Stress-by-Structure in Spanish

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In this article, we argue for a syntactic approach to the computation of stress in Spanish. Our basic claim is that stress placement in this language makes crucial reference to the internal syntactic structure of words. In particular, we propose that foot boundaries are projected from certain functional heads. The analysis is set within the framework of Distributed Morphology and uses the formalism of the bracketed grid for the representation of stress. Several hypotheses concerning the syntax of words are argued to be necessary in gaining a better understanding of stress placement in Spanish.

Keywords: stress, Distributed Morphology, metrical theory, Spanish

Stress placement in Spanish is determined by syntax. Building on previous work on the topic, and on recent developments of the theory of Distributed Morphology (Halle and Marantz 1993), we argue for an analysis of stress in Spanish that relies crucially on the internal syntactic structure of words. Although previous accounts acknowledge the relevance of word structure in the placement of stress, we show that a deeper analysis of the syntax and morphology of Spanish words provides new insight into the computation of stress in this language.

Specifically, we develop an analysis in which foot boundaries in Spanish are projected by certain functional heads contained in words. Since, as we argue, reference to these word-internal constituents is essential in building metrical structure, the present analysis argues strongly in favor of morphological frameworks, such as Distributed Morphology, in which words have syntactic structure. We also adopt the theory of metrical structure proposed in Idsardi 1992 and Halle and Idsardi 1995. This framework provides a natural way of formalizing the generalizations that are discussed here.

This article is organized as follows. In section 1, we briefly outline the most important aspects of Distributed Morphology that are relevant for our analysis of stress. We begin our analysis of Spanish stress in section 2, where we present our account of stress in verbs. In sections 3–4, we extend the analysis to other categories. In section 5, we discuss the main advantages of our analysis with respect to previous work on the topic. The article ends with some concluding remarks in section 6.

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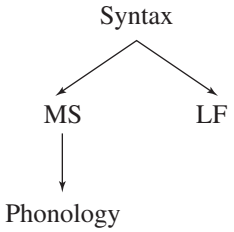
1 Theoretical Background

The framework we adopt is Distributed Morphology (DM). In this theory, there is a Morphological Structure level (MS) between Spell-Out and Phonology.

(1)



DM is characterized by the two central hypotheses in (2) (see Halle and Marantz 1994).

(2) a. *Late Insertion*. Syntax manipulates bundles of abstract syntacticosemantic features (terminal nodes, or *morphemes*). At MS, morphemes are provided with phonological features via Vocabulary Insertion, which is governed by the Subset Principle: the Vocabulary item specified for the largest subset of the features contained in a terminal node is inserted in that terminal node.

b. *Syntactic Hierarchical Structure All the Way Down*. Morphemes are organized into hierarchical structures determined by the principles and operations of syntax.

Both assumptions are crucial in our analysis. Taken together, they predict that there is a direct relation between syntax, morphology, and phonology. Specifically, we show that this is true in the domain of stress.

As for the syntax of Spanish words, we adopt the following hypotheses. Following Marantz (1997, 1999), we assume that roots have no category; in the syntax, they are merged with category-giving functional heads. In the verbal domain, this head is v (Kratzer 1996, Harley 1995, Chomsky 1995). This head is responsible for the verbal properties of the verbal complex, like (in)transitivity, agentivity, (accusative) case, and so on. In nonverbal environments, this head is n for nouns and a for adjectives (see Marantz 1999, McGinnis 2000). As illustrated in (3), the same root √*pur* 'pure' can become a noun, *puréza* 'purity' as in (3a),[1] a verb, *purificár* 'purify' (3b), or an adjective *purísta* 'puristic' (3c), depending on the syntactic configuration in which it is inserted, that is, depending on whether it is merged with n, v, or a, respectively. As shown in these examples, the phonological realization of these category-giving heads is typically a derivational suffix. When there is no apparent suffix to be inserted, as in *púro* 'pure' in (3d), UG provides a zero spell-out, as suggested in Halle and Marantz 1994. This means that every single word has internal syntactic structure, whether this is transparent or not.

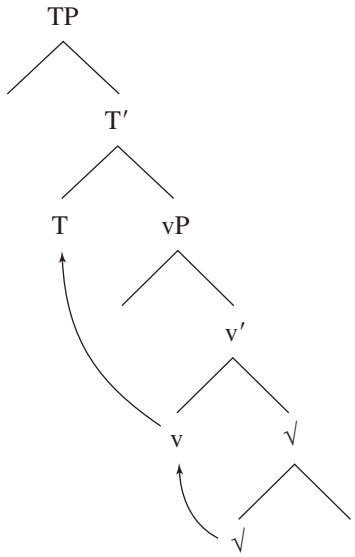
[1] Throughout the article, we depart from standard orthography by indicating the position of stress with an acute accent over all stressed vowels.

(3) *Category-giving heads*[2]

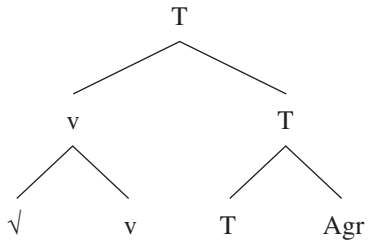
a. √ **n** b. √ **v**
pur **ez** a pur **ific** a r
c. √ **a** d. √ **a**
pur **ist** a pur **Ø** o

As illustrated in (4a), a verb is formed in the syntax by successive head-to-head movement of the root to functional heads c-commanding it (v, T, etc.). Furthermore, we assume that subject Agr is adjoined to T at MS (see Marantz 1992). The resulting structure is the one shown in (4b).

(4) a.

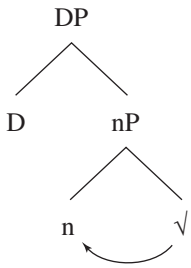


b.



In nonverbal environments, as in (5) and (6), the root moves to n or to a.

(5) a.



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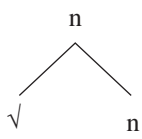
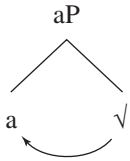
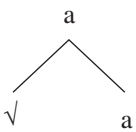


[2] What the other uncategorized positions stand for will become evident as we proceed.

(6) a.



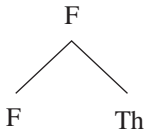
b.



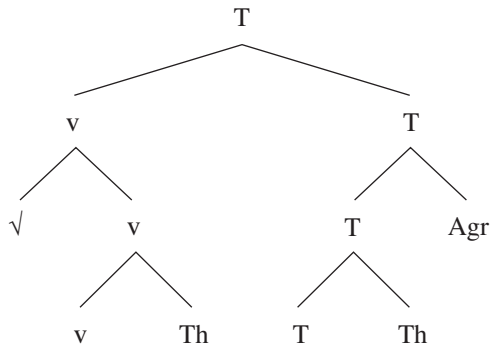
Finally, following Oltra-Massuet's (1999) work on Catalan, we propose that Spanish has the morphological well-formedness condition in (7). The result of this condition in both verbal and nonverbal domains is shown in (8).

(7) a. At MS, all syntactic functional heads require a theme position.[3]

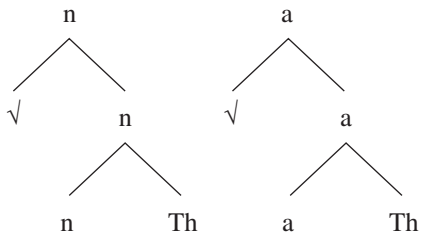
b. F →



(8) a. *Verbs*[4]



b. *Nonverbs (nouns and adjectives)*



[3] Williams (1981) makes a similar proposal for Latin. There are crucial differences, though. In his analysis, roots and tense markers bear lexical diacritics that determine the class of the following ''connective vowel.'' As noted in Oltra-Massuet 1999, this is a stipulation, while, in her analysis, the existence of multiple theme vowels follows from a general property of the language.

[4] Agr does not have a theme position. Since Agr is inserted in the morphology, it is not a *syntactic* functional head.

In verbal environments, Th adjoined to v is the traditional ‘‘theme vowel.’’ Its realization depends on its local morphological context, including the conjugation class of the root and v. Evidence for the one adjoined to other functional projections is given in Oltra-Massuet 1999 for Catalan and in Arregi 2000 for Spanish (see also Embick and Halle 2000 for Latin and Guerzoni 2000 for Italian). The basic argument given in these works, which we cannot repeat in detail for reasons of space, is that this hypothesis provides a principled account of the morphological realization of verbal inflection.[5] In (9), we illustrate this analysis of Spanish inflectional morphology with the first person plural imperfective indicative forms in the three conjugations.[6]

(9) *1Pl imperfective indicative*

a. *1st conjugation (*cantábamos *‘we sang’)*

[√ [v **Th**]] [[T **Th**] Agr]
cant **Ø á** b **a** mos

b. *2nd conjugation (*temíamos *‘we feared’)*

[√ [v **Th**]] [[T **Th**] Agr]
tem **Ø í** **Ø a** mos

c. *3rd conjugation (*partíamos *‘we left’)*

[√ [v **Th**]] [[T **Th**] Agr]
part **Ø í** **Ø a** mos

In nonverbal environments, Th is the so-called class marker (CM) or word marker (Harris 1991a), a declension class marker, as proposed in Oltra-Massuet 1999 for Catalan. As is well known, all nonverbal words in Romance must end in a suffix, the class marker, whose realization depends on declension class.[7] (10) illustrates this with words belonging to different declensional classes.[8]

[5] Occasionally, it has been pointed out to us that this proposal about theme positions seems to predict that all the theme morphemes in a verb should be realized with the same vowel (e.g., **tem-i-i-mos* instead of *tem-i-a-mos* in (9b)). Clearly, this is not the case. As expected, the realization of each theme morpheme depends on its local context. For instance, the realization of Th adjoined to v depends on the root (or v if it is overt) and on T. On the other hand, the realization of Th adjoined to T depends on T and Agr. Neither the root nor v can affect the realization of Th adjoined to T, since they are not in its local context. Note that this condition on the realization of Th need not be stipulated; it follows from a sufficiently restrictive theory of contextual allomorphy (see, e.g., Halle and Marantz 1993, Bobaljik 2000, Adger, Béjar, and Harbour 2001).

[6] Here and throughout, we concentrate on the analysis of standard Iberian Spanish, with occasional references to other varieties.

[7] The most common class markers are *-o*, *-a*, *-e*, and *-Ø*. Other, less common ones include *-u*, *-is*, and *-us*. What declension class a given word belongs to depends partly on grammatical gender (e.g., most, but not all, *-o* words are masculine). See Harris 1991a for details.

[8] The theme position of n or a is not realized overtly if this head is not the highest one in the structure. For instance, when the head a is realized as *-ist*, its theme is *-a* only if this head is the highest one (e.g., *novel-**ist-a*** ‘novelist’), but not otherwise (e.g., *novel-**ist-Ø**-ic-o* ‘novelistic’). On the other hand, the theme adjoined to v is always realized phonologically (e.g., *comunic-**a**-ción* ‘communication’), with idiosyncratic exceptions (see Harris 1969:chap. 5).

(10) *Spanish class markers*

a. [√ [n **Th**]] més Ø **a** 'table'

b. [√ [n **Th**]] ver dád Ø 'truth'

c. [√ [a **Th**]] vérd Ø **e** 'green'

d. [√ [a **Th**]] colér ic **o** 'choleric'

In the next sections, we show how these well-motivated assumptions about the structure of words allow for a simple analysis of stress in both verbal and nonverbal environments.

2 Stress in Verbal Environments

In this section, we provide an analysis of stress in Spanish verbs in all finite tenses.[9] It is well known that the correct generalization about stress in Spanish verbs cannot be stated in terms of distance from the edge of the word. Some forms have final stress, others penultimate, and still others antepenultimate, as illustrated in the following forms of *cantar* 'sing':[10]

(11) a. *Final stress*

1Sg Fut	cantaré
1Sg Prf	canté

b. *Penultimate stress*

1Pl Fut	cantarémos
2Sg ImpInd	cantábas
2Sg Cond	cantarías

c. *Antepenultimate stress*

1Pl ImpInd	cantábamos
1Pl Cond	cantaríamos
1Pl ImpSbj	cantáramos

As will be seen clearly throughout this section, stress in verbs depends on their tense and mood. This fact has previously motivated analyses in which stress placement depends to different degrees on verbal morphology. Our claim, based on Oltra-Massuet's (1999) analysis of Catalan stress, is that the placement of stress in all finite verbal forms follows the generalization that *stress falls on the vowel preceding the T node*. Our particular assumptions about the syntax of verbs, which have independent motivation, allow us to state the generalization in this simple form. We propose an analysis of these stress facts within the framework of the metrical grid (see, e.g., Liberman

[9] Nonfinite forms, which behave like nonverbs morphologically, are dealt with in section 3.2.

