

Phonological properties of Portuguese clitics: A Declarative Approach

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1 Introduction

It has repeatedly been noted in the literature (Crysmann, 2000a; Spencer, 1991, among others) that weak pronominals in European Portuguese present some diverging evidence as to their status as lexical affixes or postlexical clitics: while their placement properties w.r.t. their host are certainly governed by syntactic and semantic properties (e.g. precedence of a filler or a downward monotone quantifier Crysmann, 1999), they also exhibit a number of properties characteristic of lexically attached formatives: they display arbitrary gaps, both in the set of clitic combinations and in the combinations between clitic and host, they sometimes give rise to affix fusion, they are subject to rigid and idiosyncratic ordering, they involve semantic idiosyncrasies, they can be infixes between inflectional affixes and the stem, and they also display a number of morphophonological idiosyncrasies, including haplology.

- (1) a. que tu o compras
that you him buys
'that you buy it'
- b. Poucas vezes tu o compras.
few times you him buys
'You buy it rarely.'
- c. Tu compra-lo
you buy-him
'You buy it.'

Within recent work in HPSG (Crysmann, 2000a,b), it has been suggested that this tension can be resolved by appealing to the distinction between tectogrammatical *signs* and phenogrammatical domain objects (*dom-obj*) (Kathol, 1995): while clitic-verb complexes are represented as a single lexical sign, the phonological contributions of the host and the clitic cluster are represented on two separate domain objects, making the cluster as a whole available to syntactic ordering. Morphological and semantic idiosyncrasies, however, are effectively encapsulated in the lexical component.

Concentrating on the phonology of function words in EP, Vigário (1999a,b) has argued that despite the morphophonological idiosyncrasies displayed by pronominal affixes, their behaviour w.r.t. lexical and phrasal phonological rules sets them apart from other inflectional affixes. She therefore assumes that EP weak pronominals attach to their hosts postlexically, adjoining to (proclisis) or incorporating into (enclisis) the prosodic word of the host. In this paper, I will show that the distinction between lexical sign's and word-level domain-objects already provides a comfortable basis for an account of these phenomena as well. The analysis will be couched in terms of Declarative Phonology, drawing on insights gained in Bird (1995); Bird and Klein (1994), and Walther (1999): in particular, I will assume a surface-oriented, partially lexicalised approach to prosodisation.

2 Morphological idiosyncrasy

It is by now widely agreed (Crysmann, 1997; Spencer, 1991; Vigário, 1999b) that pronominal clitics in EP, just like in French or Italian, give rise to a number of morphological idiosyncrasies:

- Third person accusative clitics neutralise a preceding /s/, /z/, or /r/ to [l], both on a preceding verbal host, and within the clitic cluster.
- First plural object clitics truncate the final /s/ of their host, if the host itself is inflected for first person plural
- Before third person accusatives, a nasal stop is epenthed, if the host ends in a nasal vowel.

None of these processes is found outside the domain of pronominal clitics, neither in lexical nor in phrasal phonology. Furthermore, within the clitic cluster, third person dative plurals fuse with third person accusatives, resulting in a form where the number distinction of the dative clitic is neutralised.

Beside these morphological idiosyncrasies (Criterion C), EP clitics also fulfil criteria A (degree of selection), B (arbitrary gaps), D (semantic idiosyncrasy), and F (infixation) of Zwicky and Pullum (1983), casting some doubt on a postlexical analysis (see Crysmann, 2000a, for detailed discussion).

3 Phonological regularity

3.1 Word-level phonology

The first set of data Vigário presents in order to challenge the view that EP clitics are lexically attached to their hosts, constitutes of phonological phenomena which can be shown to be sensitive to some notion of word-hood.

Stress In general, primary stress in Portuguese is always assigned to either the final, the penult, or the antepenult syllable, depending, *inter alia*, on lexical and morphological factors.

- (2) dizíamos dizíamo-lo
 tell.IMP.1.P tell.IMP.1.P-3.S.ACC

Enclitics, however, never affect the stress pattern of their host, giving rise to situations where the primary stress is found further to the left than the antepenult, an otherwise unattested pattern. Vigário suggest that clitics may not be present when word stress is assigned.

Nasal gliding In the variety of EP observed by Vigário, word-final nasal vowels are realised as a glide, while word-internally this is not possible.

