A Sympathetic Approach to Stress in Spanish Ipsiradical Sets

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1. Introduction: Stress in Spanish Ipsiradical Sets

In many languages, there are verb/nominal pairs which share the same root morpheme and are segmentally identical. Harris (1992) dubs these pairs "ipsiradical sets". Some examples of Spanish ipsiradical sets are shown in (1).

(1) NOMINAL VERB
tra.bá.jo 'work' tra.bá.jo 'I work'
vi.sí.ta 'visit' vi.sí.ta 's/he visits'
cán.te 'song' cán.te 'I sing (subjunctive)'

The verb forms in (1) except for cante are present indicative. The members of each set in (1) are also prosodically identical: they all have stress on the penultimate syllable. However, this is not always the case. There are prosodically non-identical ipsiradical sets, as exemplified in (2).

(2) NOMINAL VERB
á.ni.ma 'soul' a.ni.ma 's/he encourages'
for.mu.la 'formula' for.mú.la 's/he formulates'
pla.tí.ca 'chat' pla.tí.ca 's/he chats'

Unlike the set in (1), the members of each set in (2) differ prosodically: all of the nominals have antepenultimate stress, while all the verbs have penultimate stress.

In Spanish, the position of stress is contrastive and it must be specified as the lexical property of the root morpheme. Given that the stress is lexically specified in the root and that the members of each ipsiradical sets share the same root morpheme, why do they show different stress patterns?

In the previous studies on Spanish word stress (Harris 1983, 1987: Roca 1990 etc.), it is assumed that the stress contrast observed in (2) is attributed to different stress rules in nominals vs. verbs. However, some recent studies, such as Harris (1992), attempt to provide a unified account for nominal and verbal stress. The goal of this paper is to provide a unified Optimality theoretic account for stress in Spanish ipsiradical sets. Based on McCarthy's (1998) Sympathy Theory, I argue that the stress contrast in Spanish ipsiradical sets comes from the difference in lexical sympathetic specifications between nominal and verbal suffixes.

The rest of this paper is organised as follows; In section 2 I present a preliminary analysis of the Spanish stress assignment and show that the purely phonological analysis fails to account for the stress contrast in (2). In section 3 I propose a Sympathy-theoretic account of
the stress contrast in Spanish ipsiradical set. In section 4 I briefly examine an analysis based
on Noun Faithfulness (Smith 1997). Conclusions are presented in section 5.

2. An OT analysis of Spanish stress assignment

In Spanish, stress is contrastive, but is restricted to the last three syllables of the word²
(Three Syllable Window: Harris 1983). Harris (1992) identifies the three stress patterns in (3).

(3) Type A (unmarked): penultimate stress e.g. sa.bá.na 'savannah'
Type B (marked): antepenultimate stress sá.ba.na 'bed sheet'
Type C (special): final stress Pa.na.má 'Panama'

The unmarked penultimate stress is explained by positing a binary trochee at the
right-edge of the word. To account for the marked and special stress patterns, I assume that
the root morphemes with the Type B and Type C stress have a lexical accent (indicated with
an underscore), which is encoded as a line 1 grid mark. Following Smith (1997), I assume that
accent is a diacritic whose location is contrastive and must be specified in the lexicon, while
stress is a surface property of the head of the prosodic word. The faithfulness constraint for
lexical accent FAITH-ACCENT requires lexically accented segment to be a head of the foot, but
does not require it to be stressed. The relevant constraints for the analysis are shown in (4).

(4) FAITH-ACCENTIO: If a segment in the input has a line 1 prominence, its output
correspondent must have a line 1 prominence.

RIGHT-MOST: Feet must be aligned with the right-edge of the prosodic word.
PARSE-σ: Syllable must be parsed into feet.

By ranking the constraints as in (5), we can account for the Spanish Three Syllable Window.