[10] In this article, we use the following abbreviations: 1, 2, and 3 for first, second, and third persons, Aux(iliary), Cond(itional), Erg(ative), F(eminine), Fut(ure), Imp(erfective), Ind(icative), M(asculine), Pl(ural), Pr(esent), Prf (perfective), Pst (past), Sbj (subjunctive), Sg (singular).

and Prince 1977, Prince 1983, Halle and Vergnaud 1987). We adopt the implementation of this framework proposed in Idsardi 1992 and Halle and Idsardi 1995, which can be briefly summarized as follows. A standard assumption in current theories of stress is that stress is not a phonetic feature. Rather, it is the phonetic means for marking certain groupings of linguistic elements. Furthermore, not all phonemes in the string are capable of bearing stress. This fact is implemented by having the elements capable of bearing stress project an abstract mark on a separate plane, the *metrical plane*. The sequence of abstract marks projected by stressable elements constitutes line 0 of the metrical plane. These elements are grouped into what are called *feet*. This grouping is done by inserting parentheses on the metrical plane. Idsardi's (1992) innovation is that only one parenthesis is necessary to group grid marks: a left parenthesis groups all the marks to its right, and a right parenthesis groups all the marks to its left. Parentheses are projected either at the edges of the stress domain (*Edge-Marking* rules) or at the edges of certain syllables (i.e., heavy syllables, a specific syllable in an accented Vocabulary item, etc.). Within each foot, a grid mark (the rightmost or the leftmost one) is designated as the head and is projected onto the next line in the grid.

We propose to extend Idsardi's notion of Edge Marking by allowing the projection of metrical parentheses from the syntactic structure.[11] In particular, we argue that, in Spanish, parentheses are projected from certain syntactic functional heads. The set of rules that derives stress placement in verbs is the following:

(12) *Stress algorithm*

a. Project a line 0 mark for each syllable nucleus.
b. *Insert a right parenthesis to the left of T on line 0.*
c. Project the rightmost mark of each line 0 foot onto line 1.
d. Insert a right parenthesis to the right of the rightmost mark on line 1.
e. Project the rightmost mark of each line 1 foot onto line 2.

The basic rule that derives stress placement in finite tenses is (12b). Note that it makes crucial reference to the syntactic node T, not to its phonological realization; that is, it ensures that stress precedes T, no matter what the realization of T is.

In the remainder of this section, we provide detailed analyses of all finite tenses using this algorithm. This section is divided into several subsections, each dealing with a different type of tense: the imperfective past (section 2.1), the future (2.2), the perfective (2.3), the present (2.4), and the imperative (2.5).

[11] In an earlier version of this article, we did not consider our rules projecting parentheses from the syntactic structure as part of the set of Edge-Marking rules. Following a suggestion by an anonymous reviewer, we now include these rules as a natural extension of Idsardi's notion of Edge Marking.

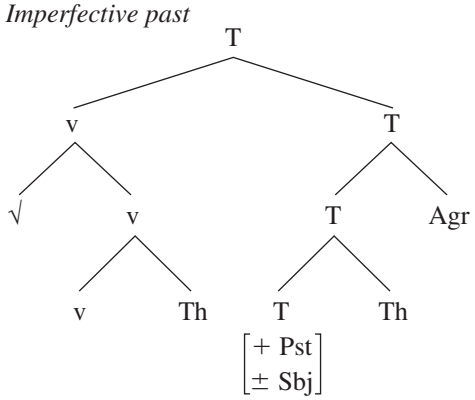
Table 1
Imperfective indicative

	1st conjugation cantar 'sing'	2nd conjugation temer 'fear'	3rd conjugation partir 'leave'
1Sg	cant **á** b a Ø	tem **í** Ø a Ø	part **í** Ø a Ø
2Sg	cant **á** b a s	tem **í** Ø a s	part **í** Ø a s
3Sg	cant **á** b a Ø	tem **í** Ø a Ø	part **í** Ø a Ø
1Pl	cant **á** b a mos	tem **í** Ø a mos	part **í** Ø a mos
2Pl	cant **á** b a is	tem **í** Ø a is	part **í** Ø a is
3Pl	cant **á** b a n	tem **í** Ø a n	part **í** Ø a n

2.1 The Past

Spanish distinguishes between the imperfective indicative and the imperfective subjunctive, illustrated in tables 1 and 2.[12] The structure for these two tenses is shown in (13). The root and v are adjoined to T, which is specified as past or past and subjunctive.[13]

(13) *Imperfective past*



[12] In accordance with standard orthography, we will not represent in a systematic way the contrast between glides [j w] and high vowels [i u] in our examples, except where relevant. However, this distinction is represented in our metrical representations of words: high vowels are syllable nuclei and therefore project a mark in the grid (e.g., (24b)); glides are not nuclei and, accordingly, they do not project onto the grid (e.g., (28)). As shown in Harris 1969, the glide/vowel contrast in Spanish must stem, at least partly, from some type of underlying distinction, although the exact nature of this distinction is not important for our purposes (see also Hualde 1991, Harris and Kaisse 1999, and references cited therein).

[13] In addition, in the indicative, T is also specified as imperfective ([− Prf]), so that it can be distinguished from the perfective past (see section 2.3). A related fact is that there is no perfective/imperfective distinction in the past subjunctive, the future (see section 2.2), the present (see section 2.4), or the imperative (see section 2.5). These facts can be accounted for in a number of different ways. For our purposes, the details of the feature specifications of the functional heads are not very important. What matters for the placement of stress in verbs is the position of T within the word, not

Table 2
Imperfective subjunctive

	1st conjugation	2nd conjugation	3rd conjugation
1Sg	cant **á** r a Ø	tem **ié** r a Ø	part **ié** r a Ø
2Sg	cant **á** r a s	tem **ié** r a s	part **ié** r a s
3Sg	cant **á** r a Ø	tem **ié** r a Ø	part **ié** r a Ø
1Pl	cant **á** r a mos	tem **ié** r a mos	part **ié** r a mos
2Pl	cant **á** r a is	tem **ié** r a is	part **ié** r a is
3Pl	cant **á** r a n	tem **ié** r a n	part **ié** r a n

The imperfective has the stress pattern in (14). In both the indicative and the subjunctive, stress falls on the vowel realizing the verbal theme position.

(14) *Stress in the imperfective*

	[√ [v Th]] [[**T** Th] Agr]
ImpInd	. . . . . **á/í** b/Ø a s/mos/. . .
ImpSbj	. . . . . **á/ié** r a s/mos/. . .

As shown in (15), the application of our stress algorithm (12) gives the right result. First, (12a) projects stressable elements onto the grid (line 0). Second, (12b) places a right parenthesis to the left of T, that is, to the left of the syntactic terminal node T, independently of its phonological realization. Since, by (12c), feet are right-headed, the result is that stress falls on the vowel preceding T.[14]

(15) a. *1Pl imperfective indicative*

Line 2						x								
Line 1						x	)							
Line 0		x				x	)		x		x			
String	c	a	n	t	Ø	**a**		b	a		m	o	s	
Syntax	[	√		[	v	Th	]]	[[	**T**	Th	]	Agr	]	

its feature content. Since these details are irrelevant for our purposes, they are ignored here, and the trees given below are only as explicit as necessary for our analysis of stress.

Spanish has a separate imperfective subjunctive paradigm, which replaces *-r-a-* with *-s-e-* in the forms in table 2. Their stress pattern is identical. There is no meaning difference between the two imperfective subjunctives. They appear to be in free variation.

[14] Line 2 is not important in (15), and it is there for consistency. In later examples, we include line 2 only when it is relevant (i.e., when there are two or more grid marks on line 1). The need for line 2 will become clear later in the discussion.

b. *2Sg imperfective subjunctive*

Line 2					x						
Line 1					x	)					
Line 0		x			x	)		x			
String	c	a	n	t	Ø	**a**		r	a		s
Syntax	[	√	[	v	Th	]]	[[	**T**	Th	]	Agr]

As we noted at the beginning of this section, the facts we just discussed, and the ones we will examine in later sections, cannot be explained in purely phonological terms, or at least not in terms of syllabic distance from the edge of the word. Some imperfective forms are stressed on the antepenultimate syllable (15a), and others on the penult (15b). The generalization that captures all the forms has to make reference to the morphosyntactic structure of the word: the stressed vowel is always the one preceding the T node. This, by itself, does not argue conclusively for our specific proposal. However, there are certain alternatives that can be ruled out as being less explanatory. For instance, one could say that stress in these forms is a lexical property of the affixes inserted in T. Proposals along these lines have been made in some previous work, including Harris 1988, 1989a, 1995 and Solan 1981. However, treating stress in all imperfective forms as lexical misses an important generalization. In the present analysis, it is not an accident that stress always falls on the vowel preceding the T affixes, since stress is determined by T itself, not by the affixes inserted in it.

Still, there are other possible hypotheses that do take into account the morphological structure of the verb. In particular, one can find two types of alternatives in the literature. First, Harris (1969) and Núñez Cedeño (1985) propose stress algorithms that take into account the particular feature specification of the T morpheme in imperfective tenses. Second, Hooper and Terrell (1976) and Roca (1990b, 1992, 1999) propose rules that place stress on the verbal theme vowel (which happens to be the one preceding the T morpheme). In the following subsection, we examine the stress patterns of the future and conditional tenses, which argue for the particular formulation of the stress algorithm proposed in this article.[15]

2.2 The Future

Here, we provide an analysis of the future and conditional tenses, which are illustrated in tables 3 and 4. We propose that the future heads a projection separate from tense; as illustrated in (16), ''future'' is future + present, and ''conditional'' is future + past (see Laka 1990).[16]

[15] Other analyses of imperfective forms include Harris 1975, 1987 and Otero 1986. The particular proposals made in these works are different from each other and from the other accounts mentioned in the text. Like the alternatives discussed above, they take into account the morphological structure of verbs, but their analysis of imperfective tenses cannot be extended to the future and the conditional.

[16] Since, as shown below, past T is realized in the same way in the conditional as in the imperfective past, T should also be specified as [− Sbj, − Prf] in the conditional (see section 2.1 and footnote 13).

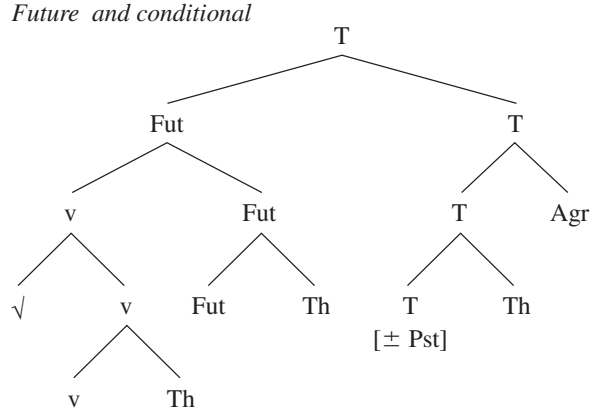
Table 3
Future

	1st conjugation	2nd conjugation	3rd conjugation
1Sg	cant a r **é** Ø	tem e r **é** Ø	part i r **é** Ø
2Sg	cant a r **á** s	tem e r **á** s	part i r **á** s
3Sg	cant a r **á** Ø	tem e r **á** Ø	part i r **á** Ø
1Pl	cant a r **é** mos	tem e r **é** mos	part i r **é** mos
2Pl	cant a r **é** is	tem e r **é** is	part i r **é** is
3Pl	cant a r **á** n	tem e r **á** n	part i r **á** n

Table 4
Conditional

	1st conjugation	2nd conjugation	3rd conjugation
1Sg	cant a r **í** a Ø	tem e r **í** a Ø	part i r **í** a Ø
2Sg	cant a r **í** a s	tem e r **í** a s	part i r **í** a s
3Sg	cant a r **í** a Ø	tem e r **í** a Ø	part i r **í** a Ø
1Pl	cant a r **í** a mos	tem e r **í** a mos	part i r **í** a mos
2Pl	cant a r **í** a is	tem e r **í** a is	part i r **í** a is
3Pl	cant a r **í** a n	tem e r **í** a n	part i r **í** a n

(16) *Future and conditional*



That the conditional encodes both the features [+Pst] and [+Fut] is well motivated, both syntactically and semantically.[17] In one of its uses, it expresses a future with a reference point in time prior to the utterance time.