- (3) a. batente 'door-knocker' [ẽ]/*[ẽj]
 b. batem (todos) 'they hit (all)' *[ẽ]/[ẽj]
 c. batem-te 'they hit you' *[ẽ]/[ẽj]

As pronominal enclitics do not block the application of nasal gliding on the host, she assumes that they cannot be part of the lexical representation of the verb.

Centralisation before palatals Another phonological rule whose domain of application is bounded by some notion of wordhood is centralisation of non-back vowels before palatals: while it does apply in inflected words, it fails to apply at the juncture between the verb and the dative clitic:

- (4) a. tenho 'I have'; espelha 'it mirrors' [e]/*[e]
 b. dê-lha 'give it to him/her/them' *[e]/[e]

Glide insertion The last piece of data in this set relates to the insertion of a glide between two vowels, if the first one is a stressed /e/.

- (5) a. passe[j]o 'walk'; are[j]a 'sand'
 b. rece[j]o 'I fear'; rece[j]a 'he fears'
 c. vê (*[j])o João 'see John'
 d. vê-(*[j])o 'see him'

Again, this process can also be observed with inflected verb forms, but it fails to apply between a verb and an enclitic.

3.2 Morphophonology

Vigário (1999b) further mentions two morphophonological rules of EP which apparently fail to apply between an enclitic and its host, one of which I will briefly review here.¹

- (6) como (<come+o) 'eat.1.S.PRES
- (7) falo (<fala+o) 'eat.1.S.PRES
- (8) coma (<come+a) 'eat.1.S.PRES.SUBJ
- (9) comia (<come+ia) 'eat.1.S.IMP

Vigário (1999b) claims that this rule is operative with all (verbal) inflectional affixes regardless of their status, comprising person/number affixes, as well as tense/mood/aspect markers. Pronominal clitics, however, do not give rise to the deletion of the theme vowel. She concludes that this fact should imply that they cannot be regarded as inflectional affixes.

- (10) come-o (*como) 'eat.3.S.PRES-3.S.ACC.M
- (11) fala-o (*falo) 'speak.3.S.PRES-3.S.ACC.M
- (12) come-a (*coma) 'eat.3.S.PRES-3.S.ACC.F

Vigário's argumentation, however, relies on the assumption that the elements she considers inflectional affixes indeed belong to distinct classes. Having a closer look at the verbal inflectional paradigms in Portuguese, it becomes apparent that the distinction between person/number markers (e.g. present tense *-o*) and tense/aspect/mood markers (e.g. *-ia*) is quite artificial: as it is only in present tense indicatives that the first person is marked by *-o*, it appears to be more appropriate to consider these markers the exponent of both person/number and tense/mood/aspect information, unless we want to commit ourselves to the introduction of zero morphemes, both for tense/mood/aspect and person/number information. Under a realisational approach to inflection all these affixes are to be considered the exponent of a single paradigm, along the dimensions of person, number, tense, mood, and aspect, constituting only a single class of inflectional affixes. Instead, it might be preferable to regard this "rule" as an instance of a phonologically conditioned allomorphy of a particular class of affixes, making Vigário's conclusion w.r.t. the inflectional status of pronominal affixes quite moot.

¹The other "rule" relates to the reduction of the theme vowel in word-final position with verbs in the *i*-conjugation. The domain of the application of this "rule" thus depends on the definition of an appropriate notion of wordhood, similar to the cases discussed in the previous section.

3.3 Clitics and function words

The phrasal phonology of EP is characterised by a wealth of external sandhi phenomena, applying regularly at prosodic word (PWd) boundaries. Frota (1998) has identified the Intonation Phrase as the upper bound for external sandhi in Portuguese. A major subclass of sandhi rules applies in the context of vowel-initial PWds, leading to resyllabification across word boundaries.

Non-back vowel deletion applies at the boundary between two PWds: if a PWd-final non-back vowel is followed by a PWd-initial vowel, the former obligatorily deletes. With prosodically weak function words (complementisers, determiners, monosyllabic prepositions), this deletion is only optional: alternatively, a final non-back vowel may get realised as a glide.

