CHAPTER 1

NON-CONCATENATIVE MORPHOLOGY IN SPANISH

1.0 Introduction

This dissertation explores a domain of Spanish morphology where, due to the demands of dominant phonological constraints, morphemes are forced to combine in ways that depart from the unmarked concatenative fashion. In order to support the claim that not all Spanish morphology is concatenative, several word formation processes in which morphology and phonology interact are examined in detail. Beyond the core grammar of the language, there exist processes such as the language game JERIGONZA, WORD-BLENDING, TRUNCATION and PLAYFUL-WORDS, which constitute various alternatives to morpheme concatenation. These alternatives are morpheme overlapping, discontinuous morphemes and templatic forms. The current work is intended as a contribution to improve our understanding of Spanish morphology as well as a contribution to two developing lines of research in theoretical linguistics. One of them, within the frameworks of Prosodic Morphology and Optimality Theory, concerns the morphology/phonology interface, which has been formalized in terms of alignment constraints that demand the matching of the edges of certain morphological and prosodic constituents. The other one, within Correspondence Theory, concerns the proposal that, in addition to the usual input-to-output derivations, languages may also exploit output-to-output derivations in order to generate new forms from fully-fledged output forms. It is claimed that Jerigonza, word-blending, truncation and playful-words are non-concatenative processes that operate on an output form to generate a new output form.

1.1 Spanish concatenative and non-concatenative morphology

Traditional studies on Spanish morphology tend to view Spanish word formation as exclusively concatenative. From that viewpoint, morphemes are linked to one another in a linear fashion, one right next to the other. As a result of this, the generation of new words is accomplished through morpheme concatenation, whereby a lexical morpheme may combine with an affix (e.g. a prefix, as in 1a; or a suffix, as in 1b), or lexical morphemes may combine with one another (as in 1c).[1]

(1) a. Prefixation: [prefix + lexical morpheme]

des + honra	→	deshonra	'dishonor'
pre + ver	→	prever	'foresee'

b. Suffixation: [lexical morpheme + suffix]

localiz(ar) + able	→	localizable	'locatable, placeable'
compet(ir) + idor	→	competidor	'competitor'

c. Compounding: [lexical morpheme + lexical morpheme]

casa + tienda	→	casatienda	'shop house'
balón + cesto	→	baloncesto	'basketball'

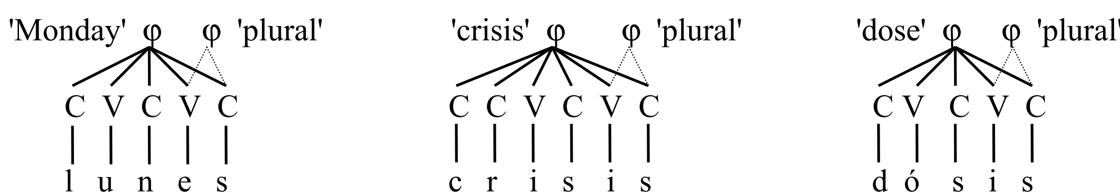
[1] Data from Lang (1990); glosses are mine. Examples will be presented in Spanish orthography except when clarity requires a phonemic transcription.

The outputs of these operations may undergo subsequent combinations with other morphemes yielding even more complex forms. But regardless of the number of morphemes a form may be made of, in that kind of processes, morphologically-complex words are made up of chains of morphemes, where one morpheme starts where the preceding one ends. Concatenative processes are not infrequent in the languages of the world. This type of morphology is, in fact, the unmarked way to combine morphemes. It is the most common type of morphology languages use to derive new words and also to generate inflected forms.

Much morphological research in Spanish has focused on word-formation processes such as derivation and compounding, for which a concatenative approach results compatible. Lesser attention has been paid to phenomena that fall beyond the core grammar of the language but which, when carefully inspected, seem to actually defy the view of Spanish morphology as the concatenation of morphemes alone. Due to the marginal status of these processes, it may appear that Spanish morphology is exclusively concatenative when, in fact, that is not the case. In addition to concatenative morphology, Spanish also has word-formation processes which yield forms where morphemes do not appear juxtaposed. It will be demonstrated that Jerigonza, Word-blending, Truncation and Playful-words are non-core grammar processes which constitute instances of non-concatenative morphology.

Pieces of evidence for non-concatenative morphology in Spanish can be found even in derivational and inflectional processes that are part of the core morphology. Harris (1980) is the first analysis proposed for Spanish that tackles morpho-phonological phenomena from a multilinear perspective. In that work, Harris proposes an autosegmental account of Spanish plurals that takes into consideration not only the segmental but the supra-segmental level as well; the latter as a plane where certain positions can exist independently from segmental units. One advantage of the Autosegmental Framework is that it not only allows the possibility of morpheme concatenation, but it also makes available the alternative of morpheme overlapping. By applying the autosegmental approach to Spanish plurals, Harris (1980) is able to shed light on odd forms such as *lunes* ‘Mondays’, *martes* ‘Tuesdays’, *análisis* ‘analyses’, *crisis* ‘crisis’, *dosis* 'doses', etc., where there is no apparent plural morpheme. The claim is that the plural morpheme overlaps upon the last two segments of the stems of this type of words. This is illustrated in (2) where the symbol φ stands for a morpheme.

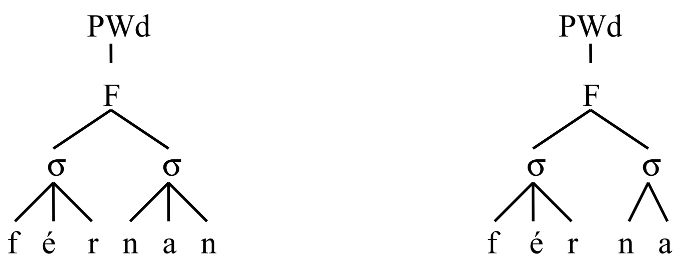
(2) <u>Morpheme overlapping in -*Vs* Spanish plural forms</u>:



The segments -*Vs* at the end of these forms are ambimorphemic because they are not only part of their corresponding stems but they also serve to realize the plural morpheme. This kind of plural form is then a case of morpheme overlapping.

Prieto (1992a) adopts insightful contributions made by McCarthy and Prince (1986) within the theory of Prosodic Morphology and applies them to one of the two types of truncation processes that exist in Spanish. In Type-A hypocoristics, most segments from the first two syllables of the source form are preserved in the truncated form. Prieto finds that Spanish truncated forms comply with an invariant prosodic configuration: a syllabic trochee[2], whose second syllable is required to be light whenever the peninitial syllable of the input word contains a diphthong (e.g. *dáni* < *danjél* 'Daniel'). Otherwise, the second syllable of the hypocoristic is optionally light (e.g. *férnan* ~ *férna* < *fernándo* 'Fernando'). To satisfy this template, hypocoristics must be equivalent to a prosodic word (PWd) that is built on a single disyllabic foot (F).

(3) <u>Prosodic structure of Spanish hypocoristics</u>: (Type A)



Lipski (1995) studies another type of truncated forms. Type-B hypocoristics preserve segments from the final syllables of the source form (e.g. *néto* < *ernésto* 'Ernesto (a boy's name)', *≠ándo* < *lisándro* 'Lisandro (a boy's name)'. Lipski also identifies a syllabic-trochee template but with a strong tendency to simplify not only diphthongs but complex onsets and syllable codas as well. Except for a nasal segment parsed as the coda of the first syllable of the template, all coda segments are lost. This tendency to simplify marked syllable structure favors open syllables of the unmarked CV-type.

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2 A syllabic trochee is a binary foot whose prominent syllable (s) precedes a less prominent one (w). That is, F = (s w) or, using an alternate notation, $F = (\acute{\sigma}\sigma)$

(4) Prosodic structure of Spanish hypocoristics: (Type B)

Colina (1996) uses a constraint-based approach to reanalyze the data presented by Prieto (1992a). She manages to rid the analysis of the light-syllable condition that applies obligatorily to those forms whose peninitial syllable contains a diphthong but only optionally to all other forms. The obligatory application of this condition is interpreted as an effect of the high rank of the well-formedness constraints *COMPLEXN and NOCODA, which dominate the correspondence constraint MAX.

(5) *COMPLEXN: *No Complex Syllable Nuclei*
Syllable nuclei may not be bisegmental.

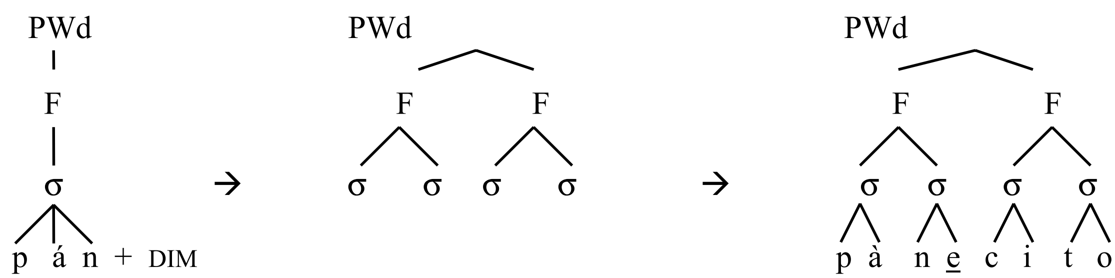
NOCODA: *No Syllable Codas*
Syllables may not have codas.

MAX: *Maximization*
Every element in the base has a correspondent in the truncated form.