[17] The claim that present and past tense are ingredients of the future and the conditional, respectively, was first defended explicitly in the generative literature in Harris 1969. Although there were previous claims to this effect, this work was the first to present a number of arguments in its support. Harris's analysis differs substantially from ours, though, in that he proposed a structure that involves the infinitive morpheme and an auxiliary verb. Similar claims have been made for other languages as well (e.g., Comrie 1985 for English and Wheeler 1979 for Catalan).

(17) Juan dijo que María cantaría.
Juan said that María sing(COND)
'Juan said that María would sing.'

The conditional is also used in the consequent of counterfactual conditional sentences, as illustrated in (18). As argued in Iatridou 2000, past tense morphology is the main ingredient responsible for the meaning of counterfactuality in this type of sentence.

(18) Si Juan tocara la guitarra, María cantaría.
if Juan play(IMP-SBJ) the guitar María sing(COND)
'If Juan played the guitar, María would sing.'

Furthermore, there are languages where, in sequence-of-tense contexts like (17), a tense is used that is transparently formed with the past and the future. Basque is one such case. The future is future + present (19a), while the conditional is future + past (19b). In both, the future and T morphemes are in different words: the future morpheme is in the main verb, and T, in the auxiliary. Thus, in Basque, it is clear that the two head separate projections.

(19) a. Juan-ek esan du Pedro-k abes-tuko du-ela.
Juan-ERG said has Pedro-ERG sing-FUT Aux(PR)-COMP
'Juan has said that Pedro will sing.'
b. Juan-ek esan zuen Pedro-k abes-tuko zu-ela.
Juan-ERG said had Pedro-ERG sing-FUT Aux(PST)-COMP
'Juan said that Pedro would sing.'

Oltra-Massuet's (1999) reanalysis of inflectional morphemes with multiple theme vowels is what allows us to translate these well-motivated assumptions about the conditional into its morphosyntactic structure in Spanish. If the future morpheme were *-ra/re*, it is not clear how one could relate it to the ''conditional suffix'' *-ria*. In her analysis, the relation between the future and the conditional becomes transparent, as it is the relation between the conditional and the imperfective past (see Oltra-Massuet 1999 and Arregi 2000 for details).

(20) *Conditional as future + past*

	[√ [v Th]]	[**F Th**]	[**T Th**]	
Fut	. . . . .	**r á/é**		. . .
Cond	. . . . .	**r í**	**Ø a**	. . .
ImpInd	. . . . .		**Ø a**	. . .

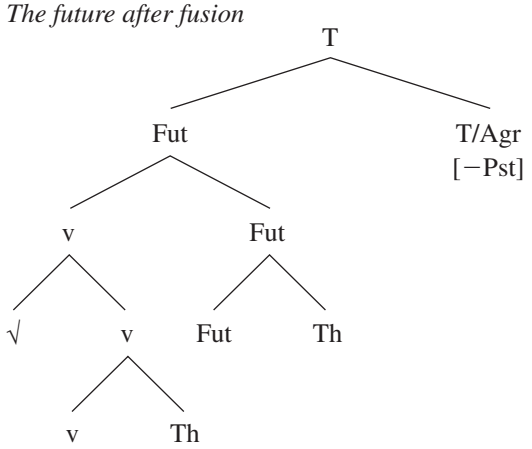
Another important ingredient in our analysis of the future, which we adopt from Oltra-Massuet 1999, is that a T node specified for the feature [−Pst] fuses with the Agr node at MS. As stated in Halle and Marantz 1994, two terminal nodes that are sisters under a single category node may fuse into a single terminal node, so that only one Vocabulary item can be inserted. Thus, the morphological operation of fusion reduces the number of terminal nodes in a tree.

(21) *Fusion*

T and Agr fuse at MS if T is [−Pst].

In the future, since the terminal node T is specified for [−Pst], the operation of fusion in (21) applies, resulting in a single T/Agr node. This accounts for the fact that there is no overt realization of T separate from Agr (see table 3), since there is only one position available for both T and Agr.[18] Another consequence of fusion is that the theme position adjoined to T disappears, as (22) illustrates.

(22) *The future after fusion*



In the future and the conditional, stress falls on the vowel preceding T, as expected.

(23) *Stress in the future and conditional*

Fut	[	√	[	v	Th	]]	[	F	Th	]	**T/Agr**		
	. . .		. . .	a/e/i			r	**á/é**		Ø/s/mos	. . .		
Cond	[	√	[	v	Th	]]	[	F	Th	]	[	**T**	Th] Agr
	. . .		. . .	a/e/i			r	**í**		Ø	a	Ø/s/mos	. . .

In this case, this vowel is the one inserted in the future theme position. In both tenses, this pattern obtains as a result of the well-formedness condition on functional heads in (7). In the specific case of the conditional, since the traditional ‘‘conditional suffix’’ *-ria* is now reanalyzed as four

[18] The fused T/Agr node contains both person/number and tense features, inherited from Agr and T, respectively. The suffixes realizing this fused morpheme in the future are the same as the ones inserted in Agr when it is not fused with T. Even though Agr and T/Agr are different morphemes, there is no contradiction in the fact that they can be realized with the same Vocabulary items, since they share some features. On the other hand, fusion of T and Agr does allow for cases in which the realization of T/Agr is different from that of Agr, since the former has features not contained in the latter. This is the case in the present indicative and the perfective, where these morphemes also fuse (see sections 2.3 and 2.4, respectively). We would like to thank an anonymous reviewer for pointing out the relevance of this part of the analysis.

different morphemes, it simply follows from the structure that the final *a* vowel, being now the theme vowel of T, lies outside the metrical boundary projected by T. The following examples illustrate the details:

(24) a. *1Sg future*

Line 1								x						
Line 0		x			x			x	)					
String	c	a	n	t	Ø	a		r	**e**		Ø			
Syntax	[	√		[	v	Th	]]	[	F	Th	]	**T/Agr**		

b. *2Sg conditional*

Line 1								x								
Line 0		x			x			x	)			x				
String	c	a	n	t	Ø	a		r	**i**		Ø	a		s		
Syntax	[	√		[	v	Th	]]	[	F	Th	]	[[	**T**	Th	]	Agr]

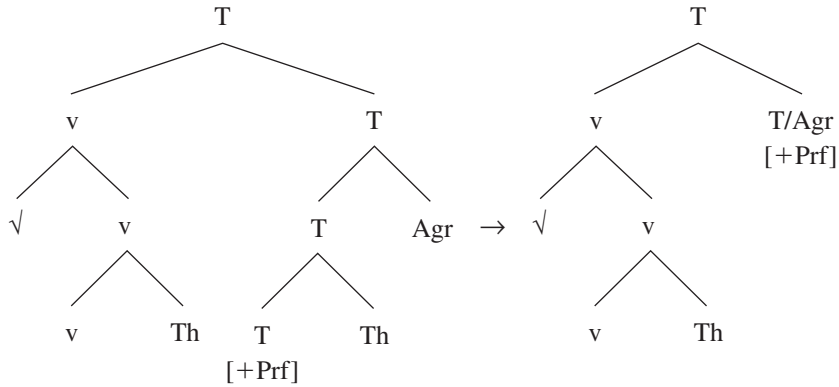
The data from the future and the conditional offer strong evidence for our analysis, and against the other morphologically based approaches discussed at the end of section 2.1 Harris's (1969) and Núñez Cedeño's (1985) rules used in deriving stress in the imperfective make reference to the specific features found in T in imperfective tenses. Although this alternative might account for the conditional forms, it has nothing to say about the future. In Hooper and Terrell's (1976) and Roca's (1990b) analyses, the rules place stress on the verbal theme vowel. Clearly, this makes wrong predictions for both the future and the conditional. All these alternative proposals (as well as the other ones mentioned at the end of section 2.1) rely on additional mechanisms to derive stress in these tenses. On the other hand, in the present analysis, the same simple algorithm takes care of all four tenses examined so far. With respect to the future and the conditional, the crucial ingredient of the analysis, which is missing in previous works on stress, is the independently motivated proposal that Fut and T are separate heads. As we argue in the next sections, this approach receives further support from the stress patterns found in other finite tenses.

2.3 The Perfect

In the past, Spanish distinguishes between the imperfective, analyzed in section 2.1, and the perfective, which is illustrated in table 5. This tense has the same syntactic structure as the imperfective past.[19] However, in this case, we propose that T and Agr fuse in the morphology as shown in (25) even though the context for the application of the fusion operation in (21) is not met.

[19] The only difference lies in the feature specification of T: imperfective past is [+Pst, −Prf], and perfective past is [+Pst, +Prf].

(25) *Fusion in the perfective*



Allowing exceptional fusion in the perfective explains why there is only one slot for both morphemes and why the Vocabulary items inserted are specific for this tense, as can be seen by comparing the paradigms for the perfective and the ones for other tenses.

For all forms but third person singular, we find the following stress pattern:

(26) *Stress in the perfective*

[√ [v Th]] **T/Agr**
. . . . . **é/á/í/ié** ste/steis/. . .

Given the structure in (25) and our stress algorithm, this stress pattern is straightforward.

(27) *2Sg perfective past*

Line 1				x				
Line 0		x		x	)		x	
String	c	a	n	t	**Ø**	**a**	s t e	
Syntax	[	√	[	v	Th	]]	**T/Agr**	

As shown in table 5, in the third person singular, stress falls on the vowel realizing T/Agr, which is at odds with our stress algorithm. This stress pattern can be best accounted for by

Table 5
Perfective past

	1st conjugation	2nd conjugation	3rd conjugation
1Sg	cant **é Ø**	tem **í Ø**	part **í Ø**
2Sg	cant **á** ste	tem **í** ste	part **í** ste
3Sg	cant **Ø ó**	tem i **ó**	part i **ó**
1Pl	cant **á** mos	tem **í** mos	part **í** mos
2Pl	cant **á** steis	tem **í** steis	part **í** steis
3Pl	cant **á** ron	tem **ié** ron	part **ié** ron

Table 6
Irregular perfective past

	poner 'put'	saber 'know'	querer 'want'
1Sg	p**ú**s e Ø	s**ú**p e Ø	qu**í**s e Ø
2Sg	pus **í** ste	sup **í** ste	quis **í** ste
3Sg	p**ú**s Ø o	s**ú**p Ø o	qu**í**s Ø o
1Pl	pus **í** mos	sup **í** mos	quis **í** mos
2Pl	pus **í** steis	sup **í** steis	quis **í** steis
3Pl	pus **ié** ron	sup **ié** ron	quis **ié** ron

considering this Vocabulary item as exceptionally specified to project a line 0 right parenthesis to its right.[20]

(28) *3Sg perfective past*

Line 2				x	
Line 1	x			x	)
Line 0	x		)	x	)
String	t e m	Ø	i	**o**	
Syntax	[√	[v	Th]]	**T/Agr**	

The stress patterns illustrated above represent the regular paradigm of the perfective past in Spanish. There are, however, a reduced number of verbs that follow a different pattern, illustrated in table 6.[21] Stress in the first and third person singular forms is further to the left than in regular verbs. This fact is accounted for in the next section, since it is related to similar facts in the present tense.

2.4 The Present

In the present tense, Spanish distinguishes between the indicative and subjunctive, illustrated in tables 7 and 8. Both present tenses have the structure in (29) (with a further distinction in the

[20] Unlike all cases we have looked at previously, this one requires line 1 rules to derive the correct stress pattern. Further evidence that these rules are needed is given in later sections. In all cases in which there is more than one line 1 grid mark, we seem to make certain predictions about secondary stress placement in Spanish. If, as claimed in Navarro Tomás 1957, Harris 1983, 1991b, and Roca 1986, Spanish has secondary stress, it is not derived at the word level (see Roca 1986, Harris 1991b). These authors identify two patterns of secondary stress: a rhythmic one and a nonrhythmic one whereby the first syllable of the word (or phrase) has secondary stress. On the other hand, on the basis of phonetic evidence, some recent work challenges the claim that Spanish has rhythmic secondary stress (see Prieto and van Santen 1996, Díaz-Campos 2000, and references cited there). Whatever the correct description of the facts is, it is clear that all secondary stresses derived by our algorithm must be removed by ''line conflation'' (see Halle and Vergnaud 1987, Idsardi 1992).

