

STEM BOUNDARY AND STRESS EFFECTS ON SYLLABIFICATION IN SPANISH¹

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Spanish stress shows a uniform pattern in verbal forms. For stressed roots in particular, the unmarked position is the last vowel. Nevertheless, first conjugation roots ending in a high vowel display two opposite behaviours: while one group follows the unmarked pattern (e.g. *envío* ‘I send’), the other group keeps the high vowel unstressed, thus always becoming a glide (e.g. *cambio* ‘I change’). While nominals related to the latter group exhibit the same stress position as the first conjugation (e.g. *cambio* [kámbjo] ‘change’, *cambio* [kámbjo] ‘I change’), this is not true of nominals related to the former group, since we find some cases with stress shift (e.g. *amplio* [ámpljo] ‘large’, *amplío* [amplío] ‘I enlarge’) and other cases without this change (e.g. *envío* [embío] ‘shipment’, *envío* [embío] ‘I send’). The goal of this paper is to account for these facts (including the lack of pairs such as **amplío* [amplío] ‘large’ and **amplio* [ámpljo] ‘I enlarge’) and analyze the prosodic and morphological factors determining glide formation.

Keywords: verbal stress, glide formation, morpheme boundaries, Spanish

1. Introduction

Glide formation in vowel sequences of rising sonority has been dealt with widely in the literature on Spanish (Navarro Tomás 1948; Harris 1983, Harris & Kaisse 1999; Colina 1999; Hualde 1999, 2005; Cabré & Prieto 2007). Nevertheless, none of these studies has

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focused on a comparison of first conjugation verbs whose stems end in a high vowel with the lexically related nominal forms. The aim of this study is to account for the syllabic behaviour of rising sonority sequences in this set of lexically related items.

Harris & Kaisse (1999) point out that verbs and related nominals may or may not display the root stress in the same position. If they do, the high vowel may be either unstressed (*cámbio* ‘change’, *cámbian* ‘they change’) or stressed (*lío* ‘confusion’, *lian* ‘they confuse’). If they do not, stress is moved to the last vowel in verbal roots. Thus, in cases such as *ámpl[jo]* ‘large’ or *vár[jo]* ‘varied’ the final vowel is lexically unstressed, whereas the high vowel is stressed in the corresponding verbal forms *ampl[i.a]n* ‘they enlarge’ or *var[i.a]n* ‘they vary’. Strikingly, we find no examples in Spanish of the reverse phenomenon, e.g. **amplio* ‘large’/ **ámplio* ‘I enlarge’. The following table shows the different stress positions that are found.

Noun/Adjective /i/	Verb /i/
<i>cámbio</i>	<i>cámbian</i>
<i>lío</i>	<i>lian</i>
<i>ámplio</i>	<i>amplian</i>

Our goal is to offer a unified analysis of the phenomena presented above, from within the Optimality Theory framework, based on the relationship between on the one hand the prosodic and morphological factors that play some role in favoring or blocking glide formation (Cabré & Prieto 2006) and the strategies determining stress assignment on the other (Ohannesian 2004).

The syllabification of high vowels adjacent to another vowel has had different solutions among Romance languages. The tendency for unstressed high vowels to become glides in this context is cross-linguistically attested. In addition, Romance languages like Spanish have undergone a historical process whereby stressed mid vowels have tended to become diphthongs in specific contexts (e.g. *tener* ‘to have’ / *tiene* ‘she has’; *morir* ‘to die’ / *muero* ‘I die’). Nevertheless, there are some other contexts where Spanish preserves hiatus syllabification. The glide formation process has been amply dealt with in the literature on Spanish (Navarro Tomás 1948; Harris 1983, Harris & Kaisse 1999; Colina 1999; Hualde 1999, 2005; Cabré & Prieto 2007; Chitoran & Hualde 2007). It has been claimed that

morpheme boundaries and stressed high vowels tend to block glide formation in morphologically related words (*env*[i.á]r ‘to send’, *env*[i.o] ‘I send’; *punt*[u.á]r ‘to punctuate’, *punt*[ú.o] ‘I punctuate’), but Cabré & Prieto (2007) point out that the stressed high vowel in nominal cases such as *navío* ‘ship’ or *policía* ‘police’ does not prevent glide formation in derived forms such as *nav*[j]ero ‘shipping’ or *polic*[j]al ‘police-related’. In fact, verbal forms tend to maintain a uniform shape in the paradigm, including deverbal nominals, e.g. *cám*bjo, *cambjámos*, *cambjánte*; *confi.o*, *confi.ámos*, *confi.anza*. Otherwise, *confi.amos* or *confjamos* alternates respectively with *confi.ánza* or *confjanza*, depending on the speaker.

Our study focuses on the resolution as diphthong or hiatus of the rising sonority sequences at the stem boundary in lexically related items. Specifically, it deals with first conjugation verbs and related nominals (including adjectives) whose stems end in a high vowel (*desafío* ‘challenge’ — *desafiar* ‘to challenge’ — *desafiante* ‘challenging’; *cambio* ‘change’ — *cambiar* ‘to change’ — *cambiante* ‘changing’). The aim of this paper is to give a unified explanation for the outcomes of this subset of lexical items and show the prosodic and morphological reasons that allow its surface syllabification.

Following Harris & Kaisse (1999), who include in their analysis those first conjugation verbs that exhibit a high vowel at the right edge of the stem, Spanish first conjugation verbs can be classified into three patterns according to the relationship between the stress position in verbal and related nominal stems and the stress position itself. As we see in the table 1 below, verbs and related nominals showing patterns 1 and 2 show the same stress position: the high vowel is always unstressed in 1, whereas it is always stressed in 2. By contrast, pattern 3 words show high vowels that are stressed in the verbal stem but unstressed in related nominals. Unexpectedly, pattern 4, the hypothetical opposite of pattern 3, with high vowels unstressed in verbs but stressed in related nominals, does not exist. In this table and elsewhere in this article, in order to facilitate interpretation, high vowels are phonetically transcribed and stressed syllables are marked independently of the conventional orthography.