The optional application of the same condition is derived through constraint unspecification. For this purpose, Colina allows the constraints NOCODA and MAX to be unspecified with respect to one another. If the ranking of these constraints is unspecified, the optimal candidate may or may not have a closed second syllable depending on whether speakers use the ranking NOCODA >> MAX or vice versa. According to Colina's analysis, truncation is a case of 'emergence of the unmarked', whereby the effects of a dominated constraint (NoCoda) become visible only when the dominant constraints (e.g. IO-faithfulness constraints) are not relevant. These issues are discussed in detail in Chapter 4.

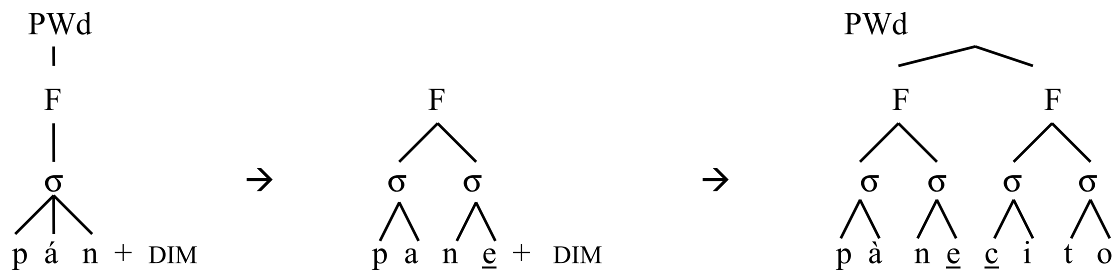
Prieto (1992b) uses the Theory of Prosodic-Morphology to analyze Spanish diminutives. This strategy enables her to propose an analysis of greater explanatory power than previous linear analyses devoted to the topic because it takes into account an important prosodic constraint. She claims that the reason why certain diminutive forms exhibit an epenthetic vowel /e/ (e.g. *panecito* 'little bread' < *pan* 'bread') is because there is a minimal word (MnWd) condition that, when activated, forces output forms to contain at least two syllabic trochees. (Epenthetic segments appear underlined)

(6) MnWd constraint in Diminutive Formation: (Prieto, 1992b)



Crowhurst (1992a,b) revisits Spanish diminutive formation focusing on Mexican dialects. She also proposes a prosodic condition to account for diminutive and augmentative forms: the base to which the diminutive/augmentative morpheme adjoins must correspond to a disyllabic foot, F = (σ σ). Under this approach, epenthesis is also triggered by the need to satisfy a template, but unlike Prieto's analysis, the template does not hold of the output form but of the base for diminutivization.

(7) <u>Disyllabic template in Diminutive Formation</u>: (Crowhurst, 1992a,b)

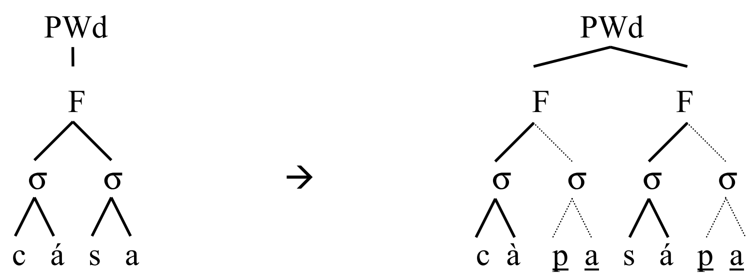


Although different, the proposals made by Prieto, Crowhurst, Lipski and Colina that have been reviewed above coincide in identifying some kind of prosodic template that determines the shape of the output form. According to these analyses, Spanish hypocoristics and diminutives are cases of template-driven morphology. But a more general conclusion these authors independently reach is that the effect of prosodic conditions is not to yield an infinite number of arbitrary forms. Rather, prosodic conditions demand configurations that coincide with prosodic categories. Therefore, these constraints are susceptible to being formalized in a very precise way through the use of the limited number of existing prosodic units.

Such work has certainly opened a new horizon of research in the field of Spanish morpho-phonology. No less important is the contribution made by Pharies (1986, 1987) on the topics of blends (e.g. *cacaína* 'filthy cocaine' < *caca* 'excrement' + *cocaína* 'cocaine') and playful-words (e.g. *guasángara* < *guasánga* 'fuss'), which are phonologically-conditioned as well. Although the data he reports has not received much attention, Pharies' work is an outstanding example of exhaustive lexicological research. Most of the blends and playful-words I analyze come from this source.

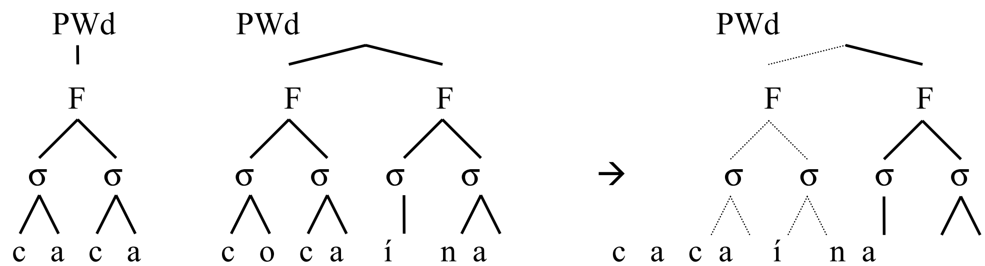
In Chapter 2, I study a language game. Despite its being so widespread in the Spanish speaking world, no research has been devoted to the puzzling facts exhibited by Jerigonza, a coded speech form that young speakers use when they want to ensure secret communication. In Jerigonza, Spanish words are 'disguised' through the introduction of epenthetic syllables that disrupt the contiguity of the source form (e.g. *capasapa* < *casa* 'house'). I claim that these epenthetic syllables help meet a prosodic configuration where the correspondent of every syllable in the source form heads a disyllabic foot. For this to be possible, the output form must contain as many epenthetic syllables as there are syllables in the source form. The result is a homogeneous prosodic structure with optimal syllable parsing: every syllable in the output is parsed under a disyllabic foot. This prosodic strategy is responsible for the camouflage effect exhibited by infixing language games like Jerigonza.

(8) Syllable epenthesis in Jerigonza:



In Chapter 3, I study Spanish blends. I argue that blending is a word-formation process whereby two lexical morphemes combine under a ban on prosodic-word recursion. Given that the category Morphological Word must be licensed by the category Prosodic Word, the two formatives of a blend must array in such a way that they can maximize the use of available prosodic-word edges. This forces some segments in the blend to act as correspondents of more than one segment in the source form. Blends are an instance of morpheme overlapping whereby two morphemes may occur simultaneously rather than sequentially. Ambimorphemic segments help maintain a closer identity between the blend and its source forms.

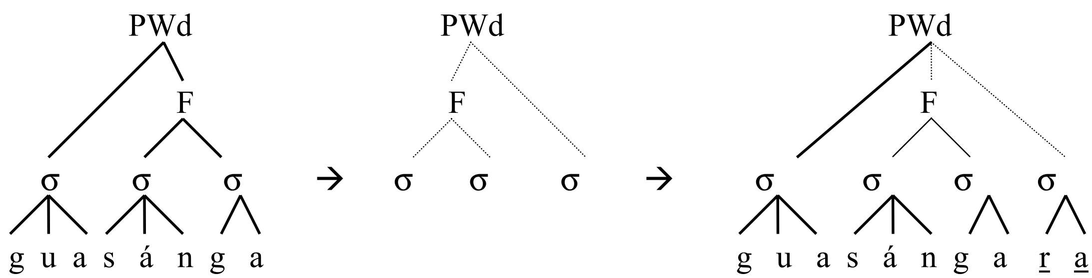
(9) Word-blending:



The topic of Spanish truncation has not been exhausted yet. Although it is the most studied phonologically-driven word-formation process of the language (Prieto 1992, Lipski 1995 and Colina 1996), none of these accounts has explained why for some truncated forms the foot structure of the input is a determining factor (e.g. [(mén.≠a)] < [kle.(mén.sja)] 'Clemencia'), whereas for others, it is completely irrelevant (e.g. [(dó.lo)] < [do.(ló.res)] 'Dolores'). In Chapter 4, I argue that there exist two main types of truncation processes in Spanish. One of them is governed by the faithfulness constraint HEAD(PWd)MAX , whose role is to ensure the preservation of those elements parsed under the head of the PWd. The other one simply obeys an ANCHORing constraint that determines which part of the input should be preserved in the output.

One of the templates identified by Pharies (1986) for Spanish playful-words features a dactyl[3] that sits at the right margin of the word (e.g. *guasángara* 'fuss' < *guasánga* 'noise'). In order to satisfy this template, an epenthetic syllable is added. In Chapter 5, I argue that the epenthetic syllable that yields this dactylic template arises from the need to satisfy a prosodic constraint that militates against word-final feet. An epenthetic syllable is needed in order to move the word-final foot away from the right edge of the PWd. The option of shifting the foot back one syllable without resorting to epenthesis is ruled out by a condition requiring that the head of the PWd of the playful-word be identical to the head of the PWd of the input.

(10) <u>Dactylic template in playful-words</u>:



It is these gaps in Spanish morpho-phonology that this dissertation intends to bridge. Under the proposals made here, the apparently unrelated processes of Jerigonza, word-blending, truncation and playful-words are brought together as alternatives to concatenative morphology: discontinuous morphemes, morpheme overlapping and templatic forms.

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[3] A final dactyl is formed when a syllabic trochee is followed by a syllable that is not parsed by a foot but directly parsed by the prosodic word: $(\sigma\sigma)\sigma]_{PWd}$

1.2 Alternatives to concatenative morphology

I propose that alongside the most productive word-formation processes of Spanish, which tend to create new forms concatenatively, there is a set of marginal morphological processes that depart from that pattern. The following data further illustrate the processes to be studied in this dissertation.