[21] All these verbs also display segmental changes. Other verbs that present the same irregularities are *andar* 'walk', *caber* 'fit', *decir* 'say', *estar* 'be', *haber* 'have', *hacer* 'do/make', *poder* 'can', *satisfacer* 'satisfy', *tener* 'have', *traer* 'bring', *venir* 'come', and others derived from these by prefixation (*contener* 'contain'), as well as verbs ending in *-ducir*, like *conducir* 'drive/lead'.

Table 7
Present indicative

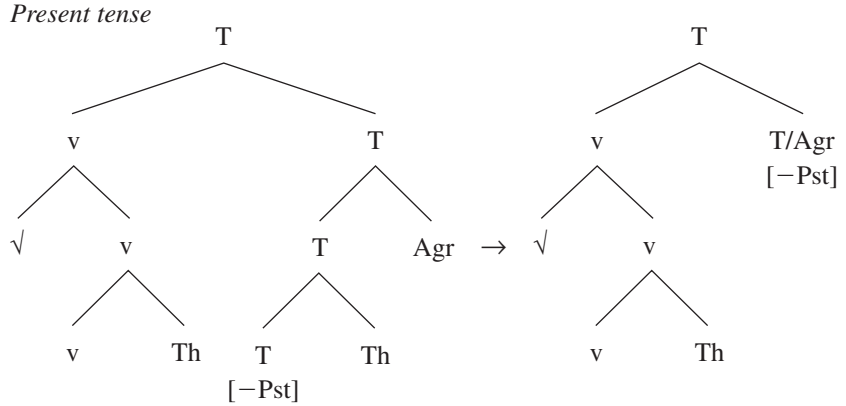
	1st conjugation	2nd conjugation	3rd conjugation
1Sg	c**á**nt Ø o	t**é**m Ø o	p**á**rt Ø o
2Sg	c**á**nt a s	t**é**m e s	p**á**rt e s
3Sg	c**á**nt a Ø	t**é**m e Ø	p**á**rt e Ø
1Pl	cant **á** mos	tem **é** mos	part **í** mos
2Pl	cant **á** is	tem **é** is	part **í** s
3Pl	c**á**nt a n	t**é**m e n	p**á**rt e n

Table 8
Present subjunctive

	1st conjugation	2nd conjugation	3rd conjugation
1Sg	c**á**nt e Ø	t**é**m a Ø	p**á**rt a Ø
2Sg	c**á**nt e s	t**é**m a s	p**á**rt a s
3Sg	c**á**nt e Ø	t**é**m a Ø	p**á**rt a Ø
1Pl	cant **é** mos	tem **á** mos	part **á** mos
2Pl	cant **é** is	tem **á** is	part **á** is
3Pl	c**á**nt e n	t**é**m a n	p**á**rt a n

specification for the feature [Sbj]). Since the terminal node T in the present tense is specified for the unmarked [−Pst] value, it fuses with Agr at MS, as in the future.

(29) *Present tense*



With respect to stress, we find not one but two different stress patterns for each tense, as shown in (30)–(32). Stress falls on the verbal theme vowel in first and second person plural, and

on the root (or v) in the other verbal forms (in (31)–(32), V́ stands for a stressed vowel that belongs to either the root or v).[22]

(30) *Stress in the present: 1/2Pl*

	[√ [v Th]]	**T/Agr**
PrInd	. . . . .	**á/é/í** mos/is
PrSbj	. . . . .	**é/á** mos/is

(31) *Stress in 1Sg present indicative*

	[√ [v Th]]	**T/Agr**
PrInd	. . . **V́** . . .	Ø o

(32) *Stress in other present forms*

	[√ [v Th]]	**T/Agr**
PrInd	. . . **V́** . . .	a/e s/Ø/n
PrSbj	. . . **V́** . . .	e/a s/Ø/n

Our set of rules can account for the stress patterns in (30)–(31) without further modifications. Stress falls on the vowel preceding T in all these indicative and subjunctive forms, as expected.[23]

(33) a. *1Sg present indicative*

Line 1			x		
Line 0	x		x)	x	
String	p	**á** r t	Ø	Ø	o
Syntax	[√	[v Th]]	**T/Agr**		

b. *2Pl present subjunctive*

Line 1				x		
Line 0	x			x)	x	
String	p	a r t	Ø	**a**	i	s
Syntax	[√	[v Th]]	**T/Agr**			

In all the other forms, stress does not fall on the vowel preceding T, as predicted by the analysis, but further to the left. For instance, the analysis developed so far derives **partés* instead of *pártes*.

[22] In some dialects of Chicano Spanish, stress falls on the vowel preceding the theme in all forms of the present subjunctive (e.g., *cántemos*, instead of Iberian Spanish *cantémos*; see Reyes 1974). Similar patterns have also been documented for other varieties (see, e.g., Mondéjar Cumpián 1970 for Andalusian Spanish). We tentatively assume that the theme vowel following the root in the present subjunctive is the one adjoined to T in those dialects, instead of being the one adjoined to v, as we have proposed for Iberian Spanish. If this is the case, our set of stress rules derives all the forms without additional stipulations.

[23] The high segment in the second person plural Agr morpheme *-is* is initially syllabified as a nucleus and therefore projects a grid mark (see (33b)). This segment surfaces as a glide owing to a regular rule of Spanish that denuclearizes unstressed high vowels when immediately following a vowel (see, e.g., Harris 1969:22–36, Hualde 1991:478, Harris and Kaisse 1999:139–140, 173–176). This also accounts for the fact that this vowel is deleted in the present indicative form in the third conjugation (e.g., *part-i-s* in table 7): after denuclearization, [par.tí.is] becomes [par.tíjs]. Since Spanish does not allow long vowels (Harris 1983, Harris and Kaisse 1999), the glide is deleted.

(34) *2Sg present indicative*: *partés

Line 1						x			
Line 0		x				x	)		
String	p	a	r	t	Ø	**e**		s	
Syntax	[	√		[	v	Th	]]	**T/Agr**	

The crucial difference between (33) and (34) lies in the position of the parenthesis: in (34), the parenthesis projected by T is to the right of the final vowel in the word. Although this configuration is allowed in the Spanish verbal paradigm (e.g., in the future), it seems to be banned in the present tense. We propose the following rule to account for this fact (see Roca 1990b, 1999 for a similar proposal):[24]

(35) *Stress Deletion (in present tense)*

x → . / x ____)#

As can be seen in (34), the grid mark projected by the theme vowel *e* on line 0 immediately precedes the parenthesis projected by the syntactic node T, and it is the rightmost mark on line 0, thus providing the context for the application of Stress Deletion. As a consequence, the line 1 grid mark corresponding to this vowel is shifted to the left, resulting in *pártes*.

(36) *2Sg present indicative*

Line 1		x							
Line 0		x				.	)		
String	p	**a**	r	t	Ø	e		s	
Syntax	[	√		[	v	Th	]]	**T/Agr**	

Stress Deletion also accounts for the irregular perfective forms that we noted at the end of the previous section (see table 6). In these irregular verbs, first and third person singular forms are stressed on the vowel preceding the verbal theme (*púse*/*púso*), while in regular verbs, stress falls on the verbal theme vowel in the first person (*partí*) and on the exceptional T/Agr morpheme *-o* in the third person singular (*partió*). We propose that these irregular perfective verbs are exceptionally marked as being subject to Stress Deletion. As shown in (37), in both first and third person singular, there is a parenthesis to the right of the rightmost mark in the metrical grid: in first person singular *púse*, this is the parenthesis projected by T, while in third person singular *púso*, it is the one projected by the exceptional morpheme *-o*. After Stress Deletion applies, stress shifts automatically to the left, resulting in *púse* and *púso*.

[24] There are two exceptional cases where rule (35) does not apply. First, in dialects (e.g., Argentinian) that use *vos* instead of *tú* as the second person singular pronoun, the corresponding present indicative form is stressed on the theme vowel (e.g., Argentinian *cant-á-s* vs. Iberian *cánt-a-s*). For these dialects, we must stipulate that Stress Deletion (35) does not apply in these forms. Equivalent stipulations must be added in alternative accounts as well.

Second, there are a few verbs that have monosyllabic forms in the present indicative (e.g., *sé* 'know-1Sg', *vás* 'go-2Sg', *dá* 'give-3Sg'). Since (35) can only apply in words with more than one syllable, the parenthesis projected to the left of T in these cases is not deleted. The result, as desired, is that these words are stressed on their only vowel.

(37)

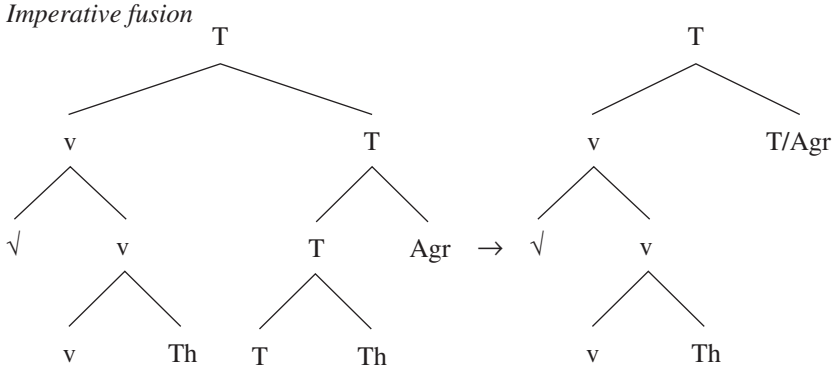
	a. *1Sg irregular perfective*	b. *3Sg irregular perfective*
Line 2	x	x
Line 1	x)	x)
Line 0	x .)	x) .)
String	p **u** s Ø e Ø	p **u** s Ø Ø o
Syntax	[√ [v Th]] **T/Agr**	[√ [v Th]] **T/Agr**

Note, finally, that Stress Deletion does not apply in the other forms in the irregular paradigm, since the context is not met.[25]

2.5 The Imperative

The imperative has only two forms for each conjugation, the second person singular and the second person plural, as shown in table 9. In all other persons, Spanish uses subjunctive morphology (see Harris 1998 for a DM analysis of these facts). In both the singular and the plural, there is a specific Vocabulary item realizing agreement features (*-Ø* and *-d*, respectively). As in the perfective (see section 2.3), this is evidence that T and Agr fuse in the imperative. Thus, the structure of imperative verbs is as shown in (38).

(38) *Imperative fusion*



With respect to stress, we propose that the singular imperative forms are subject to the Stress Deletion rule in (35), as in the present tense.[26] After this rule applies, the regular stress rules result in stress on the vowel preceding the verbal theme.[27]

[25] As noted above, these irregular perfective forms also differ from regular ones segmentally in both the root and the verbal theme. A detailed account of these facts would take us well beyond the scope of the present article. See, among others, Harris 1987, Arregi 2000.

[26] In Argentinian Spanish, one finds the specific form *cantá* instead of the Iberian Spanish form *cánta* in the second person singular imperative. This dialect variation lies in the different status of our Stress Deletion rule (35): while it is active for all 2Sg forms in Iberian Spanish, it is not in Argentinian Spanish (see footnote 24).

[27] A few irregular verbs exhibit a specific form in this context, such as *dí* from *decír* 'say' and *ház* from *hacér* 'do'. As in monosyllabic present indicative forms, Stress Deletion does not apply in these cases (see footnote 24).

Table 9
Imperative

	1st conjugation	2nd conjugation	3rd conjugation
2Sg	c**á**nt a Ø	t**é**m e Ø	p**á**rt e Ø
2Pl	cant **á** d	tem **é** d	part **í** d

(39) *2Sg imperative*

Line 1				x				
Line 0		x				.	)	
String	c	**a**	n	t	Ø	a		Ø
Syntax	[	√		[v	Th	]]	**T/Agr**	

Second person plural forms are completely regular, and stress falls on the vowel immediately preceding T.

(40) *2Pl imperative*

Line 1					x			
Line 0		x			x	)		
String	c	a	n	t	Ø	**a**		d
Syntax	[	√		[v	Th	]]	**T/Agr**	

2.6 Interim Conclusion

To summarize so far, the stress patterns of all the relevant forms are derived from independently motivated assumptions about their syntactic structure. The few exceptions we find are subject to exceptional and specific rules. Crucially, they are not exceptions to the general stress algorithm, which applies across the board. In the next two sections, we show that the same is true in nonverbal contexts.