(1)

Pattern	Verbs	Related nominals
1.	cámbj]an	cámbj]o
2.	rocí].an	rocí].o
3.	ansí].an	ánsj]a
4.	*ánsj]an	*ansí].a

Our analysis focuses on three issues: a) why verbs in group 1 in the table do not shift the stress position in verbal forms as predicted by the general rule of the language (*cámbio* N / **cambío* V vs. *ánsia* N / *ansío* V); b) why there is an apparent gap in the system, i.e. group 4 in the table does not exist (**ansía* N / **ánsio* V); and finally, c) why derived nouns, which exhibit a theme vowel before the suffix, display the same behavior as related verbs in terms of the syllabic condition of the high vowel: *cambjamos*, *cambjante* **cambi.amos*, **cambi.ante* vs. *confi.amos/confjamos*, *confi.anza/confjanza* (Cabré & Prieto 2007).

Our goal is thus to provide a unified analysis and feasible explanation for the gap presented above, the preservation of the historical stress position and, finally, the uniform behavior of deverbals in contrast to denominals.

The paper is organized as follows. Section 2 presents the data. Section 3 examines the related prosodic factors, such as stress position, and morphological processes, such as the formation of the diminutive, that exhibit analogous behavior. Section 4 presents a unified analysis within the Optimality Theory framework of the morphological and prosodic factors that control the hiatus/diphthong realization, and Section 5 includes conclusions and further implications.

2. *The data*

Spanish verbal forms are built on the following morphological constituents: root (R), theme vowel (TV), tense, aspect and mode morpheme (TAM) and number and person morpheme (NP). We adopt the structure presented in Alcoba (1991, 1999: 4924) in which the root and theme vowel make up what is labelled the verbal theme (‘Tema’) while the inflexional suffix (‘Flex’) includes the tense, aspect and mode morpheme and the number

and person morpheme, as shown in 2. The verbal theme component serves as the base for inflexional forms and derived nominals.

- (2)
- $$[[[R] [TV]]_{\text{Tema}} [[TAM] [NP]]_{\text{Flex}}]_V$$
- $$[[[cambi]_R [\acute{a}]_{TV}]_{\text{Tema}} [[ba]_{TAM} [mos]_{NP}]_{\text{Flex}}]_V \text{ '1pp Ind.Imp.Past'}$$
- $$[[[cambi]_R [\acute{a}]_{TV}]_{\text{Tema}} [[\emptyset]_{TAM} [mos]_{NP}]_{\text{Flex}}]_V \text{ '1pp Ind.Pres.'}$$

Our analysis is focused on the three singular persons and the third plural person of Present Tense, the only forms in which the root can be stressed. Taking into account those first conjugation verbs whose roots end in a high vowel, we find that verbs fall into two broad groups depending on the stress position in Present Tense forms. Verbs in group 1—the larger one—(see 3a) keep the high vowel unstressed throughout the paradigm, and it always surfaces as a glide. By contrast, verbs in group 2 (see 3b) stress the final high vowel and preserve the hiatus across the paradigm.

- (3a) Group 1
- | | |
|-------------------------------|--------------------------------------|
| cambjár 'to change' | — cámbjo 'I change' 1ps IP |
| limpjár 'to clean' | — límpjo 'I clean' 1ps IP |
| silencjár 'to silence' | — siléncjo 'I silence' 1ps IP |
| alivjár 'to relieve' | — alívjo 'I relieve' 1ps IP |
| entibjár 'to cool' | — entíbjo 'I cool' 1ps IP |
| odjár 'to hate' | — ódjo 'I hate' 1ps IP |
| acaricjár 'to caress' | — acarícjo 'I caress' 1ps IP |
| asocjár 'to associate' | — asócjo 'I associate' 1ps IP |
| envidjár 'to envy' | — envídjo 'I envy' 1ps IP |
| congenjár 'to get along well' | — congénjo 'I get along well' 1ps IP |
| ajusticjár 'to execute' | — ajustícjo 'I execute' 1ps IP |
| codicjár 'to covet' | — codícjo 'I covet' 1ps IP |
| apropjár 'to appropriate' | — aprópjo 'I appropriate' 1ps IP |
| columpjár 'to swing' | — yo colúmpjo 'I swing' 1ps IP |
| averigwár 'to find out' | — averígwo 'I find out' 1ps IP |

- (3b) Group 2
- | | |
|-------------------------|--------------------------------|
| confiár 'to trust' | — confío 'I trust' 1ps IP |
| esquiár 'to ski' | — esquío 'I ski' 1ps IP |
| puntuár 'to mark' | — puntúo 'I mark' 1ps IP |
| fluctuár 'to fluctuate' | — fluctúo 'I fluctuate' 1ps IP |
| amnistiár 'to amnesty' | — amnistío 'I amnesty' 1ps IP |
| desafiár 'to challenge' | — desafío 'I challenge' 1ps IP |
| espiár 'to spy' | — espío 'I spy' 1ps IP |
| vaciár 'to empty' | — vacío 'I empty' 1ps IP |
| rociár 'to sprinkle' | — rocío 'I sprinkle' 1ps IP |
| desviár 'to divert' | — desvío 'I divert' 1ps IP |
| enfriár 'to cool' | — enfrío 'I cool' 1ps IP |
| enviár 'to send' | — envío 'I send' 1ps IP |

If we now consider the relationship of these verbs with their nominal forms, we note that the verbs in group 1 (3a) here—which coincides with pattern 1 in table 1—differ from those showing patterns 2 and 3. While nouns and adjectives of group 1 always diphthongize (e.g. *cambjár* — *cámbjo* ‘change’, *limpjár* — *límpjo* ‘clean’, *silencjár* — *siléncjo* ‘silence’), words following patterns 2 and 3 show two different solutions, as we can see in 4a and 4b (note that the group 2 shown in 3b follows pattern 2 in table 1).

