"Complimentary" Heads in Spanish: Syntactic Phonology

Erika Varis
University of Southern California

1.	Introduction

The interaction between syntax and phonology has long been an object of study, and recent work on this interface in Spanish has examined aspects of focus and intonation (Domínguez 2004, Elordieta, Gorka & Vigário 2005). Here, I identify a syntactic structure influencing different phonological processes that have not yet been approached within the syntax-phonology interface: the head-(head of) complement structure, formed by linear adjacency of a word representing the syntactic head and the word representing the head of its syntactic complement. Sensitivity to this linear syntactic relationship is expressed here in Optimality-Theoretic terms (Prince & Smolensky 1993) via positional markedness constraints (Smith 2005) targeting the head-complement structure. Three phonological processes of Spanish are examined using the head-complement positional markedness schema: morpho-phonological determiner alternation (Section 2), coda-gliding (Section 3), and conjunction (Section 4). Using this syntactic "position" in positional markedness necessarily expands the phonological framework to a two-constituent targeted environment instead of a singleton one, and it directly links syntax and phonology by allowing phonological constraints to access this syntactic information, bypassing the prosodic hierarchy. Section 5 discusses some alternative approaches with regards to these two proposals, and shows the necessity of both the two-constituent environment and direct syntax-phonology relationship. Section 6 concludes with some remarks on theoretical implications and avenues of further research.

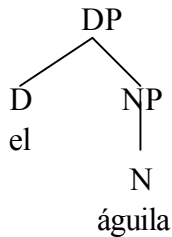1.1	Positional markedness and the head-complement environment

Positional markedness (Smith 2005), like positional faithfulness (Beckman 1998), refers to constraints that target a specific environment, or position, and has been argued to function in an augmentation capacity. That is, the position targeted by a positional markedness constraint is perceptually salient in such a way that obeying the markedness constraint in the "strong" position augments perception. For example, the onset position of a syllable is perceptually strong because it breaks up the sound signal with silences, providing a reset cue for the brain when processing speech (Delgutte 1997, Wright 2004). Therefore, the onset position has been proposed as available to be targeted in a positional markedness constraint (Smith 2000, 2005).

I propose that it is not only a single onset position that may be targeted by such a constraint, but a two-constituent environment with a specified border between the two items. Examples of two-constituent environments include syllables, words, morphemes, etc.

(1)	**Example**	**Border**
	V.V	syllable
	águila]ω[alta tall eagle	word
	águila-s	eagle-s (pl)	morpheme

Vowels in hiatus, adjacent words, and even linked morphemes belong to two separate positions, with a syllable, word or morpheme boundary between the two constituents. The double constituent environment also lends itself to syntactic relationships, such as that between a syntactic head and its complement (following X-bar theory originating in Chomsky [1970] for syntactic structural relationships).

(2) el_D $águila_N$
     the   eagle
     head   head of the complement

```
              DP
             /  \
            D    NP
            el    |
                  N
                águila
```

The determiner *el* is the head of the determiner phrase, whose complement is the noun phrase. The head of the noun phrase—the head of the complement to the DP—is the noun *águila*.

A positional markedness constraint targeting this syntactic environment identifies the two-constituent window that includes the head of a structure and the head of its complement, and evaluates markedness across the border between the two. Since positional markedness is posited to only target prominent positions—either phonetically or psycholinguistically (Smith 2005)—I suggest that the HoC border is also prominent in some way, but along the syntactic dimension rather than the phonetic or psycholinguistic[1].

The two-constituent position naturally requires a markedness constraint that also intrinsically makes reference to two items, such as NO HIATUS (formulated following McCarthy 1993):

(3)   NO HIATUS: Prohibition against two adjacent vowels from different syllables.

With head-of-complement (HoC) positional markedness, the constraint is as follows:

(4)   NO HIATUS(HoC): Prohibition against two adjacent vowels across a head-of-complement border.

The following three sections examine different phonological processes in Spanish that demonstrate sensitivity to the HoC environment, or a variation thereof, including morpho-phonological determiner alternation, coda consonant gliding, and vowel quality shifts in conjunction. All three cases demand reference to the relationship between the two words of the

---

[1] Further research is needed to determine the exact manner or details of such syntactic prominence, but it is clear that at least in the syntax-phonological interface data presented here, the head-complement relationship holds special properties.

HoC environment, showing a sensitivity not otherwise accountable for by purely phonological means.

