An utopia

The examples in (39) present the forms in which the speakers preferred the deletion of /a/ over /u/ as a way to prevent the utterance of a complex and sonorous element which may affect the second vowel. This resolution is presented in much less frequency than its opposite setting. Observe the next table in (40):

(40) Frequency of V₁ elision and heterosyllabification

Hiatus and environment	Indefinite /a#u/	Definite /a#u/
Deletion of V ₁	✓	✓
Maintenance	✓	✓
Quantitative	[a]:0	[a]:0
Frequency	[u]:15	[u]:6
(# of speakers)	[a.u]:5	[a.u]:14

As is clear in the table, the second group presents the maintenance of both input vowels in a higher frequency than in the indefinite. From this indication, we can suggest the following:

First, heterosyllabification denotes the idea that both elements are acoustically distinct from each other and expose stable qualities that discard the process of deletion as an alternative to solve this hiatus.

The next table displays the instances in which the speakers presented the preservation of the two input vowels from the hiatus.

(41) Preservation of V₁ and V₂

Underlying form	Surface form	Glossary
A: /la#ubicación/	[la.ubikasjón]	A location
C: /la#ufología/	[la.ufoloxía]	An ufology
D: /la#utilidad/	[la.utiliðað]	The utility
E: /la#umedad/	[la.umeðað]	A humidity
H: /la#uruguaya/	[la.uruwaja]	An Uruguayan
I: /la#usurpadora/	[la.usurpaðora]	A squatter
J: /la#utopía/	[la.utopía]	An utopia

According to the examples in (41), heterosyllabification is presented in more examples when the hiatus of /a#u/ relates a definite article + noun.

This section concludes its description by giving a summary of the two occurrences exhibited.

a) Deletion of V₁: less frequent here; however, still as the most prominent process for all the hiatus having /a/ as the first vowel.

b) Maintenance of V₁ and V₂: presented as the most frequent resolution for all the definite forms in general hiatus. Probably, more easy to predict due to the contrast of features in /a/ and /u/.

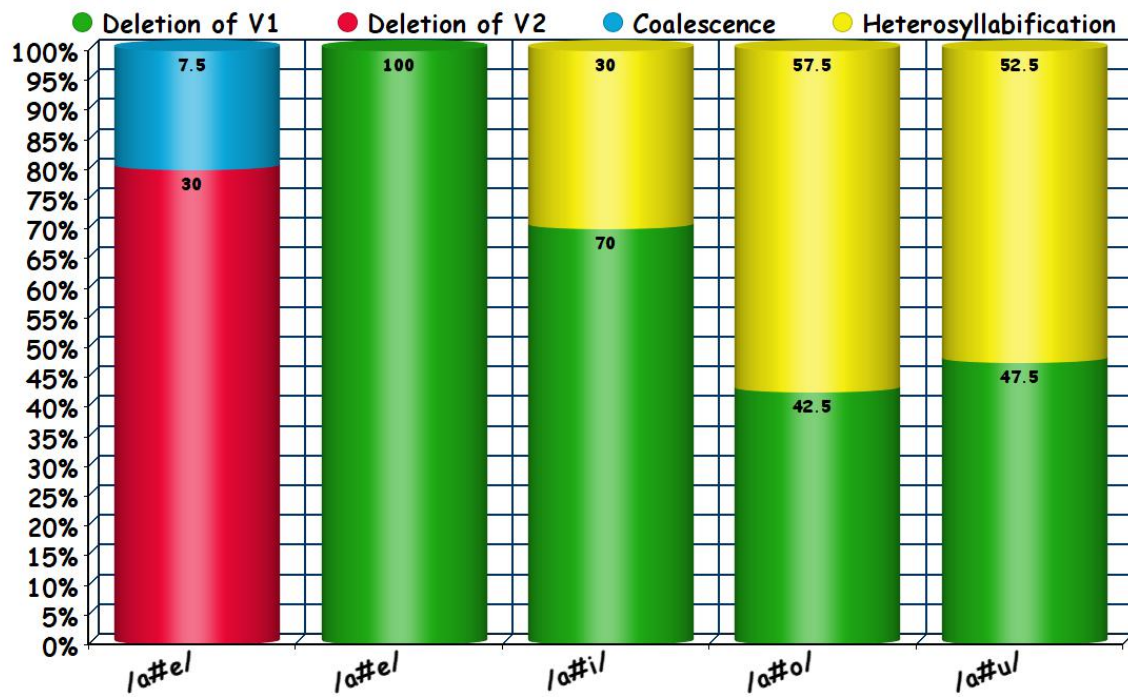
Intriguingly, some of the speakers presented the conservation of the two vowels in the hiatus for the definite, but they present deletion of V₁ for the indefinite. In other words, a single speaker presented one type of occurrence for each environment.

4.1.5- A brief section summary and a graphic generalization

This section outlined that elision /a/ as V₁ was considered the most frequent resolution in a cross-hiatus perspective; agreeing with Casali (1996) assumption. In addition, many speakers presented different way to resolve the hiatuses: deletion of V₁, deletion of V₂ or coalescence. These occurrences are the evidences that other factors, beside morphosyntactic conditions, are involved. Factors, such as, articulatory efforts, the avoidance of phonological ambiguities, and individual's preference. Specifically, the dual variation of deletion in the hiatus /a#e/ presented forms against theoretical assumptions, not to mention the occurrence of coalescence as well. The rest of the hiatus; /a#i/, /a#o/, and /a#u/), presented deletion of V₁ and maintenance of both the vowels from the input.

The next illustration presents a summary of the resolutions described in all the former sections as a bar chart form. This illustration displays the frequency in which all the resolutions from both indefinite and definite settings occurred. For convenience, the resolutions are indicated in different colors: green for V₁ deletion, red for V₂ deletion, blue for coalescence, and yellow for heterosyllabification. Fundamentally, the graphic in (42) displays a single bar for deletion of V₁. This happened because the resolution was presented in all speakers, but not in all the cases for both environments of /a#e/. The bar chart is portrayed in (42).

(42) Overview of the resolutions in indefinite and definite environments



The next sections describe the occurrences in the hiatuses that present the reverse order from those in the previous sections.

4.2- The reverse order in hiatuses

The following sections present the opposite order from the hiatuses previously described. For instance, the hiatus /o#a/ (to be presented in §4.2.3) corresponds to the contrary order from the hiatus of /a#o/ presented in §4.1.3. It is worth indicating that the next sections do not sort the examples into groups according to the resolutions. Instead, the next sections present the examples from the material and divided the sentences according to the hiatus in their boundaries in one table for each corresponding section. For instance, consider the example /aquí#aparece#un#espíritu#ancestral/ *An ancient spirit appears here*. The former sentence consists of two hiatuses word-marginally: /i#a/ and /u#a/. Therefore, it is divided and described in two sections: /aquí#aparece/ for /i#a/ in §4.2.2, and /espíu#ancestral/ for /u#a/ in §4.2.4. In general, each section involves one hiatus, its examples, and the description/discussion of the facts.

The hiatus in the forthcoming sections cover various morphosyntactic combinations such as, /pronoun#lexical/, /demonstrative#lexical/, /preposition#lexical/, /noun#adjective/, /verb#adverb/, etc. All combinations in long and short syntactic representations that include different hiatus contexts in the word-margins. This time, the surface forms are presented according to the way in which the speakers syllabified the sentences based on the recording content and the written materials. In addition, the tables with the examples in each sections are divided in four columns. The leftmost column indicates the morphosyntactic categories involved in the sentence, the second column contains the underlying forms, the third column includes the surface forms, and the rightmost column displays the glossary of the examples.

Essentially, the exhibition and absence of phonological processes here are interesting issues that deserves exploration if we stress the placement of /a/ in V₂ as the potential motivator. On the one hand, the position of /a/ prevents some resolution to happen like deletion. On the other hand, it is its position as V₂ the triggering reason for other resolutions like gliding of V₁. This section is sorted in the following way: §4.2.1 /e#a/, §4.2.2 /i#a/, §4.2.3 /o#a/, and §4.2.4 /u#a/.

The next table, (43), displays the different resolutions presented among the participants. Note that, the phonetic forms indicate the next:

[e.a], [i.a], [o.a], [u.a]: heterosyllabification

[ea]: diphthong formation

[ja], [wa]: gliding of V₁

(43) Resolutions presented among the participants

Speaker number, gender & age	/e#a/	/i#a/	/o#a/	/u#a/
1 M: 26	[ea]	[ja]	[o.a]	[wa]
2 M: 22	[ea]	[ja]	[o.a]	[wa]
3 M: 28	[ea]	[ja]	[o.a]	[u.a]/[wa]
4 F: 25	[ea]	[ja]	[o.a]	[wa]
5 M: 27	[ea]	[ja]	[o.a]	[wa]
6 M: 12	[ea]	[ja]	[wa]/[o.a]	[wa]
7 F: 18	[ea]	[ja]	[o.a]	[wa]
8 F: 35	[ea]	[i.a]/[ja]	[o.a]	[wa]
9 M: 29	[ea]	[ja]	[o.a]	[u.a]/[wa]
10 F: 40	[ea]	[ja]	[o.a]	[u.a]/[wa]
11 M: 14	[ea]	[ja]	[wa]/[o.a]	[wa]
12 F: 31	[ea]	[ja]	[o.a]	[u.a]/[wa]
13 F: 42	[ea]	[i.a]/[ja]	[o.a]	[u.a]/[wa]
14 F: 45	[ea]	[ja]	[o.a]	[u.a]/[wa]
15 M: 10	[ea]	[ja]	[wa]/[o.a]	[wa]
16 F: 38	[ea]	[i.a]/[ja]	[o.a]	[u.a]/[wa]
17 M: 22	[ea]	[ja]	[o.a]	[wa]
18 F: 25	[ea]	[i.a]/[ja]	[o.a]	[wa]
19 F: 17	[ea]	[ja]	[o.a]	[wa]
20 M: 17	[ea]	[ja]	[o.a]	[wa]
Quantitative frequency	[ea]:20 [e.a]: 20	[ja]:18 [i.a]:4	[wa]:3 [a.o]:17	[wa]:13 [u.a]:7
Frequency in ratio	[ea]:50% [e.a]:50%	[ja]:80% [i.a]:20%	[wa]:15% [o.a]:85%	[wa]:75% [u.a]:25%

As is observed in (43), the table displays the phonetic forms as representations of the resolution according to the information from the data. Note that, for the hiatus of /e#a/ all speakers were indicated with both phonetic forms ‘[ea]/[e.a].’ This does not mean that the speakers presented all the examples with both output representations. Instead, this indicates that all speakers, in at least one environment, presented [ea] or [e.a] as the solution. That is why we indicated all of them with that dual representation. Therefore, we also had to divide the quantitative and frequency percentages in the last row in (43). The same convention is applied in other hiatus contexts.

In the cases of the hiatuses of /i#a/, /o#a/, and /u#a/, there is an alternation between heterosyllabification and diphthong with gliding of V₁. Importantly, gliding of V₁ and diphthong formation were presented as two processes closely associated. In the cases where

gliding of V₁ is played, diphthongization is also presented. We proceed now to describe the occurrences of the former hiatuses for each section.

4.2.1- Hiatus of /e#a/ in different morphosyntactic environments

This section describes the occurrences in the context of /e#a/; the opposite order from the hiatus discussed in §4.1.1. Compared to its opposite order /a#e/, this hiatus presents diphthong formation and heterosyllabification. These occurrences happened regardless the syllabic positions, morphological structures, and syntactic morphosyntactic categories.

The section commences with the set of examples regarding a variation of syntactic categories. For concreteness, the interacting words are marked in bold in long sentences. Additionally, the lexically stressed vowels are underlined and orthographically accented vowels are indicated with the acute accent. The same applies for all instances in the remaining sections. The examples for the hiatus of /e#a/ in word boundaries are shown in (44).

(44) Examples of the hiatus /e#a/ in word boundaries

Morphosyntactic category	Underlying form	Surface form	Glossary
A: root-suffix	/diecisiete-avo/	[ðje.si.sje.te.a.βo] [ðje.si.sje.tea.βo]	A seventeenth
B: determiner#noun	/este#amigo/	[ste.a.mi.yo] [stea.mi.yo]	This friend
C: noun#noun	/comediante#astuto/	[ko.me.ðjan.te.as.tu.to] [ko.me.ðjan.teas.tu.to]	Astute comedian
D: preposition#verb	/luis#sabe# poque#aparece /	[sa.βe.por.ke.a.pa.re.se] [sa.βe.por.ke.a.pa.re.se]	Luis knows why s/he appears
E: affix-root	/re-analizar/	[re.a.na.li.sar] [rea.na.li.sar]	To reanalyze
F: noun#adverb	/el#bebé# duerme#alegremente /	[ðwer.me.a.le.yre.men.te] [ðwer.me.a.le.yre.men.te]	The baby sleeps happily
G: verb#adverb	/come#apresuradamente/	[ko.me.a.pre.su.ra.ða.men.te] [ko.me.a.pre.su.ra.ða.men.te]	(s/he) eats hastily
H: noun#verb	/cose#arroz/	[ko.se.a.ros] [ko.sea.ros]	(s/he) cooks rice
I: noun#auxiliary	/renate# abría #leído#el#libro/	[re.na.te.a.βría] [re.na.te.a.βría]	Renate would have read the book

As formerly mentioned, the speakers presented heterosyllabification and diphthong formation. In base on these occurrences, we suggest two points. First, the sonority of /a/ as V₂

does not affect the low sonority of /e/ as V₁. This is contrary to the hiatus of /a#e/ where a high sonorous as first vowel affects the utterance of a less sonorous vowel. Second, we state that both diphthongization and heterosyllabification are regarded to dialectal and individual's preference. This issue is analyzed in the next chapter, though.

4.2.2- Hiatus of /i#a/ in different morphosyntactic environments

The hiatus of /i#a/ in word-boundaries presents gliding of V₁ and heterosyllabification. Notably, the former resolution is in close association with diphthong formation in all syllabic positions and syntactic categories. Observe the instances where these processes occur in (45).

(45) Examples of the hiatus /i#a/ in word boundaries

Morphosyntactic category	Underlying form	Surface form	Glossary
A: Adverb#verb	/casi#abierta/	[ka.sja.βjeɾ.ta]	Almost opened
B: Possessive pronoun#noun	/mi#abuela/	[mja.bwe.la]	My grandmother
C: deictic adverb #verb	/ aquí#aparece #un#espíritu/	[akjaparese]	An ancient spirit appears here
D: prefix-base	/anti-amigos/	[an.tja.mi.ɣos]	Anti-friends
E: prefix-root	/anti-académico/	[an.tja.ka.ðé.mi.ko] [an.ti.a.ka.ðé.mi.ko]	Antiacademic
F: noun#adjective	/espagueti#amargo/	[es.pa.ɣe.tja.maɾ.ɣo]	Bitter spaghetti
G: noun#adjective	/al# jabalí#amigable /	[un.xaβa.li.a.mi.ɣa.βle]	To the friendly wild boar
H: noun#verb	/el# marroquí#aconseja /	[ma.ro.kí.a.kon.se.xa] [ma.ro.kja.kon.se.xa]	The Moroccan advices
I: noun#adverb	/el# samurái#alegremente#entrena /	[sa.mu.rá.ja.le.ɣre.men.te]	The samurai trains happily
J: noun#preposition	/el#espagueti#sobra/	[el.es.pa.ɣe.tjas.ta.so.βra]	Even the spaghetti remains

Some instances in (45) show that gliding of V₁ is not restricted to happen whenever the first vowel is stressed or highly stressed (45.H). In addition, gliding formation, which involves diphthongization, is the most frequent resolution in this hiatus. For the cases in which very stressed (accented) vowels undergo gliding, we assume that the type of speech is the factor beyond, morphosyntactic conditions, that determines its phonetic form. In this case, fast speech set limitations in the utterance that convey the partial articulation of a stressed vowel in a position that usually undergoes some phonological phenomena (Beckman 1998). Additionally, the presence of an adjacent sonorous vowel like /a/ diminishes the complete salience of /i/ as

[i]. In this case it is observed a diphthong of rising sonority (Rosenthal 1994). Oppositely, the speakers that presented heterosyllabification make a minimal effort to pronounce the stressed final segment.