(11) a. Jerigonza: (Chapter 2)

comida 'food'	→	copomipidapa 'food'
salida 'exit'	→	sapalipidapa 'exit'

b. Word-blending: (Chapter 3)

sucio + sociedad 'dirty' 'society'	→	suciedad 'dirty society'
dedo + democracia 'finger' 'democracy'	→	dedocracia 'arbitrary system of election by pointing with the finger'

c. Truncation: (Chapter 4)

♦ *Type-A Hypocoristics*

Javier 'Xavier'	→	Javi 'Xavier'
Mauricio 'Maurice'	→	Máuri 'Maurice'

♦ *Type-B Hypocoristics*

Cecilia 'Cecilia'	→	Chila 'Cecilia'
Susana 'Susan'	→	Chana 'Susan'

d. <u>Playful-words</u>: (Chapter 5)

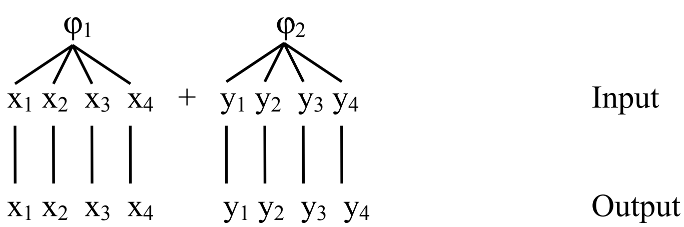
trapa 'noise'	→	trápa<u>la</u> 'fuss and confusion'
trinquis 'shot of liquor'	→	trínqui<u>li</u>s 'shot of liquor'

Except for (11b), all of the processes exemplified above operate on a single word. The outputs of Jerigonza, truncation and playful-wording are alternate forms which preserve the basic meaning of the input. Nevertheless, input and output are not semantically identical because alternate forms tend to specialize in particular functions or occur only in certain registers (e.g. Jerigonza is used by young speakers when they want to ensure secret communication; truncated forms are more likely to be used in informal registers among young people; playful words are used in child literature, music and games; and blended-forms tend to be used when one wants to be witty or sarcastic). But a more relevant fact about these sets of data is that they are related to one another in some morpho-phonological aspect. Jerigonza and playful-wording (11a and 11d), for example, yield lengthened forms that exhibit vowel copying. The sequences of underlined segments in (11a,d) act as units that serve to build the new forms. These units, however, are semantically-void because they do not contribute with any meaning. Rather, they serve as fillers that help the output form meet a particular prosodic shape.

Lengthening, of course, does not occur in truncation, but the output of this process does share with the outputs of Jerigonza and playful-wording the property of being structured in terms of prosodic templates. The reader is reminded that Spanish truncated forms (11c) are equivalent to a syllabic trochee, F = ($\acute{\sigma}\sigma$). The syllabic trochee is also a template enforced in Jerigonza (11a), as suggested by the stress pattern of these words (e.g. *[(cò.po)(mì.pi)(dá.pa)]* < *comida* 'food'). In playful-words (11d), the template target is not the entire output form, only its right edge. Nonetheless, this template also involves a syllabic trochee which helps form a final dactyl: $[\ \ldots\ (\acute{\sigma}\sigma)\sigma]_{PWd}$.

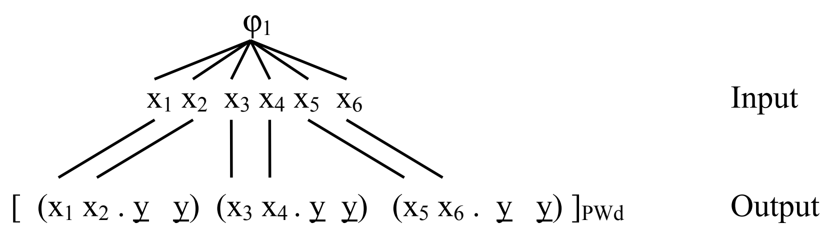
Yet, beyond these partial similarities there is a wider generalization that embraces all of the processes in (11). It is the fact that each one of them represents an alternative to concatenative morphology: (i) DISCONTINUOUS MORPHEMES in Jerigonza, (ii) MORPHEME OVERLAPPING in blends, (iii) TEMPLATE-DRIVEN SHORTENING in truncated forms and (iv) TEMPLATE-DRIVEN LENGTHENING in playful-words. It is shown below that these patterns are radically different from the unmarked concatenative pattern, which allows the preservation of a strict linear order of the segments within a morpheme and imposes a sequential order on the combination of morphemes.

(12) <u>Concatenative Morphemes</u>:



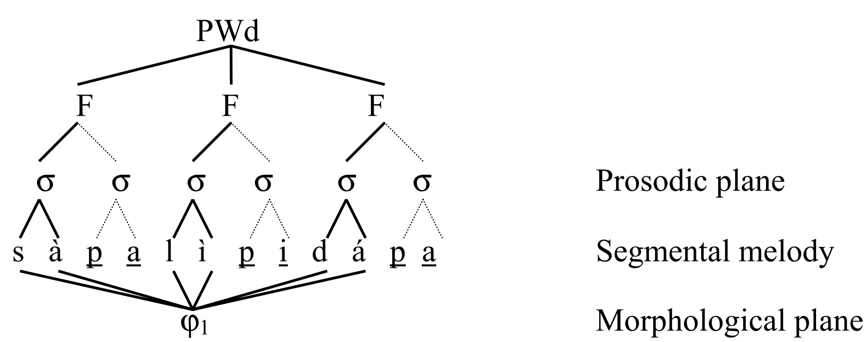
In (12), all of the segments associated with morpheme φ_1 respect a linear order (e.g. x_1, x_2 …). In that same order, they precede all of the segments associated with morpheme φ_2, whose segments, in turn, also obey a linear sequencing (e.g. y_1, y_2 …). Crucially, this order is preserved by the output correspondents. Segments that are contiguous in the input have contiguous output correspondents and one morpheme may start only at the point where the previous one ends. When word-formation processes are phonologically-conditioned, morphemes may depart from this linear order in different ways. In Spanish, the language game Jerigonza displays discontinuous morphemes (e.g. *sàpalìpidápa* < *salída* 'exit'). The following representation illustrates the case of a morpheme whose continuous input string is discontinuously realized in the output.

(13) Alternatives to morpheme concatenation: (Discontinuous morphemes)[4]



In (13), the intrusive elements interrupt the sequencing of output correspondents, which drastically affects the contiguity from input to output forms. Note that in the output, x_2 is not contiguous to x_3 and x_4 is not contiguous to x_5 , as they are in the input. These interruptions are justified by the need to meet a prosodic configuration where the correspondent of every syllable in the input heads a disyllabic foot.

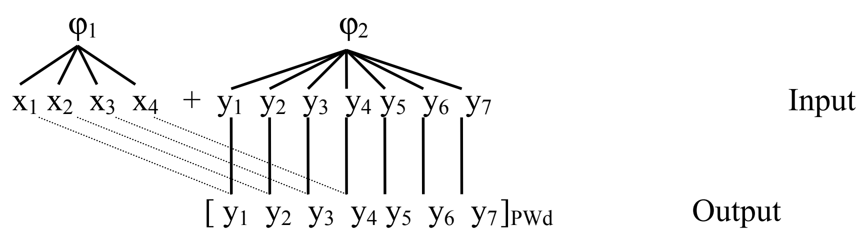
(14) Structure of the output of Jerigonza:



[4] Note that epenthetic segments are not linked to a morpheme.

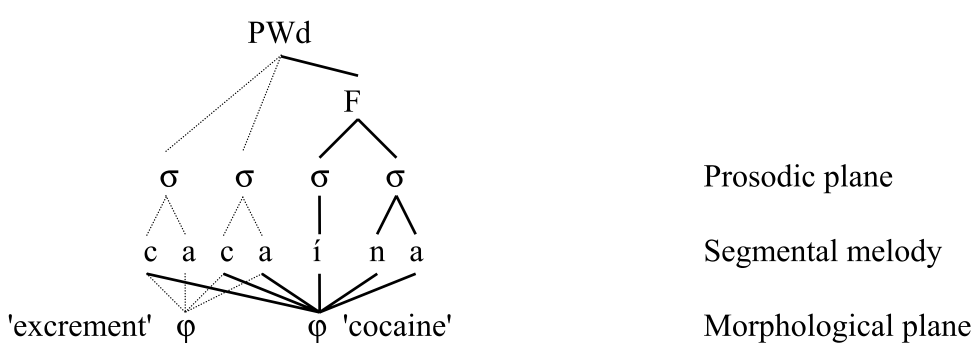
Second, the process of word-blending exhibits overlapping morphemes: one of the source forms overlaps upon a part of the other one with the result that certain segments become ambimorphemic. That is, some segments may be affiliated with more than one morpheme (e.g. *cacaína* < *caca* + *cocaína*). This strategy allows two morphemes that would normally be realized sequentially to be realized simultaneously.

(15) Alternatives to morpheme concatenation: (Morpheme overlapping)



Ambimorphemic segments (like y_1, y_2, y_3 and y_4 in the output) constitute a total break in the linear order of morphemes. A morpheme does not have to start where the preceding one ends. It may occur within the same span as another morpheme. Note how y_1 and x_1 in the input are simultaneously realized by a single segment y_1 in the output and similar situations involve the input pairs (x_2,y_2), (x_3,y_3) and (x_4,y_4).