- (13)
- | | | |
|----|---------------------------------------|-------------|
| a. | pele alva 'skin white' | *[ə]/*[j]/∅ |
| b. | pede azeitonas 'asks for olives' | *[ə]/*[j]/∅ |
| c. | (não) te agradava '(not) you pleased' | *[ə]/[j]/∅ |
| d. | de água 'of water' | *[ə]/[j]/∅ |
| e. | readaptar '(to) readapt' | *[ə]/[j]/*∅ |

EP pronominal clitics behave similarly to function words, allowing both reduction and deletion in proclitic position. Vigário (1999a) claims that stressless function words are lexicalised as syllables which prosodically adjoin to a following PWd postlexically. As EP proclitics parallel the behaviour of stressless function words, Vigário (1999a,b) suggests that they equally adjoin to their host postlexically. She contrasts this behaviour with the lexically attached derivational prefix *re-* which only allows reduction, yet no deletion.

Enclitics, by contrast, do not pattern with either proclitics or function words in this respect. If an enclitic appears word-final, Non-Back Vowel Deletion is obligatory, rather than optional.

- (14)
- | | | |
|----|--|-------------|
| a. | peço-te azeitonas '(I) ask you (for) olives' | *[ə]/*[j]/∅ |
| b. | pede-o '(he) asks (for) it' | *[ə]/[j]/*∅ |

As verb-final vowel deletion is blocked by a following enclitic, Vigário (1999a) assumes that enclitics incorporate, rather than adjoin to their host.

Back vowel deletion is another sandhi phenomenon which treats proclitics and function words in a similar way. If a PWd-final back vowel is followed by a vowel-initial PWd, the former may optionally delete. With stressless function words and proclitics, however, deletion is impossible.

- (15) *music*o *africano* 'musician african' [w]/∅

- | | | |
|------|---|--------|
| (16) | <i>do</i> archivador 'of.the archivist' | [w]/*∅ |
| (17) | (<i>não</i>) <i>to</i> aceito '(I) (not) it.you accept' | [w]/*∅ |
| (18) | deixo- <i>to</i> admirar '(I) let-it.you admire' | [w]/∅ |

As enclitics may exhibit Back Vowel Deletion, Vigário (1999a) assumes that they are found at a PWD-boundary.

3.4 Discussion

The approach taken by Vigário (1999a,b) has a few major drawbacks which I would briefly like to point out.

First, the analysis crucially relies on extrinsic ordering of phonological rules and prosodisation: to capture the phonological properties reviewed in sections 3.1 and 3.2, she is forced to assume that prosodic incorporation of enclitics is a postlexical operation. Incorporation in turn has to be ordered before the application of vowel deletion, in order to derive the contrasts between proclitics and enclitics shown in 3.3. This procedural view, together with the application of destructive phonological rules leads to the undesirable situation where lexically assigned prosodic constituents, in many cases, will not survive on the phonological surface, and intermediate ill-formed constituents (e.g. syllables whose nucleus has been deleted) must be repaired in a final resyllabification step. Furthermore, it is unclear, how such a resyllabification step will affect the bracketing of higher prosodic constituents (e.g. PWDs).

Second, the postlexical approach adopted by Vigário (1999b) forces her to invoke some special devices to integrate the morphophonological idiosyncrasies noted in section 2: she resorts to the concept of Precompiled Phrasal Phonology suggested by Hayes (1990). In this theory, phonologically idiosyncratic items can be inserted into a phrasal context, subject to subcategorisation frames which freely make reference to phonological, morphological, and syntactic properties of their environment. This mechanism stands in sharp contradiction to the wide-shared belief that indirect reference to syntax by means of prosodic structure is sufficient. Moreover, the kind of subcategorisation frames postulated by Hayes' approach are at odds with the theory of selection maintained in lexicalist frameworks such as HPSG.

Third, a postlexical approach to EP cliticisation puts quite a heavy burden on the syntactic component: thus, the rigid and idiosyncratic ordering properties, as well as arbitrary gaps will have to be dealt with in syntactic terms. Furthermore, syntax will be populated both with signs that do not contribute any depictable meaning (e.g. inherent *se*), and with fused clitics which correspond to more than one argument. It seems that these issues can only be resolved in a framework which allows for postsyntactic lexical insertion.