(4a) Root-final high vowel is stressed in both verbal and related nominal forms (corresponds to pattern 2 from table 1):

espían ‘they spy’	— espía ‘spy’
rocían ‘they sprinkle’	— rocío ‘dew’
envían ‘they send’	— envío ‘shipment’
enfrian ‘they cool’	— frío ‘cold’

(4b) Root-final high vowel is stressed in verbal forms but unstressed in related nominals (corresponds to pattern 3 from table 1):

ansían ‘they long for’	— ánsja ‘worry’
amplían ‘they enlarge’	— ámpljo ‘large’
contrarian ‘they oppose’	— contrárjo ‘opposed’
perpetúan ‘they perpetuate’	— perpétwo ‘perpetual’
continúan ‘they continue’	— contínwo ‘continuous’

Furthermore, there is a striking asymmetry between the two high vowels. While final /i/ is maintained in all related lexical items, final /u/² is present in the related nominals of some verbs (see 5a) but not present in the nominals of other verbs (see 5b), which show allomorphy:

(5a)	menguar ‘to diminish’	— méngua ‘waning’
	continuar ‘to continue’	— contínuo ‘continuous’
	perpetuar ‘to perpetuate’	— perpétuo ‘perpetual’
	atenuar ‘to attenuate’	— ténue ‘thin’

² All verbs with root-final /u/ tend to stress this vowel independently of the stress position of related nominals (even in cases such as *adecú.o*, against the preceptive form *adécwo* ‘I adjust’), except for verbs with voiced velar obstruent /g/ (*frágwan* ‘they forge’, *atestígwan* ‘they testify’):

acénto ‘stress’	— acentú.an ‘they stress’
perpétwo ‘perpetual’	— perpetú.an ‘they perpetuate’
ténwe ‘thin’	— atenú.an ‘they attenuate’
contínwo ‘continuous’	— continú.an ‘they continue’

(5b)	atestiguar ‘to testify’	— testígo ‘witness’
	puntuar ‘to punctuate’	— púnto ‘point’
	graduar ‘to graduate’	— grádo ‘degree’
	efectuar ‘to effect’	— efécto ‘effect’

It is also worth noting that those verbs that show a different stress position from that of their corresponding nominals (i.e. *ámpljo* ‘large’ vs. *yo amplío* ‘I enlarge’) are all derived from that nominal form, as is shown in 6.

(6)	ámpljo ‘large’	→ amplí.an ‘they enlarge’
	grádo ‘degree’	→ gradú.an ‘they graduate’
	contrárjo ‘opposite’	→ contrarí.an ‘they oppose’
	pátrja ‘fatherland’	→ repatrí.an ‘they repatriate’
	perpétwo ‘perpetual’	→ perpetú.an ‘they perpetuate’

Among the remainder of verbs, we can find both directions of derivation, as shown in 7a —nominals derived from verbs— and 7b —verbs derived from nominals:

(7a)	renunciar ‘to give up’	→ renúncia ‘abdication’
	despreciar ‘to scorn’	→ desprécio ‘scorn’
	enviar ‘to send’	→ envío ‘shipment’
	desafiar ‘to challenge’	→ desafío ‘challenge’
(7b)	siléncio ‘silence’	→ silenciar ‘to silence’
	envidia ‘envy’	→ envidiar ‘to envy’
	rocío ‘dew’	→ rociar ‘to sprinkle’
	frio ‘cold’	→ enfriar ‘to cool’

3. *Related issues*

In this section we will examine those factors that can help us to understand the syllabic resolution of the sequences under study. Certain morphological processes, such as the formation of diminutives, can shed light on the issue because they show the same distributional properties. We will start with nominal stress assignment and its consequences on syllabification in derived forms, and then go on to deverbal nominals and diminutive formation in the groups presented above.

3.1. Stress assignment

Spanish stress is limited to the last three syllables of the word, in what is known as the three-syllable window (Harris 1983, and Roca 1988, 2005, among others). Depending on the position of the stress, words are classified into oxytones (*cancción* ‘song’, *hindú* ‘Hindu’), paroxytones (*casa* ‘house’, *árbol* ‘tree’) and proparoxytones (*sábana* ‘sheet’, *régimen* ‘diet’). Stress assignment has been widely discussed in the literature and has been considered either syllable-quantity-dependent (Harris 1983, Hammond 1995, Oltra & Arregi 2005) or quantity-independent, either totally (Ohannesian 2004) or partially (Roca 1988, 2007). We assume here the analysis of Ohannesian (2004), who establishes three accentual patterns in Spanish, according to the number of syllables between the right edge of the stressed syllable and the right edge of the stem. The stress position is conditioned by morphological categories, namely, by the stem and prosodic word boundaries in the unmarked pattern. In marked and ultramarked cases, lexical marks determine the stress position.

As we can see in table 8 below, the last vowel of marked stems and the last two vowels of ultramarked ones have a lexical mark of zero or null prominence (underlined vowels), e.g. *árbol* ‘tree’, *sában-a* ‘sheet’, *lúgubr-e* ‘lugubrious’, *régimen* ‘diet’. These marked vowels cannot be stress bearers³.

(8)

Patterns	Syllables between the right edge of the stressed syllable and the right edge of the stem	Lexical marks		Classification according to the stress position
unmarked			<i>ca<u>s</u>a, ma<u>d</u>re</i>	paroxytones
			<i>ca<u>n</u>cción, hi<u>n</u>dú</i>	oxytones
marked	σ	last vowel of the stem	<i>sá<u>ba</u>na, lú<u>gub</u>re</i>	proparoxytones
			<i>á<u>r</u>bol</i>	paroxytones
ultramarked	σσ	two last vowels of the stem	<i>r<u>é</u>gim<u>e</u>n, ó<u>m</u>ic<u>r</u>on</i>	proparoxytones

³ Table 8 shows only primitive words. Derivational suffixes also follow the same lexical marks, thus a suffix such as /ik/ bears a lexical mark of null prominence (e. g. *mito* ‘myth’, *mítico* ‘mythic’). By contrast, inflectional suffixes lack this kind of mark. For a detailed discussion of the advantages of lexical marking of unstressed vowels instead of tonic vowels, see Ohannesian (2004).