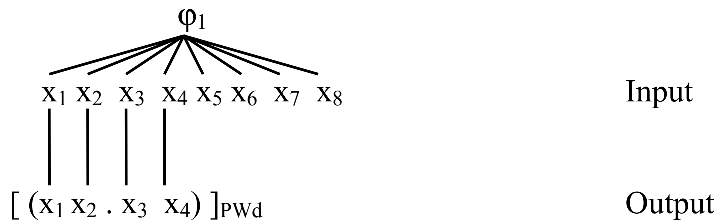
(16) Structure of the output of blending:



In Chapter 3, I argue that this state of affairs arises when two lexical morphemes are to combine under a ban on prosodic word recursion. Because of this, the two morphemes must dwell within a single prosodic word which causes them to overlap.

Thirdly, it is evident that the output of truncation is not generated through morpheme concatenation. Truncated forms are minimal words that consist of a single binary foot. Because the output form is required to meet this prosodic configuration, all segments in the input that do not fit within the minimal-word structure must be left out.

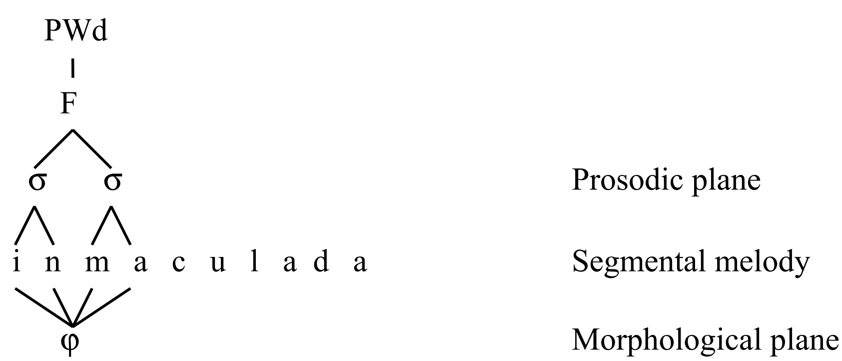
(17) <u>Alternatives to morpheme concatenation</u>: (Template-driven shortening)



The input segments x_5, x_6, x_7 and x_8 in (17) may not have an output correspondent because the correspondents of the segments x_1, x_2, x_3 and x_4 take up all the prosodic structure available in the minimal prosodic word.

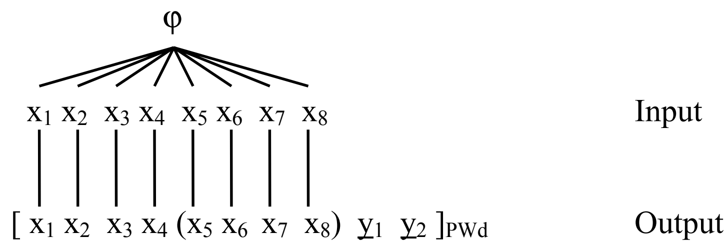
(18) <u>Structure of the output of truncation</u>:

inma < *inmaculada*



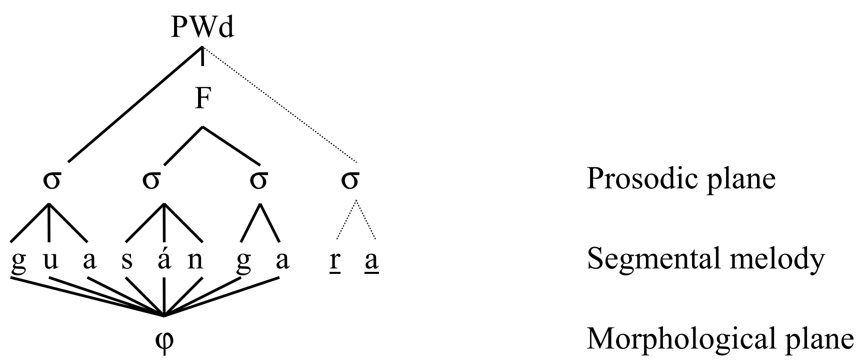
Lastly, in playful-words, template satisfaction triggers word-lengthening. Just like in Jerigonza, epenthetic syllables serve as fillers that complete the template. However, unlike Jerigonza, the epenthetic segments do not disrupt the contiguity of the input segments. This is because the target of the template is not the entire prosodic word but only its right edge, which may not match the right edge of the main-stressed foot (e.g. *guasángara* < *guasánga* 'fuss').

(19) Alternatives to morpheme concatenation: (Template-driven lengthening)



In order to avoid a match between the right edge of the main-stressed foot and the right edge of the prosodic word, the segments y_1 and y_2 are added to the output form. Note that these segments do not have a correspondent in the input. Their presence is necessary only to ensure that the main-stressed foot is not word-final.

(20) Structure of the output of playful-wording:



In brief, Jerigonza, word-blending, truncation and playful-words constitute four innovative ways to generate new forms outside the realm of concatenative morphology. In order to account for these non-concatenative processes, I assume that templates do not exist as such but as the sum of various prosodic constraints that interact to determine a prosodic configuration. For instance, a syllabic trochee is the cooperative effect of a constraint that requires syllable parsing, PARSE-SYLL; one that demands foot binarity, FT-BIN; and another one that imposes left-headedness within the foot, ALIGN(F,L,$\acute{\sigma}$,L). I also assume that morpho-phonological constraints often refer to morpho-phonological constituents to demand that an edge of some constituent match a particular edge of another one. It is further assumed that, the input for these processes is not an abstract form but a derived form, as evinced by the fact that these new output forms mimic surface properties of their source forms. Constraint interaction, alignment and output-to-output correspondence are then three basic premises of this proposal. Next, I introduce the theoretical frameworks wherein these ideas have been born and developed.

1.3 Theoretical background

The analyses proposed for each one of the word-formation processes under study here are couched within the frameworks of Prosodic Morphology Theory (McCarthy and Prince 1986, 1993a), Optimality Theory (Prince and Smolensky 1993, McCarthy and Prince 1993a) and Correspondence Theory (McCarthy and Prince 1995, Benua 1995). These frameworks have been selected because they offer the theoretical devices necessary to tackle empirical challenges such as templatic forms, violability of morpho-phonological principles, and enforced identity between two output forms.

1.3.1 Prosodic and morphological constituents

A fundamental concept in the study of language is the notion of CONSTITUENT. Constituents are constant units that play a role in the organization of a system. Since languages are organized systems, it is not surprising that each linguistic component functions in terms of precise constituent parts. The morphological and phonological components, for example, are linguistic sub-systems that operate on precise units of morphological and/or phonological material. The reality of these units is proven by the systematic behavior of linguistic processes, which only recognize constituent parts.

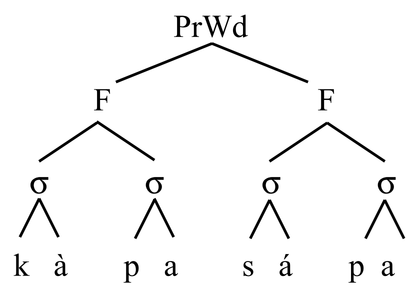
A prosodic hierarchy reflecting the domination relations among prosodic constituents has emerged from work by Selkirk (1980a,b), van der Hulst (1984), McCarthy and Prince (1986, 1988, 1993a,b), Hayes (1987, 1989), among many others. For the purposes here, I assume a version of the prosodic hierarchy that has been proposed by McCarthy and Prince (1993b). Although some versions of the prosodic hierarchy include the mora, these authors decide to exclude it because they did not find any alignment constraints that target this prosodic unit. In this study, I did not find any constraints requiring reference to the mora, either, which is why I assume the same stand. McCarthy and Prince (1993b) agree with Itô and Mester (1992) that quantity and weight, the main properties embodied by the mora, are attributes of syllables and segments rather than constituents themselves. It is also important to point out that, although there are prosodic constituents higher than the prosodic word, the hierarchy in (21) includes all the constituents that are required to account for processes that do not exceed the word boundaries, such as those that I study here.

(21) Prosodic Hierarchy: (McCarthy and Prince 1993b : 5)

PrWd	‘prosodic word’
F	‘foot’
σ	‘syllable’

According to this hierarchy, syllables are parsed by feet and the latter are parsed by the prosodic word. When the prosodic hierarchy is strictly observed, the result is exhaustive parsing, in which every syllable belongs to a foot and all feet are subsumed by the prosodic word. This is illustrated below for the Jerigonza word *càpasápa* 'house'.

(22) Hierarchical Prosodic Structure:



Prosodic word tier

Foot tier

Syllabic tier

Segmental melody

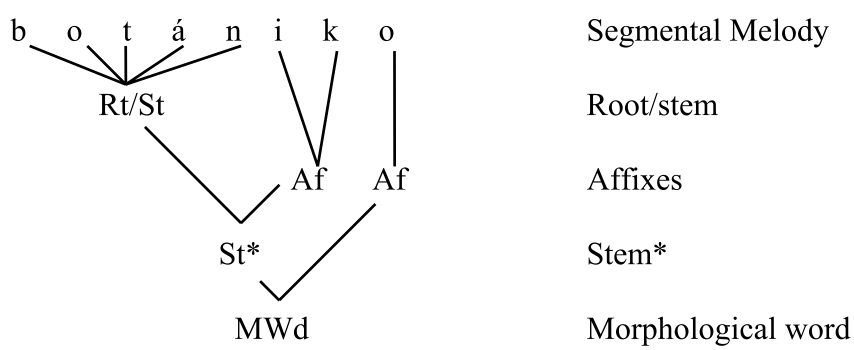
Traditional morphological categories include the root, the affix, the stem and the morphological word. I follow McCarthy and Prince (1993b) in assuming the following hierarchy, which specifies constituency relations among morphological categories.