4 Reanalysis

4.1 Transparent morphological complexes

In the analysis I am going to present, I will build on the analysis of EP cliticisation developed in Crysmann (2000a,b). Following Kathol's (1995) analysis of German separable prefix verbs, he suggests that clitic-verb complexes are lexical signs which carry a specification for two separate domain objects on their DOM list. Similar to proposals made by Miller and Sag (1997) and Monachesi (1996), EP clitics are treated as the morphological reflex of a lexical valence alternation: thus, pronominal affixes are introduced on a MORPH-list by underspecified morphological schemata, such as the following:

$$(19) \left[\begin{array}{c} \textit{word} \\ \text{ARG-ST} \left\langle \left[\begin{array}{c} \textit{aff-ss} \\ \text{PER} \quad 3 \\ \text{NUM} \quad \textit{pl} \\ \text{GEND} \quad \textit{m} \end{array} \right] \right\rangle \oplus \textit{list} \end{array} \right] \rightarrow \left[\begin{array}{c} \text{M} \left\langle \left[\begin{array}{c} \textit{praf-3-acc} \\ \text{PH} \left\langle \left\{ \textit{n}, \textit{l}, \emptyset \right\}, \textit{o}, \textit{s} \right\rangle \end{array} \right] \right\rangle \circ \textit{list} \end{array} \right]$$

The order of elements on the MORPH-list is subject to morphotactic constraints expressed over *morph*-subtypes: Affixal morphs only introduce a PHON feature (they are not *morphemes*), thus type information only serves the purpose of partitioning classes of formatives according to morphotactic and/or morphophonological properties. Furthermore, morphs can easily be the exponent of more than one function, e.g. they can be portmanteaux (Crysmann, 2000a).

In order to allow for *morphophonological* neutralisation, I will further crossclassify *morphs* as to their mode of concatenation (cf. Koenig, 1999):² minimally, we want to distinguish between regular concatenative morph's (*reg*) and truncated morph's (*trunc*). Morphs may constrain adjacent members of the MORPH-list to either of the two concatenation types, e.g. an [l]-initial third accusative clitic may constrain the immediately preceding *morph* to be truncated:

$$(20) \left[\begin{array}{c} \textit{word} \\ \text{M} \left\langle \dots, \text{[l]} \left[\text{PH} \left\langle \dots, \left\{ \begin{array}{c} \textit{s} \\ \textit{z} \\ \textit{r} \end{array} \right\} \right\rangle \right], \left[\begin{array}{c} \textit{praf-3-acc} \\ \text{PH} \left\langle \textit{l}, \dots \right\rangle \right], \dots \right\rangle \end{array} \right] \rightarrow \left[\begin{array}{c} \textit{word} \\ \text{M} \left\langle \dots, \text{[l]} \left[\textit{trunc} \right], \dots \right\rangle \end{array} \right]$$

The last member of the MORPH list will always be of type *reg*:

$$(21) \left[\text{M} \left\langle \dots, \left[\textit{morph} \right] \right\rangle \right] \rightarrow \left[\text{M} \left\langle \dots, \left[\textit{reg} \right] \right\rangle \right]$$

²This is an adaptation of Crysmann's (2000b) two-level analysis to the one-level approach that I will take.

In order to selectively access the phonological contribution according to concatenation type, I will make use of the following auxiliary function:

$$(22) \quad \text{get} \left(\begin{bmatrix} \textit{reg} \\ \text{PH } \boxed{1} \end{bmatrix} \right) = \boxed{1} \quad \text{get} \left(\begin{bmatrix} \textit{trunc} \\ \text{PH } \boxed{1} \oplus \langle \boxed{1} \rangle \end{bmatrix} \right) = \boxed{1}$$

Under Crysmann's approach, the phonological contribution of morphs is distributed across the word's DOM-list according to further lexical constraints: while in general EP words only specify a single domain object, clitic-verb complexes introduce two, one for the host, and one for the clitic cluster. The SYNSEM-value of the domain object corresponding to the host is structure-shared with the SYNSEM value of the entire sign (cf. Kathol, 1995), while the domain object holding the clitic cluster is assigned the HEAD value *noun*. Both these domain objects are constrained to the verbal cluster, to account for their limited degree of separation.