The unmarked pattern contains words in which the right edge of the stressed syllable coincides with the right edge of the stem. If the word ends in a terminal element or epenthesis it will be paroxytone (*cása, mádre*); if the word lacks these elements, it will be oxytone (*canCIÓN, hindú*). The marked pattern includes words with just one marked vowel between the right edge of the stressed syllable and the right edge of the stem. The presence of a terminal element or epenthesis yields proparoxytones (*sábana, lúgubre*), whereas the absence of such elements results in paroxytones (*árbol*). The ultramarked pattern is formed by words with two marked vowels between the right edge of the stressed syllable and the right edge of the stem (*régimen*). All the words belonging in this group are proparoxytones.

3.2. Verbal stress

Romance languages tend to regularize the stress position at the right edge of the verbal stem, which inhibits specific accentual patterns in verbal paradigms.⁴ Spanish is no exception and has standardized the stress position on the last stem vowel, thus blocking proparoxytones in Present Tense forms. The stress in proparoxytone nominal forms has moved to the last vowel of the stem in related verbs, as shown in the examples in 9 below.

(9)	fábrica ‘factory’	yo fábrico / *fábrico ‘I make’
	ánimo ‘courage’	yo ánimo / *ánimo ‘I encourage’
	intérprete ‘interpreter’	yo intérpreto / *intérpreto ‘I interpret’
	homólogo ‘homologous’	yo homólogo / *homólogo ‘I make sth homologous’
	lástima ‘pity’	yo lastímo / *lástimo ‘I hurt’
	cálculo ‘calculation’	yo calcúlo / *cálculo ‘I calculate’
	diálogo ‘dialogue’	yo dialógo / *diálogo ‘I dialogue’
	estímulo ‘stimulus’	yo estímulo / *estímulo ‘I stimulate’
	fórmula ‘formula’	yo formúlo / *fórmula ‘I formulate’
	legítimo ‘legitimate’	yo legítímo / *legítimo ‘I legitimize’
	máquina ‘machine’	yo maquíno / *máquino ‘I plot’
	matrícula ‘registration’	yo matricúlo / *matrículo ‘I register’
	número ‘number’	yo numéro / *número ‘I number’
	orden ‘order’	yo ordéno / *órdeno ‘I order’
	próspero ‘prosperous’	yo prospéro / *próspero ‘I prosper’

⁴ Italian constitutes an exceptional case. In this language, root stress particularities are preserved in verbal paradigms, yielding proparoxytonic verbal items: *fábrica* ‘factory’ / *fábrico* ‘I make’, *tránsito* ‘transit’ / *tránsito* ‘I pass’, *cálcolo* ‘calculation’ / *cálcolo* ‘I calculate’, *ábito* ‘habit’ / *ábito* ‘I inhabit’, etc. We even find preproparoxytonic stress in verbal forms not permitted in nominal items: *fábricano* ‘they make’, *tránsitano* ‘they pass’, *cácolano* ‘they calculate’, *ábitano* ‘they inhabit’.

Verbs following pattern 3 in table 1 (exemplified in 4b) also follow this pattern and standardize the stress position.

(10) <i>Nominal form</i>	<i>Verbal form</i>
várjo ‘varied’	yo varío ‘I vary’
pátrja ‘fatherland’	yo repatrió ‘I repatriate’
contínwo ‘continuous’	yo continúo ‘I continue’
efécto ‘effect’	yo efectúo ‘I effect’

It is important to highlight that all the verbs in 9 and 10 derive from their corresponding nominals and stress movement is a consequence of this fact. Crucially, stress shift is limited to this direction of derivation, i.e. from nominal forms to verbal forms. This does not imply that whenever we have noun-to-verb derivation we also have stress shift (e.g. *tíbio* / *entíbio*, *frío* / *enfrío*). However, whenever we have stress shift we necessarily have noun-to-verb derivation. By contrast, verb-to-noun derivation can never entail any stress movement (e.g. *renunciar* ‘to give up’ / *renúncio* ‘I give up’ → *renúncia*, **renúncia* ‘abdication’).

If the only possibility for stress shift is noun-to-verb derivation, this means that when nouns and verbs display different stress positions, the verbs are derived from the nouns and not vice versa. This is one of the factors that underlie the absence of hypothetical pattern 4 in table 1. For example, a pair like **amplío* A / **yo ámplio* V would imply a derivation from verb to noun and stress movement to the unmarked position. The derivational pattern illustrated by the words in 9 and 10 interacts with the general tendency of the language to homogenize verbal stress to an unmarked position. In short, in noun-verb pairs, nouns always preserve their stress idiosyncrasy while verbs do not.

The verbs in group 1 (3a) and their related nominals do not follow the general tendency of the language and fail to shift the stress to the last stem vowel. Nevertheless, the diphthong resolution blocks antepenultimate stress in Present Tense forms, submitting the outcome to the general rule of the language (e.g. *ódjo* ‘hate’ / *yo ódjo* ‘I hate’). The verbs in group 2 (3b) do not present any deviation because among these words the last high vowel is always stressed (e.g. *amnístia* ‘amnesty’ / *yo amnístio* ‘I amnesty’)⁵.

⁵ Other Romance languages such as Occitan show a similar behaviour, e.g. *cámbjes* ‘you change’, *envíes* ‘you send’ (Sauzet & Ubaud 1995).

3.3. Syllabification in derived forms

Derived nominals with theme vowels⁶ preserve the syllabification of the sequence as it exerts in the related verb. Conversely, derived nominals with stressed suffixes diphthongize independently of the syllabic condition of the high vowel in the primitive root (Cabré & Prieto 2007). The examples in 11 below show the syllabic heritage of nominals derived from verbs in opposition to the absence of this kind of heritage in 12, with nominals derived from nouns.