2.   Morpho-phonological determiner alternation

The Spanish feminine determiner takes the masculine form when the following noun begins with the stressed vowel /a/[2], and when the determiner-noun string is uninterrupted by an adjective (stress is marked with ´).
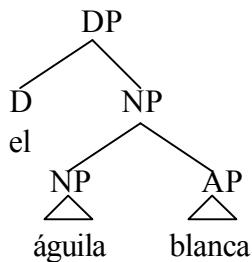
(5) Spanish determiner alternation [la]~[el]
  i. *el águila blánca*   'the eagle[f] white[f]' ii. *la álta águila*   'the[f] high[f] eagle[f]'
      [e.lá.ɣi.la.bláŋ.ka]   [la.ál.ta.á.ɣi.la]
      el háda mála   'the fairy[f] bad[f]'   *la mála háda*   'the[f] evil[f] fairy[f]'
      [e.lá.ða.má.la]   [la.má.la.á.ða]
      el água fría   'the water[f] cold[f]'   *la fría água*   'the[f] cold[f] water[f]'
   [e.lá.ɣwa.frí.a]   [la.frí.a.á.ɣwa]

Previous work on the Spanish data in question (González 2003, Harris 1983, Wolf 2008) approached them from a phonological or morpho-phonological perspective, but did not address the syntactic data, which are crucial to manifesting the determiner alternation.

The local vowel hiatus of /la-á/ must span a border between the head (the determiner) and the head of its complement (the noun) in order to trigger the determiner alternation. An adjective in the NP is not the head of the phrase, so the relationship between the determiner and the adjective is not that of head and head of complement (following Zagona 2002). Furthermore, while the adjective is posited to be in a different position of the NP depending on its postnominal (adjunct) or prenominal (specifier) linear order (Zagona 2002: p. 109-117), it is crucially never a complement to the noun or the determiner.

(6)   (i) [el[águila_head blánca]_NP]_DP   (ii) [la[álta águila_head]_NP]_DP

---
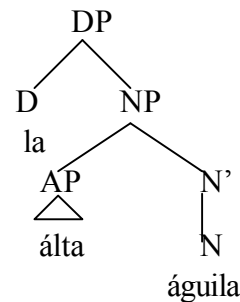
[2] There are a few exceptions to this process, including *la árabe, la Álvarez*, etc. Since corresponding masculine forms exist (*el árabe, el Álvarez*), I propose that these exceptions do not participate in the determiner alternation due to the pressure to maintain contrast (Lubowicz 2003). In addition, I assume that the alphabetic exception *la a* maintains hiatus due to paradigm pressures specific to alphabetic letters.

The differing syntactic structures affect whether the determiner switches (in 6i) or not (in 6ii). I follow Wolf (2008) and Salvá (1988) in analyzing the exceptional article *el* as morphologically feminine, not masculine. Thus, there is no violation of morphological gender agreement. The switch is in the phonological manifestation of the determiner gender morpheme. In formulating an OT analysis of the phenomenon, I use correspondence constraints adapted from Wolf (2008)[3] to govern the morphological-phonological elements:

(7) DEP-M(masculine): For every instance φ' of the feature [masculine] at the phonological level, assign a violation-mark if there is not an instance φ of [masculine] at the morpheme level, such that $\varphi\Re\varphi'$.

Informally, DEP-M(masculine) prohibits insertion of the masculine phonological form without the masculine morpheme.

(8) MAX-M(feminine): For every instance φ of the feature [feminine] at the morpheme level, assign a violation-mark if there is not an instance φ' of [feminine] at the phonological level, such that $\varphi\Re\varphi'$.

Informally, MAX-M(feminine) prohibits deletion of the feminine phonological form when there is a feminine morpheme.

Both of the above constraints are violated by the *la* to *el* switch in Spanish.

Focusing on the targeted environment of the switch, I use the positional markedness constraint NO HIATUS(HoC), as defined in (4), to produce alternation blocking by an adjective[4].

(9) Tableau: determiner alternation

(i) la águila alta	NO HIATUS(HoC)	DEP-M(masc)	MAX-M(fem)	NO HIATUS
a. l<u>a</u> águila álta	*!			**
→b. e<u>l</u> águila álta		*	*	*
(ii) la alta águila				
→a. la álta águila				**
b. el álta águila		*!	*!	*

In candidate (9ia) there is an unwanted hiatus vowel sequence across an HoC boundary. Candidate (9ib) repairs hiatus at the expense of DEP-M(masculine) and MAX-M(feminine) by deleting the feminine determiner and inserting the masculine one. Candidate (9iia) also includes an unwanted hiatus vowel sequence [a-á], but it is not across an HoC boundary, and therefore

---

[3] For the purpose of this study, I simply refer to the morpheme level and the phonological level in these constraints. Wolf (2008) uses a more complex "morph" concept to refer to the phonological elements that are linked with the morpheme in the input.

[4] For the purposes of focusing on the syntactic element of this phenomenon, I am leaving the aspects of vowel quality and stress, which are also clearly active, as a separate issue. One way of addressing the situation includes the use of Dispersion Theoretic-type minimum distance constraints on adjacent vowels (Casali 1998, Flemming 1995), and positional markedness targeting stressed vowels (Smith 2005).

vacuously satisfies the positional markedness constraint. Candidate (9iib) unnecessarily repairs the vowel hiatus, and is ruled out by morpho-phonological faithfulness.