(23) Morphological Hierarchy:

MWd	→	Stem*
Stem	→	Stem, Affix
Stem	→	Root

A ROOT is that basic part of a word which may not be broken down into smaller meaningful pieces. That is, it is the form that remains after all inflectional and derivational morphemes have been removed. Roots may be free, i.e. they may be realized in isolation (e.g. sal 'salt'); or bound, i.e. they may only be realized in combination with at least one other morpheme (e.g. sal + a 'living room'). A bound morpheme that combines with a root or more complex bases is an AFFIX. Affixes may be classified as prefixes (e.g. in + moral 'immoral'), or suffixes (e.g. nacion + al 'national'), depending on whether they precede or follow the base to which they attach. A STEM is that base to which affixes attach. Every time a new affix is added, a new Stem* category is created. According to this, a stem may be made up of a root only or a root plus other affixes accompanying it. Finally, the MORPHOLOGICAL WORD is the category that subsumes the root, stem(s) and derivational affixes. The example [botán + ik + o]'botanical' illustrates this structure.

(24) Hierarchical Morphological Structure:



It is important to clarify that, even though morphemes obey a precedence relation in underlying representations, their linear order may be affected by phonological principles. In addition to being subject to morphological constraints, which govern their distribution as prefixes or suffixes, affixes may also be governed by phonological constraints, in which case prosodic morphology phenomena arise.

1.3.2 Prosodic morphology theory

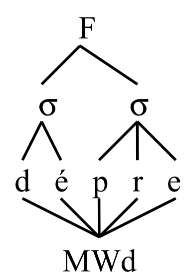
McCarthy and Prince (1986) observe that a common pattern in the generation of words is that a morphological category accommodates to an invariant frame which is equivalent to a prosodic category. In Spanish clipped-words, for example, the morphological category MWd accommodates to the form of a binary foot.

(25) Spanish Clippings:[5]

a.	depresión	→	depre	'depression'
	protección	→	prote	'protection'
	manifestación	→	mani	'protest'

b.

depresión →
'depression'

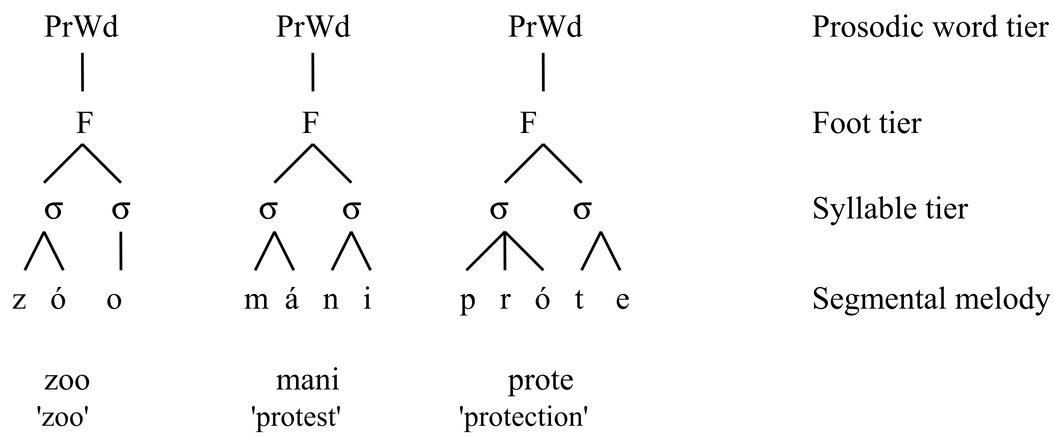


Since the number of segments a clipped form may have is not constant (e.g. *zoo* < *zoológico* 'zoo'; *mani* < *manifestación* ‘protest’; *prote* < *protección* 'protection; *progre*

[5] Examples taken from Casado Velarde's (1984). Glosses are mine.

< *progresista* ‘progressive’; etc.), the generalization on this kind of process can not be sought at the segmental level. After a study of a wide variety of processes where a templatic configuration is enforced, McCarthy and Prince (1986) conclude that templates are better defined in terms of prosodic constituents: syllable, foot, prosodic word. This important realization is the basic tenet of Prosodic Morphology Theory.

(26) Prosodic Structure of Spanish Clippings:



Thus, even if clipped forms have very little in common on the segmental tier, there is a prosodic tier on which they are all identical and definable as a single token: MWd = F. Spanish clippings are then an instance of Prosodic Morphology, where a morphological category is required to match a prosodic one, MCat = PCat.

McCarthy and Prince (1993b) further explore the domain of the morphology/phonology interface. But this time, they incorporate the principles of Optimality Theory (see 2.2, below) into their research. One of the conclusions they reach is that templates are actually the expression of constraints that govern the way the morphological and phonological components of a language interact. They redefine templates in terms of alignment constraints, which demand the matching of the edges of certain morpho-phonological constituents. According to McCarthy and Prince (1993a), the fundamental principles of the theory of Prosodic Morphology are:

(27) Prosodic Morphology: (McCarthy and Prince 1993a : 138)

a. *Prosodic Morphology Hypothesis*

Templates are constraints on the prosody/morphology interface, asserting the coincidence of morphological an prosodic constituents.

b. *Template Satisfaction Condition*

Templatic constraints may be undominated, in which case they are satisfied fully, or they may be dominated, in which case they are violated minimally, in accordance with the general principles of Optimality Theory.

c. *Ranking Schema*

P >> M

Through alignment, the Prosodic Morphology Hypothesis can be incorporated into a constraint-based model such as Optimality Theory, a framework in which alignment constraints are allowed to interact with other morpho-phonological constraints giving rise to two general rankings: (i) M >> P, for plain morphology and (ii) P >> M, for phonologically-governed morphology.

1.3.3 Optimality theory

Within Optimality Theory (Prince and Smolensky 1993, McCarthy and Prince 1993a, 1993b, and many after them), the output form is not derived through the application of a series of rules. Instead, well-formedness constraints, which are part of a function called EVAL(UATOR), select an optimal form among the set of output forms created by another function called GEN(ERATOR). GEN operates on an input form in order to generate all possible output candidates, which are evaluated by the EVAL constraints. In principle, all constraints are universal and available for all languages, although they are not always visible in all grammars. This has to do with the fact that constraints are ranked with respect to one another in terms of a dominance relationship that creates a constraint hierarchy. Compliance with a constraint hierarchy entails that dominant constraints are to be obeyed even if satisfying their demands works to the detriment of lower-ranking constraints. If some constraints are not visible in certain grammars it is because they are low-ranking and their demands are overridden by those of higher-ranking constraints. Therefore, if every language has its own ranking of the universal constraints, each constraint hierarchy corresponds to a different grammar. According to this, languages differ from one another only in their particular ranking of constraints, not in the constraints themselves. This accounts for variation from one grammar to another.

Every output candidate generated by GEN is compared to its input form. After evaluating all candidates, the one that best satisfies the constraint hierarchy is selected as the optimal form. It is possible that the optimal candidate does not perfectly satisfy the constraint hierarchy. Since optimal does not mean perfect, minimal violation is tolerated. In fact, it is most likely that the optimal candidate violates some low-ranking constraint(s). But the optimal candidate is always the one that satisfies the top-ranking constraints better than any other candidate. Within Optimality Theory, the shape of output forms is determined by the interaction of faithfulness and well-formedness constraints. Constraints interact with one another through their property of being ranked.

When the demands of two constraints come into conflict, a specific dominance relation may be established between them leading to the selection of the optimal candidate. Given two constraints X and Y and two output candidates *a* and *b*, if constraint X dominates constraint Y (X >> Y) and the number of violations of constraint X by candidate *a* is greater than the number of violations of constraint X by candidate *b*, then the more harmonic candidate between *a* and *b* is *b* for incurring less violations of the dominant constraint regardless if the number of violations of constraint Y by candidate *a* is smaller than the number of violations of constraint Y by candidate *b*.

(28) Constraint X >> Constraint Y

Input:	Constrain X	Constraint Y
a. form$_1$	* * ! *	*
b. ☞ form$_2$	* *	* *

The effects of constraint interaction may be better appreciated in tableaux. Tableaux are representations like (28) designed within Optimality Theory in order to facilitate the task of evaluating output forms. Output candidates are listed down the leftmost column of the tableau, below the box that contains the input form. Constraints, on the other hand, occupy the top row appearing according to their rank in descending order from left to right. An asterisk is the symbol used to indicate constraint violations. But some constraints (e.g. alignment constraints) are gradient, in which case, it is better to use segments to indicate the degree to which the constraint is violated. A violation of a high-ranking constraint is of course more costly than a violation of a lower-ranking constraint. When a violation has the effect of removing a candidate from the competition, this violation is signaled with an exclamation point and all lower cells in that row are shaded to indicate that, after that point, whether or not that candidate violates lower-ranking constraints is irrelevant. The candidate that best satisfies the constraint hierarchy is signaled by a pointing left hand (☞), which means that it is the optimal output form or winning candidate. In sum, instead of deriving a form step by step, Optimality Theory selects an optimal output form according to the hierarchical order obeyed by the universal linguistic principles within a particular system.

1.3.4 Correspondence theory

Correspondence Theory, an offspring of Optimality Theory, stems from the analysis McCarthy and Prince (1993a, 1995) offer to account for Reduplicative Morphology. These authors elaborate on the fact that the Reduplicant (R), always mimics a part or the entire Base for reduplication (B). On the basis of this resemblance between R and B, McCarthy and Prince propose that these two forms stand in a correspondence relationship that enforces their identity. At the underlying level, R is represented as RED, a morpheme with no segmental substance of its own. RED must flesh out from the segmental contents of B because, at the surface level, R is required to look like B. The correspondence relationship between R and B is formalized by means of two families of constraints that represent the bi-directional relationship entailed by the identity between R and B. The MAX(imixation) family of constraints responds to the direction B $\rightarrow$ R and demands that B be maximized in R. This means that everything in

B must be preserved in R. The DEP(endence) family of constraints, on the other hand, responds to the direction B $\leftarrow$ R and demands that everything in R be dependent on B. This entails that everything in R must be something originally present in B. Achieving perfect compliance with these two families of constraints translates into perfect RB-Identity (e.g. total reduplication). However, when other morpho-phonological principles take precedence over RB-Identity constraints, R may not be completely identical to B (e.g. partial reduplication).