4.2.3- Hiatus of /o#a/ in different morphosyntactic environments

The section 4.1.3 displayed the hiatus of /a#o/ and the two resolutions: deletion of V₁ and preservation. This section describes the resolutions presented among the speakers in the hiatus context of /o#a/ in word margins. This context presents heterosyllabification as the common resolution, whereas gliding of V₁, /o#a/ → [wa], is exhibited scarcely. The next table shows the examples in which heterosyllabification and gliding of V₁ occur.

(46) Examples of the hiatus /o#a/ in word boundaries

Morphosyntactic category	Underlying form	Surface form	Glossary
A: noun#verb	/el# conejo # avanza rápido/	[ko.ne.xo.a.βan.sa]	The rabbit goes fast
B: noun#adverb	/un# hábito # altamente #rígido/	[á.βi.to.al.ta.men.te]	A habit highly rigorous
C: prefix-root	/el#grupo# pro-activo /	[pro.ak.ti.βo]	The proactive group
D: adverb#noun	/losé# salvo # armando /	[sal.βo.ar.man.ðo]	I know except Armando
E: adverb#adjective	/el#es# como # atento /	[ko.mo.a.ten.to] [ko.mwa.ten.to]	He is kind of attentive
F: noun#adjective	/el# insecto # aplastado /	[in.sek.to.a.plas.ta.ðo]	The squashed bug
G: noun#adjective	/un# abogado # ágil /	[a.βo.ɣa.ðo.á.xil] [a.βo.ɣa.ðwá.xil]	An agile lawyer

As is observed in the set of examples in (46), heterosyllabification occurs in all the environments. Additionally, there are two particular instances where only three speakers presented gliding of V₁ (speakers no. 6 11 15). Interestingly, these participants are the youngest in this study; speaker 6: 12 years old, 11:14 years old, and 15:10 years old. In fact, they presented gliding of V₁ in a remarked way. In this case, they pronounced /o/ quite similar to [w] regardless the prosodic condition. Thus, we can assume that these speakers do not take into account the conditions in stressed and unstressed vowels. That is, we observe that gliding of V₁ happens in a sequence of two unstressed vowels (45.E), and in a sequence of unstressed-stressed vowels as in (45.G). Now, we move onto the next hiatus: /u#a/.

4.2.4- Hiatus of /u#a/ in different morphosyntactic environments

This section deals with the hiatus of /u#a/ in word boundaries in different morphosyntactic categories. Likewise, the speakers solved this context by exhibiting gliding of the first vowel and heterosyllabification. Oppositely to /o#a/, gliding of V₁ is highly frequent and comprehends all morphosyntactic categories. Note that, the following instances comprehend only the setting of /lexical#lexical/. This is due to the absence of function words that finish in /u/. The examples of /u#a/ in word boundaries are displayed in (47).

(47) Examples of the hiatus /u#a/ in word boundaries

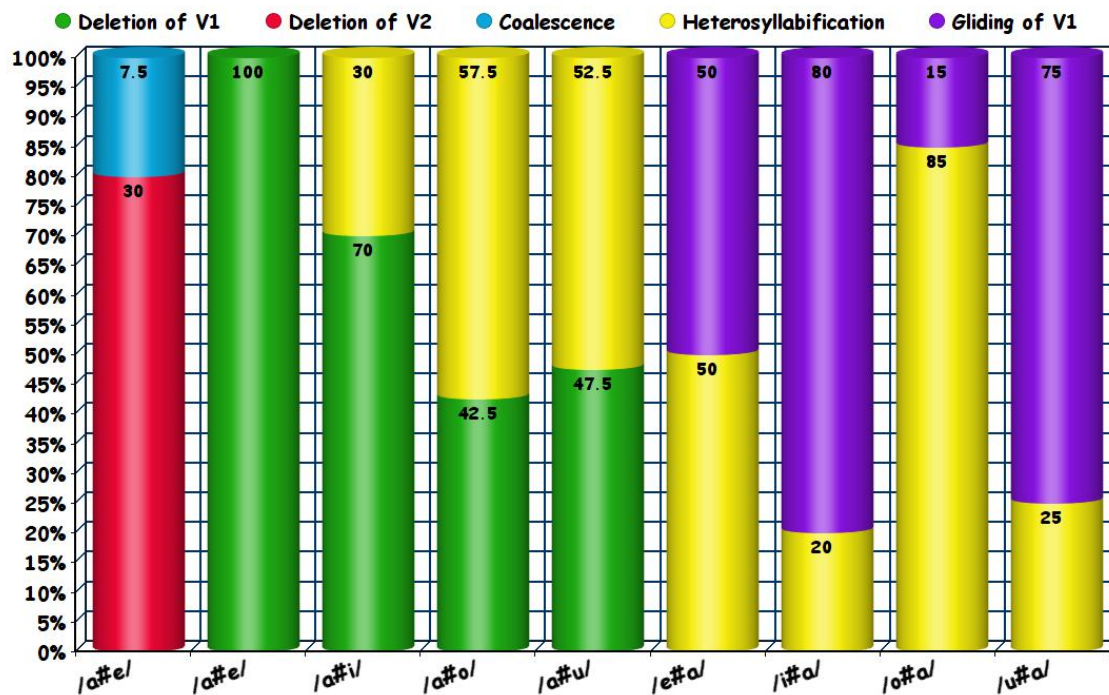
Morphosyntactic category	Underlying form	Surface form	Glossary
A: possessive pronoun#noun	/tu#artista#favorito/	[twaɾ.t̪is.ta.fa.βo.ɾi.to]	Your favorite artist
B: noun#adjective	/un#espíritu#ancestral/	[es.pí.ri.twan.ses.traɫ]	An ancient spirit
C: noun#verb	/la#tribu#adora#a#su#dios/	[tri.βwa.ðo.ɾa]	The tribe adores its god
D: noun#adjective	/el#machupicchu#antiguo/	[ma.t̪ʃu.pi.t̪ʃwan.tí.ɣwo]	The ancient Machu Picchu
E: noun#verb	/el#espíritu#aparece/	[es.pí.ri.twa.pa.re.se]	The spirit appears

The instances in (47) display that gliding of V₁ with diphthong formation is resolution with the most happening in this hiatus. Heterosyllabification is also presented; yet, in the cases in which this process appears, diphthongization occurs as well. Therefore, we assume that gliding of V₁ is more susceptible to occur, and heterosyllabification is displayed as a result of dialectal or individual's preference.

4.3- A generalization about the facts in all hiatus contexts

As a way to conclude this chapter, a bar-chart illustration of all the hiatuses described in this chapter is displayed in (48). This graphic generalizes the frequency of occurrences based on the tables in (5) and (43); the phonetic forms presented by the speaker (the data), and the morphosyntactic categories in the examples from the material. The illustration is presented in (48).

(48) The cross-hiatus resolutions and their frequency



In general terms, the processes of deletion of V₁ (green color) and heterosyllabification (yellow color) are the most common resolutions. We summarize the resolutions with their hiatuses as follow:

Deletion of V₁: presented in /a#e/, /a#i/, /a#o/, and /a#u/ for indefinite, definite, and other morphosyntactic environments.⁵

Deletion of V₂: an exclusive occurrence for the hiatus of /a#e/.

Coalescence of V₁ and V₂: presented only in the hiatus of /a#e/.

⁵ We did not describe the other morphosyntactic conditions where /a/ is V₁ in this chapter since they do not differ considerably in the resolutions of the hiatus contexts from the environments of indefinite and definite. However, these settings are discussed and analyzed in chapter five.

Heterosyllabification: occurred in /a#i/, /a#o/, /a#u/, and the rest of the hiatuses. More frequent in the environment of the definite and the hiatuses of /e#a/ and /o#a/.

Gliding of V₁: produced in all the hiatuses in which /a/ is V₂. Mostly frequent in the hiatuses of /i#a/ and /u#a/ because of the sonority contrast in a sequence of / [+high]# [+low] / vowels.

4.4- Chapter conclusion

In this chapter we described the surface forms presented in different hiatus contexts. In some cases, such forms displayed standard representations while other instantiations exhibited controversial forms. We submitted that syntactic categories were irrelevant to determine the attested forms and other factors were the motivators underlying these phonetic representations. Correspondingly, the positions of the vowels were conditions closely related to the phonetic representations that motivated the variation in the examples given.

Additionally, we observed the way how the participants demonstrated a predilection for certain processes, which in turn conveyed the phonetic representations given in (8) and (43) respectively. Therefore, the hypothesis of this study can state that Mexican Spanish is impartial towards morphosyntactic categories. It is essential now to start with the O.T. analyses of the most relevant surface forms presented throughout this chapter.

5- The analyses of the hiatus contexts in Mexican Spanish

Until now, the study has presented an idea about the central discussion of the topic. Here, the former chapters are briefly summarized: chapter one displayed some examples as way of introduction into the topic. The chapter two presented the methodology for the study, the procedure, and the information about the participants. The theoretical backgrounds were introduced in chapter three. The chapter four described the surface forms presented as the resolutions for the different hiatuses in cross-word boundaries, based on the data given by the participants.

Chapter five analyzes some of the output structures within the framework of *Optimality Theory* (henceforth O.T.) from Prince & Smolensky 1993/2004 (hence P&S 1993/2004), and other associated theories. *Correspondence Family* (McCarthy & Prince 1995) also plays an important role in proposing the set of interactive constraints. The analyses to be presented neither examine the output forms from each individual nor present the resolutions from for all speakers. Instead, the analyses display the resolutions that offered the most interesting cases in general. In view of this, some analyses might seem challenging because of the variation in the data.

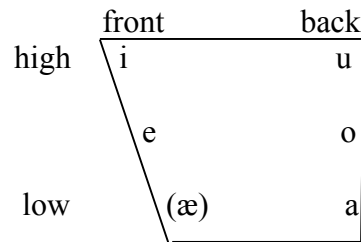
The examinations of the resolutions are presented in the next order: deletion of V_1 , deletion of V_2 , coalescence, gliding of V_1 , and heterosyllabification. In addition, the examination of each type of resolution includes two or three hiatuses. For instance, deletion of V_1 (§5.1) examines the hiatuses of /a#e/ and /a#o/, deletion of V_2 (§5.2) examines three instances of /a#e/, and so on.

As mentioned throughout this thesis, morphosyntactic conditions do not play all the time an active role for the occurrence of the phenomena. Therefore, the analyses of the hiatus resolutions take also into account other factors beside the mentioned. For instance, segmental features, articulatory efforts, the idea about an epenthetic element, and any other relevant assumption to fortify the analyses are considered (Baković, 2006; Beckman, 1998; Casali 1996, 1997; Clements 1990; Eddington, 2001; Harris, 1983; among others).

Before we plug into the O.T. discussions and analyses, it is crucial to mention that section 5.1 proposes the set of constraints for all the analyzes throughout this chapter. This is considered because §5.1.1.2, §5.2.5, and §5.3.3 examine the same underlying form: /la₁#e₂ntrada/ ‘la entrada’ *the entrance*. Since this underlying form presented three resolutions for repairing its hiatus: deletion of V_1 , deletion of V_2 , and coalescence, keeping the same set of constraints will show the way in which the rankings differ in assessing this form.

To set well-defined the use of the constraints for the analyses, observe the following illustration regarding the five vowels from the Spanish system in (49). Note that, there is a sixth element. This segment is considered the coalesced form; yet, it is non-preserving structure segment (to be discussed in §5.3).

(49) Five vowels system of Spanish



This chapter is sorted as follows: §5.1 analyses the deletion of V_1 in the hiatuses of /a#e/ and /a#o/. §5.2 examines the hiatus that present deletion of V_2 in /a#e/. The coalescence resolution is taken up in §5.3 for /a#e/. In §5.4 there is an examination regarding gliding of V_1 in /i#a/, /o#a/, /u#a/ and their heterosyllabic forms. §5.5 presents the conclusion.

5.1- Deletion of V_1 and the O.T. analyses

The resolution of V_1 elision is presented as the most common process for solving hiatuses cross-linguistically. Casali (1996) declared that, “ V_1 Elision is far more common and productive than Elision of V_2 . [...], every language in the survey with V_2 Elision also has V_1 Elision” (p.11). More specifically, deletion of /a/ as V_1 in combination with other vocalic elements, is based on the idea that [+low] vowel /a/ undergoes deletion when is adjacent to [+/-high] vowels (Harris 1983, Baković 2006). Similarly, the cases of Chicano Spanish (Baković 2006), New Mexican Spanish (Jenkins 1999), and Mexican Spanish (Vuskovich 2006), displayed the phonological omission of /a/ as V_1 in different hiatuses.⁶ In the next tableau, the leftmost column contains the underlying forms, the column in the middle stands for the surface forms, and the rightmost column presents the glossary. Anew, the orthographically accented vowels are displayed with the acute accent, and the stressed vowels in bold. Observe the examples from the materials that displayed V_1 elision in (50).

⁶ Vuskovich (2006) commented that, “Elision of V_1 , the forth most common type of hiatus resolution, displayed a very interesting trend in the context of /a + e/ where /a/ loses sonority ranking to /e/ and undergoes elision. This is uncommon given the ‘strength’ of the /a/ vowel that does not elide in standard dialects, but at most undergoes non-high glide formation” (p. 66).

(50) Deletion of V₁ in cross-hiatus contexts

Underlying form	Surface form	Glossary
A: /una#egipcia/	[u.ne.xip.sja]	An Egyptian (person)
B: /escala#evolutiva/	[es.ka.le.βo.lu.ti.βa]	Evolutionary scale
C: /José#asta#impresiona/	[as.tim.pre.sjo.na]	(s/he) even impress
D: /el#maneja#intestamente/	[el.ma.ne.xin.ten.sa.men.te]	He drives intensely
E: /una#/casa#obscura/	[ka.sob.sk <u>u</u> .ra]	Dark house
F: /el#planeta#original/	[el.pla.ne.to.ri.xi.nal]	The original planet
G: /Juan#compra#unidades/	[xwan.kom.pru.ni.ð <u>a</u> .ðes]	Juan buys unities
H: /extra-humectante/	[eks.tru.mek.t <u>a</u> n.te]	Extra moisture

The examples in (50) display the way in which /a/ undergoes deletion when occupying the first position in a hiatus context regardless its morpho-syntactic condition. In a naïve way, we can consider the assumptions from Baković (2006), Casali (1996), Harris (1983), Pulleyblank (1988), about the condition of /a/ as V₁, and posit a general rule for deletion of V₁ in (51).

(51) Rule for deletion of V₁

$$V_1 \rightarrow \emptyset / C_ \# V_2 C$$

This rule seems ideal for its application in the cases where a hiatus displays a juncture of two vowels differing in height. However, this is not the only triggering reason for the elision of /a/. Regarding this, we observe that the deletion of /a/ occurs due to its articulatory requirements and sonority level according to the Sonority Sequence Principle (Clements, 1990; Parker, 2002; Selkirk, 1984). In fast speech, complex segments are avoided due to the limited time for their proper articulations; thus, the vowel /a/ become less ideal for this type of communication due to its just-mentioned characteristics (Steven 1989). Contrarily, fast-speech benefits those easy-to-produce segments since they need less articulatory requirements for its utterance. For instance, in a hiatus of /a#e/, the speech gives preference to /e/, and thus the application of the rule in (51) shows its effect. Nevertheless, the deletion of /a/ contradicts Browman & Goldstein's (1992) perspective. In this respect the segments must exhibit their complete qualities, i.e. amplitude, duration, sonority, etc.; so they can be phonetically distinguished to avoid misperceptions. Especially, if we are referring to a distinguished vowel, such as /a/; being a "corner element" (Steven 1989) and ample in duration (Archangeli & Pulleyblank 1994).