The constraint ranking falls into the positional markedness schema presented in Smith (2005):
(10)   Positional Markedness >> Faith >> Markedness
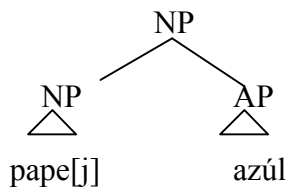   NO HIATUS (HoC) >> DEP-M(masc), MAX-M(fem) >> NO HIATUS

3.   Coda gliding

In Caribbean dialects of Spanish, coda consonants show various weakening effects, including /s/ aspiration or deletion and /n/ velarization. In Cibaeño, a Dominican dialect, laterals and rhotics optionally form palatal glides in coda position (11i). But, there are exceptions when the following word is vowel-initial (Guitart 1981, Harris 1983) (11ii):
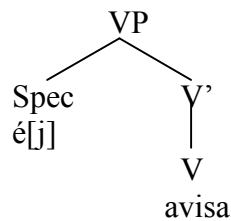
(11)   Coda gliding
i.   *papel blanco*   =   *pape*[j] *blanco*   ii.   *papel azul*   =   *pape*[j] *azul*
     paper white   paper blue
     él da   =   *é*[j] *da*   *él avisa*   =   *é*[j] *avisa*
     he gives   he warns
     el día   =   *e*[j] *día*   *el aviso*   =   *e*[l] *aviso*
     the day   the warning

The one context that resists coda gliding is the vowel-initial determiner-noun environment. The head-complement relationship of *el aviso* (12iii) stands in contrast to the head-adjunct and specifier-head relationship in *papel azul* (12i) and *él avisa* (12ii), respectively:[5]
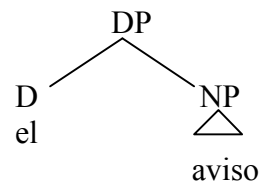
(12)   i. pape[j] azul   ii. é[j] avisa   iii. e[l] aviso

                 NP   VP   DP
                / \   / \   / \
              NP   AP   Spec   V'   D   NP
              △   △   é[j] | el   △
           pape[j] azúl   V   aviso
                                               avisa

Once again, the avoidance of a marked sequence (this time, glide-vowel)[6] across an HoC boundary affects the phonological pattern, this time blocking coda weakening.

In order to focus on the role of the syntactic component, I use the cover markedness constraints SEGMENT SEQUENCING and CODA LENITION in the OT analysis, which are descriptive of the

---

[5] Unfortunately, there was no data presented with an adjective intervening between the determiner and noun, so it is unclear whether the appropriate specification is head-head of complement specification, or merely a simpler head-complement one.
[6] Many linguists have made use of a consonant-vowel sequence scale, often couched in terms of an ideal onset (Smith 2005, Prince & Smolensky 1993), with voiceless obstruents at the "best" end of the spectrum and glides/semi-vowels at the "worst".

requirements driving the phonological process:

(13)   SEGSEQ: enforces perceptually salient consonant-vowel sequences (in this case, it acts as *Glide-Vowel)[7]
        CODALENITION: reduces or weakens coda consonants in various ways, here by reducing liquids to glides.

The positional markedness constraint active here is:

(14)   SEGSEQ(HoC): prohibits G-V across an HoC boundary.

The following tableau demonstrates the constraint interaction of positional markedness SEGSEQ together with its regular markedness version and the constraint driving coda lenition.

(15) Tableau: coda gliding

(i) el$_{spec}$ avisa$_{head}$	SEGSEQ(HoC)	CODALEN	SEGSEQ
a. e[l] avisa		*!	
→b. e[j] avisa			*
(ii) el$_{head}$ aviso$_{comp}$			
→a. e[l] aviso		*	
b. e[j] aviso	*!		*

Candidate (15ia) vacuously satisfies SEGSEQ(HoC) because it does not include an HoC boundary, but is ruled out by CODALEN, because it fails to glide the liquid. Candidate (15ib) also vacuously satisfies SEGSEQ(HoC), and wins on CODALEN. Candidate (15iia) obeys SEGSEQ(HoC), though it fails to lenite the coda consonant, and candidate (15iib) glides the coda to obey CODALEN, but violates SEGSEQ(HOC) by including the unwanted sequence G-V across a head-head of complement boundary.

In this case, the positional markedness and general markedness constraints do not surround a Faith constraint, but rather another markedness, because HoC prevents an otherwise widespread markedness repair[8]. Aside from this minor change, the general ranking schema remains the same:

(16) SEGSEQ (HoC) >> CODALEN >> SEGSEQ

4.   Conjunction

Conjunction is another area of the phonological grammar where the head-complement syntactic

---

[7] IDENT-IO must also be low-ranked in this dialect, to produce the liquid → glide effect.