(5) RIGHT-MOST, FAITH-ACCIO » FTBIN » ALL-Ft-R » PARSE-σ

(a) Type A: /sabana/  ⇔  sa.(bá.na)

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<th>R-MOST</th>
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<td>i. sa.(bá.na)</td>
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<td>ii. (sá.ba).na</td>
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<td>*!</td>
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<tr>
<td>iii. sa.ba.(ná)</td>
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<td>*!</td>
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(b) Type B: /sabana/  ⇔  (sá.ba)..na

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<tr>
<td>i. sá.(bá.na)</td>
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<td>*!</td>
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<td>ii. (sá.ba).na</td>
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<tr>
<td>iii. (sá.ba).(ná)</td>
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<td>*!</td>
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c. Type C: /panama/  $\Rightarrow$  pa.na.(má)

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<tr>
<td>i. pa.(ná.ma)</td>
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<td>!***</td>
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<td>*</td>
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<tr>
<td>ii. (pá.na).ma</td>
<td></td>
<td>!</td>
<td></td>
<td>!</td>
<td>*</td>
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<tr>
<td>iii. pa.na.(má)</td>
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d. Preantepenultimate stress is impossible: /caballero/  $\Rightarrow$  (câ.ba).(llé.ro)

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<tr>
<td>i. câ.ba.(llé.ro)</td>
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<td>!***</td>
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<tr>
<td>ii. (câ.ba).llé.ro</td>
<td></td>
<td>!</td>
<td>**</td>
<td><em>!</em></td>
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<tr>
<td>iii. (câ.ba).(lle.ro)</td>
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<td>!</td>
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<tr>
<td>iv. (câ.ba).(llé.ro)</td>
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If the lexically accented segment is syllabified to one of the last three syllable, it receives surface stress, as can be seen in (6a-c). By contrast, in (6d) where the accented segment is in the preantepenultimate syllable, binary parsing of the accented segment leaves two syllables to its right (6d ii). This parsing is ruled out by PARSE-$\sigma$, which requires exhaustive parsing of the output syllables. Between the candidates (7d iii-iv) in which the syllables are exhaustively parsed, the higher-ranked RIGHT-MOST rules out the candidate (7d iii) because the right-most foot is not a head of the prosodic word. As a result, the lexically accented segment in the preantepenultimate syllable is overridden by the default penultimate stress.

Although the constraint ranking in (5) can account for the Spanish stress patterns, it fails to account for the stress contrast in (2).

(7) a. nominal: /ánim a/$_n$  $\Rightarrow$  (á.ni).ma

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<th>PARSE</th>
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<tbody>
<tr>
<td>i. á.(ní.ma)</td>
<td></td>
<td>!***</td>
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<td></td>
<td>*</td>
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<tr>
<td>ii. (á.ni).ma</td>
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b. verb: /ánim a/$_v$  $\Rightarrow$  *(á.ni).ma

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<th>FtBIN</th>
<th>ALL-Ft-R</th>
<th>PARSE</th>
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<tbody>
<tr>
<td>i. á.(ní.ma)</td>
<td></td>
<td>!***</td>
<td></td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>ii. (á.ni).ma</td>
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</table>

Regardless of the grammatical category the input form belongs to, a lexically accented segment in one of the last three syllable of the word is stressed by the higher-ranked FAITH-ACC$_{io}$. Therefore, the purely phonological analysis such as (5) wrongly predicts the antepenultimate stress for verbs and fails to account for the stress contrast between nominals and verbs in (2).

In the next section, I propose an account for the stress contrast, focusing on the difference in the morphological structures between nominals and verbs.
3. A Sympathy-theoretic Analysis for Stress in Spanish Ipsiradical Sets

3.1. Morphological structures of nominals and verbs

Núñez Cedeño and Morales-Front (1999) propose the morphological structures of Spanish nominals and verbs which are illustrated in (8).

(8) a. nominals: intermediario 'intermediary'
   \[[P^n \text{ Root DS}^n_{\text{STEM}} \text{ CM}]_{\text{WORD}}
   \text{[[inter \ medi ari]} \ o\]
   
b. verbs: preocuparemos 'we will preoccupy'
   \[[P^n \text{ Root TV TAM}]_{\text{STEM}} \text{ PN}]_{\text{WORD}}
   \text{[[pre \ ocup a re]} \ mos\]
   
P = prefix, DS = derivational suffix, CM = class marker, TV = theme vowel,
TAM = tense/aspect/mood marker, PN = person/number marker

According to (8), the members of the ipsiradical sets have morphological structures as in (9).