$$(23) \quad \left[\begin{array}{l} \textit{word} \\ \text{SS } \boxed{1} \left[\text{L} | \text{C} | \text{ARG-ST } \langle \dots, \textit{aff}, \dots \rangle \right] \end{array} \right] \rightarrow$$

$$\left[\begin{array}{l} \text{DOM} \left\langle \begin{array}{l} \text{PH} \quad \text{get}(\boxed{2}) \circ \textit{list} \\ \text{SS} \quad \boxed{1} \\ \text{TOPO} \quad \textit{vc} \end{array} \right\rangle \circ \left\langle \begin{array}{l} \text{HD} \quad \textit{noun} \\ \text{TOPO} \quad \textit{vc} \end{array} \right\rangle \\ \text{M} \left\langle \begin{array}{l} \textit{stem} \\ \text{PH} \quad \boxed{2} \end{array} \right\rangle \circ \textit{list} \end{array} \right]$$

While the phonological contribution of the verbal stem is mapped onto the verbal *dom-obj*, pronominal affixes have to be realised on the nominal one.

$$(24) \quad \left[\text{M} \left\langle \dots, \begin{bmatrix} \textit{praf} \\ \text{PH } \boxed{1} \end{bmatrix}, \dots \right\rangle \right] \rightarrow \left[\text{DOM} \left\langle \begin{array}{l} \text{PH} \quad \text{get}(\boxed{1}) \circ \textit{list} \\ \text{HD} \quad \textit{noun} \\ \text{TOPO} \quad \textit{vc} \end{array} \right\rangle \circ \textit{list} \right]$$

As the order of the DOM list is only partially specified, syntactic constraints may still decide upon the order of the host and the clitic cluster. Thus, while all of morphophonology and most of morphotactics is captured in the lexicon, syntax is provided with a minimal representation that is sufficient to model the effect of proclisis in the presence of a trigger by means of order constraints.

4.2 Phonological constraints on words

In the review of Crysmann's approach to the morphosyntax of EP cliticisation, we have seen that the conflict between lexical affixation of pronominal

affixes and their syntactically conditioned surface order was resolved by appealing to two different notions of wordhood: the lexical sign, as the upper domain of morphological constraints, and the domain object, as the minimal unit for syntactic order constraints. We have also shown, how morphophonological idiosyncrasies can be modelled as restrictions on neighbouring morphs. Before we can apply this proposal to the phonological facts reviewed in section 3, we will have to briefly expand on the phonological representations we want to assume.

In the spirit of Declarative Phonology (Bird, 1995), I assume that phonological generalisations are both surface-true and surface-apparent. Thus, apart from morphologically-conditioned truncation, as the one illustrated above, there are no non-monotonic operations on phonological representations. This entails that phonemic descriptions at the lexical level are sets of possible realisations. Using a type hierarchy, alternant sets may be represented as given below.

$$(25) \quad \begin{array}{cc} \text{abs-}j & \text{abs-}\tilde{e} \\ \widehat{j \ \emptyset} & \widehat{\tilde{e} \ \tilde{e}} \end{array}$$

Turning now to the lexical rule of word-final nasal gliding, we can now give a straightforward treatment: instead of deriving the diphthong from the non-diphthong, we assume that lexical forms of nasal syllables are always represented as alternant sets. As we have seen above, the presence of an enclitic does not affect the gliding of the verb-final nasal. As the verb and the clitic cluster are represented on different domain objects, we can state the constraint on nasal gliding as follows:

$$(26) \quad \left[\begin{array}{c} \text{word} \\ \text{DOM list} \circ \left\langle \left[\text{PH list} \oplus \left\langle \left[\text{NASAL +} \right], \underline{1} \left\{ \begin{array}{c} j \\ \emptyset \end{array} \right\} \right] \right\rangle \right\rangle \right] \rightarrow \\ \left[\begin{array}{c} \text{word} \\ \text{DOM list} \circ \left\langle \left[\text{PH list} \oplus \left\langle \left[\text{NASAL +} \right], \underline{1} \{j\} \right] \right\rangle \right\rangle \right] \end{array} \right.$$

Word-internally, gliding can be inhibited by an analogous constraint selecting the zero alternant.

Given an appropriate domain of application, namely a *dom-obj* on a word-level sign, the data in section 3.1 can be covered without necessitating a postlexical analysis of the pronominal affixes.