[8] This effect could also be obtained by using the HoC environment with a positional faithfulness constraint, perhaps something like IDENT(HoC). I prefer to use positional markedness here to reflect the similarities between determiner alternation, coda gliding and conjunction. All three cases involve a marked sequence of segments, whether vowel-vowel or glide-vowel, and the avoidance of said marked sequence in the head-complement environment.

structure plays a role. In Spanish, the two coordinators 'and' and 'or' consist of a single vowel whose allophone surfaces when followed by a word beginning with the same vowel. However, the alternation does not occur with identical vowels between the first conjunct and the coordinator, because they are not in a head-complement relation.

(17) i.   *inteligente* [i] *sincero*   ii.   *sincero* [e] *inteligente*
            intelligent and sincere   sincere and intelligent

            uno [o] *dos*   *uno* [u] *otro*
            one or two   one or (the) other

In (17i), we see the standard phonological realization of the coordinator morpheme, when followed by any consonant. But in (17ii), word [i] 'and' realizes as [e] when followed by an *i*-initial word, and [o] 'or' realizes as [u] when followed by an *o*-initial word. It is notable that in the phrase *uno o dos*, even though there is an identical *o-o* sequence between the words *uno* and *o*, the allophone [u] is not triggered. I propose that this difference stems from the lack of head-complement relation between *uno* and *o*, whereas there is a head-complement relation between /o/ and *otro* in the phrase *uno u otro*. The syntactic structure for *uno u otro* is given in (18), following Camacho (2003).

(18)   CoordP
           /   \
       Conj1   Coord'
       uno   /   \
                 Coord   Conj2
                   u   *otro*
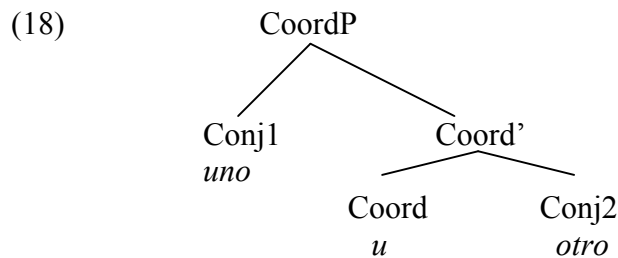
Unlike the previous case studies, where the HoC environment was specific to the head of the complement, with conjunction it appears to be more general, and sensitive only to the head-complement relationship. In structures with complex second conjuncts, allophonic variation will still be triggered by a non-head member of the conjunct[9]:

(19)   *amplios espacios* e *increibles paisajes*   wide spaces and incredible landscapes
       altas torres e *invencibles murallas*   tall towers and invincible walls
       crueles invasores u *orgullosos patriotas*   cruel invaders or proud patriots
       audaces marineros u *osados guerreros*   brave sailors or daring warriors

While the head of the complement does not affect the process here, the dichotomy between complement (allophony triggered) and non-complement (allophony not triggered) still holds, so I

---

[9] Many thanks to the attendees of IATL 25 for pointing out this possibility, and to Hector Velásquez for providing the examples in (19). Attempts to form counterexamples with intervening sentential adverbs failed, as the adverb was always interpreted to be within the 2nd conjunct, instead of applying to the 1st conjunct as well. Truly parenthetical sentential adverbs in this position were produced with pauses, allowing maintenance of the *i-i* or *o-o* vowel hiatus. Further exploration of such prosodic effects is needed.

use the positional markedness environment head-complement (HC), which allows for the more general sensitivity:

(20)   NO HIATUS (HC): Prohibition against adjacent vowels across a head-complement boundary[10]

In the tableau (21), we can see the interaction between this HC positional markedness and faithfulness, here in the form of IDENT[hi]-IO.

(21) Tableau: conjunction

(i) uno/o.o/tro	NO HIATUS(HC)	IDENT [hi]-IO	NO HIATUS
a. uno[o.o]tro	*!		**
→b. uno[u.o]tro		*	*
(ii) un/o.o/dos			
→a. un[o.o]dos			*
b. un[u.o]dos		*!	

Candidate (21ia) contains an unwanted identical vowel sequence across an HC boundary, and is ruled out. Candidate (21ib) repairs the vowel sequence by changing the coordinator to [u], incurring a violation of IDENT [hi]-IO, but obeying NO HIATUS(HC). Candidate (21iia) also contains the unwanted identical vowel sequence, but it is between the specifier and head, not head and complement, so it vacuously satisfies NO HIATUS(HC). Candidate (21iib) unnecessarily repairs the vowel sequence and incurs a violation of IDENT [hi]-IO, which rules it out.