Generalizing this approach, McCarthy and Prince propose that their analysis of reduplication as a process that obeys a correspondence relationship between two forms may be extended to regular derivational processes in order to relate an abstract input form (IF) with the resulting output form (OF). Given that input and output forms always bear a degree of resemblance, it is assumed that IF and OF are required to be similar. In other words, an output form must be faithful to its input and vice versa. Here again, a certain degree of faithfulness may have to be sacrificed if other constraints rank higher, in which case some discrepancies between OF and IF arise. But this does not mean that faithfulness between the two forms is not being enforced. It simply means that satisfying other constraints may take precedence over achieving perfect faithfulness.

Within Correspondence Theory, the phonological processes traditionally known as deletion and epenthesis are interpreted as a consequence of violating the MAX and DEP constraint families, respectively. If an input string S_1 contains elements {a, b, c} then, MAX requires that the output string S_2 also contain instances of the elements {a, b, c}. The element {a} in S_1 is the correspondent of the element {a} in S_2, the element {b} in S_1 is the correspondent of the element {b} in S_2 and so on. Every instance of an element in

S_1 that does not have a correspondent in S_2 constitutes a violation to MAX. So, MAX is the constraint that militates against deletion, penalizing outputs that are unfaithful to their input for not having a correspondent for each and every element in the input form. In tableau (29) below, (29a) is the candidate favored by MAX because it provides a correspondent for every input element.

(29) MAX violations:

Input:	{a, b, c}	MAX
a. ☞	{a, b, c}	
b.	{a, b}	* !
c.	{a}	* ! *
d.	{ }	* ! * *

DEP, on the other hand, requires that every element in S_2 have a correspondent in S_1. That is, DEP, says that no instance of an element should appear in S_2 if there is not an instance of that element in S_1. So, DEP is the constraint that militates against epenthesis penalizing outputs that are unfaithful to their input for having a greater number of elements than the original number existing in the input form. In tableau (30) below, (30a) is the candidate favored by DEP because it does not contain any elements that lack an input correspondent.

(31) DEP violations:

Input:	{a, b, c}	DEP
a. ☞	{a, b, c}	
b.	{a, b, c, d}	* !
c.	{a, b, c, d, e}	* ! *
d.	{a, b, c, d, e, f }	* ! * *

With the incorporation of the constraints MAX and DEP, Correspondence Theory does away with the principle of Containment from Optimality Theory. As a result, the constraints PARSE and FILL are no longer necessary. Output forms are free of empty elements (FILL violations) and they do not contain prosodically unlicensed elements (PARSE-seg violations).

1.4 Output-to-output correspondence

Recent proposals within Correspondence Theory (Kentowicz 1994, McCarthy and Prince 1995, Benua 1995) have advanced the hypothesis that two output forms may be related to one another through a correspondence relationship that demands their identity. It is claimed that similar to the correspondence relationships that hold between a Base and its Reduplicant in reduplicative morphology or between an Input Form and its corresponding Output Form in regular derivations, there is also a correspondence relationship that relates two fully-fledged forms. According to this proposal, output forms generated from an abstract input, may serve as input in order to generate other output forms. To avoid confusion with the terms 'input' and 'output', I will refer to derived forms that serve as input as Source Forms (SF), whereas the forms that are derived from them will be called New Output (NWO).

(32) <u>Output-to-Output Correspondence Relationship</u>:

$$\begin{array}{ccc} \text{Source Form (SF)} & & \\ \downarrow\uparrow & & \text{OO-correspondence} \\ \text{New Output (NWO)} & & \end{array}$$

The NWO that arises from an SF is the optimal candidate selected according to the constraint ranking that governs the OO-correspondence dimension. Evidence that there exists this output-to-output correspondence relationship is provided by the fact that NWO refers to derived properties of SF.[6] This can only make sense if NWO has access in some way to the information encoded in SF. If NWO and SF are subject to correspondence constraints that enforce their identity, the fact that these forms may bear astonishing resemblance with respect to one another is not an accident but an expected result.

The arguments presented in favor of OO-correspondence by McCarthy (1995), McCarthy and Prince (1995), Benua (1995) and Kenstowicz (1994) concern allophonic realization. In cases of overapplication, a segment that should not undergo a phonological process because it is not in the context where the process is triggered undergoes the change so that it remains faithful to a changing output form (e.g.

6 Lexicon and Grammar Optimization (Inkelas, 1995) are principled criteria that will be used to determine what linguistic material is present underlyingly. All properties that do not contribute to optimize the lexicon and/or grammar will be assumed to be derived.

Nasalization[7] in Madurese reduplication: |±t-nℜ±t < RED + neat 'intentions'). In cases of underapplication, a segment that should undergo a phonological process for being in the context where the process is triggered does not undergo the change because it is required to remain faithful to another output form (e.g. *l*-deletion in Chumash reduplication: [8] *c'al-c'aluqay'* < RED + *c'aluqay* 'cradles').[9] Under and over-application follow from a constraint ranking where output-to-output identity constraints dominate phonological ones: OO-Identity >> P.[10]

---

7 In Madurese, the nasality of a nasal consonant spreads rightward until it encounters an oral obstruent.

8 In Chumash, *l* deletes when it precedes a coronal consonant.

9 David Odden correctly points out that McCarthy and Prince (1995) account for over and under-application through BR-Identity. But given that McCarthy and Prince explicitly say that the Base is an output form (p. 274), I interpret the correspondence relationship between the Base and the Reduplicant as one that holds between output forms. In other words, BR-Identity is a type of OO-Identity, as it has also been interpreted by Benua (1995).

10 Unfortunately, some of the first output-to-output correspondence analyses proposed in the literature (McCarthy 1995, Benua 1995, Kenstowicz 1994) have been impeached of using the data opportunistically, misanalyzing it and making problematic predictions (Hale, Kissock and Reiss 1996).

Hale, Kissock and Reiss argue that the Rotuman incomplete/complete phase alternation interpreted by McCarthy (1995) as syntactico-semantically-conditioned has been misanalyzed because it is actually a phonologically-conditioned alternation. They propose an algorithm that builds binary feet from right to left within each clitic group. If a vowel is both at the right edge of a foot and a morpheme, that vowel will undergo the effects of incomplete phase formation:

(Metathesis) [ia t← (pure)] → [ia t← (puer)]

Against Kenstowicz (1994), Hale, Kissock and Reiss argue that his account of the *honor*… Latin paradigm, which is based on the constraint UNIFORM EXPONENCE, inaccurately evaluates the candidates and opportunistically selects the constraints and the candidate sets in order to obtain the desired results.

With regards to Benua's (1995) account of English hypocoristics (e.g. Lar < Larry), they argue that the data has been opportunistically selected, ignoring cases where faithfulness to vowel quality is not shown (e.g. Lawr < Lawry) and cases where the hypocoristic is more faithful to the abstract input form than to the base (e.g. Pat < Patricia). For further details, the reader is referred to the original source.

The type of argument I rely on for assuming an output-to-output correspondence dimension is based on prosodic structure dependence. Based on the fact that the NwO mimics and/or depends on the prosodic structure of its SF, I assume that SF is a derived output form. I claim that, although some prosodic information may be present in underlying representations (e.g. morae), most prosodic structure in Spanish is derived (e.g. syllables, feet and prosodic word). From this standpoint, prosodic structure is an exclusive trait of output forms, not a property of abstract input forms. I follow Inkelas (1995) in her proposal that underspecification is determined by optimization with respect to the grammar. Within this approach, Lexicon and Grammar Optimization are the principles that determine what should be prespecified or underspecified underlyingly.

(33) Lexicon Optimization: (Inkelas, 1995 : 289)

Given a set $S = \{S_1, S_2, \ldots S_i\}$ of surface phonetic forms for a morpheme M, suppose that there is a set of inputs $I = \{I_1, I_2, \ldots I_j\}$, each of whose members has a set of surface realizations equivalent to S. There is some $I_i \in I$ such that the mapping between I_i and the members of S is the most harmonic, i.e. incurring the fewest marks in grammar for the highest ranked constraints. The learner should choose that I_i as the underlying representation for M.

(34) Grammar Optimization: (Inkelas, 1995 292)

The optimal grammar is the most transparent, i.e. the one in which alternations are maximally structure-filling (Kiparsky, 1993).

Contrary to the assumption that all structure that is unmarked, redundant or predictable should be underspecified, Lexicon Optimization dictates that only predictable structure that alternates may be underspecified. Furthermore, given two grammars that yield the same output, Grammar Optimization favors the grammar that derives that output in a feature-filling manner over one that does so in a feature-changing fashion. Within Correspondence Theory, Grammar Optimization translates into the constraint ranking MAX(imization) >> DEP(endence). Reversal of this ranking would favor feature-changing grammars. When applied to Spanish, Lexicon and Grammar Optimization reveal that every underlying vowel has a mora. Consider the case of Spanish high vocoids, /i/ and /u/, which alternate with their glide counterparts.