3 Stress in Nonverbal Environments

In terms of their morphological properties, Spanish words can be divided into two classes: verbs and nonverbs. In the framework of DM, the two are distinguished by the functional categories they contain: verbs have T, Agr, and (optionally) Fut, and nonverbs do not (see Harris 1991a, 1996, 1999, Oltra-Massuet 1999). This division is reflected in the placement of stress. In verbs, the position of stress depends on T. This cannot be the case in nonverbs, since they have no T node. In this section, we argue that the placement of stress in nonverbs is also governed by their syntactic structure. In particular, we argue that it is determined by a rule that projects a parenthesis to the right of certain nonverbal functional categories. We start with nouns and adjectives in section 3.1 and discuss other types of nonverbs in section 3.2.

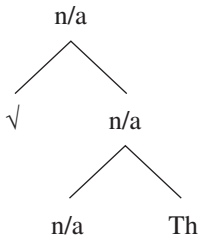
3.1 Nouns and Adjectives

Any analysis of Spanish stress in nonverbal environments must take into account the following well-known generalizations:

(41) a. In most V-final words, stress falls on the penultimate syllable.
b. In most C-final words, stress falls on the final syllable.

Recall that the structure we assume for nonverbs is the one in (42): at MS, the root is adjoined to n/a, and a theme position is also adjoined to n/a.

(42)



The position Th, the class marker, is usually realized as a vowel or as zero.

(43) *Stress in nonverbs*

V-final words: vocalic class marker				*C-final words: zero class marker*			
√	n/a	Th		√	n/a	Th	
m**é**s	-Ø	**-a**	‘table’	animá**l**	-Ø	-Ø	‘animal’
v**é**rd	-Ø	**-e**	‘green’	patá**n**	-Ø	-Ø	‘clumsy’
jug	**-ó**s	**-o**	‘juicy’	ver	-d**á**d	-Ø	‘truth’
holand	**-é**s	**-a**	‘Dutch’ (F)	holand	**-é**s	-Ø	‘Dutch’ (M)

Once we take this structure into account, the true nature of the generalizations in (41) emerges. The final vowel referred to in (41a) is the class marker, that is, the Vocabulary item inserted in the theme position adjoined to n/a. Thus, the words in (41a) are those whose class marker is a vowel (*o*/*a*/*e*). On the other hand, the words in (41b) are the ones whose class marker is Ø. As argued in Hooper and Terrell 1976 (see also Roca 1988), the generalization that captures both cases is the following:

(44) Stress falls on the vowel preceding Th.

Thus, as in verbs, the correct generalization about stress in nonverbal environments has to make reference to the morphological structure of words. Therefore, we need to extend our stress rules to include these cases, by adding (45b).

(45) *Stress algorithm*
a. Project a line 0 mark for each syllable nucleus.
b. *Insert a right parenthesis to the right of the highest n or a on line 0.*
c. Insert a right parenthesis to the left of T on line 0.

d. Project the rightmost mark of each line 0 foot onto line 1.
e. Insert a right parenthesis to the right of the rightmost mark on line 1.
f. Project the rightmost mark of each line 1 foot onto line 2.

(45b) ensures that stress falls on the syllable preceding the class marker. This is due to the fact that, as illustrated in (46) with both types of words, Th is right-adjoined to n/a.[28] The stress computation for the general cases that we have looked at so far is as follows:

(46)

	a. *Vocalic class marker* (mésa *'table')*	b. *Zero class marker* (verdád *'truth')*
Line 1	x	x
Line 0	x) x	x x)
String	m **e** s Ø a	v e r d **a** d Ø
Syntax	[√ [**n** Th]]	[√ [**n** Th]]

Note that the stressed syllable can be part of the root, as in *mésa*, where n is Ø; or it can be part of n, as in *verdád*. Once we take into account the syntax of words, the two independent generalizations that we had at the beginning are reduced to one: in both cases, the stressed vowel is the one preceding the Th node.

When the word contains more than one n or a, only the highest one in the structure is used in determining stress placement, as stated in (45b). Consider, for instance, *nacionalización* 'nationalization', decomposable as *nac-ion-al-iz-a-cion*. This word contains two nominal heads (realized as *-ion* and *-cion*) and an adjectival head (realized as *-al-*). (It also contains a verbal head, realized as *-iz-*, with theme *-a-*, which is irrelevant for stress.) Only the highest head, realized as *-cion*, projects a right parenthesis, which results in final stress.

Further evidence for the generalization in (44) is given in Hooper and Terrell 1976 and Roca 1988. There are cases that are exceptions to the phonological generalizations in (41), but that our analysis handles without any further stipulations. Consider first V-final words whose class marker is [Ø]. As our analysis predicts, stress falls on the vowel preceding the Th node, and the words surface with final stress.[29]

(47) *V-final words with zero class marker: final stress (*café *'coffee')*

Line 1	x
Line 0	x x)
String	c a f **e** Ø Ø
Syntax	[√ [**n** Th]]

[28] The reference to the ''highest'' n or a in (45b) will become clear below.

[29] Evidence that the final vowel is not the theme comes from derivational morphology. Recall that nonverbal themes attach to n (or a), not to the root. Although, in cases where n is Ø, the theme is right-adjacent to the root, in others, it is not (e.g., *verdád* in (46)). Descriptively speaking, it is as if roots ''lose'' their theme when a derivational suffix is attached to them. Thus, derivational morphology can be used to check whether a given string is part of the root or the theme. In the particular case of *café*, the final vowel is part of the root, so it remains when suffixes are added to the root, as in diminutive *cafe-cít-o* and *cafe-tér-a* 'coffee pot'. See Harris 1991a for details.

The second apparently exceptional case is formed by the group of words whose class marker is of the form [Vs]. As expected in our analysis, stress in these words falls on the vowel preceding the [Vs] class marker.[30]

(48) *Words with a [Vs] class marker: penultimate stress (*vírus *'virus')*

Line 1			x			
Line 0			x		)	x
String	v	**i**	r	Ø	u	s
Syntax	[	√	[	**n**	Th	]]

Another apparently marked case is the plural: even though it may add a syllable, it does not shift stress.[31] Under our analysis, this is expected, since plural morphology does not add the relevant syntactic structure.[32]

(49) *Stress in the plural*

a. *Singular (*verdád *'truth')*

Line 1				x			
Line 0		x		x	)		
String	v	e	r	d	**a**	d	Ø
Syntax	[	√	[	**n**		Th	]]

b. *Plural (*verdádes*)*

Line 1					x			
Line 0			x		x	)	x	
String	v	e	r	d	**a**	d	e	s
Syntax	[[	√	[	**n**		Th	]]	Pl]

All these cases must be treated as somehow exceptional in an analysis that relies on the phonological generalizations in (41). They provide strong evidence that the syntactic structure of words is crucial in determining regular stress in Spanish nonverbs.[33]

[30] Evidence that the final [Vs] string in these words is the theme can be seen in the fact that it disappears when derivational suffixes are added to the root (see footnote 29). For instance, for *vír-us*, adding the suffix *-ic* gives *vír-ic-o*. There is also a class of words that have *-s* in the theme position (e.g., *tórax* [tó.rak + s] 'thorax'). These are discussed in footnote 38.

[31] There are a few well-known highly exceptional cases where the addition of the plural morpheme does shift stress. These are dealt with in footnotes 41 and 43.

[32] As shown in Harris 1999, the ''epenthetic'' vowel *e* in the plural is inserted in the class marker position. This is reflected in (49b), but it is not crucial for our analysis of stress.

[33] Harris (1983, 1988) argues that words with no (apparent) internal structure (e.g., clippings and acronyms) provide evidence for an analysis based on the phonological generalizations in (41). Like other nonverbs, these words have penultimate stress when V-final and final stress when C-final. Since, apparently, these words have no internal structure, the alternative morphosyntactic generalization in (44) has nothing to say about them. This point does not affect our analysis. As we stated in section 1, every single word has minimal structure, that is, a root plus a category-giving functional head. In the default case, the regular stress rules derive penultimate stress for V-final words (e.g., the foreign names *Toyóta* and *Isúzu*, the clipped forms *móto* and *Juánjo*, and the acronym *UNÉSCO*) and final stress for C-final words (e.g., the foreign names *Solác* and *Moulinéx* and the acronyms *UNICÉF* and *OTÁN*). The former are reanalyzed as consisting of a root plus a vocalic theme, as in *Juanj-o*, the latter as having a zero theme. The fact that the final vowel in the former is reanalyzed as a vocalic theme comes from derivation: this vowel disappears when a derivational suffix is added to these roots, as in the diminutive *Juanj-it-o* for the clipping *Juanjo* (see footnote 29). As expected, there are also words of this type that exhibit stress retraction, such as the foreign names *Kléenex* [klíneks], *Kódak*, and *Cánon* (see section 4). We would like to thank an anonymous reviewer for bringing these facts to our attention.

With respect to these latter cases, Harris (1988:15) claims that they are irrelevant, since their stress pattern merely mimics the stress pattern of the words in the original language. We disagree with this claim. As argued in Roca 1990a: 154–157, even borrowings that preserve the stress pattern of the originating language obey the stress rules of Spanish

3.2 Other Categories

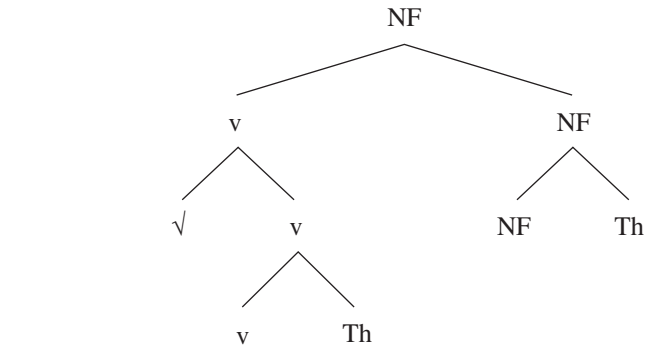
There are four types of nonverbs that we have not discussed so far: adverbs, determiners, strong pronouns, and nonfinite verbs.[34] These words have a class marker, that is, a theme position whose realization is governed by the same principles as in nouns and adjectives (see Harris 1991a, 1996). Stress in these categories follows the same generalization as in the nonverbal categories examined above.

Consider first adverbs. Like other nonverbs, they have a theme position (see Harris 1991a): *cérc-**a*** 'near', *déntr-**o*** 'inside', *léj-**os*** 'far', *bién-**Ø*** 'well'. We assume that adverbs are of the same category as adjectives (see Emonds 1970, 1976).[35] In our analysis, this means that they contain the functional category a, to which the morpheme Th is adjoined at MS. As expected, their stressed vowel is the one preceding Th.

Determiners and pronouns are of category D (see Abney 1987). Like any other functional category in Spanish, Th is adjoined to D at MS, as illustrated by the class markers in *múch-**o*** 'much', *ést-**e*** 'this (M)', *éll-**a*** 'she', *aquél-**Ø*** 'that (M)'. Stress in these words also falls on the vowel preceding the class marker.

Finally, nonfinite verbs (infinitives, participles, and gerunds) also behave morphologically like nonverbs (see Harris 1996). More specifically, these words have a nonverbal layer above the verbal one, as exemplified in (50) with the verb *purificár* 'purify'.

(50)



Infinitive:	pur	ific	á	r	Ø
Participle:	pur	ific	á	d	o/a
Gerund:	pur	ific	á	nd	o

(even though, in cases like *Kléenex* and *Kódak*, stress is ''irregular''). As discussed in section 4, any analysis of Spanish stress must account for the fact that the stressed syllable cannot be to the left of the antepenult (see also footnote 43). This generalization is true even for borrowings: foreign names with other stress patterns are not possible (e.g., Roca's (1990a) **Schéveningen*, **Híndeloopen*).

[34] There are four other nonverbal categories: complementizers, prepositions, definite articles, and weak pronouns (clitics). Words in these categories never bear stress.

[35] This assumption is not crucial. If adverbs are a separate category (as argued in Jackendoff 1977), there would be an adv head in adverbs instead of an adjectival head. The predictions about stress would be identical.