(9) a. nominal: \[[\text{anim} \text{ROOT}] \text{ aCM}]_{N}
    b. present tense verb: \[[\text{anim} \text{ROOT aTV aPTM}] \text{ oPN}]_{V}

The final vowel of nominals is class marker, while that of present tense verb is present tense marker (PTM). In addition, verbs have a theme vowel, which is deleted on the surface\(^3\). The nominal class marker and the verbal present tense marker are different in surface metrical structure, as in (10).

(10) a. nominal
    i. \[[\text{vi.(sí.t]} \text{ aCM}]_{N} \quad \text{ii. } [[\text{á.ni}.m] \text{ aCM}]_{N} \]
    b. verb
    i. \[[\text{vi.(sí.t aPTM)}]_{V} \quad \text{ii. } [[\text{a.ni.m aPTM}]]_{V} \]

The nominal class marker is either parsed or unparsed into feet depending on the surface stress pattern, while the present tense marker is always parsed into feet.

To account for the difference in metrical properties between the class marker and the present tense marker, I propose that the difference comes from their lexical sympathetic specifications: the present tense marker is lexically specified for sympathy, while the class marker does not have any specification about sympathy.

3.2. Sympathy Theory

Sympathy Theory is originally proposed by McCarthy (1998) as an OT resolution to opacity problems which arise from serial derivation in traditional rule-based theory and is extended by Itô and Mester (1997) to opacity effects in prosodic morphology. According to McCarthy (1998), sympathy is a faithfulness relation between output candidates. The object of sympathy (indicated by \(\text{\#}\)) is the most harmonic member of the set of candidates that obey a designated Input-Output faithfulness constraint (the \(\text{\#}\)-selector). As it is a kind of faithfulness, sympathy is demanded by ranked, violable faithfulness constraints.
3.3. Application of sympathy to stress in Spanish ipsiradical sets

In their Sympathy-theoretic analysis of the opacity effect in German truncation, Itô and Mester (1997) propose that the specific morpheme can be specified for the $\mathfrak{S}$-selector as the lexical requirement. For example, Itô and Mester argue that the German truncation morpheme /-i/ is specified with the lexical requirement $\mathfrak{S}$-selector = ALL-$\sigma$-L: ALL-$\sigma$-L is the constraint that determines the $\mathfrak{S}$-ed candidate for forms with the suffix /-i/. With a lexically specified $\mathfrak{S}$-selector, a specific morpheme can trigger sympathetic correspondence.

In this paper, I extend the morpheme-triggered sympathy further to the non-opaque phenomenon to give an unified account for the stress contrast in Spanish ipsiradical sets. I propose that the Spanish verbal present tense marker is a sympathy-triggering morpheme: it has a lexical specification $\mathfrak{S}$-selector = MAXIO, while the Spanish nominal class marker has no sympathetic specification and does not trigger sympathetic correspondence.

The constraints relevant for the analysis are shown in (11).

(11) MAXIO: Input segments must have output correspondents.
ANCHOR(Head-Ft, Ft, Final)$_{\mathfrak{S}O}$:

If a segment in the $\mathfrak{S}$-ed candidate is final in the head foot of the word, then its correspondent in the output is final in a foot.

ONSET: Syllable must have an onset.
The constraints in (11) are integrated with the ranking in (5) resulting the ranking (12).

(12) ANCHOR(Head-Ft, Ft, Final)$_{\mathfrak{S}O}$, ONSET » RIGHT-MOST, FAITH-ACCENTIO » FTBIN » ALL-Ft-R » PARSE-$\sigma$

By the ranking (12), we can account for the stress contrast in Spanish ipsiradical sets$^4$.