(35)	a.	ampl[í]o 'I expand'	b.	acaric[j]o 'I caress'
		me grad[ú]o 'I graduate'		frag[w]o 'I plan'

Some authors have interpreted this alternation as evidence for an underlying vowel/glide contrast (Harris 1969, 1992, Cressey 1978, Morgan 1984, Hualde 1991). Note that despite appearing in the same position, the high vocoids of the examples in (35a) get stressed whereas those of the examples in (35b) are skipped when stress is assigned. This is exactly what would be expected if an underlying mora were posited for the former set of data but not for the latter.

(36)	μ | /amplio/	μ | /me graduo/	/akarisio/	/fraguo/	*Input*
	[amplío]	[me ɣradúo]	[akarísjo]	[fráɣwo]	*Output*

Nonetheless, Lexicon Optimization says that positing underlying high vocoids without a mora is too costly. This result is not stipulated but deducted from the evaluation of input candidates with respect to the relevant constraints. Tableau (37) is a Lexicon Optimization tableau, which is marked as LO to distinguish it from regular tableaux that evaluate output forms. The relevant constraints here are MAX(μ) and DEP(μ), which obey the ranking MAX(μ) >> DEP(μ), according to the principle of Grammar Optimization. Since the question is whether the underlying high vocoids have a mora or not, the input candidates are /i_μ/ ~ /i/ and /u_μ/ ~ /u/. These input candidates are compared to their attested output realizations, [i] ~ [j] and [u] ~ [w]. The candidate that best satisfies the constraint ranking is selected as the optimal input form.

(37) LO: MAX(μ) >> DEP(μ)

LO	Input candidates	Attested outputs	MAX(μ)	DEP(μ)
☞ a.	i_μ	i_μ j_μ		
b.	i	i_μ j_μ		* ! *
☞ a'.	u_μ	u_μ w_μ		
b'.	u	u_μ w_μ		* ! *

Candidates (37a) and (37a') are the optimal input forms because they achieve perfect satisfaction of the input/output faithfulness constraints. Candidates (37b) and (37b') correspond to the underspecified inputs. They run afoul of the constraint DEP(μ) twice each because in the attested outputs the vocoids /i/ and /u/ always bear a mora whether they are realized as vowels or glides (Dunlap 1991, Rosenthall 1994). This means that contrary to the widely held view proposed by moraic phonologists that vowels are moraic whereas glides are not, in Spanish, both vowels and glides are moraic. As pointed out by Rosenthall (1994, p. 135) 'the terminology used to describe vowels and their nonmoraic counterparts fails here [in Spanish] because the high vocoid component of a diphthong is moraic.' Positing a mora for every underlying vocoid is crucial in order to account for primary stress in Spanish given it is quantity-sensitive and that high vocoids contribute with weight whether they surface as vowels or glides. For a complete discussion on the issue of moraic glides, the reader is referred to Dunlap (1991) and Rosenthall (1994).

Lexicon Optimization also requires that all other underlying vowels have a mora. Otherwise, gratuitous violations of DEP(μ) would arise, as illustrated in tableau (38) below.

(38) LO: MAX(μ) >> DEP(μ)

LO	Input candidates	Attested outputs	MAX(μ)	DEP(μ)
☞ a.	a_μ k a_μ r i_μ s i_μ o_μ	a_μ k a_μ r $í_\mu$ c j_μ o_μ		
b.	a k a r i s i o	a_μ k a_μ r $í_\mu$ s j_μ o_μ		* ! * * * *
☞ a'.	f r a_μ g u_μ o_μ	f r $á_\mu$ ɣ w_μ o_μ		
b'.	f r a g u o	f r $á_\mu$ ɣ w_μ o_μ		* ! * *

Since surface vocoids are always moraic in Spanish, the optimal input form must be one in which every vocoid has a mora (38a) and (38a'), so that this structure does not have to be filled in, thereby giving rise to unnecessary DEP(μ) violations (38b) and (38b')

.

The question why the high vocoids of the examples in (35) do not get stressed has already been answered within Optimality Theory by Rosenthall (1994), based on previous work by Harris (1983, 1989, 1992) and Dunlap (1991). As pointed out by these authors, stress in Spanish falls into two main patterns. In Type-A forms, primary stress falls on the final syllable if it is closed by a consonant other than /s/, and on the penult otherwise (39a). In Type-B forms, stress is pushed back one syllable in the first two sets of forms, with primary stress falling on the penult if the final syllable is closed, and on the antepenultimate syllable when both the penult and the ultimate syllable are open (39b). In both patterns, if the penultimate syllable is closed and the final is open, stress falls on the penult. A closed syllable is bimoraic and may support a binary foot. An open syllable is monomoraic and may not form a foot by itself. The following sets of data are representative of these stress patterns.

(39) a. <u>Type A</u>: b. <u>Type B</u>:

[… H]		[… σ H]	
gentíl	'kind'	cárcel	'prison'
canción	'song'	mártir	'martyr'
vendedor	'salesman'	revólver	'revolver'
[… L L]		[… σ LL]	
gitáno	'gypsy'	pájaro	'bird'
compléto	'complete'	sílaba	'syllable'
cirujáno	'surgeon'	tránsito	'traffic'
[… H L]			
artísta	'artist'	(Same as Type A)	
inteligénte	'intelligent'		
cantánte	'singer'		

Type A, whose forms outnumber those of Type B, has been recognized as the unmarked stress pattern. Type B differs from Type A only in the extrametrical character of the final mora. In other words, when parsing Type-B forms, the final mora may not be used to build a foot. Within Optimality Theory, extrametricality is a prosodic effect that follows from the interaction of the constraints NONFINALITY and ALIGN(F,R,PWd,R).

(40) NONFINALITY: *Non-Finality*
The main-stressed foot is not word final.

(41) ALIGN(F,R,PWd,R): *Align the main-stressed foot*
Align (F,R,PWd,R)
The right edge of the main-stressed foot matches the right edge of the prosodic word.

In Type-A words, the right edge of the main-stressed foot and the right edge of the PWd are aligned because ALIGN(F,R,PWd,R) dominates NONFINALITY. As a consequence of this ranking, the high vocoid of the examples in (35a) is realized as a vowel because it must bear stress so that the foot is formed in the right position to make this alignment possible (see 42a below). In tableau (42), candidate (42b) is ruled out by ALIGN(F,R,PWd,R) because the main-stressed foot is separated from the right edge of the PWd by one mora.

(42) Type A: ALIGN(F,R,PWd,R) >> NONFINALITY

Input: a_μm p l $i_\mu o_\mu$	ALIGN(F,R,PWd,R)	NONFINALITY
a. ☞ [($a_\mu m_\mu$. (p l $í_\mu$. o_μ)]$_{PWd}$		*
b. [($á_\mu$ m_μ p l j_μ) o_μ]$_{PWd}$	μ !	

Conversely, in Type-B words the right edge of the main-stressed foot does not match the right edge of the PWd because NONFINALITY dominates ALIGN(F,R,PWd,R). Consequently, the high vocoid of the examples in (35b) is realized as a glide because it may not bear stress if the main-stressed foot is to be non-final. In tableau (43) below, candidate (43d) forms a foot whose right edge matches the right edge of the PWd in compliance with ALIGN(F,R,PWd,R). But since NONFINALITY is the dominant constraint in Type-B words, a configuration where the foot is minimally pushed back one mora to avoid finality is preferred (43b). Shifting the foot back more than one mora gives rise to unnecessary ALIGN(F,R,PWd,R) violations (43a,b).

(43) Type B: NONFINALITY >> ALIGN(F,R,PWd,R)

Input: $a_\mu k\ a_\mu r\ i_\mu s\ i_\mu o_\mu$	NONFINALITY	ALIGN(F,R,PWd,R)
a. $[(\acute{a}_\mu.\ k\ a_\mu).\ r\ i_\mu.\ s\ j_\mu\ o_\mu]_{PWd}$		μ ! μ μ
b. $[a_\mu.\ (k\ \acute{a}_\mu.\ r\ i_\mu).\ s\ j_\mu\ o_\mu]_{PWd}$		μ ! μ
c. ☞ $[a_\mu.\ k\ a_\mu.\ (r\ \acute{\imath}_\mu.\ s\ j_\mu)\ o_\mu]_{PWd}$		μ
d. $[a_\mu.\ k\ a_\mu.\ r\ i_\mu.\ (s\ \acute{\imath}_\mu\ o_\mu)]_{PWd}$	* !	

Lexicon Optimization would also require that syllable, foot and prosodic word structure be present in the input, so that the appearance of these prosodic constituents in the output is not sanctioned by DEP. However, an important distinction between linguistic material and linguistic structure must be taken into consideration. Whereas features, segments and morae are linguistic material; syllables, feet and prosodic words are linguistic structure. The constraints DEP and MAX regulate the identity between input and output in terms of linguistic material but they have nothing to say with respect to their structure. Within Optimality Theory, linguistic structure is provided by the function GEN, which generates all possible structural associations for the material contained in any given input. Consequently, syllables, feet and prosodic words, which are different levels of prosodic structure, fall beyond the scope of Lexicon Optimization. These structural units are projected by GEN in order to license morphological material at the surface level. It is the role of EVAL, the evaluator function, to determine which of all the possible structural associations projected by GEN is optimal. Syllabification is interpreted as the reconciliation of two sources of conflict: each segment's suitability for being parsed in a particular syllabic position, and prosodic constraints such as ONSET, NOCODA, *COMPLEX, etc., which impose a certain structure on syllables (Prince and Smolensky, 1993, p, 127).

(44)	ONSET:	A syllable must have an onset.
	NOCODA:	Syllables may not have codas.
	*COMPLEXO,N,C:	Onset, syllables and codas may not be bisegmental.

Similarly, foot structure arises from reconciling a prosodic licensing principle, PARSE-SYLL, with prosodic structure constraints such as FOOT-BINARITY, FOOT-FORM and different versions of ALIGNMENT.