The by now familiar ranking of positional markedness over faithfulness over general markedness is maintained, with the slight alteration in the position (HC):

(22)   NO HIATUS (HC) >> IDENT [hi]-IO >> NO HIATUS

5.   Alternative analyses

The case studies above demonstrate interaction between syntax and phonology via phonological markedness sensitivity to the head-complement relationship. The syntactic relationship is couched in terms of an environment for positional markedness constraints, expanding the positional markedness framework to two-constituent environments. The targeted position references a two-word window, allowing the interword syntactic relationship to come into play, rather than focusing on a single category that is blind to the surrounding context. The HoC positional markedness approach presented here also proposes a direct link between syntax and phonology, bypassing the prosodic hierarchy which has previously been proposed to be a necessary mediator. This section evaluates alternative analyses which avoid double constituent environments or a direct link between syntax and phonology, but which ultimately fail to account for the data in question.

---

[10] Again, I leave the identical vowel quality as a separate issue, though both NO HIATUS constraints here must be sensitive to the difference between the sequences *u-o* and *o-o*. It is also worth mentioning that stress does not play a role in this phenomenon, unlike determiner alternation.

5.1   One constituent environment vs. two

Previously established positional markedness constraints targeted environments making reference to a single constituent, such as the onset of a syllable (Smith 2005). Considering the similar effects of NO HIATUS and ONSET, why not simply use ONSET-based positional markedness to explain the data?

ONSET may be formed in a couple of different ways in attempting to explain the determiner alternation in Spanish. First, we might use positional ONSET(noun), enforcing an onset at the beginning of every noun. This would drive alternation from /la/ *águila* to [el] *águila,* but does not differentiate between the phrases *la álta águila* and *el águila*. In the determiner-adjective-noun context, the *a*-initial noun *águila* does not have an onset, despite still being a noun and therefore eligible for the above suggested positional markedness ONSET constraint.

An additional advantage of the NO HIATUS two-constituent environment is that it allows future detailed analysis of vowel quality in this phenomenon. As previously mentioned, the initial vowel quality of the noun will affect whether or not the determiner alternation is triggered. For example, *la hora* [la óra] 'the hour' maintains the feminine form of the determiner; non-identical vowel quality satisfies markedness. A one-constituent constraint like ONSET does not leave room for analysis of vowel quality, since it can only focus on one vowel, not two. The alternation is triggered only with identical vowels, *a-a*, *i-i*, or *o-o*, in both the determiner and conjunction data. A two-constituent constraint like NO HIATUS allows for future formulations sensitive to this adjacent vowel quality.

Furthermore, since adjectives in Spanish have both masculine and feminine forms, were we to use a constraint like ONSET(noun), the unattested masculine form *alto* would be available as a non-identical vowel hiatus in the phrase *la álta águila*, predicting *la álto águila*. This candidate would completely satisfy ONSET(noun), once vowel quality blocking effects were taken into account.

(23) Tableau: hypothetical Onset(noun) in determiner alternation, with vowel quality

i. la águila	Onset(noun)	DEP-M(masc)	MAX-M(fem)	Onset
a. la águila	*!			*
→ b. el águila		*	*	
ii. la hora				
→ a. la hora				*
b. el hora		*!	*!	
iii. la álta águila				
a. la álta águila	*!			**
b. el álta águila	*!	*	*	
☛※ c. la álto águila		*	*	**

An ONSET formulation would have further trouble with conjunction. The combination of the coordinator and 2nd conjunct will always trigger the vowel alternation, regardless of the syntactic category of the 2nd conjunct:

(24) N: *uno u otro*   'one or the other'
      A: *sincero e inteligente*   'sincere and intelligent'
      DP: *María e Isabel*   'Maria and Isabel'
      V: *destaca e intensifica*   '[it] emphasizes and intensifies'

The second word of the two-constituent environment varies, but in all cases the syntactic relationship between the two words remains the same: head-complement.
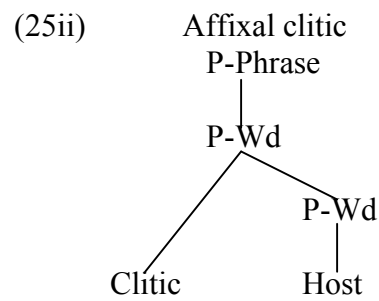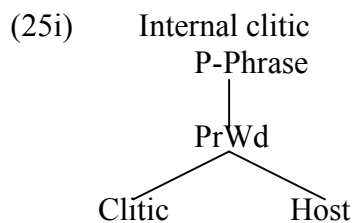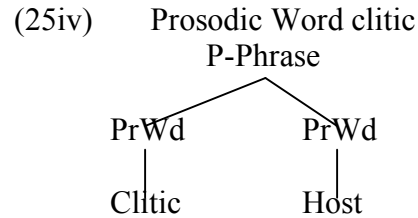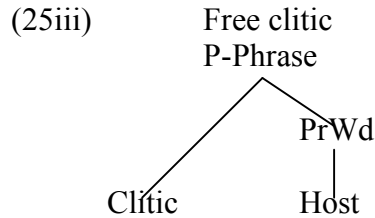
5.2   Phrasal phonology vs. direct link