In this structure, the nonfinite suffixes *-r/d/nd* are inserted in the category NF (for *nonfinite*). Whatever the syntactic properties of this category, it must count as nonverbal for phonological and morphological processes.[36] That is why the Th adjoined to NF is *-o*, *-a*, or *-Ø*, all of which are class markers that appear in other nonverbal categories.[37]

The stressed vowel in nonfinite forms, as in other nonverbs, is the one preceding the class marker (i.e., the Th adjoined to NF), as illustrated by the infinitive *purificár*, the participle *purificádo*, and the gerund *purificándo*.

The discussion in the previous paragraphs makes it clear that we need to generalize rule (45b), which inserts a right parenthesis to the right of n/a, so that it can cover all nonverbs. The new modified rule is (51).

(51) Insert a right parenthesis to the right of the highest nonverbal functional node on line 0.

As should be clear from the discussion above, *nonverbal functional node* refers to all functional categories except v, Fut, and T (i.e., n, a, D, and NF).

To conclude this section, we have argued that our analysis derives the major stress patterns of Spanish words from independently motivated assumptions about their syntactic structure. Although this accounts for the majority of cases, a few (systematically) irregular words remain. These are the topic of the next section.

4 Stress Retraction in Nonverbal Environments

It is well known that there are exceptions to the generalizations about stress in nonverbal environments discussed above. Specifically, some words require that stress fall one syllable further to the left than expected. We call this phenomenon *stress retraction*. In this section, we provide an analysis for this stress pattern and discuss certain phonological restrictions imposed on it.

4.1 Clash Avoidance and Window-Narrowing Effects

As noted above, the stressed vowel of certain words lies further to the left than the regular stress rules predict. For instance, some forms that should have penultimate stress (i.e., words with a

[36] Syntactically, nonfinite forms have uses both as verbs and as nonverbs. For instance, when used as the past participle in perfect tenses, the participle behaves syntactically like a verb (e.g., it assigns accusative case); when used as a passive participle, it behaves like an adjective (e.g., it agrees in gender and number with the subject). It is not clear to us how this multiple functionality of nonfinite forms should be captured. That is why we have chosen the theory-neutral label NF for the nonfinite functional heads. Our analysis of stress in these forms does not depend on these details.

[37] Further evidence that nonfinite forms are morphologically nonverbal is provided by the fact that they can contain suffixes that are only allowed in nonverbs, such as the diminutive. For instance, the diminutive of the gerund *corr-ie-nd-o* 'running' is *corr-ie-nd-it-o*, and the diminutive of the participle *jod-i-d-o* 'fucked' is *jod-i-d-it-o*. This is not possible in finite verbs (cf. **corr-it-e*/**corr-it-o*/**corr-e-cit-o* from *corre* 'run, 3Sg PrInd'). Note that adding a diminutive suffix to *X* does not necessarily result in the meaning 'small *X*'. In one of its most common uses, affective speech, it does not alter the semantics of the word it is attached to. This is a typical context where a diminutive participle or gerund is appropriate.

vocalic class marker) have antepenultimate stress, as in *cóler-a* 'cholera', and others that should have final stress (i.e., words with a zero class marker) have penultimate stress, as in *césped-Ø* 'grass'.[38]

To account for these cases, we propose that the roots of these words are lexically marked with a right parenthesis to the left of their final vowel.

(52) *Marked roots*

a.	b.
x) x	x) x
c o l e r	c e s p e d

Words containing these roots in nonverbal environments would have two metrical boundaries, the one introduced by the root and the one projected to the right of n.

(53) *Stress with marked roots*

	a. cólera *'cholera'*	b. césped *'grass'*
Line 0	x) x) x	x) x)
String	c o l e r Ø a	c e s p e d Ø Ø
Syntax	[√ [**n** Th]]	[√ [**n** Th]]

We propose that in these cases, lexical stress surfaces as a result of the avoidance constraint in (54) (see Idsardi 1992:chaps. 2, 5, for discussion of the role of constraints in the metrical grid). As stated in (54), this constraint is active only in nonverbal environments. This context restriction simply states the well-known generalization that there is no phenomenon of lexically determined stress in verbal environments.[39]

(54) *Clash Avoidance*

*)x) (in nonverbal environments)

This constraint prevents a rule from applying if it results in a clash. The parenthesis that would be projected by n is in fact avoided if there is a lexical parenthesis creating the clash. The one that comes with the root is not avoided, since it is not introduced by rule: at the point at which it is introduced, there is no clash to be avoided. The correct derivation of stress for this type of

[38] Words like *tórax* [tó.raks] 'thorax' and *bíceps* also fall under this exceptional class. As argued in Harris 1983, the final *-s* in these words is the realization of the theme position (cf. the derived form *torác-ic-o* 'thoracic'; see footnote 29 for the relevance of derived words for the analysis of theme positions). Since the stressed vowel is one to the left of what the regular stress rules would derive, these examples are just like *cólera* and *césped*.

[39] Evidence that the constraint in (54) is only active in nonverbs is provided by the following minimal pairs (among many others): *práctica* 'practice (noun)' versus *practíca* 'practice (verb), 3Sg PrInd', and *cómputo* 'computation' versus *computo* 'compute, 1Sg PrInd'. That is, in Spanish, lexical stress does not trigger retraction in verbs. For instance, in the first pair above, the (categoriless) root /praktik/ has a lexical parenthesis. Clash Avoidance ensures that the noun has antepenultimate stress. If this constraint applied in verbal environments, we would wrongly derive final stress in the verb too, since this constraint would prevent Stress Deletion (35) from applying. Thus, the constraint must be restricted to apply in nonverbal environments only.

word is illustrated in (55).[40] The effect of Clash Avoidance is thus the preservation of lexical stress in nonverbal contexts.[41]

(55) *Stress with marked roots*

	a. cólera *'cholera'*	b. césped *'grass'*
Line 1	x	x
Line 0	x) x x	x) x
String	c **o** l e r Ø a	c **e** s p e d Ø Ø
Syntax	[√ [**n** Th]]	[√ [**n** Th]]

Not only roots can be lexically marked. There are also derivational suffixes (i.e., items inserted in n/a) that are marked. One such suffix is *-ic*, as illustrated in (56). For instance, the word *báse* gets stress by the application of the general rule that projects a metrical boundary to the right of n. In *básico*, however, the application of the general rule is blocked by Clash Avoidance, owing to the presence of the parenthesis that comes with the suffix *-ic*.[42]

(56) *Stress with marked suffixes*

a. bás-e 'base'	b**á**s-ic-o 'basic'
metál 'metal'	met**á**l-ic-o 'metallic'

[40] Morris Halle (pers. comm.) has pointed out that William Idsardi, in recent unpublished work, proposes that clash avoidance phenomena should be handled in terms of rules that delete grid marks instead of constraints or rules that get rid of parentheses. Under this view, stress-retracting items would not have a lexical parenthesis in Spanish, and there would be no Clash Avoidance constraint. Rather, such items would be subject to a rule that would delete their final grid mark (presumably, a suitable modification of our (35)), resulting in stress retraction. This would also involve a reformulation of our analysis of restrictions on stress retraction in section 4.2. Our analysis could easily be modified in this manner without altering its basic predictions. We leave it as a matter for future research whether this is in fact the correct analysis of stress retraction in Spanish.

[41] As shown in section 3, our analysis correctly predicts that plural words are stressed on the same vowel as their singular counterparts. This generalization is also true in words that trigger stress retraction (e.g., *cráter-cráteres* 'crater'). There are two types of exceptions to this generalization, exemplified by (a) *carácter-caractéres* 'character' and (b) *régimen-regímenes* 'regime' and *espécimen-especímenes* 'specimen'. These cases are highly exceptional, and there is a strong tendency to regularize them: for many speakers, the plural of *carácter* is *carácteres*, and the singular of *especímenes* is *especímen*. In words of type (a), the singular triggers stress retraction, and the plural does not. We can simply stipulate that its lexical parenthesis is deleted in the plural. Words of type (b) are somewhat more complicated: there is stress retraction in both the singular and the plural. This case is dealt with in footnote 43.

[42] There is a well-known group of monosyllabic roots (e.g., *metr* 'meter') that are stress retracting when a prefix is added to them: *kiló-metr-o* 'kilometer', *centí-metr-o* 'centimeter' (i.e., as with the suffix *-ic*, stress falls on the preceding morpheme). In our analysis, this means that this type of root has a lexical parenthesis: /m)etr/. On the other hand, words containing these roots and no prefix are stressed on the root vowel: *métro*. Our analysis seems to predict that the latter have no stress, since the lexical parenthesis and Clash Avoidance would prevent insertion of a parenthesis to the right of n. This, however, is not the case. As proposed in Idsardi 1992:76, there is a universal rule that deletes a (right) parenthesis if it does not group any grid marks.

(i)) → Ø/#____

As desired, this rule deletes the lexical parenthesis in this class of roots when they are not prefixed (so that Clash Avoidance does not apply), but it does not when they are prefixed (so that Clash Avoidance does apply).

b.	báse *'base'*	básico *'basic'*
Line 1	x	x
Line 0	x) x	x) x x
String	b **a** s Ø e	b **a** s i c o
Syntax	[√ [**n** Th]]	[√ [**a** Th]]

We have formulated Clash Avoidance (54) as a constraint on rule application, rather than as a clash deletion rule. That this approach is correct is shown by words in which a clash *is* allowed.

(57) *Marked root plus marked suffix (*colérico *'choleric')*

Line 2	x
Line 1	x x)
Line 0	x) x) x x
String	c o l **e** r i c o
Syntax	[√ [**a** Th]]

In this case, the node a cannot project its parenthesis because of Clash Avoidance. However, this word does contain a clash, which is not avoided because the parentheses that make up the clash are not inserted by rule. In this case, both the root and the suffix have a lexical parenthesis. Crucially, if Clash Avoidance were formulated as a deletion rule, it would not be able to distinguish between lexical and rule-inserted parentheses in the way that it does when formulated as a constraint.

Clash Avoidance also predicts that stress can only be retracted one syllable to the left: if a marked root or suffix has any other parenthesis further to the left, the constraint does not prevent n/a from projecting. Thus, although Clash Avoidance predicts well-formed *amar**í**ll-o* 'yellow', *Am**é**ric-a*, *anim**á**l-Ø*, and *can**í**bal-Ø*, ill-formed **Á**meric-a* and **á**nimal-Ø* cannot be derived. Words with a lexical parenthesis too far to the left result in unmarked stress.

(58)

	a. *América *'America'*	b. *ánimal *'animal'*
Line 2	x	x
Line 1	x x)	x x)
Line 0	x) x x) x	x) x x)
String	a m e r **i** c Ø a	a n i m **a** l Ø Ø
Syntax	[√ [**n** Th]]	[√ [**n** Th]]

Hence, we derive the well-known generalization that stress cannot go beyond the penultimate syllable in C-final words,[43] or beyond the antepenultimate syllable in V-final words. Furthermore,

[43] There are a few well-known exceptions to this generalization, such as *déficit* and *Júpiter*. We propose that, in addition to having a lexical parenthesis (i.e., /xu)piter, de)fiθit/), these words are subject to a rule that deletes their final grid mark (see Halle 1998 for the same rule in English). After this rule applies, line 0 of the word *Júpiter* is as shown in (i).

our analysis correctly predicts that C-final words whose final consonant is part of the class marker *can* have antepenultimate stress: *síntes-is* 'synthesis', *anális-is* 'analysis'.[44] These words are just like *cóler-a* or *Américc-a*.[45]

In sum, several of the so-called window-narrowing effects in Spanish stress are reduced to our Clash Avoidance constraint and the fact that derivational and inflectional morphology in this language is suffixal. In the next section, we discuss other window-narrowing effects that result from certain restrictions on stress retraction.

4.2 Restrictions on Retraction

In the previous section, we have shown that certain Vocabulary items trigger stress retraction in nonverbs. However, there are certain restrictions on retraction, first examined extensively in Harris 1983. As we discuss immediately below, there are two basic patterns: (a) restrictions having to do with syllable weight, and (b) restrictions having to do with glides.

(i) x) x .
j u p i t e r

Clash Avoidance prevents the insertion of the parenthesis to the right of n, resulting in stress on the first syllable. Another type of exception is illustrated by ***régimen*** 'regime' and ***espécimen*** 'specimen'. In their plural counterparts, stress is displaced one syllable to the right: ***regímenes***, ***especímenes***. We assume that these words have two lexical parentheses: /re)xi)men/. This correctly predicts plural *regímenes*. As for the singular, we make two additional assumptions. First, like *Júpiter*, these words are subject to the rule that deletes their final grid mark, resulting in the line 0 shown in (ii).