As we have already suggested above, the morphophonological facts discussed by Vigário (1999b) are probably better treated as a case of allomorphic variation. Under the approach adopted here, this may be easily expressed by means of subclassifying stems into themed and unthemed stems

and restrict the unthemed stems to those context where they are followed by a vowel-initial tense affix on the MORPH list. Thus, we are only left with the phenomena of vowel deletion discussed in section 3.3.

4.3 Partially lexicalised prosodisation

In the discussion of Vigário's (1999a) analysis, we have noted that her approach to the phonology of clitics and function words suffers from a certain degree of procedurality and destructive operations. Thus, instead of fully specifying prosodic units such as PWD or syllable at the lexical level, and later have these units destroyed by deletion rules, I will propose that words are only partially prosodised at the lexical level, and that parts of their segmental contribution can prosodically integrate with a following word.

As for the encoding of prosodic structure, I will draw from proposals by Bird and Klein (1994) and Walther (1999). I will assume that PHON values consist of two list representations, one, a list of segments, the other a list of syllables.

$$(27) \quad \underset{phon}{\left[\begin{array}{ll} \text{SEG} & list(seg) \\ \text{SYL} & list(syl) \end{array} \right]} \quad \underset{syl}{\left[\begin{array}{ll} \text{ONS} & list(ons) \\ \text{NUC} & nuc \\ \text{COD} & list(cod) \end{array} \right]}$$

Furthermore, segments are typed according to the syllable role they bear (Walther, 1999).

Prosodic words are encoded by classifying syllables as to their PWD-initial or PWD-final position: *w-ini*, *w-fin*, *w-med*, *w-ini-fin*.

Turning now to the sandhi phenomena at hand, we will set up the following alternant sets:

$$(28) \quad \begin{array}{ccc} \text{abs-schwa} & & \text{abs-u} \\ \begin{array}{c} \diagup \quad | \quad \diagdown \\ \text{ə} \quad \text{j} \quad \emptyset \end{array} & & \begin{array}{c} \diagup \quad | \quad \diagdown \\ \text{u} \quad \text{w} \quad \emptyset \end{array} \end{array}$$

Selection of an alternant is constrained by the syllable role:

$$(29) \quad \begin{array}{ll} \text{a. } ons \rightarrow \neg \text{ə} & nuc \rightarrow \neg \text{j} \\ \text{b. } ons \rightarrow \neg \text{u} & nuc \rightarrow \neg \text{w} \end{array}$$

In order to permit syllabification into a following word, we will have to assume that Portuguese words are only partially syllabified. Final segments in particular may either syllabify within their own word, or into the onset of the following word. To restrict the range of possibilities, we state that vowel initial words have an open onset (type *list*), while initial-consonants syllabify as the onset of the word-initial syllable, barring resyllabification from a preceding word.

$$(30) \left[\begin{array}{l} \text{word} \\ \text{DOM} \left\langle \left[\text{PH} \mid \text{SEG} \left\langle \langle \underline{1} \text{V}, \dots \rangle \right\rangle, \dots \right] \right\rangle \rightarrow \\ \left[\text{DOM} \left\langle \left[\text{PH} \mid \text{SYL} \left\langle \begin{array}{l} \text{ONS} \text{ list} \\ \text{NUC} \underline{1} \end{array} \right\rangle, \dots \right] \right\rangle, \dots \right] \end{array} \right]$$

$$(31) \left[\begin{array}{l} \text{word} \\ \text{DOM} \left\langle \left[\text{PH} \mid \text{SEG} \left\langle \langle \underline{1} \text{C}, \dots \rangle \right\rangle, \dots \right] \right\rangle \rightarrow \\ \left[\text{DOM} \left\langle \left[\text{PH} \mid \text{SYL} \left\langle \begin{array}{l} \text{ONS} \langle \underline{1}, \dots \rangle \\ \text{NUC} \end{array} \right\rangle, \dots \right] \right\rangle, \dots \right] \end{array} \right]$$

While all words restrict the initial syllable of their left-most *dom-obj* to be PWD-initial (cf. (30) and (31)), only content words (given here as the major lexical categories) also restrict the right boundary of their right-most *dom-obj*.