The three phenomena shown here provide support for the syntactic head-complement relation as targeted by phonology. Previous work has argued for the accessibility of syntax to the phonological grammar (Chen 1990), but a direct relation between syntax and phonology has also been strongly argued against in literature on Phrasal Phonology (Nespor & Vogel 1986, Inkelas & Zec 1990), where the prosodic hierarchy has been posited as a necessary intermediate between syntax and phonology. So, how does prosody fare with the phenomena?

Taking a look at the morpho-phonological determiner switch, the data show sensitivity to the word orders DN and DA. Therefore, in order for prosody to mediate between syntax and phonology, it must produce a difference between the word orders: DNA vs. DAN.

There are a few problems with this proposed prosodic difference. Recent work on Italian (Dehé & Samek-Ludovici 2009) showed no statistically significant differences in the prosodic patterns of NA and AN sequences, with a preceding indefinite article. Regardless of word order, the sequence was wrapped in a single phonological phrase. Also, I performed pilot recordings in Spanish with the DNA and DAN sequences, which consistently displayed a pitch accent (used in previous Spanish prosodic literature as an indication of a phonological phrase boundary [Prieto 2006]) on the last word of the sequence. There was no p-phrase boundary anywhere in between any of the words in question. This lack of evidence indicates that if there is a prosodic structure difference, it is not experimentally measurable on the p-phrase level.

There is, of course, the possibility that there is an underlying phrasal hierarchical difference that maps onto the same prosodic outcome. Beneath the p-phrase, there are different possible structures for the words in question. Following Anderson (2005) and Selkirk (1996), the determiner prosodifies as a clitic, but there are different types of clitics:

(25i)   Internal clitic   (25ii)   Affixal clitic
             P-Phrase   P-Phrase
                | |
             PrWd   P-Wd
            /   \   /   \
        Clitic   Host   Clitic   P-Wd
                                                                   /   \
                                                              Clitic   Host

(25iii)   Free clitic
            P-Phrase

                        PrWd
                         |
    Clitic   Host

(25iv)   Prosodic Word clitic
            P-Phrase

    PrWd   PrWd
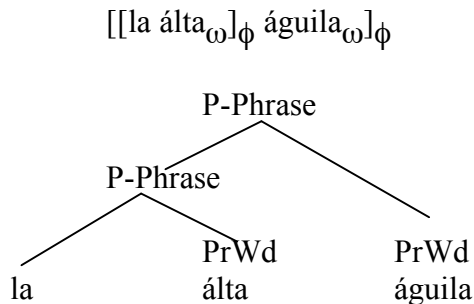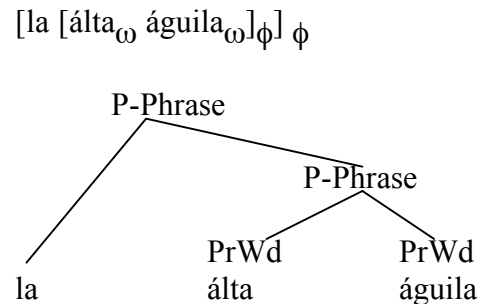 | |
    Clitic   Host

In Spanish, the determiner is not a prosodic word, and it does not receive lexical stress, which rules out the prosodic word clitic structure in (25iv). The internal clitic and affixal clitic structures have been proposed mainly to show the difference between enclisis and proclisis, respectively. Spanish has enclisis and proclisis with other clitics, but the determiner shows similarity to the proclitic structure of accusative pronoun clitics (Uriagereka 1995), and the Spanish determiner (and indeed, other clitics) shows no classic PrWd-level phenomena, such as stress assignment. These observations lead us towards an affixal or free clitic structure, rather than an internal (enclitic) structure, leaving the free clitic and affixal clitic as the two possible prosodic structures we're looking for to distinguish between the behavior of the determiner in DNA and DAN.

Let's assume DN is affixal but DA is free, and the determiner simply varies in its clitic structure. Of course, when we add the second element of the NP, we have to posit a p-phrase boundary in the free clitic scenario, either between the A and N (26i), or between the D and A (26ii).