(11) Verbal form – Nominal form

cambjár — cambjánte ‘changing’
limpjár — limpjáble ‘cleanable’
silencjár — silencjáble ‘waning’
averigwár — averigwáble ‘ascertainable’

confiár — confiánza ‘trust’
esquiár — esquiáble ‘suitable for skiing’
puntuár — puntuáble ‘evaluable’
fluctuár — fluctuánte ‘fluctuating’

(12) Nominal form – Nominal form

ánsja ‘anxiety’ — ansjóso ‘anxious’
pátrja ‘fatherland’ — patrjóta ‘patriot’
siléncjo ‘silence’ — silencjóso ‘silent’
ágwa ‘water’ — acwóso ‘watery’

valía ‘value’ — valjóso ‘valuable’
manía ‘foible’ — manjático ‘finicky’
sangría ‘bleeding’ — sangrjénto ‘bloody’
navío ‘ship’ — navjéro ‘shipping’

3.4. Diminutives

As is well known, the most common Spanish diminutive suffixes are *-it+Terminal Element (TE)* and *-cit+TE* (see footnote 6). Leaving aside special cases, the marked form *-cito/a* is used in bases without a terminal element (see 13a) and bisyllabic words whose stem ends in an unstressed high vowel. In these cases, the diminutive formation process preserves the syllabification of the base by the insertion of an epenthetic *e*, as we see in 13b below. Otherwise the unmarked form *-ito/a* is used.⁷

(13a) jardín ‘garden’ — jardincito
madre ‘mother’ — madrecita

(13b) labjo ‘lip’ — labjecito
indja ‘Indian’ — indjecita

⁶ We distinguish the term *theme vowel* from *word marker*. Following Harris (1991), *word marker* or *terminal element (TE)* is that element which only appears at the right-hand edge of a word in its singular form and may not be followed by any suffix except a plural marker. Such elements may be made up of any of the five vowels, either alone or followed by *s*, or *-s* itself. *Theme vowel* must be interpreted as the vowel that follows the verbal root.

⁷ For more details, see Jaeggli (1978), Harris (1983, 1993), Crowhurst (1992), Prieto (1992), Ohannesian (1996), Lloret (1996), Colina (2003) and Bermúdez Otero (2007).

It is important to point out that the unmarked form *-ito/a* can also be accepted in some cases that ought to yield *-cito/a*, such as *jardín* > *jardinito*, but the inverse situation is always ungrammatical, e.g. *casa* > **casecita* (see 13c).

(13c)	<i>casa</i> ‘house’	— <i>casita</i> , <i>*casecita</i>
	<i>comadre</i> ‘kinswoman’	— <i>comadrita</i> , <i>*comadrecita</i>
	<i>pintalabjos</i> ‘lipstick’	— <i>pintalabitos</i> , <i>*pintalabjecitos</i> (cf. <i>labjecito</i> , <i>*labito</i>)

We present in 14 some possible diminutive forms of nouns related to the three patterns described above (exemplified in 3a, 4a and 4b). The peculiarities of this process, i.e. the spontaneity conditions of its production, involve considerable variability, whether dialectal or idiolectal. Nevertheless, some forms are clearly rejected by all speakers and others are clearly preferred. In this regard, it is noteworthy that groups 1 and 2 follow their respective verbal/nominal syllabification patterns in the formation of diminutives. Interestingly, however, the diminutives of words in group 3 do not follow the pattern seen in 13b above, but rather obey the same pattern as the stressed nominals of group 2. Diminutive formation in the three groups is illustrated in 14a, 14b and 14c below.

As we see in 14a, group 1 diminutive forms with *-ecito/a*, which allow the glide to be preserved, are preferred over forms with *-ito/a*, which are pronounced with hiatus.

(14a) Group 1		
	<i>plágjo</i> ‘plagiarism’	— <i>plajecito</i> , <i>*plagiíto</i> (cf. <i>plagjár</i> , <i>plágjan</i> , <i>plagjában</i>)
	<i>límpjo</i> ‘clean’	— <i>limpito</i> , <i>*limpiíto</i> (cf. <i>limpjár</i> , <i>límpjan</i> , <i>limpjában</i>)
	<i>génjo</i> ‘genious’	— <i>genjecito</i> , <i>*geniíto</i> (cf. <i>congenjár</i> , <i>congénjan</i>)
	<i>prémjo</i> ‘award’	— <i>premjecito</i> , <i>*premiíto</i> (cf. <i>premjár</i> , <i>prémjan</i> , <i>premjában</i>)
	<i>cópja</i> ‘copy’	— <i>copjecita</i> , <i>*copiíta</i> (cf. <i>copjár</i> , <i>cópjan</i> , <i>copjában</i>)

Conversely, forms from group 2 surface with hiatus. In addition, any form with a glide is clearly rejected:

(14b) Group 2		
	<i>espía</i> ‘spy’	— <i>espiíta</i> , <i>*especita</i> (cf. <i>espiár</i> , <i>espián</i> , <i>espiában</i>)
	<i>crío</i> ‘kid’	— <i>criíto</i> , <i>*crjecito</i> (cf. <i>criár</i> , <i>crián</i> , <i>criában</i>)
	<i>estría</i> ‘striation’	— <i>estriíta</i> , <i>*estrjecita</i> (cf. <i>estriár</i> , <i>estrián</i> , <i>estriában</i>)
	<i>rocío</i> ‘dew’	— <i>rociíto</i> , <i>*rocjecito</i> (cf. <i>rociár</i> , <i>rocián</i> , <i>rociában</i>)

The behaviour of nominals from group 3 is identical to that of group 1: a high vowel surfaces as a diphthong in both cases. However, strikingly, the diminutivization process

works like group 2. These diminutive forms with hiatus realization are preferred over gliding, as we see in 14c.