(13) present tense verb: [[anim a $\text{a}_{	ext{PTM}}$]$_V$ $\Rightarrow$ $\text{a}$. (ni.ma)]

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<thead>
<tr>
<th></th>
<th>ANCHOR$_{\mathfrak{S}O}$</th>
<th>ONS</th>
<th>FAITH-ACC$_{\mathfrak{S}O}$</th>
<th>ALL-Ft-R</th>
<th>PARSE</th>
<th>MAX$_{\mathfrak{S}O}$</th>
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<tbody>
<tr>
<td>i.</td>
<td>a. ni.(má.a)</td>
<td>**!</td>
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<td></td>
<td>✓</td>
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<tr>
<td>$\mathfrak{S}$ii.</td>
<td>(á.ni).(má.a)</td>
<td>**!</td>
<td>**</td>
<td></td>
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<td>✓</td>
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<tr>
<td>iii.</td>
<td>(á.ni).ma.a</td>
<td>*!</td>
<td>**</td>
<td>**</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>$\Rightarrow$ iv.</td>
<td>a.(ni.ma)</td>
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<td>*</td>
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<tr>
<td>v.</td>
<td>(á.ni).ma</td>
<td>*!</td>
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In present tense verbs, the present tense marker triggers the $\mathfrak{S}$-selection. Given that the $\mathfrak{S}$-selector is MAX$_{\mathfrak{S}O}$, the possible $\mathfrak{S}$-ed candidates (13i-iii) have the lexical accent on the preantepenultimate syllable. As we have seen in (6d), the lexical accent on the preantepenultimate syllable is overridden by the default penultimate stress. Of the candidates (13i-iii), (13ii) is the most harmonic member and is designated as the $\mathfrak{S}$-ed candidate. Since the word-final segment $a$ in the $\mathfrak{S}$-ed candidate is final in the head foot of the word, the sympathetic faithfulness constraint ANCHOR$_{\mathfrak{S}O}$ requires the final segment of the output, namely the present tense marker, to be parsed as a foot-tail. By the ranking ANCHOR$_{\mathfrak{S}O}$ » FAITH-ACC$_{\mathfrak{S}O}$,
the candidate (13iv) with the penultimate stress is evaluated as optimal. The \( \mathcal{O} \)-candidate itself is ruled out because of its \textsc{onset} violation.

In nominals, sympathy is not relevant, because the nominal class marker has no lexical sympathetic specification. In this case, the lexically accented segment is stressed on the surface because of the ranking \textsc{faith-accio} » \textsc{all-ft-r}.

(14) nominal: \([\text{anim}] \text{a}_N \Rightarrow (\ddot{\text{a}} \text{ni}. \text{ma})

<table>
<thead>
<tr>
<th>ANCHOR</th>
<th>ONS</th>
<th>FAITH-ACCIO</th>
<th>ALL-FT-R</th>
<th>PARSE</th>
<th>MAXIO</th>
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<tr>
<td>i. a(\text{ni}. \text{ma})</td>
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<tr>
<td>ii. (\ddot{\text{a}} \text{ni}. \text{ma})</td>
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In this section, we have seen that the stress contrast in Spanish ipsiradical sets can be accounted for in a unified way by applying sympathy to the morphophonological phenomenon that is not an instance of opacity. In the next section, I briefly discuss an alternative Noun Faithfulness analysis.

4. An Alternative Analysis: Noun Faithfulness

To account for the fact that nouns are permitted to show more phonological contrast than words of other categories, Smith (1997) proposes noun-specific faithfulness constraints and argues that the ranking \textsc{noun faith} » \textsc{markedness} » Context-free Faith ensures the privileged status of nouns.

Within the framework of Noun Faithfulness, the stress contrast in Spanish ipsiradical sets might be accounted for by the ranking in (15).

(15) \textsc{right-most, faith-acc} \(N\) » \textsc{ftbin} » \textsc{all-ft-r} » \textsc{faith-acc}, \textsc{parse-σ}

(16) a. nominals: /\text{anima}/_N \Rightarrow (\ddot{\text{a}} \text{ni}. \text{ma})

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<th>FAITH-ACC(N)</th>
<th>ALL-FT-R</th>
<th>FAITH-ACC</th>
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<tbody>
<tr>
<td>i. (\ddot{\text{a}} \text{ni}. \text{ma})</td>
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<tr>
<td>ii. a(\text{ni}. \text{ma})</td>
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b. verbs: /\text{anima}/_V \Rightarrow a(\text{ni}. \text{ma})