(ii) x) x) .
r e g i m e n

Second, they are also subject to rule (35), which deletes a grid mark in the context ____)#. We used this rule previously in section 2.4 to account for stress in the present. The result is antepenultimate stress in the singular. As can easily be checked, stress in the plural is not affected. As in any other analysis of these facts that we know of, these cases have quite a few lexically determined restrictions, which reflects the fact that these cases are highly marked. As we observed in footnote 41, speakers tend to regularize them.

This analysis of exceptional antepenultimate stress allows us to maintain the three-syllable window restriction in Spanish, which has no exceptions (see the references cited in section 5). The two ways in which stress can be displaced to the left, lexical parenthesis and deletion of the final grid mark, cannot result in stress further than the third syllable from the end of the word.

[44] As pointed out by an anonymous reviewer, an interesting case of this type of word is provided by last names ending in *-ez* (e.g., ***Rodrígu-ez***, ***Álvar-ez***). These are always related to a first name that has a word marker instead of *-ez* (e.g., ***Rodríg-o***, ***Álvar-o***). Furthermore, the stress pattern of the first name is preserved in the last name: if the first name has regular stress, so does the last name (e.g., *Rodríg-o*/*Rodrígu-ez*); if the first name has stress retraction, so does the last name (e.g., *Álvar-o*/*Álvar-ez*). This fact follows directly if we assume that *-ez* is a class marker. Since the only difference between each first name and the corresponding last name lies in the realization of the theme position, they are predicted to have the same stress pattern.

[45] Evidence that *-is* is a class marker in these words comes from the fact that it is not present when a derivational suffix is added to the root: *sintét-ic-o* 'synthetic', *analít-ic-o* 'analytic' (see footnote 29). The analysis also predicts the existence of V-final words whose class marker is zero and that have penultimate stress. These words are not common, since the class of V-final words with a zero class marker is itself uncommon. However, they do exist (contrary to an anonymous reviewer's claim); *whískey* [gwíski] is a relevant example. At least for some speakers, the final vowel is not a class marker, as witnessed by the fact that the diminutive for these speakers maintains this vowel: *whiski-cit-o* (a Google search on this word performed on 22 July 2003 returned about 153 hits for this diminutive).

The relation between syllable weight and stress retraction is illustrated in the following pairs. In each pair, the first member exemplifies an existing word without stress retraction, and the second member a nonexisting counterpart with stress retraction.

(59) *Stress retraction and syllable weight*

a.	al**á**rma 'alarm'	*__á__larma	[a.lar.ma]
b.	cont**é**nto 'happy'	*c__ó__ntento	[kon.ten.to]
c.	Jam**á**ica	*J__á__maica	[xa.maj.ka]
d.	anci**á**no 'aged'	*__á__nciano	[an.θja.no]
e.	inci**é**nso 'incense'	*__í__ncienso	[in.θjen.so]

As all these examples indicate, stress cannot occur to the left of a penultimate heavy syllable.[46] This has generally been taken to be evidence that stress is weight sensitive in Spanish (see, e.g., Harris 1983, 1995, Den Os and Kager 1986). Following Roca (1990a), we will formalize this restriction in terms of a rule that restricts the class of words that can undergo stress retraction.

In order to see how this generalization can be implemented, consider how **álarma* would be derived in the present analysis. Like all words with stress retraction, it must be derived from a lexically marked Vocabulary item. The representation of this word would be as follows before parenthesis-projecting rules apply (for convenience, the string is parsed into syllables):

(60) Line 0 x) x x
String a .**l a r.** m **Ø** a
Syntax [√ [**n** Th]]

As in all cases of retraction, this lexical parenthesis would block the insertion of the regular right parenthesis to the right of n, as a result of Clash Avoidance. This is precisely what we need to avoid, since stress retraction is impossible in this type of word. We can achieve the right result if the lexical parenthesis in these cases is deleted. We thus propose the following rule:[47]

[46] In words ending in a syllable whose onset is a trill, such as *cacharro* 'thing', stress retraction is not possible either (**cácharro*). Following Harris (1969, 1983), we assume that surface intervocalic trills are derived from underlying sequences of two flaps /VrrV/. This sequence is parsed into separate syllables by general rules of the language: [Vr.rV]. Thus, when stress rules apply, the penultimate syllable of this type of word is heavy, which means that the generalization about heaviness illustrated in (59) subsumes this restriction on stress retraction as well.

[47] There are several well-known exceptions to the generalization about syllable weight discussed here. They include the place name *Frómista* and foreign names such as *Wáshington* and *Róchester*. All these are clear examples of stress retraction, so they must have a lexical parenthesis, for example, /fro)mista, ro)čester/. We stipulate that these words are exceptions to the rule deleting a parenthesis before a heavy syllable (61). This accounts for *Frómista*: its final vowel is the theme, so the rule inserting a parenthesis to the right of n would insert it to the left of the final vowel. However, Clash Avoidance prevents this, resulting in antepenultimate stress. As for examples like *Róchester*, we assume that, just like *Júpiter*, they are subject to a rule that deletes their final grid mark (see footnote 43). The result is antepenultimate stress.

(61) *Parenthesis deletion before a heavy syllable*

$$) \rightarrow \emptyset \; / \underline{\quad\quad} \; x \; | \; \sigma_H$$

As can be seen in (60), the syllable following the lexical parenthesis in *alarma* is heavy. After the parenthesis is deleted, the regular stress rules result in *alárma*, as desired.

(62)

Line 1			x			
Line 0	x		x		)	x
String	a	.l	**a**	r. m	Ø	a
Syntax	[		√	[**n**	Th	]]

Hence, we derive the fact that stress retraction is not possible in this class of words. The main function of the parenthesis deletion rule proposed above is to restrict the class of words that can have a lexically projected parenthesis. This rule applies before all other stress rules, removing lexical parentheses in a phonologically defined set of words. The result is that all the regular stress rules apply to these words, resulting in the unmarked pattern.

Note that we must assume that final syllables cannot count as heavy, since, as we showed in the previous section, stress retraction is possible in words with a heavy final syllable. A relevant example is provided by *césped* in (55b). In this word, the lexical parenthesis is not deleted, even though the syllable following it is heavy. This syllable is final in the word, and it does not count as heavy for the stress rules. This assumption is not particular to our analysis (see, e.g., Harris 1995): the fact is that penultimate heavy syllables do not allow stress retraction, and final heavy syllables do. Similar restrictions on stress placement hold in other languages, such as English (see Halle and Vergnaud 1987:230–231 and references cited there).

A different restriction on stress retraction is illustrated in the following pairs:

(63) a.	car**í**cia ‘caress’	*c**á**ricia	[ka.ri.θja]
b.	ing**é**nuo ‘naïve’	***í**ngenuo	[in.xe.nwo]
(64) a.	conv**ó**y ‘convoy’	*c**ó**nvoy	[kom.boj]
b.	Paragu**á**y	*Par**á**guay	[pa.ra.ɣway]

This might seem like an effect of syllable weight: the final syllable is heavy, and stress retraction is not possible. However, as just noted, final heavy syllables do not in general prevent retraction. What distinguishes these cases from others is that the final syllable is heavy because it contains a glide.[48] We propose that this restriction is the consequence of the following rule (where *G* is a glide):

[48] There are a few exceptions to this generalization, such as *ventr**í**locuo* [ben.trí.lo.kw + o] ‘ventriloquist’ and foreign names (e.g., *D**í**sney*). These are lexically marked as exceptions to rule (65) below.

(65) *Parenthesis deletion before a glide*

$$) \rightarrow \emptyset \; / \underline{\quad} \; x \\ | \\ VC_0G$$

The initial representation of **cáricia* and **cónvoy* would be as follows:

(66)

	a. *cáricia *'caress'*	b. *cónvoy *'convoy'*
Line 0	x) x x	x) x
String	k a r i θ **j** Ø a	k o m b o **j** Ø Ø
Syntax	[√ [n Th]]	[√ [n Th]]

Rule (65) deletes the lexical parenthesis in (66), and further application of the stress rules results in regular *carícia* and *convóy*, as shown in (67). Thus, **cáricia* and **cónvoy* cannot be derived.[49]

(67)

	a. *cáricia *'caress'*	b. *cónvoy *'convoy'*
Line 1	x	x
Line 0	x x) x	x x)
String	k a r **i** θ j Ø a	k o m b **o** j Ø Ø
Syntax	[√ [**n** Th]]	[√ [**n** Th]]

To summarize this section, there are certain restrictions on stress retraction that are the consequence of the rules in (61) and (65). These are rules that apply before all other stress rules and, by deleting lexical parentheses in certain contexts, restrict the class of words that can undergo stress retraction.[50]

[49] Another way of implementing this restriction on retraction would be to assume that glides, as well as vowels, project a grid mark on line 0 (as stated in (45a), only vowels project in our analysis). This alternative would rule out **cáricia* and **cónvoy* in the same way as **América* and **ánimal* in (58). This is, in essence, the solution proposed by Harris (1995). There are two problems with this alternative. First, it would derive stress on glides in certain cases (e.g., *[ka.ri.θja] as opposed to [ka.rí.θja] for *caricia*). One would thus have to add further stipulations in order to place stress on a vowel instead of a glide. For instance, Harris (1995:881–882) assumes that words like [ka.ri.θja] are obligatorily stress retracting, so that stress falls on the vowel preceding the glide. Although this describes the facts correctly, this addition to the analysis would not come ''for free'' by saying that glides cannot bear stress in Spanish. The basic idea behind this analysis is that glides *are* stressable, since they project a line 0 grid mark. In our analysis, glides do not project, so this problem does not arise: words with stress on glides are not possible as a matter of principle. Second, it would have to be stipulated that glides do not project a grid mark in verbal environments, for reasons given in Harris 1995:876–877, 882. In the analysis we propose, this is not necessary: rule (65) applies before other stress rules, so it only affects lexical parentheses. Since lexical parentheses have no effect in verbal environments (see section 4.1), it follows that rule (65) can have no effect on verbs either.

Note that our analysis also correctly handles cases like *láudano* [láw.ða.n + o] 'laudanum' and *alféizar* [al.féj.θar + Ø] 'windowsill', which have received some attention in previous literature (e.g., Harris 1995:870, 881). Both are stress retracting, so they are both stressed on the first stressable segment (i.e., the vowel, not the glide) to the left of what the regular stress rules would predict.

[50] Several authors claim that there is an additional restriction on retraction (Roca 1988, 1990a, 1997, Carreira 1988, Farrell 1990, Dunlap 1991). According to them, stress retraction is not possible if the onset of the final syllable is alveolopalatal [č], palatal [y, ʎ, ɲ], or velar [x]. We have chosen not to take this alleged restriction on retraction into account because, as argued in detail in Harris and Kaisse 1999:147–151, it seems to be nothing more than an accidental gap in the Spanish lexicon. We would like to thank an anonymous reviewer for pointing out the problems with this generalization.

5 Previous Accounts

The main claim put forth in this article is that the placement of regular stress in Spanish words is determined by their syntactic structure. In this section, we compare this claim with previous analyses. As will be seen below, many of the generalizations we discussed above have been considered in previous work. Our analysis gives a unified account of these generalizations by taking a deeper look at the syntax and morphology of Spanish.[51]

One of the main arguments for the present proposal is that all past and future tenses are accounted for by the same simple algorithm (see sections 2.1–2.3). Once we adopt the hypotheses about the structure of verbs made in sections 1–2, it is clear that the stressed vowel in all these tenses is the one preceding the T node.[52] As we discussed at the end of sections 2.1 and 2.2, previous works fail to give a unified account of all these tenses.