(14c) Group 3

ánsja ‘worry’	— ansiíta, ??ansjecíta (cf. ansiár, ansían, ansiában)
ámpljo ‘large’	— ampliíto, ??ampljecíto (cf. ampliár, amplían, ampliában)
ágrjo ‘sour’	— agriíto, ??agrjecíto (cf. agriár, agrían, agriában)
pátrja ‘fatherland’	— patriíto, ??patrjecíta (cf. repatriar, repatrián, repatriában)

As this examination of diminutives makes manifest, the distributional patterns of the verbs under study have a larger scope than it seemed at first sight. They are not limited to primitive nouns and verbs, nor to deverbal nominals. Diminutive forms thus give us additional evidence that can help improve our analysis.

4. Analysis

Based on the analysis of Ohannesian (2004), we now describe the Spanish stress assignment conditions that predict the stress position. We will be starting from nouns –and not from verbs— because of the lexical marks of null prominence, which can be deleted in verbs. As we have seen in the preceding section, the stress position in verbal roots is fixed when they are stressed on the last syllable. Our analysis is built on the combination of alignment constraints (McCarthy 1993, 2004) with a faithfulness constraint (Prince & Smolensky 1993). The alignment constraints⁸ account for morphological categories such as stems or words intervening in the stress assignment, whereas the identity constraint imposes faithfulness to lexical marks of vowel prominence.

Leaving aside the constraints that are not relevant for our purposes in this paper, the first alignment constraint ALIGN FOOT RIGHT PROSODIC WORD RIGHT, defined in 15, prevents the foot that holds the stress from moving away from the right edge of the word, while the second constraint, ALIGN STRESS RIGHT STEM RIGHT, defined in 16, favours the coincidence of the stressed syllable with the stem.

⁸ Alignment constraints are applied categorically, i.e. violations are not gradient. For example, the form *régimen* has only one mark of violation of ALIGN STRESS R STEM R, even though there is a distance of two syllables.

(15) ALIGN FOOT R PRWD R

The right edge of the foot must coincide with the right edge of the prosodic word.

(16) ALIGN STRESS R STEM R

The right edge of the stressed syllable must coincide with the right edge of the stem.

An identity constraint FAITHFULNESS NULL PROMINENCE imposes faithfulness to lexical vowel prominence marks. This constraint must be ranked higher than alignment constraints. FAITHFULNESS must be respected because Spanish nominal stress assignment gives priority to preserving the underlying form over respecting alignment, as can be seen in the unmarked pattern.

(17) FAITHFULNESS NULL PROMINENCE

The output must respect the vowel prominence marks of the input.

These statements yield the hierarchy of constraints shown in 17:

(18) FAITHFULNESS NULL PROMINENCE >> ALIGN FOOT R PRWD R >> ALIGN STRESS R STEM R⁹

The tableau in 19 shows an example of the unmarked pattern. Stems are given between square brackets and feet between parentheses. Candidate *b.* respects neither the foot alignment nor the stress alignment constraints. Candidate *c.* violates the stress alignment constraint.

(19)

[cascabel]	FAITH NULL PROMINENCE	ALIGN FOOT R PRWD R	ALIGN STRESS R STEM R
a. φ [casca(bél)]			
b. [(cásca)bel]		*!	*
c. [cas(cábel)]			*!

⁹ The hierarchy ALIGN FOOT R PRWD R >> ALIGN STRESS R STEM R prevents undesirable outputs in verbal forms, like *cántamos – [(cánt)a]mos, stressed at the right edge of the stem cant-. By contrast, the correct form cantámos – [can(t)ámos] fulfils the foot alignment but not the stress alignment constraint.

An example of the marked pattern is shown in 20 and in 21 we present an example of the ultramarked pattern. Both candidates *a.* in 20 and 21 are optimal because they respect the faithfulness constraint at the top of the hierarchy. Candidates *b.* and *c.* are ungrammatical in spite of the fact that they respect alignment constraints.

(20)

[sab <u>a</u> n]a	FAITH NULL PROMINENCE	ALIGN FOOT R PRWD R	ALIGN STRESS R STEM R
a. ☞ [(sáb <u>a</u>)n]a		*	*
b. [sa(b <u>á</u> n)]a	*!		

(21)

[regim <u>e</u> n]	FAITH NULL PROMINENCE	ALIGN FOOT R PRWD R	ALIGN STRESS R STEM R
a. ☞ [(r <u>e</u> gim <u>e</u> n)]		*	*
b. [re(g <u>í</u> m <u>e</u> n)]	*!		*
c. [regi(m <u>e</u> n)]	*!		

4.1. Verbal stress assignment

In relation to the verbal stress assignment, we have to take into account those marks of prominence that are held by the nominals lexically related with verbs. For example, *cambio* ‘change’ has the final high vowel of the stem marked as unstressed: *cambi]_N*. So the final high vowel of the verbal stem must also be marked: *cambi]_V* (Cabré & Ohannesian 2007). The following two tableaux illustrate the difference between the marked pattern in 22 and the unmarked pattern in 23.

(22)

cambi] _v +o	FAITH NULL PROMINENCE	ALIGN FOOT R PRWD R	ALIGN STRESS R STEM R
a. ☞ [(cám.bj]o)			*
b. [cam(bí].o)	*!		
c. [(cámbi].o)		*!	*

(23)

vaci] _v +o	FAITH NULL PROMINENCE	ALIGN FOOT R PRWD R	ALIGN STRESS R STEM R
☞ a. [va(cí).o]			
b. [(vácj)o]			*!
c. [(váci).o]		*!	*

Unstressed high vowels followed by another vowel surface as glides. As noted by Cabré & Prieto (2004: 133), glide formation “is triggered by a general instantiation of the Onset Principle. Within OT, ONSET expresses the general prosodic restriction that every syllable must have an onset and motivates the strong preference for CV syllables rather than V syllables”.

As we have pointed out, verbs presented in 3a and 3b (e.g. *cambiar* ‘to change’ or *confiar* ‘to trust’) can exhibit a uniform pronunciation of the raising sonority sequences throughout the paradigm. Verbs such as *confiar* display hiatus pronunciation even in forms with the high vowel unstressed (e.g. *conf[i.á]mos*). Thus, as noted, paradigm uniformity arises as another factor to determine diphthong or hiatus pronunciation. In order to account for this effect, we have to resort to a new constraint (OPMAX_v), presented in Cabré & Prieto (2007), according to which the competing candidates are the whole paradigms themselves (McCarthy 2005).