Temporarily, we propose the following descriptive generalizations in the examples from (50).

(52) Descriptive generalization for V₁ elision

Low vowels are not permitted in hiatus contexts. This requirement is imposed by deletion. Except when the hiatus is word-internal.

5.1.1- The constraints and the first O.T. analysis of /a#e/

The deletion process of V₁ here involves the preservation of a segment that is considered part of a content word (Casali 1997) and is located in a syllabic position that displays contrast towards phonological phenomena. That position is known as “privileged position” (Beckman 1998), strong-initial position for neutralization (Barnes, 2002; *ibid.*). Other assumptions stated initial segments provide lexical access and word recognitions which, similarly, has semantic weight (Beckman, 1998; van Bergem 1991). Nonetheless, deletion of /a/ is achieved at the cost of keeping a less sonorous and less-established segment (Clement 1990; Parker, 2002; Selkirk, 1984; Stevens 1989). Therefore, we need to propose the set of constraints that provide the arguments for motivating the preservation of /e/ for a feasible analysis.

The fact of having a phonetic omission in the output level, requires directly a constraint against this occurrence. Now, we propose a specific constraint that assess the deletion of any vocalic element in the output: MAX-V (McCarthy 2000).⁷ Likewise, we propose a constraint that triggers such deletion process. A constraint that seeks to avoid the sequence of two vowels in the output level. Therefore, we propose *HIATUS. Both constraints defined as follows:

(53) First set of constraints

A) MAX-V: every vowel in the input has a correspondent in the output

(McCarthy 2000).

B) *HIATUS: no heterosyllabic vowel-vowel sequences

(McCarthy 1993:172).⁸

⁷ See Correspondence Family (McCarthy & Prince 1995) for an extended explanation about the use of the constraints from the MAX family.

⁸ We restrict the effects of No-Hiatus only to vowels associated to word-boundaries, and not word-internal. Otherwise, a word like /el#baile/ ‘el baile’ *the dance* would wrongly map as *[el.βile].

Fundamentally, we propose other constraints that present alternatives besides deletion for solving the hiatus in discussion. Note that, these constraints must outrank MAX-V; otherwise, deletion would be an optional resolution and not the process we are expecting to happen. The constraints specified in (54).

(54) Second set of constraints

A) *DIP: two moras are not connected to two vocalic nodes within a single syllable (Rosenthal 1994: 25).

B) UNIFORMITY: “No Coalescence”

No element of S_2 has multiple correspondents in S_1
(McCarthy & Prince 1995: 123).

With both set of constraints from (53) and (54) interacting, we establish the following ranking in (55) to observe the potential outcome from it.

(55) Partial ranking

*HIATUS, *DIP, UNIFORMITY >> MAX-V

The ranking seems feasible; it demands the deletion of a vowel in the output level as the best resolution for a hiatus. Nevertheless, the consideration of these constraints is not sufficient evidence for applying this ranking in the analysis. Therefore, in a situation where we apply such ranking, an underlying form like /una#estrella/ ‘una estrella’ *a star*, could alternatively surface as [unestre λ a] and [unastre λ a]. This occurs by considering the fact that we do not know which of the vowels must be deleted. Hence, applying the ranking given in (5) does not specify what vowel should be elided. With respect to the latter surface form: [unastre λ a], this resolution is not banned; yet, we need to motivate the occurrence of elision in V_1 . This condition obligates us to suggest a more-specific constraint from the MAX family (McCarthy & Prince 1995), so the deletion process can merely target /a/. We pose then, the constraint in (56), with the formal ranking displayed in (57).

(56) MAXLEX

MAXLEX: every segment in a lexical word or morpheme must have a corresponding segment in the output (Casali 1997:501).

An important clarification must be commented here. The constraint in (56) favors a lexical word; a distinction we do not consider in the analyses. However, for the next set of examples, we must state that this distinction plays an active role. Otherwise, in a case like /diesiocho-avo/ ‘diesciochoavo’ *an eighteenth (division)*, which underlying form maps as [djesjotʃ-aβo], the constraint MAXLEX would be violated and would not play any important role in the ranking. The former instance demonstrates that morpho-syntactic distinctions are not crucial in the process, and deletion is simply applied in consideration of other factors. So, with the previous constraint in consideration we formalize the ranking in (57).

(57) Formal ranking

*HIATUS, *DIP, UNIFORMITY >> MAXLEX >> MAX-V

In the introduction of this section, we commented that the sonority degree in /a/ is a fundamental aspect for its maintenance over the rest of the vowels. This statement associates the Sonority Sequencing Principle (henceforth SSP) and its hierarchy (discussed in detail in §5.2).⁹ According to the sonority hierarchy, the vowel /a/ is located as the most sonorous vowel cross-linguistically. Observe the ranking in (58) adapted from the five vowel from the Spanish inventory, plus the vowel for the case of coalescence (to be discussed in §5.3).

(58) Sonority Hierarchy¹⁰

(low peripheral vowel >>) High peripheral vowels >> mid-non peripheral vowels >> Low peripheral vowel

(æ >>) i u >> e o >> a

(adapted from de Lacy 2002:55, 2006:286)

The fact of placing /a/ as the highest segment in the hierarchy implies that this vowel represents the best nucleus within a syllable since it presents the best sonority harmony. An idea that relates *Segmental Sonority Prominence* (Prince & Smolensky 1993/2004:149). So, if we were to follow the SSP, then /a/ should not be omitted because of its intensity. In the last

⁹ See Selkirk 1984, Clements 1990, Parker 2002, de Lacy 2002, 2006.

¹⁰ Note that, we set the vowel /æ/ in parenthesis because this vowel will be very marked as nucleus for the present study.

of the scenarios, it should be minimally reduced, but still present. Paradoxically, it is its sonorous characteristic what makes this vowel being phonetically omitted. So for purposes of our analyses, we adopt the marked perspective regarding the sonority hierarchy and assume that the segment not-pertaining to the Spanish inventory; /æ/, represents a marked nucleus than /i/ and /u/, which in turn are more marked than /e/ and /o/, and subsequently more marked than /a/. This preference is sensitive to the processes in examination, though. We present in (59) two divisions: one that specifies the segments that represent the marked status for a nucleus (59.A), and other that specifies the most representing features for each segment in the hierarchy (59.B).

(59) Nucleus markedness dominance in Spanish

(A) *æ > *i, *u > *e, *o > *a

(B) *[+front, +low] > *[-low, +high] > *[-high, -low] > *[+low]

The form *æ characterizes a combination of features that does not represent a lexical segment in a language like Spanish. However, when Spanish native speakers associate factors beyond the domains of the lexicon, they can produce this combination. In order to avoid contradictions in this the analyses, we adopt the idea that [æ] is a linguistic feature that represents only the combination of the features [+low] from V₁ and [+front] from V₂ for the hiatus of /a#e/. But importantly, these representations of features prevent this form to violate MAX-V and MAXLEX because it preserves a linking with the positions where the two segments from the hiatus are located (/V₁#V₂/). In other words, [æ] represents the features [+low] and [+front], which in turn, are connected with the position of V₁ and V₂. Similarly, the same convention is used for the rest of the morphological structures of the candidates in the analyses. We propose the following set of constraint in (60) to motivate what was formerly stated.

(60) Markedness in vowels features

(A) *MID: *[-high, -low] (mid-vowels are prohibited)
(Beckman 1998:64).

(B) *LOW: *[-high, +low] (+low vowels are prohibited)
(Ibid).

(C) *LOW, FRONT: a vowel should not be [front] and [low]
(adapted from Casali 1996:59).

The use of these constraints vary depending on the hiatus and the environment under examination. In addition, we adopt a general idea and state that every nucleus in a syllable incurs a violation to a constraint from (60). However, what makes the analyses feasible is the order in which the former constraints are sorted and the fact that not all markedness constraints (those in 60) are considered in the analysis. Furthermore, we need to provide the set of constraints that motivates the preservation of certain features in the output. Based on McCarthy & Prince's (1995) *Correspondence Theory*, they stated that the deletion or insertion of any feature incurs a violation to IDENT-IO, while the phonetic omission of a complete segment would violate MAX-IO. In this study, we adopt Zoll (1996) MAX-IO for features and present it as MAX[F], defined in (61):

(61) MAX[F] definition

MAX[F]: Every input feature has a correspondence in the output
(Zoll 1996:67).

The constraint in (61) plays a particular role, it only penalizes the absence of features in the output level. For the processes presented in this language, we state that any modification, insertion or elision of a feature in the output level, involves a violation to this constraint. Importantly, MAX[F] must be specified into the features that will crucially participate in the analyses. The latter occurs due to two reason: firstly, they specify the features needed for supporting the output forms in certain processes (deletion of V_1 , deletion of V_2). Additionally, they support those candidates that preserve both input vowels from the hiatus; despite they are non-optimal. Second, these constraints provide the features to the type of linguistic character required for representing the coalesced form in the output level (to be discussed in §5.4). For handiness in our analyses, we define a set of constraints derived from MAX[F] in (62), and we provide a tableau in (63) with examples and comments to illustrate their use through the analyses.

(62) MAX[F] derived constraints' definitions

- (A) MAX[+low]: every occurrence of [+low] in the input has a correspondent in the output.
- (B) MAX[+back]: every occurrence of [+back] in the input has a correspondent in the output.
- (C) MAX[+front]: every occurrence of [+front] in the input has a correspondent in the output.

(Crosswhite 2001, Coetzee 2006)

The table in (65) presents constraints with particular attention to MAX[+low], MAX[+back] and MAX[+front] functions.

(63) The use of the constraints MAX[F]

/a ₁ # e ₂ /	MAX (+low)	MAX (+back)	MAX (+front)	Comment about the violation incurred
[a ₁ e ₂] (+low, +back, +front)				All [+low], [+back], and [+front] presented in the output level.
[a ₁] (+low, +back, -high)			*	There is no [+front] segment in the output level.
[e ₂] (-low, +front, -high)	*	*		There is no [+low, +back] segment in the output level.
[a ₁₂] (+low, +back, -high)			*	/a/ loses its [+front] feature by merging with /a/.
[e ₁₂] (-low, +front, -high)	*	*		/a/ loses its [+low] and [+back] features by merging with /e/.
[æ ₁₂] (+low, +front)		*		Both [+low] and [+front] are preserved in the output, but [+back] is not presented.
[∅] *(+low, +back, +front)	*	*	*	[+low], [+back], and [+front] are deleted in the output level.
[ə] (-low, -front)	*	*	*	The constraints [+low], [+back], and [+front] are deleted in the output level; instead, [-low] and [-front] are inserted.

The table in (63) presents the segments in the input and output levels with their specifications in features (left most column). For the analyses, however, we consider only the three constraints from MAX[F] as the active features for a feasible analysis. The other constraints adopt an inactive status because of their irrelevance.

We move now to the O.T. analysis of the word /la#entrada/ ‘la entrada’ [the entrance] in (64).

5.1.1.1- First O.T. analysis: deletion of V₁ in the hiatus of /a#e/

(64) O.T. analysis for /la#entrada/ → [len.tra.ða] ‘la entrada’ *the entrance*

/la ₁ #e ₂ ntrada/	*HIATUS	*DIP	UNIF	*FRONT, LOW	MAXLE y	MAX [+low]	MAX [+front]	*MID	*LOW	MAX-V
A: la ₁ .e ₂ n.tra.ða	*!							*	***	
B: la ₁ e ₂ n.tra.ða		*!						*	***	
C: læ ₁₂ n.tra.ða			*!	*!					***	
D: la ₁₂ n.tra.ða			*!				*		***	
E: le ₁₂ n.tra.ða			*!			*		*	**	
F: la ₁ n.tra.ða					*!		*		***	*
☛ G: le ₂ n.tra.ða						*		*	**	*

For handiness, we begin the analysis by assessing the candidates from top to bottom. Having the two constraints MAX-V in the lowest positions of the ranking, ensures that this hiatus is resolved with the elision of one vowel. The first candidate, A, maps faithfully and avoids the violation of the former constraint. Similarly, the candidate B did not incur any violation to MAX-V, and notably, these candidates satisfy both MAX[+low] and MAX[+front]. However, parsing the vowels of the hiatus in heterosyllabic position as in A, or within the same syllable as a diphthong in B are not good alternatives. The first condition does violation to *HIATUS, whereas the second militates against *DIP since a syllable cannot share two vocalic moras. For these conditions, both candidates are not considered as potential competitors. Coalescence is presented in candidates C, D, and E, all of them violating UNIFORMITY. Notably, this resolution seems potentially plausible compare to heterosyllabification and diphthong formation from candidates A and B because it avoids having the two vowels from the hiatus in the output form by merging them into a single representation.

Nonetheless, if we observe the nucleus of candidate C, we notice that this element not only violates UNIFORMITY, but the constraint *low, front as well. Worse still, this double-constraint violation complicates the indication which constraint is the one truly disfavoring C because both are symmetrically ranked. That is why we assigned an exclamation mark for each constraint. Conversely, the constraint *low, front is avoided in the candidates D and E. In addition, having the rank *low, front >> MAX[+low], MAX[+front] compels the competitors to present a different coalesced output form. The candidate D displays [a₁₂] and the candidate E presents [e₁₂]. In both surface structures, however, there is a lack of feature that undermine

them as possible coalesced forms, not mentioning as possible optimal candidates as well. In this regard, the form [a₁₂] candidate D violates MAX[+front], and the surface form [e₁₂] in competitor E militates against MAX[+low]. Therefore, both candidates must be disregarded. The remaining candidates, F and G, are the only competitors militating against MAX-V at the bottom of the ranking.

Note that, both candidates also incur violations to the constraints favoring the preservation of features (MAX[+low] and MAX[+front]). In addition, the candidate G, compared to F, violates *MID. However, this violation does not demote the former candidate when we compare the violation of the competitor F incurred in MAXLEX. The ranking MAXLEX > *MID > *LOW > MAX-V denotes that violating MAX is worse than not satisfying *MID. As a result, the candidate G is selected as the optimal.

Two issues still opened, thought. Firstly, we did not comment the numerous violations incurred to the constraint *LOW. Second, this analysis stated the arguments for motivating the elision of a 'better' segment in terms of sonority (/a/) in favor of a 'less' sonorous segment (/e/). Regarding the first point, we proposed the ranking in (59) which denotes that violating this constraint does not implicate considerable problems since it is the least marked segment as a nucleus. In addition, the ranking from the tableau in (64) displays that MAX-V and *LOW are equally ranked. Therefore, having a nucleus of this quality does not bring any problematic outcome regardless its number of violations.

Second, particularly referring to the vowels in the hiatus /a#e/, the ranking MAXLEX > ... > *MID > *LOW, motivates the fact that /e/ is kept because of its morpho-syntactic position in a lexical word besides presenting a more-marked nucleus than /a/. This assumption seems possible if we consider that the final /-a/ in /la/ behaves as thematic vowel; i.e., a functional-ending morpheme (Bermúdez-Otero 2006, 2013). An idea that is reinforced in the following discussion.

5.1.2- Second O.T. analysis: deletion of V₁ in the hiatus of /a#o/

Consider now the example in (65) taken from (50.E) where the hiatus resolution is resolved in the same way as the former analysis.

(65) Example from (50.E)

/kasa#obskura/ → [kasobskura] ‘casa obscura’ *dark house*

The underlying form in this environment involves two lexical words. This attention, however, implies a paradoxical outcome if we maintain strong the notion of distinguishing between lexical words and functional words. This happen because applying deletion to /a/ (V₁) in /kasa/ ‘casa’ house, would implicate a violation to MAXLEX. Then, if MAXLEX is violated, then the output structure from (65) would not be accepted. Consequently, it is fundamental to restrict our perspective to a morphological domain, and submit what we state in the last part of the previous section: final vowel /a/ corresponds to a functional morpheme. This statement relies on the idea about the behavior of the vowels /-a -o -e/ as “thematic vowels” (Bermúdez-Otero 2006:278-279, 2013:10). A term that indicates the gender of Spanish nouns; /-a/ for female, /-o/ for male, and /-e/ for neutral gender-nouns where both female and male are included. Therefore, having this in consideration avoids problematic violations to MAXLEX. In addition, Bermúdez-Otero proposed the rule in (66) to motivate the deletion of an ending-functional morpheme.