 (26i) Free clitic construction + PrWd

[[la álta$_\omega$]$_\phi$ águila$_\omega$]$_\phi$

                P-Phrase

        P-Phrase

                PrWd   PrWd
    la   álta   águila

(26ii) Free clitic construction on two PrWds

[la [álta$_\omega$ águila$_\omega$]$_\phi$] $_\phi$

                P-Phrase

                            P-Phrase

                        PrWd   PrWd
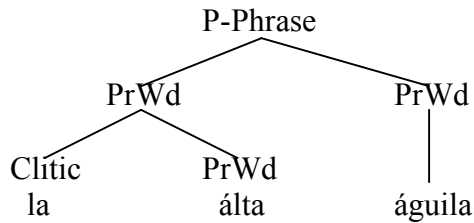   la   álta   águila

And, as previously discussed, there is no evidence of a p-boundary between either word pairs.

A second problem with phrasal phonology is it has been posited to be blind to syntactic category (Nespor & Vogel 1986), which would mean that there is no reason for the determiner to prosodify with one structure when followed by a noun, but another structure when followed by an adjective.
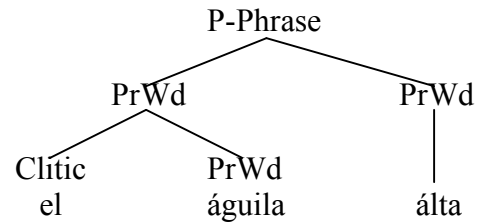
As a result of these two problems, both constructions must be of the affixal clitic type, in order to avoid an intervening p-phrase boundary and follow overall phrasal theory.

(27) Affixal clitic construction + additional PrWd

(i) $[[\text{la álta}]_{\omega}\ [\text{águila}]_{\omega}]_{\phi}$ (ii) $[[\text{el águila}]_{\omega}\ [\text{álta}]_{\omega}]_{\phi}$

```
              P-Phrase                                        P-Phrase
             /        \                                      /        \
         PrWd          PrWd                              PrWd          PrWd
        /    \          |                               /    \          |
    Clitic   PrWd                                   Clitic   PrWd
      la      álta     águila                         el      águila     álta
```

Prosodic hierarchy cannot produce a difference between the word orders, and therefore is inadequate as a mediator between syntax and phonology for this phenomenon. Syntax and phonology are directly connected, such that the phonological grammar has access to syntactic data[11].

6.0   Conclusion

In sum, we have seen three different phonological processes in Spanish—and its dialects—that are sensitive to the head-(head of)complement syntactic structure in boundary augmentation. Determiner alternation augments a V-V sequence to C-V only when identical vowel hiatus occurs across a head-head of complement boundary: between a determiner and noun, not determiner and adjective or noun and adjective. Coda gliding in Cibaeño is blocked, augmenting segment sequencing by maintaining C-V over G-V, also only between determiners and nouns. In conjunction, identical vowel hiatus between the coordinator and 2nd conjunct triggers the vocalic change of the coordinator so that the V-V sequence is non-identical, but hiatus between the 1st conjunct and coordinator has no effect.

The HoC or HC environment sensitivity is expressed as positional markedness, following Smith (2005), targeting the syntactic environment, and in these phenomena manifests with segment sequencing markedness constraints. Constraint interaction in general follows the positional markedness layout: C(HoC) >> FAITH >> C. The positional markedness framework presented in Smith's work is expanded here to a double-constituent environment combined with a NO HIATUS-type constraint base, as the most effective and representative of this data. The use of positional markedness here has also allowed a direct link between phonology and syntax, contrary to current phrasal phonological theory.

Two main implications for phonological theory result from the head-complement exploration presented here. One is that at least one language of the world exhibits a direct influence of syntax on phonology, without reference to prosodic hierarchy, challenging the universal necessity of phrasal phonology as a mediator, which suggests future changes or reworking of the theoretical framework. The second implication is that of the "specialness" of the head-complement relation. The fact that this syntactic relationship is targeted implies that it is special to the grammar in some way. While the head-adjunct and spec-head relations have been identified in syntax as

---

[11] Note that in this is not a two-way influence. Like Chen (1990), phonology is affected by syntax, but syntax is not affected by phonology.

having special or distinctive properties (Chen 1990 and Koopman 2006, respectively), it seems that little has been proposed for the head-complement relation, as of yet. More research in syntax and phonology is needed to further explore the HoC relation and provide an explanation for why this environment stands out from the rest in the syntax-phonology interface.

References

Anderson, Stephen R. 2005. *Aspects of the Theory of Clitics*. Oxford Studies in Theoretical Linguistics. Oxford University Press.

Beckman, Jill, 1998. Positional Faithfulness. University of Massachusetts, Amherst: dissertation. ROA-234.

Camacho, Jose. 2003. *The structure of coordination: conjunction and agreement phenomena in Spanish and other languages*. Kluwer Academic Publishers.

Casali, Roderic F. 1998. Resolving Hiatus. *Outstanding dissertations in Linguistics*. Garland Publishing, Inc., New York.

Chen, Matthew Y. 1990. What must phonology know about syntax? In Sharon Inkelas & Draga Zec (eds.) *The Phonology Syntax Connection*. University of Chicago Press.

