L. Garrapa: Italian Vowel Deletion across Word Boundaries: Phonology or Morphology?

Italian Vowel Deletion across Word Boundaries: Phonology or Morphology?

Luigia Garrapa
University of Konstanz (D) & C.R.I.L., Università del Salento (I)
lugiagarrapa@uni-konstanz.de; luigia.garrapa@ateneo.unile.it
Workshop “Formal and Semantic Constraints in Morphology”
Konstanz, November 1-2, 2007
SFB 471 “Variation and Evolution in the Lexicon”

1. Introduction

• This study will try to shed light on the functioning of Italian Vowel Deletion (VD) across word boundaries, i.e. applying to the final vowels (V1) of determiners/inflected prepositions/pronouns followed by vowel-initial (V2) nouns/lexical verbs ([Fnc Lex] sequences) as well as to final vowels of pronouns followed by the auxiliary verb avere plus the past participle of a lexical verb ([Fnc Fnc Lex] sequences), see (1a)-(2):

(1) a. un/l’/questo,quest'/quell'esempio; una,un'/la,l'/questa,quest'/quella/quell'idea, ‘an/the/this/that example (m.); an/the/this/that idea (f.)’
   b. dell’esempio, della/dell’ idea, etc.
   ‘of the example (m.), of the idea (f.)’
   c. lo/la/li/le amavo, lo/la/li/le umiliavo, lo/la/li/le uso, etc.
   I loved him/her/it/them, I humiliated him/her/them, I use it/them’

(2) lo/la/li/le ha/ho dato/a/i/e, lo/la/li/le avevo/a perso/a/i/e, ecc.
   ‘I, s/he have/has given it/them (m./f.); I, s/he had lost it/them (m./f.)’

• The variety under analysis is Italian as spoken in Florence (Tuscany, central Italy).

• I will provide evidence that Italian VD is not entirely optional and unpredictable as stated in previous accounts (see Agostiniani, 1989; Nespor 1990) and that the determiners uno/lo/quello are not the only two Fnc which undergo VD obligatorily in prevocalic context.

• I will show that Italian VD is not a single phenomenon; rather it is possible to distinguish a lexical VD (applying to determiners) from a postlexical VD (applying to pronouns).

• The application vs non-application of VD is crucially determined by the interplay of morphological, phonological and frequency factors.

2. Fnc Analized

• The Fnc under analysis are those listed in Table 1:

<table>
<thead>
<tr>
<th>Determiners</th>
<th>Lo, la, gli, le ‘the’ (m.s., f.s., m.p., f.p.); uno, una ‘a/an’ (m.s., f.s.); Questo/a/e ‘this/these’ (adj) (m.s., f.s., m.p., f.p.); Quello/a, Quegli, Quelle ‘that/those’ (adj) (m.s., f.s., m.p., f.p.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pronouns</td>
<td>Lo, la ‘it’ (m.s., f.s.); Li, le ‘them’ (m.p., f.p.); Glielo/a ‘it to him/to her’ (m.s., f.s.); Glieli/e ‘them to him/them to her’ (m.p., f.p.); Mi ‘me/to me’; Ci ‘us/to us’; Gli ‘him/to him’; Le ‘her/to her’.</td>
</tr>
<tr>
<td>Infl.Prepositions</td>
<td>dello/a, degli, delle ‘of the’ (m.s., f.s., m.p., f.p.)</td>
</tr>
</tbody>
</table>

Table 1: Fnc under analysis
3. Participants, Materials and Procedure

- The data presented here come from two different sources: the C-Oral-Rom Italian corpus of Cresti & Moneglia (2005) and an experimental study I carried out in Florence in March 2007.

3.1 The C-ORAL-ROM Italian Corpus

- It represents the language actually spoken in Florence and its neighbouring area (formal as well as informal speech). There are 451 speakers, of different age, education and geographical origin (42% of them come from Tuscany). The corpus has been collected in Western Tuscany during the years 1980-2003 and the majority of speech files were recorded in the years 2000-2003.

3.2 The Experimental Study in Florence

- **Speakers:** 6 university students of 24-29 years and 3 workers of 45 years (coming from Florence or from the neighbouring area), who live and study/work in Florence.

- **Materials:** a self-constructed questionnaire, made of 484 stimuli (184 for determiners, 252 for pronouns and 48 for inflected prepositions) was employed to evaluate the conditions of application of VD. The stimuli were presented to the speakers in random order.