(66) Rule for stem-final vowel deletion

$$V \rightarrow \emptyset / \uparrow_{\text{stem}}^{\sigma_w} [\text{suffix } V]$$

[Bermúdez-Otero 2006:280]

The former rule is usually applied in an environment like /stem-suffix/. Nonetheless, in this case the “thematic vowels” could be considered morphemes attached to a lexical stem, and when unattached, the stem has access to lexical derivations. For instance, in the case of /kas-a/ ‘casa’ house, we have forms like augmentative [kas-ota] ‘casota’ *big house*, diminutives [kas-ita] ‘casita’ small house, or other lexical formations, like [kas-era] ‘casera’ *home-made* or [kas-ut̪a] ‘casucha’ (*pejorative*) house. In this way, we observe how deletion of V₁ is triggered by morphological requirements that facilitate the process of deletion. Now, it is time to turn our attention to the O.T. discussion. Notably, the set of constraints for the discussion here does not differ significantly from the one in the analysis of (64); we only deleted some constraints in because of their irrelevance. Additionally, if we observe the following pair of examples based

on the idea of “thematic vowel,” in both examples of /la#entrada/ and /kas-a#opuesta/, do not display considerable divergences. Observe the O.T. tableau in (67) with its discussion below.

(67) O.T. tableau for /kasa#opuesta/ → [ka.so.pwes.ta] ‘casa opuesta’ *opposite house*

/kasa ₁ #o ₂ bskura/	*HIATUS	*DIP	UNIFORMITY	MAXLEX	*MID	*LOW	MAX-V
A: ka.sob ₂ .ku.ra					*	**	*
B: ka.sa ₁ .ob ₂ .sku.ra	*!				*	***	
C: ka.sa ₁ ob ₂ .sku.ra		*!			*	***	
D: ka.sa ₁₂ b.sku.ra			*!			***	
E: ka.so ₁₂ b.sku.ra			*!		*	**	
F: ka.sa ₁ b.sku.ra				*!		***	*

The tableau (67) shows, once again, that ranking MAX-V in the last position motivates deletion as one of the feasible resolutions. So violating a faithfulness constraint is a good alternative to avoid the hiatus of /a#o/. The candidate A does not violate any of the top-ranked constraint; however, it militates against the last three constraints by having the vowels /e/ and /o/ in its nuclei. Additionally, the absence of a segment incurs a violation to MAX-V. The candidates B and C, on the contrary, do not present elision of any segment. Nonetheless, we stated that heterosyllabification and diphthong formation are not feasible resolutions. Therefore, a fatal violation mark is assigned to *HIATUS and *DIP. Coalescence is presented in both the competitors D and E. However, both candidates violate UNIFORMITY equally. Even worse, ranking *MID > *LOW demotes directly the candidate E, not mentioning that coalescence of hiatus /a#e/ as [o₁₂] is not a phonetic form presented in the data. Finally, having MAXLEX outranking MAX-V favors the candidate A over F to surface as the optimal, even though F does not violate *MID. However, this un-fulfillment is innocuous compared to the violation incurred to MAX-LEX.

5.2- Deletion of V₂ and the O.T. analyses

The resolution of V₂ deletion in this study is restricted only for the hiatus of /a#e/. Other theoretical approaches have also presented deletion of V₂ in Spanish for the same contexts and other hiatuses as well.¹¹ The descriptions of the data from §4.1.1.1 and §4.1.1.2 presented cases where deletion of the second vowel occurred for definite and definite nouns; more frequent in the latter context than in the former. In the next examples, we display the cases for both types of environments and the sentences from the materials applied to the participants in the present study. Moreover, in chapter four we emphasized that this process occurred when the alveolars /l n r s/ and bilabial /m/ were adjacent to V₁ and V₂. Observe the examples in (68).

(68) Examples of V₂ deletion (V₁ in bold)

Underlying form	Surface form	Glossary
A: /una#elegante/	[u.na.le.ɣan.te]	An elegant (person)
B: /la#entrada/	[lan.tra.ða]	The entrance
C: /extra-enmarcado/	[eks.tran.mar.ka.ðo]	Extra-framed
D: /paloma#enjaulada/	[pa.lo.man.xau.la.ða]	Caged pigeon
E: /la#fastidiosa#emboscada/	[la.fas.ti.ðjo.sam.βos.ka.ða]	The annoying ambush

Deletion of V₂ occurs alongside the presence of certain alveolars and bilabial /m/. Naïvely, we can pose that the presence of surrounding-segments triggers the deletion of /e/. However, this viewpoint seems difficult to maintain because there is no reason to assume that a vowel is elided because of the contact with adjacent segments. Therefore, in this section we adopt a more-restricted viewpoint and state that deletion of V₂ is the consequence of a phonological requirement and a speaker's variation.¹²

¹¹ Jenkins (1999) studied the condition in deletion of V₂ for New Mexican Spanish in contexts like /ae/, /oe/ and /oa/. He stated that this occurrence was conditioned to stress position. When V₁ was a stressed segment, for the case of /ae/, /e/ would undergo deletion. The same results for Vuskovich (2010). The vowel /e/ would be elided when is located in an unstressed position.

¹² The case of individual variation denotes the *Competence-Performance assumption* (Chomsky 1965). In this regard, we state that an underling form like /paloma#enkarselada/ represents the mental property of a string, which structure is constituted by two individual-lexical words: a noun + adjective. Therefore, a person understands the properties of these words and recognize them as proper entities for the grammar, that is competence. Nevertheless, when two output forms derive from the same underlying representation; e. g., [palomenkarselada] and [palomankarselada], then we state that it is performance the factor involved here. In this case, the two surface forms present some "errors" of production by virtue of an external factor beyond the grammatical rules; fast speech. Even though the speaker has a

This section motivates the idea that initial /e/ in /a#e/ is an inadequate segment to be preferred as a nucleus due to its less-sonorous characteristic. Unfortunately, in section 5.2, we stated that the degree of sonority in /a/ as V₁ represented a disadvantage for its utterance in fast speech. Our discussion of V₂ elision, however, motivates the utterance of /a/ based on three theoretical approaches: *Sonority Sequence Principle* (Clements, 1990; Selkirk, 1984) emphasized on the Spanish inventory (Parker 2002), the relation of sonority with *Markedness* (Beckman, 1998; de Lacy, 2002, 2006; Rice 2007), and the perspective that initial /e/ is a segment that does not pertain to the Spanish lexicon (Bonet, 2006; Colina, 2009; Eddington, 2001; Lema, 1978).

5.2.1- Sonority: first motivator

The first approach relates the idea of *Sonority Sequence Principle*. This principle states that vowels in a syllable must occupy the nucleus positions, while the consonants are placed at the margins; the onset and/or the coda (Clements, 1990; Parker, 2002; Selkirk, 1984). For a syllable to be properly constructed, the onset must display a sonority increasing towards the nucleus (from left edge to the center), and the coda must exhibit a decreasing in sonority from the nucleus (from the center to the right edge). As for that, Gutierrez-Rexach (2006) commented that, “the more sonorous segment is, the more harmonic it becomes as a peak (nucleus) [...]” (p. 453).¹³ Therefore, in a situation where two vowels in a hiatus; e. g. /a#e/, are in phonological conflict and one must surface in the output level, then /a/ is straightforwardly preferred due to its sonorous intensity. The scales in (69) and (70) display the following: (69) illustrates the hierarchical divisions based on the most common segments cross-linguistically (Clements, 1990; Selkirk, 1984). The scale in (70) is more specific to the language, it shows and sorts the segments according to their sonority degree (Parker 2002).

correct-mental representation of the underlying form, the output form presents divergences which in fact are acceptable and thus, the speaker performance is not judged as improper.

¹³ See Prince & Smolensky (1993) *Associational Harmony* (P&S 2004: 141, 144) for a detail explanation.

(69) Sonority Scale and syllabified examples

-voice stop p.t.k	+voice stop b.d.g	-voice fricative f.θ.s	+voice fricative v.ð.z	nasal m.n	liquid l.r	glide j.w	vowel i.u.e.o.a
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(Clements 1990, Selkirk 1984)

(70) Sonority scale for Spanish

Class of segments	Segments	Sonority Index
low vowels	a	13
mid vowels	e o	12
high vowels	i u	11
glides	j w	10
laterals	l	9
flaps	r	8
trills	r	7
nasals	m n	6
voiceless fricatives	s	5
voiced fricative	v z	4
voiceless fricatives	f θ ð	3
voiced stops	b d g	2
voiceless stops	p t k	1

(adapted from Parker 2002:127)

In both scales the vocalic elements are shown as the most sonorous segments; particularly the vowel /a/. Consequently, if we pretend to motivate the utterance of /e/ instead of /a/, then we would present inconsistencies towards this principle.¹⁴ With this into account, we can make a more-concrete argument to support the occurrence of V₂ deletion in /a#e/. Yet, we contradict Beckman's (1998) standpoint where initial-positions are "privileged positions" and show contrasts against phonological phenomena. This obligates us to adopt the notion of markedness in nucleus for the section below.

¹⁴ Prince & Smolensky (1993) posited a constraint to support the preference of /a/ as better nucleus in a syllable to create a harmonic effect. They propose:

(55) H_{NUC}: a higher sonority nucleus is more harmonic than one of lower sonority.

I.e. If |x| > |y| then Nuc/x > Nuc/y.

(Prince & Smolensky 2004:17)

5.2.2- Markedness in sonority: second motivator

The idea of markedness in the nucleus was presented in the scale from (59). In that scale we stated that /e/ would present a higher degree of markedness as the nucleus in a syllable when /a/ is also an alternative for this syllabic position. Importantly, this assessment was based on the relation nucleus-sonority where a vowel the more sonorous, the best for being an ideal nucleus (Gutierrez-Roxach, 2006; P&S 1993, 2004). For purpose of the discussion, we repeat the scale of markedness in nucleus from (59) in (71).

(71) Nucleus markedness dominance in Spanish

(A) *æ > *i, *u > *e, *o > *a

(B) *[+front, +low] > *[-low, +high] > *[-high, -low] > *[+low]

The illustration in (71) confirms that /e/ represents a more-marked status than /a/ in phonological domains: sonority. This assumption is not randomly done, though. The idea of /e/ as a marked nucleus relates its classification as a non-stable element (Stevens 1989). For example, in languages where the vowels /i u a/ are the most common segments; e. g. Spanish, the qualities in /a/ are more-perceived than those in /e/ in a situation where both vowels are uttered in a sequence (Crosswhite 2001). We reinforce the idea of /e/ as an unstable segment when we correlate it with the notion of being an epenthetic element in sC clusters; discussed below.

5.2.3- The segment /e/ as epenthetic element: third motivator

In base of the descriptions of the data, we observed that the hiatus of /a#e/ exhibited two types of elision: deletion of V₁ and deletion of V₂. For the latter deletion type, we stated that /e/ was elided because of its less-sonorous, less-stable and less-salient conditions. Now, we add the perspective that /e/ behaves as an epenthetic element and thus its deletion does not convey a marked-phonetic structure. The vowel /e/, as epenthetic element in initial position; specifically, in /sC/ clusters, is a topic which has been early discussed (Harris 1987; Lema, 1978). Recent studies include (Bonet, 2006; Eddington, 2001). Some examples of initial /sC/ cluster are shown in (72).

(72) Spanish word with /sC/ cluster with epenthetic /e/

Underlying forms	Surface form	Glossary
A: /studiante/	[estuðjante]	Student
B: /speranza/	[esperansa]	Hope
C: /scuela/	[eskwela]	School
D: /spacio/	[espasjo]	Space
E: /scoba/	[eskoβa]	Broom

For the examples above, Harris (1983) formalized a rule that establishes /e/ as the vowel to be inserted when phonetic and phonology require it.

(73) Rule for epenthetic /e/

$$\emptyset \rightarrow e/ _ _ s [+consonantal]$$

(Harris 1983:29)

According to Harris (1983), this rule explains that an element is inserted into an empty slot in the prosodic skeleton. This vacant space must have the feature [-consonantal] in order to ensure that the incorporating segment be a [+vocalic] element. In addition, the idea of treating /e/ as the default vowel for being epenthetic was related to its frequency in this type of initial clusters.¹⁵ Correspondingly, this notion is reinforced when loan words with the same initial sequences are incorporated into the lexicon, e. g. the case of English words. These presented in (74).

(74) Loan words in Spanish with initial epenthesis

English underlying form	Spanish surface form
A: /spray/	[esprai]
B: /slogan/	[esloyan]
C: /status/	[estatus]

Thus, we observe again, that vowel /e/ is the element inserted in these structural conditions. Additionally, we suggest that English-origin words displaying epenthetic /e/ during the utterance, is connected to lexical similarities that the two languages share. Both Spanish

¹⁵ Eddingtong (2001) expressed that, "2,367 cases of *esC-* and only 447 combined cases of *a/i/u/osC-*. In other words, 82.3% of all instances of *VsC-* have /e/ as the initial vowel" (p.47).

and English languages exhibit words that are morpho-syntactically and semantically related. Observe the examples in (75).

(75) Spanish and English related words

Spanish	English	Semantic meaning in both languages
A: estidiante	student	Learner
B: escape	scape	Absconding
C: estadía	stay	Permanency
D: España	Spain	Spain

In a situation where a Spanish native speaker is asked to pronounce the words in the middle column from (75), we can expect the optional insertion of an initial /e/ due to the relation of the English words with their Spanish counterparts. Note that, these instance are commonly observed in speakers learning English. The latter occurrence involves a mental process of lexical storage; the high frequency of native words presenting /e/ in initial /sC/ clusters motivates the utterance of /e/ in words with similar sequences (Eddington 2001). Likewise, the words from the first column can also surface without initial /e/ at the beginning of a sentence. Yet, this occurrence is less frequent, but possible when the vowel /e/ is between two fricatives; i. e., located between /s_sC/ or /t_sC/ (Serrano 2008). The former alternatives reinforce the notion of the epenthetic status of /e/.

Eddington (2001) examined the alternations between /e/ and /ø/ in prefixed-words where the type of affix and the semantic transparency of the stem would determine this alternation. He classified the prefixes in two types, displayed in (76) and (77).

(76) Class I prefixes

Non-initial epenthesis in a relation of unproductive prefix + semantically opaque stem:

(A): /ad+scrito/ → [ads.kri.to] ‘adscrito’ assigned

(B): /tran-scurir/ → [trans.ku.rir] ‘transcurrir’ to elapse

(77) Class II prefixes

Initial epenthesis in a relation of productive prefix + semantically transparent stem:

(A): /anti+espjonaje/ → [an.tjes.pjo.na.xe] ‘antiespionaje’ anti-espionage

(B): /anti+estetico/ → [an.tjes.te.ti.ko] ‘antiestético’ unaesthetic

(Eddington 2001:35-37)

Nevertheless, if we consider the opposite conditions of the relation prefix + stem from (76) and (77), then we can observe the following marked forms in (78) and (79).

(78) Marked form of class I prefixes

Initial epenthesis in a relation of unproductive prefix + semantically opaque stem.