On the other hand, as we showed in section 2.4, our analysis requires an additional rule in order to account for certain present forms. For ease of exposition, we repeat the forms of the present indicative of the first conjugation here (the present subjunctive has basically the same stress patterns):

(68) *Stress in the present*

	√	v	Th	**T/Agr**
1Sg	c**á**nt	Ø	Ø	o
1P1/2P1	cant	Ø	**á**	mos/is
2Sg/3Sg/3P1	c**á**nt	Ø	a	s/Ø/n

According to our analysis, these forms are also stressed by the rule that inserts a right parenthesis to the left of T. That is, they are stressed in the same way as past and future forms. This is clearly the case in the first person singular and first and second person plural forms, but not in the second and third person singular and third person plural forms. For the latter, we proposed a rule, (35), that makes the final vowel unstressable. This is, in essence, the position adopted in Hooper and

[51] The discussion below assesses previous work with respect to this central claim. We will, however, not discuss aspects of the analyses we do not consider as important. For instance, we have proposed that line 0 feet in Spanish are unbounded and right-headed. In this respect, previous works on Spanish stress written in the metrical framework can be divided in two camps: those that make a similar claim about foot structure (Roca 1988, 1990a,b, 1991, 1992, Harris 1989a), and those that claim that feet are bounded and left-headed (e.g., Harris 1983, 1987, 1988, 1989b, 1991b, 1995, Halle, Harris, and Vergnaud 1991, Solan 1981, Núñez Cedeño 1985, Otero 1986, Den Os and Kager 1986, Roca 1997, 1999, Lipski 1997, Saltarelli 1997). We do not consider this aspect of the analysis important because we could have devised a system in which feet were binary and left-headed, but which kept the central claim that syntactic structure determines stress placement. On the other hand, our choice of right-headed unbounded foot structure keeps the analysis maximally simple. For instance, the generalization that stress in verbs falls on the vowel preceding T is most easily implemented by inserting a right parenthesis to the left of T.

[52] The only exceptions are the third person singular perfective forms of the regular perfective and the first and third person singular forms of the irregular perfective (see sections 2.3–2.4). As far as we know, these forms also require exceptional mechanisms in previous accounts.

Terrell 1976 and Roca 1990b, 1992, 1999. The main advantage of this proposal is that it allows us to maintain a simple algorithm that accounts for stress placement in all verbal forms in a unified way; the few apparent exceptions are the consequence of an additional rule that applies in the present (and in a few other exceptional forms; see sections 2.4–2.5).

Other authors have relied on an apparently simpler generalization about stress in the present: in all the forms, stress falls on the penultimate syllable. This position is defended in several works, including Harris 1988, 1995.[53] The main argument for these proposals is that this same generalization is true also for the majority of nonverbal forms (with some qualifications discussed below). Since these proposals rely on a cross-categorial generalization, we must first discuss what they have to say about stress in nonverbal environments. As we argue below, this generalization is misleading, since it is in fact not obeyed in nonverbs. This removes the apparent advantages of this analysis of stress in the present.

The basic idea in this family of proposals is that (regular) stress in nonverbs follows the generalizations in (41), repeated here:

(69) a. In most V-final words, stress falls on the penultimate syllable.
b. In most C-final words, stress falls on the final syllable.

Although these generalizations are true of most nonverbal words (excluding those that undergo retraction; see section 4), we already noted in section 3.1 that there are certain systematic exceptions to them (see also Hooper and Terrell 1976, Otero 1986, Roca 1988). Most notably, there are V-final words with final stress, which in this type of analysis must be treated as exceptions (e.g., *café* 'coffee'). For instance, in Harris 1983, the final (nonheavy) rime in these words is exceptionally labeled as strong, which in this analysis means that it is assigned stress. However, treating these words as exceptions does not take into account the fact that their final vowel is not part of the theme (or class marker, in more traditional terminology). Even if this correlation between final stress and the nonthematic nature of the final vowel is made systematic (as in Harris 1983), the correlation is not explained. Similarly, stress in plural forms falls on the same vowel as in the corresponding singular form, which in most cases means that they are C-final words with penultimate, not final, stress (cf. Sg *mésa* 'table' and P1 *mésas*). Thus, they must be treated as exceptions to the generalization about C-final words. For instance, in Harris 1988, it is stipulated that the *s* in the plural morpheme is ''ignored'' by the stress rules.[54]

As we noted in section 3.1, the generalization in (44) about stress in nonverbs, repeated here, subsumes the ones in (69) and all the apparently exceptional cases mentioned above.

[53] See also Harris 1969, 1975, 1987, 1989a, 1991b, Halle, Harris, and Vergnaud 1991, Solan 1981, Núñez Cedeño 1985.

[54] More precisely, in this analysis, regular stress rules assign stress to the final syllable in the word. This accounts for the fact that (most) C-final words have final stress. Furthermore, word-final vowels are extrametrical, which accounts for the fact that (most) V-final words have penultimate stress. Finally, it is stipulated that a vowel counts as final in the word if it is only followed by an ''inflectional consonant'' such as the one in the plural morpheme *-s*. Thus, with respect to stress, it is as if the plural morpheme were not there.

(70) Stress falls on the vowel preceding Th.
(see Hooper and Terrell 1976, Roca 1988, 1990a,b, 1992, 1997, 1999)

In most words ending in a vowel, the final vowel is the theme, so stress is penultimate. In most words ending in a consonant, the theme is Ø, so stress falls on the final syllable. Furthermore, words ending in a vowel that is not the theme have final stress (e.g., *café* 'coffee'), and words ending in a consonant that is the realization of the plural morpheme have stress on the same vowel as their singular counterpart, since the plural morpheme does not add relevant morphology (e.g., Sg *mésa* 'table' and P1 *mésas*). In our analysis, this generalization is the result of a rule that inserts a right parenthesis to the right of nonverbal functional categories. The basic idea is that, in both verbs and nonverbs, stress is determined by the syntactic structure of words.

Thus, analyses that are based on the generalizations in (69) do not seem to be on the right track, since they fail to give a principled account for certain systematic exceptions to the generalizations. This is significant because the alternative generalization in (70), which we adopt, takes care of all relevant cases, including these apparent exceptions.[55]

We can now go back to stress in the present. As we noted above, these alternative accounts rely on the generalization that stress in the present falls on the penultimate syllable, their main advantage being that this generalization is also apparently true in nonverbs. However, we have just argued that this is not the case. Furthermore, problems similar to the ones discussed above arise when trying to extend this analysis to verbal forms in the present (see (68)). Some of them end in a vowel and have penultimate stress. However, others (second person singular and first, second, and third person plural) end in a consonant, but they also have penultimate, not final, stress. Just as in plural nonverbs, this type of analysis must stipulate that this final consonant is ignored by the stress rules.[56]

In sum, the advantages of this type of account are only apparent, and we thus see no serious objection to the proposal adopted here. Just as in all other tenses, stress in the present is determined by the rule that inserts a right parenthesis to the left of T. The few apparent counterexamples that exist are handled by an additional rule that applies in the present and in a few other exceptional forms.

[55] Harris (1995) develops an analysis that assigns stress to the penultimate vowel in the word, regardless of whether this vowel is followed by a consonant or not. This accounts straightforwardly for V-final words whose final vowel is the theme, and for their plural counterparts (and for all present tense forms). However, Harris needs to stipulate that nonverbs that have a phonologically empty theme actually have a vocalic theme that is maximally underspecified and is deleted after the stress rules apply. No independent evidence is given for this underspecified vowel (as opposed to saying simply that these words have a zero theme). Stress is assigned to the preceding vowel, which surfaces as the last one in the word. This accounts for stress in both C-final and V-final words with an empty theme. As we showed above, they have final stress (i.e., penultimate before the theme is deleted). In effect, this analysis assumes the generalization in (70) that stress in nonverbs falls on the vowel preceding the theme, albeit in an indirect way. Thus, it is immune to the criticisms we made above about this type of account. However, this is achieved at the cost of positing an underspecified vowel for which no independent evidence is given. Although we do not have a principled objection to the use of underspecified vowels in general, an analysis that does not need them and that accounts for the generalization in (70) directly is to be preferred.

[56] In Harris 1988, this case and the case of plural nonverbs are given a unified account, since the consonants that are ignored by the stress rules are all ''inflectional'' (see footnote 54 above). This does not alter the fact that it is a stipulation designed to account for exceptions.

To conclude, the main advantage of the present analysis is that our proposals concerning the syntax and morphology of Spanish enable us to provide a simpler account of stress placement. More specifically, we have shown that several generalizations that have been uncovered in previous work receive a unified explanation once we take into account the syntax of words.

Before we end this section, we would like to mention several (relatively) recent works that propose nongenerative accounts of Spanish stress: Aske 1990, Eddington 2000, and Bárkányi 2002. We will not compare these analyses with the one proposed here, since they adopt a basic framework that is very different from ours. However, they all claim to provide evidence against generative accounts. Their main argument is the following. In generative analyses, marked patterns are (in part) the consequence of lexical marking (e.g., *cólera* 'cholera' has a lexical mark that triggers stress retraction). Aske, Eddington, and Bárkányi argue that this approach predicts that, when confronted with new words for which no stress is known (e.g., written words with no orthographic stress marking), speakers of Spanish will assign them unmarked stress. ''As these words do not have an entry in the speakers' mental lexicons—as they are nonexistent—they cannot be marked as exceptions for stress retraction'' (Bárkányi 2002:388; see also Aske 1990: 34–36, Eddington 2000:103). These authors provide interesting data showing that, contrary to this alleged prediction, speakers assign some new words the unmarked pattern and others the marked one. It seems to us that this argument is obviously flawed. Generative models of phonological competence make absolutely no prediction about the status of a new word as marked or unmarked. The only (quite trivial) prediction is that, if the new word is assigned a lexical mark, it has marked stress; otherwise, it has unmarked stress. Where Aske's, Eddington's, and Bárkányi's argument goes astray is in the assumption that, in the generative model, since these words are new, they cannot be part of the lexicon when the rules apply to them. We do not know where this assumption stems from, and these authors do not provide any reference to generative works where this assumption is made explicitly. To conclude, their claim that their results provide evidence against generative models of phonology is unwarranted.

6 Conclusions

We have argued for an analysis of stress that directly relates the syntax of Spanish to the computation of stress through morphological structure. This account of Spanish stress provides evidence for a tight relation between these three modules of grammar, as predicted by the framework of Distributed Morphology. The analysis also argues in favor of theories in which words are syntactically decomposed. In particular, the generalizations about stress placement discussed in this article cannot be accounted for in a straightforward manner in frameworks, such as Anderson's (1992) A-Morphous Morphology, in which words have no internal structure. For instance, we argued in section 2 that stress in verbs falls on the vowel preceding the *node* T, regardless of the specific phonological realization of this node. In other words, stress in verbs is dependent on a property of this syntactic node, not a property of the suffixes realizing it. In a theory where words have no structure (hence no T node), this generalization cannot be stated. Rather, this property has to be stipulated for each of these suffixes separately. Hence, a fundamental generalization about Spanish stress cannot be given a unified account in this framework.

We have implemented this account of Spanish stress by allowing foot boundaries to be projected from syntactic boundaries, thus extending the domain of application of Idsardi's (1992) Edge Marking, so as to allow this parameter to refer to syntactic units. This formalism for the computation of stress is especially well equipped for this purpose, owing to its emphasis on the projection of parentheses on the metrical grid.

A question we have not addressed so far is whether the two rules projecting parentheses from the syntax can be unified (see (45c), (51)).

(71) a. Insert a right parenthesis to the left of T on line 0.
b. Insert a right parenthesis to the right of the highest nonverbal functional node on line 0.

It is obvious that the two have a lot in common: they insert a right parenthesis, and its placement depends on the highest functional category in the word (T in verbs, and n, a, D, or NF in nonverbs). However, there is an important difference between the two rules: the placement of the parenthesis with respect to the relevant functional category is different in the two types of words (to the left of T, but to the right of nonverbal categories). A possible way of collapsing the two rules is the following:

(72) Insert a right parenthesis *to the right of the highest functional node* on line 0.

In nonverbal domains, this rule is equivalent to (71b). In verbs, this explains why it is T, and not Fut or v, that projects a parenthesis. In verbal forms in which T does not contain a vowel (e.g., in imperfective tenses), this rule has the same effect as (71a). Since there is no grid mark corresponding to T, placing a parenthesis to its left or right makes no difference for stress placement. On the other hand, the new rule makes wrong predictions in forms in which T contains a vowel that projects to the grid (e.g., in some present forms). In order to maintain this modification of the analysis, we would thus need to change some of our assumptions about the structure of these forms. We leave this as a question for future research.

To conclude, in this article, we have argued for a novel analysis of Spanish stress. Although we have concentrated on this language, we believe that this approach can also handle the stress systems of other Romance languages. In fact, the present proposal was first developed in Oltra-Massuet 1999, 2000 for Catalan, and Guerzoni 2000 offers an account of stress in Italian verbs based on similar principles. What this research project shows is that syntax plays a more important role in the computation of word-level stress than has been standardly assumed. It should thus be seen as an invitation to reexamine the stress systems of other language families as well.

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