(45)	PARSE-SYLLABLES:	A syllable must be parsed by a foot.
	FOOT-BINARITY:	Feet are binary under a moraic or syllabic analysis.
	ALIGN($PCat_1$, x, $PCat_2$, x):	Align an edge of $PCat_1$ with the corresponding edge of $PCat_2$.

Satisfaction of these constraints is checked at the surface level not at the underlying level, where prosodic structure does not exist because it has not been projected by GEN. [11]

Given that most prosodic structure is derived, it follows that a process that requires reference to the prosodic structure of the input may not have an abstract form as input. Such input must necessarily be a derived form. As an example, consider the case of one of two truncation processes in Spanish.

(46) Type-B hypocoristics:

a.	mojsés	→	≠é≠e	Moisés
	balentín	→	tíno	Valentín
b.	sesílja	→	≠íla	Cecilia
	gonsálo	→	≠álo	Gonzalo
c.	lásaro	→	lá≠o	Lázaro
	tránsito	→	tán≠o	Tránsito

For the immediate purposes, I disregard sound substitutions (e.g. ≠ < s), to focus on the contrast in prosodic structure between SF and NWO. The SF's in (46a) are oxytones; those in (46b) are paroxytones and those in (46c) are proparoxytones. Regardless the stress pattern of SF, the NWO is always equivalent to a syllabic trochee built preferably on open syllables, although the first syllable may be closed by a nasal consonant. The striking fact about these data is that the segments parsed by the syllabic trochee come from the main-stressed foot of SF.

[11] The fact that prosodic structure is projected by GEN does not preclude exceptional cases of lexicalized prosodic structure. The irregular stress of a small set of Spanish words (e.g. *café* 'coffee', *sofá* 'sofa', etc.) would require an underlying degenerate foot.

(47) Faithfulness to the main-stressed foot:

a. [moi.(sés)] → [(≠é.≠e)]
   [ba.len.(tín)] → [(tí.no)]

b. [se.(sí.lja)] → [(≠í.la)]
   [gon.(sá.lo)] → [(≠á.lo)]

c. [(lá.sa).ro] → [(lá.≠o)]
   [(trán.si).to] → [(tán.≠o)]

In order the capture this important generalization, any account of this process needs to refer to the prosodic structure of SF, which means that SF may only be a derived output form.

1.5 Various instances of OO-correspondence in Spanish

Now that OO-correspondence has been motivated, I proceed to show how Jerigonza, word-blending, truncation and playful-words are processes that enforce the identity between two output forms. For each one of these processes, there exists empirical evidence that the new forms are derived from an output form. A striking property of Spanish blends, for example, is that the blended form has the exact same prosodic structure as one of its SF's.

(48) Prosodic Resemblance between NWO and SF in blends:

SF_2	[(sú.cio)]	[(drá.ma)]
SF_1	[so.cie.(dád)]	[cru.ci.(grá.ma)]
NwO	[su.cie.(dád)]	[cru.ci.(drá.ma)]

The NwO's [su.cie.(dád)] and [cru.ci.(drá.ma)] mirror the prosodic structure of one of their SF's: [so.cie.(dád)] and [cru.ci.(grá.ma)], respectively. The same number of syllables and the same stress pattern reveal the identity in syllable and foot structures between SF_1 and NwO. This important property of blends would be merely an accident if we were to assume that blends are derived from a pair of abstract input forms. By contrast, if one assumes that blends are derived from output forms which, as all surface forms, already have a defined prosodic structure, it becomes evident that the reason for this resemblance is because blends preserve the prosodic information encoded in their SF's.

(49) Blending model:

$$\begin{tikzcd}
IF \arrow[d, shift right, swap, "\text{IO-Correspondence}"] & \\
SF \arrow[u, shift right] \arrow[r, shift left] \arrow[r, phantom, "\text{OO-correspondence}", yshift=-4ex] & B \arrow[l, shift left]
\end{tikzcd}$$

According to this model, the base for a blend B is a source form SF, which is derived from an abstract input form IF. SF remains faithful to IF because they stand in an IO-Correspondence relationship that enforces (SF-IF)-Identity. Similarly, B resembles SF because they stand in an OO-correspondence relationship that promotes (SF-B)-Identity. It is precisely this OO-correspondence relationship that forces B to mimic derived properties of SF which IF does not have. Also note that B and IF are not required to remain faithful because they are not governed by a correspondence relationship. This is consistent with the finding that the new output form (whether it is a blend, Jerigonza word, truncated form or playful-word) never displays any properties of IF that are not present in SF.

Like blending, other Spanish word-formation processes rely on prosodic information that can only be found in an output form. In one of the three varieties of Jerigonza I have identified, a sequence of epenthetic segments (e.g. *CV*) is added immediately to the right of every syllable boundary in SF.

(50) <u>CV-Epenthesis in Jerigonza</u>:

SF		*NWO*	
a.mí.ɤo	→	à.<u>pa</u>.mì.<u>pi</u>. ɤó.<u>po</u>	'friend'
bár.ko	→	bàr.<u>pa</u>.kó.<u>po</u>	'ship'
pro.tés.ta	→	prò.<u>po</u>.tès.<u>pe</u>.tá.<u>pa</u>	'protest'

Without access to the syllable structure of SF, the generalization that epenthetic segments appear after every syllable boundary could not be captured. Only if this process has access to the prosodic structure of an output form is it possible to explain its regularity in regards to the site of epenthesis. An abstract input may not be the form that is fed into GEN in order to create Jerigonza words simply because abstract input forms do not contain derived properties such as syllable structure. The following model observes the same correspondence relationships as (49) above only that it applies to Jerigonza, J.

(51) <u>Jerigonza model</u>:

$$
\begin{tikzcd}
\textit{IF} \arrow[d, shift right, swap, "\text{IO-Correspondence}"] & \\
\textit{SF} \arrow[u, shift right] \arrow[r, shift left] & \textit{J} \arrow[l, shift left, "\text{OO-correspondence}"]
\end{tikzcd}
$$

Within Spanish Truncatory Morphology, Type-A hypocoristics are disyllabic forms that mimic the two leftmost syllables of SF. However, when the peninitial syllable of SF is heavy, it is possible to drop the consonant that closes that syllable (Prieto 1992).

(52) <u>Type-A Hypocoristics</u>:

SF		*NWO*			
ɒ̄.δól.fo	→	ɒ̄́.δol	~	ɒ̄́.δo	Rodolfo
ar.mán.do	→	ár.man	~	ár.ma	Armando
fer.nán.do	→	fér.nan	~	fér.na	Fernando

Note that the truncated form that retains the coda of the second syllable remains more faithful to the source form. Interestingly, the segment that closes the second syllable of the truncated form must be a segment parsed under the second syllable of SF. The examples in (53) show that when this is not the case (e.g. when the consonant that closes the second syllable in the truncated form is parsed under the third syllable of the source form), the preservation of that extra segment is not possible.

(53) <u>Type-A Hypocoristics</u>:

SF		*NWO*			
te.ré.sa	→	té.re	~	*té.res	Teresa
do.ló.res	→	dó.lo	~	*dó.lor	Dolores
mar.ɣa.rí.ta	→	már.ɣa	~	*már.gar	Margarita

These facts indicate that the generation of truncated forms is sensitive to the syllable structure of SF. The conclusion one is led to, once again, is that the input for truncation is a derived output form, which supports the following truncation model.

(54) Truncation model:

$$\begin{array}{lccc} & \mathit{IF} & & \\ \text{IO-Correspondence} & \big\downarrow\!\big\uparrow & & \\ & \mathit{SF} & \rightleftarrows & \mathit{TF} \\ & & \text{OO-correspondence} & \end{array}$$

Lastly, consider the case of Spanish playful-words. In the following examples, a sequence of epenthetic segments (e.g. Liquid + Vowel) is added immediately to the right of the main-stressed foot of SF.

(55) Epenthesis in playful-words:

SF		*NWO*	
[(θán.θa)] 'swing'	→	[(θán.θa).la] 'swing'	Zanza ~ Zánzala
[(trá.pa)] 'pointless talk'	→	[(trá.pa).la] 'pointless talk'	Trapa ~ Trápala
[gwa.(sán.ga)]	→	[gwa.(sán.ga).ra]	Guasanga ~ Guasángara

Epenthesis in this type of playful-words helps avoid a word-final foot. This process implements a change in prosodic structure: $[\ \ldots\ (\acute{\sigma}\sigma)]_{\mathrm{PWd}} \rightarrow [\ \ldots\ (\acute{\sigma}\sigma)\sigma]_{\mathrm{PWd}}$. Such transformation is obviously not arbitrary because epenthetic segments may not be introduced just anywhere. Reference to the main-stressed foot of SF is required in order to select the optimal NWO. For this reason, only an output form endowed with prosodic structure may be the input of playful-words.

(56) <u>Playful-word model</u>:

IF

IO-correspondence ⇅

SF ⇄ *PW*

OO-correspondence

In sum, Jerigonza, blend, truncated forms and playful-words are various instances of OO-correspondence. This proposal results in a model of Spanish word-formation that consists of two levels. In level 1, an output form (OF) is generated from an abstract input form (IF). In level 2, the output of level 1 serves as a source form (SF) to generate a new output form (NwO).

(57) <u>A model of Spanish word-formation</u>:

	IF	*Input Form*
IO-correspondence (Level 1)	↕	
	OF / SF	*Output / Source Form*
OO-correspondence (Level 2)	↕	
	NwO	*New Output Form*

Traditional studies on Spanish morphology have only recognized level 1. The current study acknowledges the existence of non-concatenative word-formation processes in Spanish and places them in a second level since they operate on the output of level 1.