(A): /ad+eskrito/ → *[adeskrito]

(B): /hemi+esferio/ → *[hemiesferjo]

(79) Marked forms of class I prefixes

(A): /anti+spjonaxe/ → [antisjonaxe]

(B): /super+strato/ → [superstrato]

(ibid)

The marked forms in (78) and (79) display two notions to motivate /e/ as epenthetic vowel because its marked presence in the output level. On the one hand, semantically opaque stems do not present epenthesis when they are prefixed (76). In fact, these output structures are ungrammatical, or less acceptable, if /e/ is initially added (78). However, when these words are not prefixed, it can be expected the insertion of /e/ due to their semantically opaque stem and their lack of facilitating syllabification. On the other hand, the marked forms in (79) are open

in the sense that prefixed words with and without initial /e/ in the stem are accepted forms (ibid). Even better, fast speech sets the conditions to make the speakers to produce these words without /e/. More specifically, in the hiatus of /a#e/, the words /contra+escritura/ counterdeed or /contra+escota/ prevented sheet, both class II prefixed words can alternatively map as [kontraskritura] or [kontreskritura] for the first, and [kontraskota] or [kontreskota] for the second.

In some backgrounds, one form may be more frequent than the other; a native speaker may tend to produce one way over the other, regardless its unmarked or marked morphological structure. As for that, (Beckman 1998; de Lacy 2002, 2006; Rice, 2007) stated that markedness is not stringent in the sense that many phonological and external factors determine the status of a segment or an output form to be marked or unmarked. Some of the causes for such preference could be the tendency for inserting /e/ in initial /sC/ compound words as “rule”, or simply to avoid complex phonological sequences. These grounds demonstrate that if both unmarked and marked forms are accepted, then /e/ is not an essential requirement to conceive a proper communication, and thus, we can propose that /e/ is an element that appears optionally when the phonology or the native speaker request it.

Nevertheless, the former discussion about the markedness status for /e/ was focused on initial /sC/ cluster. The examples from the data demonstrated that /e/ is also deleted in other morphological conditions beside /sC/ initial-sequences. In consideration of these instances, that is why we adopted the idea of markedness in the nucleus for Spanish (59).

5.2.4- A brief convention about Markedness

Before we move onto the O.T. examinations, it is important to reinforce the idea of Markedness as a non-universal language perspective. In this regard, (Beckman, 1998; de Lacy 2006) motivated the non-existence of a “general specification” for markedness in vowels and consonants. The markedness status in both type of segments varies from language to language. Thus, de Lacy (2006) noted that, “[...] there is no single ‘unmarked segment’. Markedness hierarchies conflict, and so several segments have the potential to be treated as the least marked in a language for a particular process, depending on which hierarchy dominates” (p. 286). In other words, the variation in Markedness is the close interaction between phonological and non-phonological criteria (Rice 2007). As for that Rice commented that, “Natural markedness criteria including language-particular and cross-linguistic frequency, ease of articulation, perceptual salience, [...] work together to determine the tendencies toward certain phonetic outputs” (ibid p.96). Consequently, we suggest that the discussion of the un/markedness status

for /e/ varies depending on the conditions and the process in the language. For instance, /e/ can be unmarked for the process of epenthesis due to its frequency to satisfy morphological needs. Or can be a marked element to occupy the nucleus position whenever /a/ is also available.

5.2.5- First O.T. analysis of V₂ deletion

The described data from chapter four provided the instances where deletion of V₂ shown accepted-output forms. Moreover, we stated that this process was triggered due to the marked status of /e/ as a nucleus for a syllable compared with /a/ in a hiatus context like /a#e/ where one of the vowel must represent the nucleus in a syllable and speaker's preference. As was stated in the introduction of this chapter, and confirmed in the analyses in §5.2.1.1 and §5.2.2, the set of proposed constraints do not differ considerable.

The underlying form to be discussed involves the same form as in §5.2.1.1. The first analysis of this section is shown in (80).

(80) O.T. analysis for /l-a#entrada/ → [lan.tra.ða] 'la entrada' *the entrance*

/l-a#entrada/	*HIATUS	*DIP	UNIFORMITY	*LOW, FRONT	MAX [+back]	MAX [+low]	MAX [+front]	*MID	MAX LEX	*LOW	MAX-V
A: la ₁ e ₂ n.tra.ða	*!							*!		***	
B: la ₁ e ₂ n.tra.ða		*!						*!		***	
C: læ ₁₂ n.tra.ða			*!	*!	*!					**	
D: le ₂ n.tra.ða					*!	*!		*!		**	*
E: la ₁ n.tra.ða							*!		*	***	*
F: le ₁₂ n.tra.ða			*!		*!	*!		*!		**	*
G: la ₁₂ n.tra.ða			*!				*!		*	***	*

In the tableau (80) the hierarchical position of the constraint MAX-V ensures that deletion in the output structure is considered as one of the resolutions for the hiatus in discussion. Candidate A fatally violates *HIATUS because its underlying form where the vowels in the hiatus are in heterosyllabic position. Oppositely, the competitor B avoids this syllabic form by opting for diphthong formation. In candidate C, we observe the apparent merge of /a#e/ as [æ], a non-lexical vowel for the Spanish system. Nevertheless, both *DIP and UNIFORMITY are equally positioned in the ranking; both constraint in high positions. On the one hand, candidate B is ruled out because it violates *DIP. On the other hand, competitor C which output form militates against UNIFORMITY, MAX[+back,]and *LOW, FRONT is also

disregarded. Worse, the dual violation in this tableau is ambiguous because we cannot be sure which violation is the one that really demotes this candidate.

In case of competitor F and G, their output structures present a potential coalesced form which violates neither *HIATUS nor *DIP. In addition, they exhibited an alternative to coalescence at the expenses of violating other constraints. Nonetheless, MAX[F] constraints must be considered to rule out these candidates. As for that, MAX[+back] and MAX[+low] are violated by candidate F, and MAX[+front] is not satisfied in G. These violations demote the candidates to surface as potential optimal. Candidate D does not incur violation to any of the former constraints; the same with competitor E. We observe that both competitors violate the lowest constraint MAX-V; thus, both meet the requirements for surfacing as optimal. Nonetheless, both candidates fatally violate some of the MAX[F] constraints ranked equally as *HIATUS, *DIP, and UNIFORMITY. Our discussion in the previous sections motivated the reason for not considering the deletion of initial /e/ in /entrada/ as a serious phonetic absence because it represented a marked nucleus as not being sonorous enough compared to /a/. Consequently, ranking *MID > MAXLEX > *LOW > ensures that /a/ is preferred over /e/ as better nucleus which in turn is reinforced by its sonorous intensity; despite this selection conveys the deletion of a segment in a lexical word in favor of a functional morpheme. In this case, phonological requirements were more important than morphological. Therefore, candidate E surfaces as the optimal.

5.2.6- Second O.T. analysis of V₂ deletion

Continuing with the idea of sonority in /a/ as the triggering motivator for deletion of /e/ (V₂), we present the next O.T. tableau in (81). This environment includes the same vowels for its hiatus as in the former analysis. Notably, the noun in this instance contains a structure that includes the neutral ending-morpheme (“athematic vowel”) /-e/. Additionally, we omit some of the constraints and candidates for purpose of handiness and redundancy.¹⁶ Observe the O.T. tableau in (81)

(81) O.T. analysis for /una#elegante/ → [una.le.yan.te] ‘una elegante’ *an elegant (person)*

/un-a ₁ #e ₂ legante/	*HIATUS	*DIP	UNIFORMITY	*MID	MAX LEX	*LOW	MAX-V
A: u.na. ₁ e ₂ .le.yan.te	*!			***!		**	
B: u.na ₁ e ₂ .le.yan.te		*!		***!		**	
C: u.næ ₁₂ .le.yan.te			*!	**!		**	
D: une ₂ .le.yan.te				***!		*	*
☐E: una ₁ .le.yan.te				**!	*	**	*

The tableau (81) confirms that deletion of a vowel in the output form is needed to solve this hiatus; MAX-V occupies the last position in the ranking. The first three candidates violate *HIATUS, *DIP, and UNIFORMITY respectively. In the case of candidate A structure with two vowels in a heterosyllabic position is not an alternative to solve this hiatus. Candidate B avoids heterosyllabification, but it does it at the expenses of violating *DIP. UNIFORMITY must outrank MAX-V so coalescence cannot be an alternative, a solution presented by candidate C. Therefore, considering that all the former constraints outrank *MID, none of these candidates surface as the optimal. The candidates D and E, contrary to the former competitors, incurred violation to MAX-V; a necessary dissatisfaction in order to determine the correct output form.

Further, *LOW is also violated as a result of their structures. Importantly, both candidates fatally violate *MID. This state of affairs, leads us to observe in detail the number

¹⁶ Note that, at the beginning of this chapter we stated that some rankings would present a different number of constraints. However, we did not change or replace the types of constraints. We keep the same to observe the way they interact according to the environments.

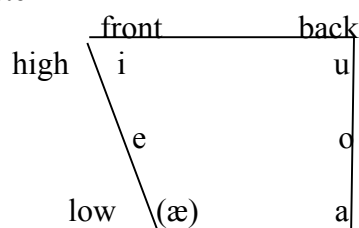
of violations incurred in *MID as the factor for deciding the optimal candidate. In this regard, we state that sonorous is essential in this decision. Therefore, when we consider the position of *LOW and *MID in the ranking, and the number of violations incurred, this denotes that *MID vowels are more marked than *LOW. So, the candidate not presenting a segment less sonorous than /a/ is the competitor selected as the optimal. In this case, it is less important to violate *LOW rather than *MID, at the expenses of violation in addition lower-ranked MAXLEX. That is, the candidate E.

5.3- Coalescence and the O.T analyses

The occurrence of coalescence, similarly as in the case of deletion of V_2 , is restricted to the hiatus of /a#e/; particularly to the definite environments. In this section, we submit that the hiatus of /a#e/ involves coalescence which creates a segment different from the Spanish vowel system: [æ]. Notably, in the cases where coalescence has also occurred in other Spanish dialects, this process has been catalogued as irregular and difficult to define; its characteristics vary from dialect to dialect. For example, this process has shown surface forms like [e] (Baković 2006), [ɛ] and [i] (Jenkins 1999), or in other circumstances the output form remains undetermined, and the only specified characteristic is the position of its occurrence (Smith, Flores & Gradoville 2012). Consequently, we suggest that a coalescence in Spanish creates an irregular vowel that does not exist in the Spanish underlying inventory and only surfaces in certain environments, and is presented among few speakers.

For purposes of our discussion, we repeat the chart that displays the five vowels from the Spanish inventory plus the coalesced structure from (49) in (82). The pair examples where coalescence occurred is provided in (83).

(82) Five vowels system



(83) Examples of coalescence of V_1 and V_2

- | | | | | |
|-------------------|---|--------------|--------------|--------------|
| (A): /la#entraða/ | → | [læn.tra.ða] | ‘la entrada’ | the entrance |
| (B): /la#erosión/ | → | [læ.ro.sjon] | ‘la erosión’ | the erosion |

As is observed in the illustration in (82), the coalesced representation [æ] shares the features values [+front] and [+low] from /e/ and /a/ respectively. In previous sections, we stated that such similarities in features functioned as a connection with the positions of V_1 and V_2 to avoid the violation of certain constraints. The occurrence of this representation denotes that there are constraints relatively interacting to produce such surface form, even though this combination of features is not “allowed” neither in the Spanish lexical grammar nor in phonological grounds (Archangeli & Pulleyblank 1994). In this section, we pose the idea that Spanish native speakers can make the combination of features to produce the sound [æ] in

consideration of factors beyond lexical and phonological grounds. For instance, the speakers can produce it when they are thinking, doubting, or learning English. Now, we explain the latter point. Consider, for example, the word /cat/ → [kæt]. The pronunciation of this word in English, requires that the Spanish native speaker makes the combination of the features [+low] and [+front] to create such output form. Note that, if this structure were not possible then the speaker would pronounce the word /cat/ as [kat], or rarely [ket], due to the proximity to the lexical vowels /a/ and /e/. Therefore, we adopt the idea that this segment is a non-structure preserving segment, because it is presumed to be unspecified in the underlying lexicon of Spanish, but it occurs under certain conditions, environments, or specific speakers. Thus this form does not represent any phonetic contrast in the output level (Kiparsky 1982, Myers 1991, Krämer 2006).

The analyses in this section are sorted as follows: the first O.T. analysis determines the segment that best represent the coalesced-output form based on its features. The second analysis presents a definite environment where coalescence occurred: /la#entrada/ ‘la entrada’ *the entrance*.

Two points must be mentioned before we start with the discussion of the O.T. analyses. First, in order to ensure that [+low] and [+front] are the features that best represent the coalesced form, we follow *Underspecification Theory* (Archangeli 1984). According to Archangeli’s (1984),

In a language’s underlying representation only the features that are distinctive in that language, that is, features which actually are necessary to distinguish two sounds, have values specified. Any feature which is non-distinctive [...] is a redundant feature [...] its values are supplied by redundancy (p. 43).

Therefore, we propose that in the case of /a/ and /e/, the feature [+low] in /a/ and [+front] in /e/, are the features that phonetically distinguish these vowels.¹⁷ As a result of the robust maintenance of these feature, we have a structure that is [+low] and [+front] when these vowels interact adjacently in rapid speech.

Second, we must re-state the constraints proposed in §5.1 for handiness in the analyses, and as a reminder of the their functions.

¹⁷ This is in consideration of language of five-vowel system (like Spanish), where the features [+/-high], [+/-low], and [+/-back] are active elements to determine the combination of features to create segments. Notably, the feature [+low] represents /a/ and [-back] represents /e/ (Archangeli & Pulleyblank 1994:278).

5.3.1- A reminder about the constraints

The constraints from §5.1 are summarized in (84).

(84) Summary of the constraints

Constraint	Definition	Author
A: MAX-V	Every vowel in the input has a correspondent in the output	McCarthy (2000)
B: *HIATUS	No heterosyllabic vowel-vowel sequences	McCarthy (1993)
C: *DIP	Two moras are not connected to two vocalic nodes within a single syllable	Rosenthal (1994)
D: UNIFORMITY	“No coalescence” No element of S ₂ has multiple correspondents in S ₁	McCarthy & Prince (1995)
E: MAXLEX	Every segment in a lexical word or morpheme must have a corresponding segment in the output	Casali (1997)
F: *MID	*[-high, -low] (mid-vowels are prohibited)	Beckman (1998)
G: *LOW	*[-high, +low] (+low vowels are prohibited)	Beckman (1998)
H: *LOW, FRONT	A vowel should not be [front] and [low]	Adapted from (Casali 1996)
I: MAX[F]	Every input feature has a correspondence in the output	(Zoll 1996)
J: MAX[+low]	Every occurrence of [+low] in the input has a correspondent in the output	(Coetzee, 2006; Crosswhite, 2001)
K: MAX[+back]	Every occurrence of [+back] in the input has a correspondent in the output	(Coetzee, 2006; Crosswhite, 2001)
L: MAX[+front]	Every occurrence of [+front] in the input has a correspondent in the output	(Coetzee, 2006; Crosswhite, 2001)

5.3.2- First O.T. analysis: determining the coalesced structure

As previously mentioned in §5.3, the objective of this analysis is to determine which input form (candidate) represents the most appropriate structure for coalescence based on its features. The O.T analysis is presented in (85)

(85) Analysis for coalescence of /a[+low]#e[+front]/ as [æ] /+low, +front/

/a ₁ #e ₂ / [low] [front]	*DIP	MAX [+low]	MAX [+front]	*LOW, FRONT	UNIFORMITY
A: a ₁ e ₂	*!				
B: e ₂		*!			
C: a ₁			*!		
D: e ₁₂		*!			*
E: a ₁₂			*!		*
☛ F: æ _{1,2}				*	*

As the tableau in (85) shows, the constraint *DIP bans the presence of a faithful structure that consists of two vowels in the same syllable; candidate A directly eliminated. Deletion is present in candidates B and C. Nonetheless, ranking MAX[+low] and MAX[+front] over UNIFORMITY implies that deletion does not convey an appropriate output form despite both the competitors surface unfaithfully. In this respect each candidate lacks of the vowel that satisfies the respective MAX features. Consequently, they are ruled out. For the case of D, E, and F, the constraints MAX[+low] and MAX[+front] must outrank the markedness constraint that prohibits the presence of a “not allowed” combination of features: LOW and FRONT. This ranking makes the coalesced form to surface into a structure different from the vowels in the input; a form that is absent in the lexicon because of its combination of features. In this case, we observe the presence of a non-preserving structure segment [æ] in F.