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<th>FAITH-ACC(N)</th>
<th>ALL-FT-R</th>
<th>FAITH-ACC</th>
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<tr>
<td>i. (\ddot{\text{a}} \text{ni}. \text{ma})</td>
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<tr>
<td>ii. a(\text{ni}. \text{ma})</td>
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As can be seen in (16a), the ranking \textsc{faith-acc}\(N\) » \textsc{all-ft-r} ensures that the lexical accent is realised as stress in nominals. On the other hand, in verbs, \textsc{faith-acc}\(N\) is not relevant and the lexical stress is overridden by the default penultimate stress because \textsc{all-ft-r} outranks \textsc{faith-acc} as in (16b).

Although the Noun Faithfulness analysis can account for the stress contrast in (2) correctly, it make a wrong prediction to the Spanish verbal stress. The constraint ranking (15) predicts that all verb forms are stressed on the penultimate syllable. However, this is not true:
for example, 1st. plural imperfects have antepenultimate stress (e.g. hablábamos 'we spoke') and 1st. single preterits have stress on the final syllable (e.g. hablé 'I spoke'). Furthermore, there are ipsiradical sets in which the members of each set show three distinct stress patterns.

(17) NOMINAL PRESENT TENSE VERB PRETERIT VERB

tér.mi.no ter.mi.no ter.mi.nó 'end' 'I finish' 's/he finished'
prós.pe.ro pros.pé.ro pros.pe.ró 'prosperous' 'I proper' 's/he prospered'

As we can see in (18), the Noun Faithfulness analysis wrongly predicts penultimate stress for preterits: since preterit is a verb, the high-ranked \textsc{Faith-Acc} is not relevant and \textsc{FtBin} \Rightarrow \textsc{Faith-Acc} incorrectly selects (18ii) with the penultimate stress as optimal.

(18) /termino/  \Rightarrow  *(ter)(mí.no)

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<th>\textsc{FtBin}</th>
<th>\textsc{Faith-Acc}</th>
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<tbody>
<tr>
<td>i. (ter.mi)(nó)</td>
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<td>!</td>
<td></td>
</tr>
<tr>
<td>ii. (ter)(mí.no)</td>
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To resolve this problem, it is necessary to assume a faithfulness constraint that is specific to preterit verbs, but this move contradicts the Noun Faithfulness hypothesis that noun-faithfulness constraints are the only kind of category-specific faithfulness constraint in the grammar.

On the contrary, the proposed sympathetic analysis correctly accounts for the stress contrast in (17). Since preterit verbs do not have the present tense marker, they do not trigger sympathy and the lexical accent is realised as stress on the surface, as we have seen in (6c).

5. Conclusions

In this paper, I have proposed a Sympathy-theoretic account of the stress contrast in Spanish ipsiradical sets. I have argued that the stress contrast between verbs and nominals results from the different lexical sympathetic specification between the verbal present tense marker and the nominal class marker: the former has a lexical sympathetic specification \$-\text{selector} = \text{MAX}_0$, while the latter does not have sympathetic specification. Since the stress contrast in Spanish ipsiradical set is not an instance of opacity, the sympathetic analysis proposed in this paper can show that Sympathy Theory is not a mere tool to resolve opacity problems in OT but a general model of phonological competence.

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Notes

1 I would like to thank the audiences of Phonology Forum 1999 held at Tokyo Metropolitan University (September 2-4, 1999), especially Diana Archangeli, Haruka Fukazawa, Shosuke
Haraguchi, and Haruo Kubozono, for their comments, suggestions and encouragement. I am grateful to Hideyuki Hirano for his valuable comments and insights. This work is supported by JSPS Research Fellowships for Young Scientists and Grant-in-aid for JSPS Fellows.

2 In this paper, I do not argue the quantity-sensitive aspect of Spanish stress, which is not relevant for the analysis of the ipsiradical sets.

3 The deletion of TV not TAM is justified by subjunctive forms: anima _aTV eTAM ⇒ anime 's/he encourages'.

4 The stress in the prosodically identical ipsiradical sets (1) is explained in the same manner as in (13-14).

5 I would like to thank Hitoshi Gotoo for reminding me this fact.

References