$$(32) \left[\begin{array}{l} \text{word} \\ \text{HD } \textit{noun} \vee \textit{verb} \vee \textit{adjective} \end{array} \right] \rightarrow \left\{ \left[\left[\text{DOM} \left\langle \dots, \left[\text{PH} \left[\begin{array}{l} \text{SEG} \left\langle \dots, \underline{1} \text{C} \right\rangle \\ \text{SYL} \left\langle \dots, w\text{-fin}, \begin{array}{l} \text{ONS} \left\langle \dots, \underline{1} \right\rangle \end{array} \right\rangle \end{array} \right] \right] \right] \right] \right] \right\}$$

$$\left\{ \left[\left[\text{DOM} \left\langle \dots, \left[\text{PH} \left[\begin{array}{l} \text{SEGS} \left\langle \dots, \textit{nuc} \vee \textit{cod} \right\rangle \\ \text{SYL} \left\langle \dots, w\text{-fin} \right\rangle \end{array} \right] \right] \right] \right] \right] \right\}$$

Function words such as *de* ‘of’ prosodically adjoin to a following PWD and therefore do not set a right PWD-boundary. E.g., the lexical entry for the preposition *de* will be given as follows:

$$(33) \left[\text{PH} \mid \text{SYL} \left\langle \begin{array}{l} \left[\begin{array}{l} \text{ONS} \langle \textit{d} \rangle \\ \text{NUC} \textit{\emptyset} \end{array} \right] \\ \left[\begin{array}{l} \text{ONS} \langle \textit{d}, \{j, \emptyset\} \rangle \end{array} \right] \end{array} \right\rangle \right] \right]_{w\text{-ini}}$$

The reduced variant ([j] or \emptyset) can only be selected, if the following word begins with a vowel, as consonant-initial words have their onsets already

specified. Syllables without nuclei are banned from phrasal phonology. Realisation as [ə] preceding a vowel-initial word, however, is ruled out by the following sandhi constraint:

$$(34) \quad \neg \left[\text{SYL} \left\langle \dots, \left[\begin{array}{l} \text{NUC} \quad \text{ə} \\ \text{COD} \quad \langle \rangle \end{array} \right], \textit{w-ini} \left[\text{ONS} \langle \rangle \right], \dots \right\rangle \right]$$

Pronominal clitics enjoy a phonological representation similar to function words.

$$(35) \quad \left[\text{PH} | \text{SYL} \left\langle \left\{ \left[\begin{array}{l} \text{ONS} \quad \langle \text{t} \rangle \\ \text{NUC} \quad \text{ə} \end{array} \right] \right\} \right\rangle \right]_{\textit{syl}} \left[\begin{array}{l} \text{ONS} \quad \langle \text{t}, \{ \text{j}, \emptyset \} \rangle \end{array} \right]$$

However, in contrast to function words, which are lexical signs, and therefore subject to the constraint in (30) and (31), the syllables a clitic contributes are inherently underspecified for PWD properties. These properties are instead determined by the morphological schema, subject to the position of the clitic. In proclitic position, the left boundary is set by virtue of (30) and (31), while in enclitic position, the right boundary is set, due to (32). Thus, depending on their position, the prosodic properties resemble either those of function words, or those of their host.

We can take advantage of this situation and formulate a lexical constraint which rules out resyllabification of a glide across a right boundary:

$$(36) \quad \neg \left[\textit{word} \left[\text{DOM} \left\langle \dots, \left[\text{PH} | \text{SYL} \left\langle \dots, \textit{w-fin}, \textit{w-ini} \left[\text{ONS} \langle \dots, \text{j} \rangle \right] \right\rangle \right] \right] \right] \right]$$

This constraint will target content words and enclitics alike, leaving only two choices here: \emptyset (before vowels) or [ə] (before consonants).

Although space does not permit an analysis of Back Vowel Deletion, it should be clear that such an analysis will be quite straightforward, given that all the necessary distinctions are already in place.

5 Conclusion

In this paper, I have discussed some phonological properties of European Portuguese which Vigário (1999a,b) deems problematic for a lexical approach to EP clitics. I have argued that the postlexical solution Vigário proposes displays a number of conceptual weaknesses. Furthermore, the high

degree of procedurality and the abundant use of destructive rule applications are certainly at odds with a constraint-based framework such as HPSG. An alternative analysis has been provided, building crucially on the distinction between signs and domain objects. Under the approach developed here, prosodic properties are derived from these two different notions of wordhood, providing further empirical support for the lexical introduction of multiple domain objects.

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