Oppositely, the candidates D and E display coalesced forms that are more possible than the structure in candidate F. This seems possible because these candidates contain coalesced segments that represent some lexical vowels. However, each of the coalesced form violates MAX[F] constraints; whereas the form in competitor F does not. These circumstances denote that candidate F is the optimal form to represent coalescence in the output level.

5.3.3- Second O.T. analysis: coalescence of V₁ and V₂ in /a#e/

The underlying form in this analysis is the third and the last of the underlying form that presented three occurrences for solving its hiatus. Once again, we consider the word ‘la entrada’ *the entrance*, and is analyzed in (86).

(86) O.T. analysis for /la#entrada/ → [ləntɾaða] ‘la entrada’ *the entrance*

/l-a ₁ #e ₂ ntrada/	*HIATUS	*DIP	MAXLEX	MAX-V	*LOW, FRONT	*MID	UNIFORMITY	*LOW
A: la ₁ e ₂ n.tra.ða	*!					*		***
B: la ₁ e ₂ n.tra.ða		*!				*		***
C: le ₂ n.tra.ða				*!		*		**
D: la ₁ n.tra.ða			*!	*!				***
☐E: læ ₁₂ ntraða					*		*	**

The last two constraints in the ranking suggest two conventions. Firstly, having the constraint *LOW in a low-ranked position does not convey any serious result to our discussion. We mentioned the latter claims is because the violation of this constraint is not avoided because of the morphological characteristics in all candidates. Second, UNIFORMITY indicates that whichever of the candidates presenting coalescence in its output structure, is considered as a possible candidate for being the optimal. The discussion here begins from bottom to top in the competitors. The violation incurred in *LOW by candidate E is mandatory considering its output structure. Importantly, this candidate satisfies all the top-ranked constraints; it displays all the segments in MAX, and it does not resolve its hiatus through diphthong formation or heterosyllabification. However, it violates UNIFORMITY, which in turn involves the violation to *LOW, FRONT. Nonetheless, these violations are innocuous because of their hierarchical positions. The next candidate, D, does not violate *MID and *LOW, FRONT. However, it violates two important constraints MAX-V and MAXLEX. Worse, this dual violation obscures which constraint displays the worst consequence for this candidate. C also fails to surface as the optimal output; the phonetic omission of a segment militates against MAX-V. In other words, the ranking MAX-V >>...>> UNIFORMITY denotes that deletion is not a feasible resolution in this situation.

The opposite condition is presented in candidates B and A. Both competitors map faithfully. Moreover, both satisfy all the MAX features constraints, *LOW, FRONT, and UNIFORMITY by solving their hiatuses with diphthong formation and heterosyllabification. These resolutions, however, violate *DIP in B, and *HIATUS in A respectively. In consideration of the former, we conclude that E represents the best structure as optimal output.

5.4- Gliding of V₁, hiatus preservation and the O.T. analyses

In this section we analyze the resolutions of the hiatuses /i#a/, /o#a/, and /u#a/ in word boundaries. These contexts display that gliding of V₁ and diphthong formation occurred in close association, and heterosyllabification occurred as another resolution.¹⁸ For the next analyses, we take into account the examples that exhibited alternations between heterosyllabification and diphthong formation based on the data. In addition, we consider previous constraints to highlight how they differ from previous analyses, and to see if additional constraints are required.

5.4.1- Gliding of V₁ and preservation

Most of the Spanish literature related to the behavior of glides discuss the underlying, and controversial surfacing forms of [j] and [w] (Baković, 2006; Cabré & Prieto, 2006; Chitorian & Hualde, 2007, Colina, 1999, 2006).¹⁹ On the one hand, Baković (2006), and Roca (1997), stated that glides and high-vowels do not differ in features and morphological contexts. That is, in the phonetic level, there is no distinction between high vowels and glides since both are pronounced quite similar. Likewise, Cabré & Prieto (2006), Chitoran & Hualde (2007), Harris & Kaisse (1999), and Roca (2006) claimed that the only difference between vowels and glides remains on their phonetic syllabification; a difference related to articulatory efforts, dialectal and an individual's preference. On the other hand, Colina (2006), and Shepherd (2003), present examinations in which gliding is the consequence of satisfying undominated constraints from the ONSET types.²⁰ As a result of this satisfaction, high-vowels /i/ and /u/ become into glides

¹⁸ We did not examine the case of the hiatus /e#a/ because our data did not present any instance of gliding of V₁. Contrary to what Shepherd (2003), Baković (2006), Colina (2006), and Souza (2010) presented. In this case, we assume that /e#a/ is prone to undergo gliding in word-internally rather than word-boundary. This was observed, at least, based of the data presented by the speakers in the present study.

¹⁹ See also Harris & Kaisse, (1999); Hualde, (1991); Roca, (1997).

²⁰ Principally, this constraint demands that all syllables must have onsets (Prince & Smolensky 2004:93).

that correspond part of the nucleus (complex nucleus), or part of the onset (complex onset), and thus avoiding onsetless syllables. In both instances, the gliding vowels function onsets.

Further, in a situation where a gliding vowel becomes an onset or part of the onset, the vowel loses its feature [+syllabic] and obtains a [-syllabic] feature; a necessary modification in order to have a harmonic rhyme in a syllable (Harris 1983:25). In this section we explore the idea that [i], [u] and [j], [w] do not differ in features. Therefore, we follow Kaisse & Harris (1999); Roca (1997), and Chitorian & Hualde (2007) to state that their frequency of use in syllabification, due to their articulatory properties, is what makes glides and vowels differ from each other.

The examples from the data presented that heterosyllabification occurred regardless the morphological consequences. Subsequently, we observe that heterosyllabification associates the presence of an onsetless syllable (V₂), an undesirable structure for a CV language like Spanish. Examples of gliding and heterosyllabification of /i#a/ are presented in (88). In the same way as with other examples, the instances in (87) are indicated with bold for the stressed vowel and acute accent for lexically accented vowels in the middle column.

(87) Gliding and hiatus of /i#a/ → [ja] and [i.a]

Underlying form	Surface form	Glossary
A: /mi#abuela/	[mja.βwe.la] [mi.a.βwe.la]	My grandmother
B: /casi#abierta/	[ka.sja.βjer.ta] [ka.si.a.βi.er.ta]	Almost opened
C: /anti-académico/	[an.tja.ka.ðé.mi.ko] [an.ti.a.ka.ðé.mi.ko]	Anti-academic
D: /aquí#aparece/	[a.kja.pa.re.se] [a.kí.a.pa.re.se]	It appears here
E: /el#espagueti#amargo/	[e.les.pa.ɣe.tja.mar.ɣo] [e.les.pa.ɣe.ti.a.mar.ɣo]	The bitter spaghetti

As the table in (87) displays, underlying /i/ surfaces faithfully as [i], or become into a glide [j]. For these types of alternations, gliding of V₁ and hiatus maintenance occur due to an individual's preference, style or dialect (Cabré & Prieto, 2006; Chitoran & Hualde, 2007; Harris & Kaisse, 1999). Particularly, Cabré & Prieto (2006) divided the speakers in two classes: “conservative speakers” and “innovative speakers” (p. 213). Similarly, the data displayed that the speakers whom preferred hiatus were identified as conservatives because they presented a

slight pause between V₁ and V₂ during the utterance according to the audio source.²¹ Presumably, the “conservative speakers” presented this minimal pause in order to make distinctions between words, even though fast speech does not display conditions for the complete articulatory requirements in vowels that may hint the margins of the words. On the contrary, “innovative speakers” presented examples where a diphthong is more frequent. We observe the unification of two words, which conveyed the gliding of V₁. Examples of alternations between heterosyllabification and diphthong formation in /o#a/ are given in (88).

(88) Heterosyllabification and diphthong formation of /o#a/ → [wa] and [o.a]

Underlying form	Surface form	Glossary
A: /el#es#como#atento/	[el.es.ko.mo.a.ten.to] [el.es.ko.mwa.ten.to]	He is kind of attentive
B: /un#abogado#ágil/	[un.a.βo.γa.ðwá.xil] [un.a.βo.γa.ðo.á.xil]	An agile lawyer

Similarly as in (88), the examples of the hiatus /o#a/ display alternations in the surface forms as heterosyllabification [o.a] and diphthong formation, which involves gliding of V₁, [wa]. Curiously, the occurrence of diphthongization was the least common process presented in the data. In fact, only three people presented this resolution in two sentences (46.E and 46.G). Furthermore, we stated that the stress was not a factor to determine gliding of /o/ as [w] (46.E now 89.B). Consider the example (46.E now 89.A) that has a sequence of two unstressed vowels in the context /o#a/, and likewise, gliding of V₁ occurred. That is why we adopted the idea of the sonority in /a/ as the potential motivator.

Note that, for the instances under discussion we cannot assume the idea that glides and mid-vowels do not differ in features, and thus can be treated equally. Accordingly, when a mid-vowel becomes into a glide, there is a modification in height: from [-high] to [+high] (Baković 2006). Interestingly, this latter denotes the prominent preference of the speakers to conserve both vowels as indicators of the boundaries between the words, and to avoid phonetic misperceptions of [o] with [u] or [w].

²¹ A special word of gratitude to Dr. Raúl Ahumada (former professor) for his help in the identification of these details in the audio.

(89) Gliding and hiatus of /u#a/ → [wa] and [u.a]

Underlying form	Surface form	Glossary
A: /tu#artista#favorito/	[twar.tis.ta.fa.βo.ri.to] [tu.ar.tis.ta.fa.βo.ri.to]	Your favorite artist
B: /espíritu#ancestral/	[es.pí.ri.twan.ses.tral] [es.pí.ri.tu.an.ses.tral]	Ancient spirit
C: /la#tribu#adora#a#su#dios/	[la.tri.bwa.ðo.ra.su.ðjos] [la.tri.bu.a.ðo.ra.su.ðjos]	The tribe adores its god
D: /el#machupichu#antiguo/	[el.ma.ʃu.pi.ʃwan.tí.ɣwo] [el.ma.ʃu.pi.ʃu.an.tí.ɣwo]	The ancient Machu Picchu
E: /el#espíritu#aparece/	[el.es.pí.ri.twa.pa.re.se] [el.es.pí.ri.tu.a.pa.re.se]	The spirit appears

The alternating surface forms of /u#a/ as [wa] and [u.a] in (89) demonstrate that diphthong formation and heterosyllabification are considered potential alternatives on these morphosyntactic environments. As we have noted in the descriptions of chapter four and confirmed here, diphthongization, which involves gliding of V₁, was more frequent than heterosyllabification. Crucially, comparing the frequency of V₁ gliding among the three hiatuses /i#a/, /o#a/, and /u#a/, we can state that the hiatus of /u#a/ displays diphthongization in a very high frequency. Regarding this, Cabré & Prieto (2006) comment that, “[c]rosslinguistically [jV] is more general than [wV]: in other words, glide formation seems to be subject to a universal ranking, that is *w >> *j.” (p.220). Now, we complement the previous ranking and present it as follows:

(90) Frequency of gliding in the hiatuses /u#a/, /o#a/, and /i#a/

*w /u/ >> *w /o/ >> *j.

The previous hierarchy is based on the information where, gliding of /i/ as [j] is the most common gliding form. Observe the frequency in (91) based on the data in chapter four.

(91) Frequency of /i#a/, /o#a/ and /u#a/ as gliding surface forms based on the descriptions in chapter four

Hiatus	/i#a/	/o#a/	/u#a/
Gliding	[ja]: 75%	[wa]: 15%	[wa]: 65%
Heterosyllabification	[i.a]: 25%	[o.a]: 85%	[u.a]: 35%

According to (91), the frequency in percentage rate for the three hiatuses, confirms that diphthong formation is more frequent than heterosyllabification. Nevertheless, one question

remains open: is the frequency of diphthong formation what makes this resolution better than heterosyllabification? The answer is that it is not the frequency what makes it better; instead, it is the ease in gestural articulation within a syllable what makes diphthongization more frequent than hiatus preservation.

Following Browman & Goldstein (1995) and Chitoran & Hualde (2007) investigations, the syllable must be composed of a systematic correlation between the onset, nucleus and the coda, so gestural articulations can be made in a coordinated way to avoid ambiguous perceptions. If we consider the idea that fast speech is the talking in use, we notice that heterosyllabic structures are not suitable because of their gestural requirements in the vowels to map faithfully in the output level. In the that hiatus maintenance were considered in fast speech, V_1 would show variations; it would be perceived as a long or short vowel depending on the gestural articulations. This variation would happen because of the transition from the onset to V_1 and then to V_2 in the nucleus. Diphthong formation, more precisely, diphthong formation with gliding of V_1 , on the other hand, offers constricted and better syllabic structures, which in turn are better in transition because V_1 constitutes part of the nucleus for V_2 . This condition involves a feasible coordination within a syllable. Moreover, Browman & Goldstein (1995) stated that one of the essential characteristics that makes a syllable workable in fast speech is its constricted articulations; the more constricted, the better function as stable coordinator. Consequently, for Chitoran & Hualde (2007) diphthongs offer the best alternative because of their unified and restrained characteristics in the syllable. This idea gains more credibility when we observe that diphthong formation occurred more regularly than heterosyllabification in the data, and that glides are “fast in transition and less intense” (Padgett 2008:2).²² A condition that reinforces its presence in the output level. We move now onto the O.T analyses for gliding and hiatus preservation.

²² Nevertheless, Padgett (2008) maintained the viewpoint that there are still distinctions between vowels and glides, at least in constriction degree, in syllabic role, and dynamic aspects: (vowels are longer than glides and more variable). A phonetic characteristic that we perceived among the participants to label them as ‘conservatives.’

5.4.2- O.T. analyses for gliding of V₁

This section examines the gliding process of the hiatuses /i#a/, /o#a/, and /u#a/ in an Optimality-Theoretic perspective. The tableaux in this section are presented in the same order as we mentioned the hiatuses.

Before we start with the analyses, we must set some conventions clear. Following Baković (2006), McCarthy (1993), and Rosenthal (1994) we set the distinctions between the two types of diphthongs, a heterosyllabic structure, and the constraints that each structure involves. For purpose of handiness, we present the table in (92).

(92) Syllable structures for diphthongs and hiatus formations

Syllable structure	Constraint violated and comment	Illicit structure
<p>A)</p>	<p>*DIP: two moras are not connected to two vocalic nodes within the same syllable (Rosenthal 1994:25).</p>	<p>*CVV(C): /tu#alma/ → *[tual.ma] 'your soul'</p>
<p>B)</p>	<p>1-To-1: let μ be some mora and X some segmental melody such that μ dominates X. Assign a violation if either (i) μ also dominates some other segmental melody X' or (ii) X is also dominated by some other mora μ' (Baković 2006:65).</p>	<p>*CGV(C): /tu#alma/ → *[twal.ma] 'your soul'</p>
<p>C)</p>	<p>*HIATUS: no heterosyllabic vowel-vowel sequences (McCarthy 1993:172).</p>	<p>*CV.V(C) /tu#alma/ → *[tu.al.ma] 'your soul'</p>

The table above displays the three different structures for the analyses. Crucially, we maintain the notion that there are no differences between vowels and glides. Nonetheless, we must specify that diphthong formations with glides (92.B), known as rising-sonority diphthongs (Rosenthal 1994), are preferred because of their easy gestures and stability over a diphthong with two nuclei (92.A). Consequently, whenever the output structure presents a form like [CVV(C)], then a violation to *DIP will be assigned, and when a surface form displays [CGV(C)], 1-To-1 will be violated. Note that, in the case in which [VV] is preferred, then both vowels must be presented in heterosyllabic positions; otherwise, there would be phonetic

ambiguities between them by having a syllable with two nuclei; e. g., **[.CuaC.]* or **[CiaC]*.²³
 The O.T. analyses of (87.B) is given in (93).