Chomsky, Noam. 1970. Remarks on nominalization. In R. Jacobs and P. Rosenbaum (eds.) *Reading in English Transformational Grammar*, 184-221. Waltham: Ginn.

Dehé, Nicole & Vieri Samek-Ludovici. 2009. On the prosody and syntax of DPs: evidence from Italian noun-adjective sequences. *Natural Language Linguistic Theory* 27: 45-75.

Delgutte, Bertrand. 1997. Auditory Neural Processing of Speech, in W.J. Hardcastle and J. Laver (eds.) *The Handbook of Phonetic Sciences*. Oxford: Blackwell, 507-538.

Domínguez, Laura. 2004. Mapping Focus: The syntax and prosody of focus in Spanish. Boston University, Boston, MA: dissertation.

Elordieta, Gorka, Sónia Frota and Marina Vigário. 2005. Subjects, objects and intonational phrasing in Spnaish and Portuguese. *Studia Linguistica* 59: 11-143.

Flemming, Edward. 1995. Auditory representations in phonology. UCLA: Ph.D. dissertation.

González, Carolina. 2003. Interacción fonológico–morfológica de los artículos definidos en español e italiano. In Fernando Sánchez Miret (ed.), *Actas del XXIII Congreso Internacional de Lingüística y Filología Románica*, Salamanca, 24-30 septiembre 2001, vol. I. Tübingen: Max Niemeyer Verlag, 343-355.

Guitart, Jorge M. 1981. Some theoretical implications of liquid gliding in Cibaeño Dominican Spanish. In H. Contreras and J. Klausenberger (eds.) *Proceedings of the Tenth Anniversary Symposium on Romance Linguistics*, supplement II to Papers in Linguistics 223-228. Washington: University of Washington.

Harris, James W. 1983. Syllable Structure and Stress in Spanish: A Nonlinear Analysis. *Linguistic Inquiry Monographs* 8: 1-158. Cambridge, MA.

Inkelas, Sharon and Draga Zec. 1990. *The Phonology Syntax Connection*. University of Chicago Press.

Koopman, Hilda. 2006. Agreement configurations: in defense of "Spec head". In C. Boeckx (ed.) *Agreement Systems*. John Benjamins.

Lubowicz, Anna. 2003. Contrast Preservation in Phonological Mappings. Ph.D. dissertation, University of Massachusetts, Amherst. GLSA Publishing. ROA-554.

McCarthy, John J. 1993. A Case of Surface Constraint Violation. *Constraint-Based Theories in Multilinear Phonology*, Carole Paradis and Darlene LaCharité (eds.), special issue of *Canadian Journal of Linguistics* 38: 169-195.

Nespor, Marina and Irene Vogel. 1986. *Prosodic Phonology*. Dortrecht: Foris Publications.

Prieto, Pilar. 2006. Phonological phrasing in Spanish. In Fernando Martínez-Gil and Sonia Colina (eds.) *Optimality-Theoretic Studies in Spanish Phonology*. John Benjamins Publishing Company.

Prince, Alan and Paul Smolensky. 1993. Optimality Theory: Constraint Interaction in Generative Grammar. Rutgers University Center for Cognitive Science Technical Report 2. ROA-537-0802.

Salvá, Vicente. 1988. *Gramática de la Lengua Castellana, según ahora se habla*. Estudio y edición de Margarita Lliteras. Vol. I. Editorial Arco Libros, S.A., Madrid.

Selkirk, Elisabeth. 1996. The prosodic structure of function words. In James L. Morgan & Katharine Demuth (eds.) *Signal to Syntax: bootstrapping from speech to grammar in early acquisition*. Lawrence Earlbaum Associates, Inc.

Smith, Jennifer L. 2000. Prominence, augmentation and neutralization in phonology. In Lisa Conathan, Jeff Good, Darya Kavitskaya, Alyssa Wulf and Alan Yu (eds.) *Berkeley Linguistics Society* 26: 247-257.

Smith, Jennifer L. 2005. Phonological Augmentation in Prominent Positions. *Outstanding Dissertations in Linguistics*. Routledge, New York.

Uriagereka, Juan. 1995. Aspects of the syntax of clitic placement in Western Romance. *Linguistic Inquiry*, 26: 79-123. MIT Press.

Wolf, Matthew Adam. 2008. Optimal Interleaving: serial morphology-phonology interaction in a constraint-based model. PhD dissertation: University of Massachusetts, Amherst.

Wright, Richard. 2004. A review of perceptual cues and cue robustness. In Bruce Hayes, Robert Kirchner and Donca Steriade (eds.) *Phonetically Based Phonology*, 34-57. Cambridge University Press.

Zagona, Karen. 2002. *The Syntax of Spanish*. Cambridge University Press.