(24) OPMAX_v

All forms belonging to one paradigm must be realized in a uniform way.

The tableau in 25 shows how the high-ranked OPMAX_v (unordered with respect to Faith) accounts for the output resolutions of the whole verbal paradigm. In the subset of verbs represented by *cambiar*, the correct candidate forms a diphthong, and ONSET selects the optimal candidate 25a over 25d. For ease of presentation we include not the whole paradigm but only the forms that are relevant to the hierarchy.

(25)

cambi-	OPMAX _v	FAITH NULL PROMINENCE	ALIGN STRESS R STEM R	ONSET
☞ a. cámbjo, cambjár, cambjába, cambjámos			*	
b. cambi.o, cambi.ár, cambi.ába		*!	*	*
c. cámbjo, cambi.ába	*!		*	*
d. cámbi.o cambi.ába			*	*!

On the other hand, in the case of verbs like *confiar*, without null prominence lexical marks, ALIGN STRESS R STEM R prefers the candidate that stresses the high vowel, because it stays at the right-hand edge of the stem, as we see in 26. In these cases ONSET is not relevant.

(26)

confi-	OPMAX _v	FAITH NULL PROMINENCE	ALIGN STRESS R STEM R
a. ☞ confio, confi.ámos, confi.ába			*
b. confio, confjámos, confjába	*!		*

4.2. Deverbal nominals

The theme vowel plays a crucial role in maintaining uniformity effects of gliding not only across the verbal paradigm but also in derived contexts. As we saw in section 3.3, suffixed nominals derived from verbs preserve the same syllabification, e.g. *cámbjo* – *cambjante* ‘changing’, *confi.o* – *confi.ánza* ‘trust’. It seems that the stressed high vowel of the stem forces the hiatus outcome in the derived nominal. This correspondence is reinforced in comparison with nouns or adjectives derived from other nouns: derived

nominals with stressed suffixes diphthongize independently of the syllabic condition of the high vowel of the primitive root (Cabré & Prieto 2007): *valí.a* ‘value’ — *valjóso* ‘valuable’, *sangrí.a* ‘bleeding’ — *sangrjénto* ‘bloody’.

As we have seen, the presence of the theme vowel in derived nominals constitutes the unquestionable evidence for their deverbal condition. These facts demonstrate that, at least in the pronunciation of raising sonority sequences, we must extend the scope of paradigmatic effects to deverbal forms. Kenstowicz (1996:382) proposes the “Uniform Exponence” constraint, which “minimizes the differences in the realization of a lexical item (morpheme, stem, affix, word)”. On the basis of this proposal, which evaluates sets of morphologically related words for prosodic similarity, we reinterpret the paradigmatic constraints of McCarthy (2005) to include all derived forms with theme vowel. We illustrate our model in 27 and 28.

(27)

cambi-	OPMAX _v	FAITH NULL PROMINENCE	ALIGN STRESS R STEM R	ONSET
a. cámbjo cambjába cambjábale			* * *	
b. cámbjo cambjába cambi.ánte	*!		* * *	*

(28)

confi-	OPMAX _v	FAITH NULL PROMINENCE	ALIGN STRESS R STEM R
a. confi.o, confi.ába, confi.ábale			* *
b. confi.o, confi.ába, confjábale	*!		* *

4.3. Prosodic effects

In the case of longer words, the diphthong pronunciation is generalized. In order to explain this, following Cabré & Prieto (2007), we resort to a faithfulness condition called PROSODIC PROMINENCE which agglutinates three prominence conditions that apply to syllables in terms of acoustic duration: 1) syllables in stressed position are more prominent than syllables in unstressed position; 2) syllables in word-initial position are more

prominent than syllables in non-initial position; and 3) syllables in short stems or words are more prominent than syllables in longer stems or words. The prominence level of a given syllable is obtained through a computation of these three pairs of prominence levels. If the syllabic prominence obtained is high, this is a clear indicator that glide formation will be blocked.¹⁰ We mark in italics those forms that violate PROSODIC PROMINENCE in any of these three conditions.

(29)

	PROSODIC PROMINENCE	OPMAX _v
a. <i>fi.o</i> , <i>fi.ámos</i> , <i>fi.arémos</i> b. <i>fi.o</i> , <i>fi.ámos</i> , <i>fjarémos</i> c. <i>fi.o</i> , <i>fjámos</i> , <i>fjarémos</i>	*! *!	* *
a. <i>confi.o</i> , <i>confi.ámos</i> , <i>confjarémos</i> b. <i>confi.o</i> , <i>confi.ámos</i> , <i>confi.arémos</i> c. <i>confi.o</i> , <i>confjá.mos</i> , <i>confjarémos</i>	*! *!	* *
a. <i>desconfi.o</i> , <i>desconfjámos</i> , <i>desconfjarémos</i> b. <i>desconfi.o</i> , <i>desconfi.ámos</i> , <i>desconfi.arémos</i> c. <i>desconfi.o</i> , <i>desconfi.ámos</i> , <i>desconfjarémos</i>	*! *!	* *

Having analyzed the consequences of PROSODIC PROMINENCE on the verbal paradigm, we will now offer a feasible account of the regularization of stress position in verbal stems. The regularization of stress position in verbal stems is morphologically driven. As Harris (1987:64) says, “each inflectional paradigm has a characteristic fixed stress pattern that admits no variation, however minimal, among individual lexical items.” As we saw, those verbs that shift the stress from nominals to the right edge of the stem violate FAITH NULL PROMINENCE because we assume that all lexically related items share the same prominence marks (e.g. *fábric]a_N*, *fabric]o_V*, **fábric]o_V*). So we need a new markedness constraint that dominates FAITH NULL PROMINENCE in order to account for the fact that all verbal stressed stem forms ending in a consonant carry the stress on the last

¹⁰ Although a certain amount of variation is found, our analysis is based on the predominant tendency.

vowel (* ~VC]_{vbSt}). The stressed stem forms are 1, 2, 3, 6 Present Tense, that is, all singular forms and the third person plural of all present tenses. This constraint allows the emergence of the unmarked pattern in those verbal stems that hold lexical marks of null prominence.