5.4.2.1- O.T. analysis for gliding of V₁ in /i#a/

(93) O.T analysis for /casi#abierta/ → [ka.sja.βjer.ta] ‘casi abierta’ *almost opened*

/kasi ₁ #a ₂ bierta/	*HIATUS	UNIFORMITY	MAX-V	*DIP	1-To-1
A: ka.si ₁ .a ₂ .βjer.ta	*!				
B: ka.sa ₂ .βjer.ta			*!		
C: ka.se ₁₂ .βjer.ta		*!			
D: ka.si ₁ .βjer.ta			*!		
E: ka.si ₁ a ₂ .βjer.ta				*!	
☛ F: ka.sj ₁ a ₂ .βjer.ta					*

In tableau (93) the candidates with deletion of a vowel violates one of the top-ranked constraints: MAX-V. Both candidates B and D alter their input structures by deleting V₁ (B) and V₂ (D). The candidate A militates against *HIATUS by syllabifying the vowels in a heterosyllabic structure. We stated that this type of structure is not preferred for this environments because of their complex requirements in rapid speech. Oppositely, the competitor C avoids violations to *HIATUS and MAX-V. Unfortunately, it fatally violates UNIFORMITY. Much vexing, however, is the fact that there are no instances of coalescence between two vowels differing considerably in height /i/ [+high]#/a/[+low]. The competitors E and F seem two potential structures; yet, competitor E presents a syllabic structure of two moras in two vocalic nodes. A condition that complicates the fast transition and the coordination in a syllable for the talk in use. Conversely, F facilitates this syllabic structure by changing V₁ into a glide, which in turn provides a stable correlation between the onset-nucleus-coda because both glide and vowel share the same mora. Therefore, candidate F is selected as the optimal output.

²³ Importantly, Spanish allows syllables with two nucleus word-internally: [pai.sa.xe] ‘landscape,’ [an.ðroi.ðe] ‘android,’ [xwi.sjo] ‘judgement,’ [kwo.ta] ‘fee,’ etc. These forms are grammatically and phonetically accepted. This indicates that the forms [CVV(C)] in word-boundaries are very rare. As we said, however, this is due to dialectal and individual preference.

5.4.2.2- O.T. analysis for gliding of V₁ in /o#a/

The next example examines the hiatus of /o#a/ as gliding [wa] from the example (88.B). Similarly as the previous analysis, we apply the same ranking of constraints.

(94) O.T analysis for /un#abogado#ágil/ → [un.a.βo.ɣa.ðwá.xil] ‘un abogado ágil’ *an agile lawyer*

/un#abogado ₁ #á ₂ gil/	*HIATUS	UNIFORMITY	MAX-V	*DIP	1-To-1
A: un.a.βo.ɣa.ðo. ₁ .á ₂ .xil	*!				
B: un.a.βo.ɣa.ðo ₁₂ .xil		*!			
C: un.a.βo.ɣa.ðá ₂ .xil			*!		
D: un.a.βo.ɣa.ðo ₁ .xil			*!		
E: un.a.βo.ɣa.ðo ₁ á ₂ .xil				*!	
☛ F: un.a.βo.ɣa.ðw ₁ á ₂ .xil					*

It is observed that candidate A fails to surface as the optimal because of its violation towards *HIATUS; it presents a heterosyllabic form. UNIFORMITY is crucially violated in candidate B since coalescence is not a resolution presented in the hiatus /o#a/. Both competitors C and D map unfaithfully by lacking a vowel in the output level, absences that incur violations to MAX-V. Once again, the decision relies on candidates E and F. The surface form [un.a.βo.ɣa.ðw₁á₂.xil] in F denotes a feasible output since the mora in the nucleus is shared by the glide [w] and [a], a sequence which facilitates the gestural movements during the utterance. This lenience, however, is refuted by candidate E which presents two moras in two vocalic nodes. The latter moraic sharing conveys difficulties to fast speech because of its faithful-articulatory requirements in vowels. We conclude with the selection of the competitor F as the optimal candidate.

5.4.2.3- O.T. analysis for gliding of V₁ in /u#a/

(95) O.T. analysis for /espíritu#ancestral/ → [es.pí.ri.twan.ses.tral] ‘espíritu ancestral’
ancient spirit

/espíritu ₁ #a ₂ ncestral/	*HIATUS	UNIFORMITY	MAX-V	*DIP	*1-To-1
A: es.pí.ri.tw ₁ a ₂ n.ses.tral					*
B: es.pí.ri.to ₁₂ n.ses.tral		*!			
C: es.pí.ri.ta ₂ n.ses.tral			*!		
D: es.pí.ri.tu ₁ a ₂ n.ses.tral				*!	
E: es.pí.ri.tu ₁ .a ₂ n.ses.tral	*!				

The candidate A in this tableau is considered the optimal since presents a syllable structure where a gliding and a vowel constitute share the same mora of the nucleus. This sharing create stability within the syllable to avoid phonetic misperception by posing the V₁ as a short allophone of /i/. The rest of the candidates incur crucial violation to the top-ranked constraints. These dissatisfactions diminish their potential as competitors for surfacing as optimal. Regarding the previous, we can state that candidate A surfaces as the optimal candidate.

5.4.3- O.T analyses for hiatus preservation

This section presents the analyses of the hiatuses with heterosyllabic forms in the output level. We stated that the native speakers classified as “conservatives” presented this structure as a way to indicate the margins in words. The analyses in this section involve the discussion of the hiatuses /e#a/ and /o#a/. We selected these hiatuses because heterosyllabification was the most recurrent resolution according to the data. Contrary to the previous analyses, the constraint *HIATUS will be crucial to determine the optimal candidate. Therefore, it must be outranked to prevent the consideration of other resolutions to repair these hiatuses. We proceed to analyze the cases of /e#a/ and /o#a/ in (96) and (97) respectively.

5.4.3.1- O.T analysis of heterosyllabification in /e#a/

(96) O.T. analysis for /este#a_migo/ → [es.te.a.mi.ɣo] ‘este amigo’ *this friend*

/este ₁ #a ₂ migo/	MAX-V	UNIFORMITY	1-To-1	*DIP	*HIATUS
A: es.ta ₂ .mi.ɣo	*!				
B: es.tæ ₁₂ .mi.ɣo		*!			
C: es.te _{1a₂} .mi.ɣo				*!	
D: es.tj _{1a₂} .mi.ɣo			*!		
☛ E: es.te ₁ .a ₂ mi.ɣo					*

The candidate A presents an unfaithful form by deleting V₁. Hence, it crucially violates MAX-V. The same constraint, oppositely, is not violated by the next competitor: B. Nonetheless, it satisfies this constraint at the expenses of violating UNIFORMITY. Worse, there are no instances of coalescence in the data of this dialect for this hiatus; becoming into a very illicit representation. Candidate C syllabifies the two vowels in the hiatus within the same syllable. However, this syllabic form provides complexities for making phonetic distinctions by having two vocalic very abutting in the nucleus position. Therefore diphthong formation of this type is not an alternative to resolve this hiatus. Parsing the glide and the vowel tautosyllabically, as in candidate D, violates 1-To-1 since two segmental melodies (the glide and the vowel) share the same mora syllable-internally. Despite this form seems possible, it is not the alternative presented in this hiatus; thus, this candidate is discarded. Finally, the competitor E presents distinctions between the words’ margins, and in fact, presents heterosyllabification as it solution. Hence, we select it as optimal output for this analysis.

For the second analysis of heterosyllabification, we consider the same underlying form from the analysis presented in (88): /un#a_bogado#a_gil/ ‘un abogado ágil’ *an agile lawyer*.

Furthermore, we apply the same ranking of constraints. An example of hiatus of /o#a/ as [o.a] is displayed in (97).

5.4.3.2- O.T analysis of heterosyllabification in /o#a/

(97) O.T. analysis for /un#abogado#ágil/ → [un.a.βo.ɣa.ðo.á.xil] ‘un abogado ágil’ *an agile lawyer*

/ un#abogado ₁ #á ₂ gil/	MAX-V	UNIFORMITY	1-To-1	*DIP	*HIATUS
A: un.a.βo.ɣa.ðo ₁ .á ₂ .xil					*
B: un.a.βo.ɣa.ðó ₁₂ .xil		*!			
C: un.a.βo.ɣa.ðo ₁ á ₂ .xil				*!	
D: un.a.βo.ɣa.ðw ₁ á ₂ .xil			*!		
E: un.a.βo.ɣa.ðá ₂ .xil	*!				

Starting from bottom to up in the candidates, E satisfies the lowest constraint *HIATUS, but it does violation to MAX-V by surfacing unfaithfully. Since this constraint is one of the top-ranked constraints in the hierarchy, it disfavors this competitor to be the optimal. The next candidate, D, maps faithfully. Unfortunately, two segments share one mora in the syllable [ðwa]. Consequently, this sharing fatally violates 1-To-1. Candidate C does not share a mora; however, it contains two moras connected to two vocalic nodes in the nucleus [.ðoa.]. This structure represents a complex syllabic form, and it militates against *DIP. We observe that candidate B satisfies all the former constraints; yet, it shows a coalesced segment, [ó₁₂]. This candidate is discarded because it violates top-ranked UNIFORMITY. Finally, we observe that candidate A contains an well-structured heterosyllabic form. It presents the two vowels from the hiatus /o#a/ in separate syllables by incurring a violation to low-ranked *HIATUS. Consequently, this candidate surfaces as the optimal in this analysis.

5.5- Chapter conclusion

In this chapter we observed the deletion of /a/ (V_1) was the consequence of the complexities in features involving sonority degree and articulatory efforts in this segment. In the case of V_2 elision, we discussed the alternative status of /e/ as marked and unmarked segment; marked as nucleus, but unmarked as epenthetic element. In both cases, /e/ (V_2) was perceived as a non-preferred vowel for certain environments. Oppositely, we stated that regardless the complex features of /a/ (as functional morpheme), this segment was preserved due to its sonorous intensity, and thus deletion of V_2 occurred.

Further, we observed the process of coalescence as a result of the combination of features [+low] and [+front]. We emphasized that this combination was not lexically allowed in Spanish, but manifested under certain circumstances. For that reason, we catalogued as a non-structure preserving segment (Myers, 1991; Kiparsky, 1982; Krämer, 2006). However, this process would still need more motivation because if we maintain to keep the idea that coalescence is a combination of features derived from input vowels, then the segments /a/ and /e/ should be associated as well and not just their features. That is why, we stated that coalescence conveys some difficulties for its formal description.

This chapter also discussed some instances in which gliding of V_1 was frequent in /i#a/, and /u#a/. Likewise, the process of heterosyllabification was very frequent in the hiatuses of /e#a/ and /o#a/. Following Colina (2006), we suggested that heterosyllabification occurred because of the speaker's preference as way to distinguish the limits between words. Diphthong formation, on the other hand, occurred because of its gestural easiness for a fast transition within a syllable during fast speech. Even though Spanish presented diphthong formation in a more frequent rate than hiatus maintenance, we stated that the former resolution does not make it better than the latter. Importantly, we stress that the few speakers presenting hiatus preservation demonstrated a strong tendency to make lexical distinctions regardless the type of speech in use.

6- Conclusion

The study presented the processes that occurred as the results of the different types of hiatuses, that involved /a/ as V_1 or V_2 , in cross-word boundaries. It also showed the phonetic variation among the participants and the way how the processes were motivated by additional factors beyond morphosyntactic environments. We observed the resolutions of some hiatuses by conveying unusual surface structures that, in fact, were considered acceptable forms among the speakers. Particularly, we referred to the cases of V_2 elision and coalescence as restricted processes to the hiatus of /a#e/.

The empirical examples from the data supported the main assumption of this thesis. They helped to confirm that Mexican Spanish does not contemplate all the time morphosyntactic environments for the solution to hiatus contexts. This claim gains more credibility when we observed that even the same participant resolved a hiatus in different ways within the same environment. Therefore, there are not deterministic ways to predict the type of process in a specific environment, but it is possible to analyze tendencies within the most relevant phonological facts.

The objective of this thesis was to analyze the output representations of the word margins' hiatuses from an Optimality-Theoretic approach. Fundamentally, we were required to posit different types of markedness constraints to motivate the surface forms because of the discrepancies in the results from the data. The proposal of these constraints was subject to other pertinent factors that also interacted in the resolutions of the hiatuses. In this regard, we observed that sonority, segmental markedness, articulatory efforts, and the individual/dialectal preference were these motivations. For instance, in chapter five we observed that deletion of V_2 in /a#e/ required that /a/ dominated /e/ in sonority and nucleus harmony. Thus, we proposed the hierarchy of markedness in nucleus for Spanish (59). In the case of coalescence (chapter 5), we proposed this segment as a non-preserving structure. An output form that occurs only in certain environments and particular conditions. Nevertheless, whether there is or not a coalesced segment in this language, it is something that requires more examinations so we can develop precise conclusions about this process.

Nevertheless, some issues are still opened. In this study we did not address the consequences that both types of deletion processes would convey to the alignment in a word. We observe that deletion of V_1 or V_2 conveys also misalignments between the “[...] edges of morphological and prosodic constituents” (McCarthy & Prince 1995:13). In this respect, when V_1 deletion occurs we observe a misalignment between the right edge of the first word with

the prosodic word, and when V₂ deletion happens, then the left edge of the second word does not coincide with the prosodic word. Take for instance, the word /una#escoba/ a broom, with its O.T. tableau as follows:

/una#escoba/	R-ANCHOR	L-ANCHOR	MAX-V
A: u.nes.ko.βa	*!		*
B: u.nas.ko.βa		*!	*

Observe that there is no optimal candidate here because we attempt to promote the function of the ANCHORING constraints when deletion occurs. It is important to contemplate that any type of resolution in this language, except for heterosyllabification, imply certain types of misalignment between the syllable and the prosodic word.

Before we conclude with this discussion, we must reinforce the factor that motivated the acceptance of unusual surface structures. This notion goes beyond O.T., and morphosyntactic domains, but still is an important factor in phonology. We stated that Bermúdez-Otero (2006, 2013) studied the morphological conditions for nouns with “athematic vowel” /-e/. He presented some examples where both masculine and feminine involved a noun with this ending-morpheme. For example, in particular cases like [unaleyante] “an elegant,” we propose that /a/ is preserved as a formal and semantic requirement to specify the gender in the noun. That is, in a situation where this word is uttered in isolation without its article; e. g. [eleyante] “elegant” (person), the word itself would not provide hints about its gender and, thus, the biological sex of its reference. Even though the context refers to a person; a [+female] noun who is elegant/fancy, in its isolated utterance does not provide any clue regarding its gender. Henceforth, in the case of /una#elegante/, final /-a/ was preserved as a way to mark the [+female] feature of the noun. In this regards, there is a necessity for the speaker to preserve semantic information to indicate the correlation between the article and its neutral noun.

The former proposals are a few of the many issues that can be derived from the output representations in this variety; Mexican Spanish presents issues that deserve deep exploration because of its variety from speaker to speaker.

References:

- Anttila, A. (2002). Variation and phonological theory. In Chambers, J K., Trudgill, P., and Schilling-Estes, N (Eds.), *The handbook of language variation and Change*. Oxford: Blackwell. Pp. 206-243.
- Anttila, A. (2007). Variation and optionality. In Paul de Lacy (Ed.), *The Cambridge handbook of phonology*. Cambridge: Cambridge University Press. Pp. 519-536.
- Archangeli, D., B. (1984). *Underspecification in Yawelmani in phonology and morphology*. Ph.D. thesis. Massachusetts Institute of Technology, Massachusetts, MA.
- Archangeli, D. B., & Pulleyblank, D. (1994). *Grounded phonology*. Current Studies in Linguistics, 25. Cambridge, MA: MIT Press.
- Baković, E. (2006). Hiatus resolution and incomplete identity. In Martinez-Gil, F., & Colina, S. (Eds.), *Optimality-theoretic studies in Spanish phonology*. Amsterdam: John Benjamins. Pp. 62-73.
- Barnes, J. A. (2002). *Positional neutralization: A phonologization approach to typological patterns*. Ph. D. thesis. University of California Berkeley, Berkeley, CA.
- Beckman, J. N. (1998). *Positional faithfulness*. Ph. D. thesis. University of Massachusetts Amherst, Amherst, MA.
- Bermúdez-Otero, R. (2006). Morphological structure and phonological domains in Spanish denominal derivation. In Martinez-Gil, F., & Colina, S. (Eds.), *Optimality-theoretic studies in Spanish phonology*. Amsterdam: John Benjamins. Pp. 278-311.
- Bermúdez-Otero, R. (2013). The Spanish lexicon stores stems with theme vowels, not roots with inflectional class features. *Probus*, 25(1), 3-103.

- Bonet, E. (2006). Gender allomorphy and epenthesis in Spanish. In Martinez-Gil, F., & Colina, S. (Eds.), *Optimality-theoretic studies in Spanish phonology*. Amsterdam: John Benjamins. Pp. 312-338.
- Browman, C. P., & Goldstein, L. (1992). Articulatory phonology: An overview. *Lingua*, 49, 155-180. (SR-111).
- Browman C. P., & Goldstein, L. (1995). Gestural syllable position effect in American English. In Bell-Berti, F., & Raphael, L., J. (Eds), *Producing speech: Contemporary issues*. For Katherine Safford Harris. New York: AIP Press. Pp. 19-33.
- Cabré, T., & Prieto, P. (2006) Exceptional hiatuses in Spanish. In Martinez-Gil, F., & Colina, S. (Eds.), *Optimality-theoretic studies in Spanish phonology*. Amsterdam: John Benjamins. Pp. 205-238.
- Casali, F. (1996) *Resolving hiatus*. Ph. D. thesis. University of California Los Angeles, Los Angeles, CA.
- Casali, F. (1997) Vowel elision in hiatus contexts: Which vowel goes?. *Language*, 73(3), 493-533.
- Chitoran, I., & Hualde, J. I. (2007). From hiatus to diphthong: The evolution of vowel sequences in Romance. *Phonology*, 24(1), 37-75.
- Chomsky, N. (1965). *Aspects of the theory of syntax*. Cambridge, MA: MIT Press.
- Clements, G., N. (1990). The role of the sonority cycle in core syllabification. In Kingston, J., & Beckman, M. E. (Eds.), *Papers in laboratory phonology I: Between the grammar and physics of speech*. Cambridge: Cambridge University Press. Pp 283-333.
- Coetzee, A. W. (2006) Variation as accessing ‘Non-optimal’ candidates. *Phonology*, 23(3), 337-385.

Colina, S. (1999) Reexamining Spanish glides: Analogically conditioned variation in voicod sequences in Spanish dialects. In Gutierrez-Rexach, J., & Martinez-Gil, F. (Eds.) *Advances in Hispanic linguistics: Papers from the 2nd Hispanic linguistics symposium*. Somerville, MA: Cascadilla. Pp. 121-154.

Crosswhite, K. (2001) *Vowel reduction in optimality theory*. New York, NY: Routledge Publishing.

de Haas, W. (1987). An autosegmental approach to vowel coalescence. *Lingua*, 73(3), 167-199.

doi: 10.1016/0024-3841(87)90007-6

de Lacy, P. (2002). *The formal expression of markedness*. Ph.D. thesis. University of Massachusetts Amherst, Amherst, MA.

de Lacy, P. (2006). *Markedness: Reduction and preservation in phonology*. Cambridge: Cambridge University Press.

Eddington, D. (2001). Spanish epenthesis: Formal and performance perspectives. *Studies in the linguistic science*, 31(2), 33-53.

Gutiérrez-Rexach, J. (2006). Sonority scale and syllable structure. Toward a formal account of phonological change. In Martínez-Gil, F., & Colina, S. (Eds.), *Optimality-theoretic studies in Spanish phonology*. Amsterdam: John Benjamins. Pp. 447-469.

Harris, J. W. (1983). *Syllable structure and stress in Spanish: A nonlinear analysis*. Cambridge, MA: MIT Press.

Harris J. W. & Kaisse, E. M. (1999). *Palatal vowels, glides and obstruents in Argentinian Spanish*, 16(2), 117-190.

Hualde, J. I. (1991). On Spanish syllabification. In Campos, H. & Martínez-Gil, F. (Eds.), *Current studies in Spanish linguistics*. Washington, D.C.: Georgetown University Press. Pp. 475-493.

Hualde, J.I. (1999). Patterns in the lexicon: hiatus with unstressed high vowels in Spanish. In Gutiérrez-Rexach, J. & Martínez-Gil, F. (Eds.), *Advances in Hispanic linguistics*. Somerville, MA: Cascadilla. Pp. 182-197.

Jenkins, Devin L. 1999. Hiatus resolution in Spanish: phonetic aspects and phonological implications from Northern New Mexican data. Ph. D. thesis. University of New Mexico, Albuquerque, NM.

Kager, R. (1999). *Optimality theory*. Cambridge: Cambridge University Press.

Kiparski, P. (1982). Lexical phonology. In Yang, I. S. (Ed.), *Linguistics in the Morning Calm*. Seoul: Hanshin Publishing Co. Pp-3-91.

Krämer, M. (2006). The Emergence of the comparatively unmarked. In Baumer, D., Montero, D. & Scanlon, M. (Eds.), *Proceeding of the 25th west coast conference on formal linguistics*. Somerville, MA: Cascadilla Proceeding Project. Pp. 236-244.

Krämer, M. (2009). *The phonology of Italian*. Oxford: Oxford University Press. Pp.234-249.

Lema, J. (1978). *An examination of vowel epenthesis*. Master thesis. Simon Fraser University, British Columbia, Canada.

Lindblom, B. (1986). Phonetic universal in vowels systems. In Ohala, J. J. & Jaeger J. J. (Eds.), *Experimental phonology*. Orlando, FL: Academic Press. Pp. 13-44.

Maddieson, I., (1984). *Patterns of sounds*. Cambridge: Cambridge University Press.

McCarthy, J. (1993). A case of surface constraints violation. *Linguistics Department Faculty Publication Series*, 23. Retrieved from http://scholarworks.umass.edu/linguist_faculty_pubs/23

McCarthy, J. (2000). The prosody of face in Rotuman. *Linguistics Department Faculty Publication Series*, 87. Retrieved from http://scholarworks.umass.edu/linguist_faculty_pubs/87

- McCarthy, J. & Prince, A. (1995). Faithfulness and Reduplicative identity. *Linguistics Department Faculty Publication Series*, 10. Retrieved from http://scholarworks.umass.edu/linguist_faculty_pubs/10/
- Myers, S. (1991). Structure preservation and the strong domain Hypothesis. *Linguistic inquiry*, 22(2), 379-375.
- Padgett, J. (2008). Glides, vowels, and features. *Lingua*, 118. 1937-1955.
- Parker, S. G. (2002). *Quantifying the sonority hierarchy*. Ph. D. thesis. University of Massachusetts Amherst, Amherst, MA.
- Prince A. & Smolensky P. (1993/2004). *Optimality theory: Constraints interaction in generative grammar*. Oxford: Blackwell Publishing.
- Pulleyblank, D. (1988). Vocalic underspecification in Yoruba. *Linguistic inquiry*, 19(2), 233–270.
- Rice, K. (2007). Markedness in phonology. In Paul de Lacy (Ed.), *The Cambridge handbook of phonology*. Cambridge: Cambridge University Press. Pp.79-98.
- Roca, I. (1997). *There are no glides, at least in Spanish: An optimality account*. *Probus* 9, 233-265.
- Roca, I. (2006). The Spanish stress window. In Martinez-Gil, F., & Colina, S. (Eds.), *Optimality-theoretic studies in Spanish phonology*. Amsterdam: John Benjamins. Pp. 239-277.
- Rosenthal, S. (1994). *Vowel/glide alternation in a theory of constraint interaction*. Ph. D. thesis. University of Massachusetts Amherst, Amherst, MA.
- Selkirk, E., (1984). On the major class features and syllable theory. In Aronoff, M. & Oehrle, R. (Eds.), *Language sound structure*. Massachusetts, MA: MIT Press. Pp. 107-136.

Serrano, J. (2006). En torno a las vocales caedizas del español mexicano: Una aproximación sociolingüística. *Academia*. Retrieved from http://www.academia.edu/3166948/EN_TORNO_A_LAS_VOCALES_CAEDIZAS_DEL_ESPA%91OL_MEXICANO_UNA_APROXIMACION_SOCIOLING%93N_SOCIOLING%9C%8DSTICA

Shepherd, M. A. (2003) *Constraints interactions in Spanish phonotactics: An optimality theory analysis of syllable-level phenomena in the Spanish language*. Master thesis. California State university Northridge, Northridge, CA.

Smith, J. M., Flores, T. L. & Gradoville, M. S. (n.d.) An analysis of vowels across word boundaries in Veracruz, Mexican Spanish. In Villeneuve, A-J. & De Jong, K. *IULC working papers*, 8(1), 1-21. Retrieved from <https://www.indiana.edu/~iulcwp/wp/article/view/08-07/43>

Stevens, K. (1989). On the quantal nature of speech. *Journal of Phonetics*, (17), 3-45.

Van Bergem, D. (1991) Acoustic and lexical vowel reduction. Paper presented at the Phonetics and phonology of speaking styles: Reduction and elaboration in speech communication, 1991, Barcelona, Spain. Abstract retrieved from [http://www.isca-speech.org/archive_open/ppospst/pp91_010.html]

Vuskovich, M. A. (2006). *A sociolinguistic perspective toward hiatus resolution in Mexico City Spanish*. Master thesis. Louisiana State University and Agricultural and Mechanical College, Baton Rouge, LA.

Zoll, C. C. (1996) *Parsing below the segment in a constraint based framework*. Ph. D. thesis. University of California Berkeley, Berkeley, CA.

Appendix

(First version)

Encuesta sobre la pronunciación de frases I

Nombre (opcional): _____

Sexo: _____

Lugar de origen: _____

Edad: _____

Favor de leer las siguientes frases en voz alta en los puntos uno y dos a una velocidad natural una vez, y después a una velocidad rápida dos veces; una después de la otra. Posterior a esto, indique la manera en como separaría cada frase. El límite de la sílaba puede ser indicado con un punto o una línea. Le sugerimos que tome su tiempo para separar las frases.

1. /a#e/

Una ebanistería, una ecología, una editorial, una efeméride, una egipcia, una ejecutiva, una elegante, una embajada, una entrada, una epéntesis, una erosión, una escuela, una eternidad, una existencia.

La ebanistería, la ecología, la editorial, la efeméride, la egipcia, la ejecutiva, la elegante, la embajada, la entrada, la epéntesis, la erosión, la escuela, la eternidad, la existencia.

2. /a#i/

Una ibérica, una iconografía, una idea, una iglesia, una hijastra, una ilustración, una imagen, una inscripción, una hipótesis, una ironía, una historia, una italiana, una iguana, una iyanífa.

La ibérica, la iconografía, la idea, la iglesia, la hijastra, la ilustración, la imagen, la inscripción, la hipótesis, la ironía, la historia, la italiana, la iguana, la iyafina.

De la misma manera que en las frases anteriores, le pedimos que lea en voz alta las siguientes frases y nuevamente las separe en sílabas.

- Una historia casi abierta.
- Un cuadro extra-enmarcado.
- La erosión del suelo.
- Un dieciochoavo y un diecisieteavo.
- Una persona especial es un comediante astuto.
- Luis sabe porque aparece.
- El conejo avanza rápido.
- Extra-humectante.
- La persona operada maneja intensamente.
- La maquina utilizada.
- La casa embrujada.
- Mi abuela camina enfurecidamente.
- Aquí aparece un espíritu ancestral.
- La escala evolutiva.
- Tu artista favorito es un anti-amigos.

- El profesor anti-académico.
- Re-analizar es un hábito altamente rígido.
- El bebé duerme alegremente.
- Este amigo come apresuradamente.
- Carlos cose arroz y espagueti amargo.
- El samurái ataca.
- El samurái alegremente entrena al jabalí amigable.
- El marroquí aconseja sabiamente.
- El grupo pro-activo.
- Losé salvo Armando.
- El es como atento.
- El insecto aplastado.
- Un abogado ágil visita el Machu Picchu antiguo.
- La tribu adora a su dios.
- Renate habría leído el libro.
- El espagueti hasta sobra.
- José hasta impresiona.
- Un regalo para estrella es una casa oscura.
- La fastidiosa emboscada por la paloma encarcelada.
- Juan compra unidades.
- Corro para eludir un problema.
- El planeta original.
- La fastidiosa emboscada por la paloma enjaulada.
- A veces, corro para eludir problemas.

Muchas gracias por su participación!!

(Second version)

Encuesta sobre la pronunciación de frases II

Nombre (opcional): _____

Sexo: _____

Lugar de origen: _____

Edad: _____

Favor de leer las siguientes frases en voz alta en los puntos uno y dos a una velocidad natural una vez, y después a una velocidad rápida dos veces; una después de la otra. Posterior a esto, indique la manera en como separaría cada frase. El límite de la sílaba puede ser indicado con un punto o una línea. Le sugerimos que tome su tiempo para separar las frases.

3. /a#o/

Una obsesión, una ochava, una odisea, una ofrenda, una hoguera, una ojeada, una oleada, una omega, una onceava, una oñeta, una operación una oruga, una hostilidad, una otomí, una oyente.

La obsesión, la ochava, la odisea, la ofrenda, la hoguera, la ojeada, la oleada, la omega, la onceava, la oñeta, la operación la oruga, la hostilidad, la otomí, la oyente.

4. /a#u/

Una ubicación, una ucraniana, una ufología, una utilidad, una humedad, una unidad, una uñota, una uruguaya, una usurpadora, una utopía.

La ubicación, la ucraniana, la ufología, la utilidad, la humedad, la unidad, la uñota, la uruguaya, la usurpadora, la utopía.

De la misma manera que en las frases anteriores, le pedimos que lea en voz alta las siguientes frases y nuevamente las separe en sílabas.

- Una historia casi abierta.
- Un cuadro extra-enmarcado.
- La erosión del suelo.
- Un dieciochoavo y un diecisieteavo.
- Una persona especial es un comediante astuto.
- Luis sabe porque aparece.
- El conejo avanza rápido.
- Extra-humectante.
- La persona operada maneja intensamente.
- La maquina utilizada.
- La casa embrujada.
- Mi abuela camina enfurecidamente.
- Aquí aparece un espíritu ancestral.
- La escala evolutiva.
- Tu artista favorito es un anti-amigos.
- El profesor anti-académico.
- Re-analizar es un hábito altamente rígido.
- El bebé duerme alegremente.

- Este amigo come apresuradamente.
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- El samurái alegremente entrena al jabalí amigable.
- El marroquí aconseja sabiamente.
- El grupo pro-activo.
- Losé salvo Armando.
- El es como atento.
- El insecto aplastado.
- Un abogado ágil visita el Machu Picchu antiguo.
- La tribu adora a su dios.
- Renate habría leído el libro.
- El espagueti hasta sobra.
- José hasta impresiona.
- Un regalo para estrella es una casa obscura.
- La fastidiosa emboscada por la paloma encarcelada.
- Juan compra unidades.
- Corro para eludir un problema.
- El planeta original.
- La fastidiosa emboscada por la paloma enjaulada.
- A veces, corro para eludir problemas.

Muchas gracias por su participación!!