(30) * ~VC]_{vbSt} (1, 2, 3, 6 Present)

The rightmost vowel of stems ending in a consonant must be stressed in 1, 2, 3, and 6 persons of the Present tense forms.

(31)

fabríc-	* ~VC] _{vbSt}	FAITH NULL PROMINENCE
☞ fabríc]o		*
fábric]o	*!	

Verbs of pattern 3 in table 1 such as *ampliar* also have the regularized stress position exemplified by *fabricar* regardless of the presence of prominence marks. According to Harris & Kaisse (1999:124) “unmarked high vocoids surface as peaks when there is no vocoid of greater sonority next to them; when adjacent to a non-high vocoid, they surface as glides. Syllabic [i u] in hiatus is the special case, which we represent (...) /i./ and /u./.” Following Harris & Kaisse we will mark the final high vowel of these verbs. We propose a new markedness constraint for this specific shape (* ~V.]_{vbSt}).¹¹ The added dot is a lexical mark that indicates the syllabic condition of the high vowel. In 33 and 34 we show how the two constraints work.

(32) * ~V.]_{vbSt} (1, 2, 3, 6 Present)

The rightmost vowel of stems ending in a syllabic high vowel (marked with a dot) must be stressed in 1, 2, 3, and 6 persons of the Present Tense forms.

(33)

amplí.-	* ~VC] _{vbSt}	* ~V.] _{vbSt}	FAITH NULL PROMINENCE
☞ amplí]o			*
ámplj]o		*!	

¹¹ Roca (2007) uses a similar strategy to mark syllabic high vowels.

(34)

fabr̥iç-	* ~VC]vbSt	* ~V.]vbSt	FAITH NULL PROMINENCE
☞ fabríc]o			*
fábric]o	*!		

The examples in 31, 33 and 34 have the last vowel of the stem lexically marked with a null prominence and consequently this syllable cannot bear stress. The constraint * ~VC]vbSt accounts for the stress shift to the last vowel of the verbal stem in *fabríc*, whereas the constraint * ~V.]vbSt is necessary to explain the same stress shift for verbal stems from group 3, such as *amplío*.

However, Harris's claim about the uniformity of inflectional paradigms cannot be categorical because the first group of verbs (*cámb[jo]N*, *cámb[jo]V*) fails to shift the stress to the last vowel of the stem. All words lexically related to this group keep the root-final vowel unstressed, invariably exhibiting a diphthong pronunciation. We exemplify in the following tableau the contrasting behaviour of verbs from groups 1 and 3.

(35)

ampl̥i-	* ~V.]vbSt	FAITH NULL PROMINENCE
☞ amplí]o		*
ámplj]o	*!	
camb̥i-		
☞ cámbj]o		
cambí]o		*!

This lexical marking gives us a feasible solution to the asymmetry that groups 1 and 3 show. Group 1 always diphthongizes because its high vowel does not have the hiatus mark. As we saw above, Spanish diminutive formation provides additional empirical evidence due to the different realization of high vowels: *génjo* 'genius' — *genjecito*, **geni.ító* (cf. *congenjár*, *congénjan*); *ágrjo* 'sour' — *agri.ító*, **agri.ecito*, ??*agrjecito* (cf. *agri.ár*, *agri.an*, *agri.ában*).

Our proposal also takes into account the non-existence of pattern 4 in table 1 (**ampl[i.o]A* — **yo ámpl[jo]V*), that is, verbs with stress marks lexically related to nouns lacking the same mark. For Harris & Kaisse (1999), the absence of a pair like this can be

explained by the fact that in a word such as *cóp[j]a* ‘copy’ the high vowel is an unmarked vowel, whereas in *áns[i]a* the high vowel is a marked vowel, similar to cases such as *vac[í]o*. A word like **vác[j]o* is not possible because adjective and verb would derive from two distinct underlying representations, marked for the adjective but unmarked for the verb. The problem of their analysis is that *ansi.a* is predicted, leaving it unclear how the usual pronunciation *áns[j]a* can be accounted for. In our study, by contrast, ONSET prevents *ansi.a* from being the optimal candidate (see 25).¹²

Our analysis, thus, explains this gap with reference to the analogous forms in verbal environments. It is well known that derived contexts tend to display uniform patterns. This can be considered an example of the emergence of the unmarked (McCarthy & Prince 1994). Verbs of pattern 3 in table 1 are always derived forms and this is what blocks stress shift to the left. Therefore it is not possible for a primitive form with unmarked stress position such as *vacío* to exhibit marked stress position typical of derived forms: **vácjo*. We account for this by resorting to the requirements presented above, particularly the constraint $*\sim V.]_{VbSt}$, which blocks the presence of an unstressed high vowel (in the corresponding verbal forms) that carries a dot in the stem at the lexical level. This constraint is ranked higher, thus forcing the violation of faithfulness and blocking the possibility of pattern 4.

5. Conclusion

In this paper we have offered a unified analysis of Spanish first conjugation verbs whose stem ends in a high vowel, framing the phenomenon in the general context of the language and avoiding undesirable predictions.

We have thus addressed the three basic questions raised at the beginning of this paper: a) we have answered why verbs of the first and largest group do not regularize verbal stress position; b) we have described the crucial role of the theme vowel in clarifying the behaviour of derived forms; and c) we have provided conclusive evidence denying the possibility of a hypothetical pattern 4. We have contextualized all these facts in the general

¹² For more details about such cases, see Cabré & Prieto (2007).

processes of the language and reinforced our argument by means of additional evidence from the formation of diminutives.

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