- **Procedure:** during the experiment the speakers carefully listened to the utterances (mostly in the 2nd person singular) I pronounced and were later asked to perform them (without having the possibility to visualize them) as natural as possible (bringing them in the 1st person singular, if necessary). Some examples of the utterances I pronounced are listed in (3):

  (3)  
  Dimmi che _le usavi_ sebbene non ti piacessero.  
  ‘Tell me that you used them (f.p.) even though you did not like them.’  
  Dimmi che _vi evitava_ con atteggiamento sprezzante.  
  ‘Tell me that s/he avoided you scornfully.’  
  Dimmi che _glielo avevi prestat_ o altre volte.  
  ‘Tell me that you had already lent it (m.s) to him/her’  
  Dimmi che _questo elenco è davvero interminabile._  
  ‘Tell me that this list is really a never-ending one.’  
  Dimmi che hai fatto _le analisi del sangue stamattina._  
  ‘Tell me that you did the blood analysis this morning.’

- **Design of the experiment:**
  - Determiners and inflected prepositions (Fnc) are followed by nouns (Lex), cf. (4)-(5):

    (4)  
    Un/L’/Questo/Quell’amico → un/l’/Quest’/Quell’amico, etc.  
    ‘a/the/this/that (m.s.) male friend’
    Una/La/Questa/Quella idea → un’l’/Quest’/Quell’idea, etc.  
    ‘a/the/this/that (f.s.) idea’
    Gli/Questi/Qegli anni → Gli/Questi/Qegli anni (rar. Gl’/Quest’/Qegl’anni), etc.  
    ‘the/these/those (m.p.) years’
    Le /Quste/Quelle analisi → Le /Quste/Quelle analisi (rar. L’/Qest’/Quell’analisi), etc.  
    ‘the/these/those (f.p.) analysis’

    (5)  
    Dello abito, Della essenza → Dell’abito, Dell’essenza, etc.  
    ‘of the (m.s.) dress, of the (f.s.) essence’
    Degli amici, Delle idee → Degli amici (rar. Degl’ amici), Delle idee (rar. Dell’idee).  
    ‘of the (m.p.) male friends, of the (f.p.) ideas’

  - All pronouns (Fnc) are followed by lexical verbs (Lex), see (6):

    (6)  
    lo/li esorta, la/le odia → lo/li esorta, la/le odia (rar. l’esorta, l’odia), etc.  
    ‘S/he exhorts him/them (m.), S/he hates her/them (f.)’
    mi/çi umilia, mi/çi elenca qlco → mi/çi umilia, mi/çi elenca (rar. m’/ç’umilia, m’/ç’elenca).  
    ‘S/he humiliates me/us (m./f.), S/he lists sth. to me/us (m./f.)’
    gli/le obiettava qlco → gli/le obiettava (*gl’/l’obiettava), etc.  
    ‘S/he objects sth. to him/her’
Only a subset of pronouns (lo/a/i/e, glielo/a/i/e, Fnc) are followed by the auxiliary verb avere ‘to have’ (Fnc), plus the past participle of a lexical verb (Lex), see (7):

(7)  l'o/ lì ha/aveva dato/i
     ‘S/he has/had given it/them (m.)’

     l'a/ le ho/aveva persa/e
     ‘S/he has/has lost it/them (f.)’

Each Fnc is followed by 4 Lex beginning with unstressed V2, 4 Lex beginning with V2 which bears secondary stress and 4 Lex beginning with V2 which bears primary stress, see (8)-(10):

(8)  l'o amáva, mì elènca, della icònà, una olìva, etc.
    ‘She loved him, S/he lists sth. to me, of the (f.s.) icon, an (f.s.) olive’

(9)  l'o èvitáva, mì òbìttáva, della òperáia, una èsigènza, etc.
    ‘S/he avoids him, S/he objectes sth. to me, of the female worker, an (f.s.) exigence’

(10) l'o úsano, mì èvita, della ìsola, una ìsola, etc.
    ‘They use it (m.), S/he avoids me (m./f.), of the (f.) isle, an (f.) isle’

These data were analyzed using descriptive statistics (adopting the following measures of dispersion: $M$ mean, $SD$ standard deviation, $CV$ coefficient of variation, $SV$ the smallest value, $LV$ the largest value, $R$ range) and nonparametric Chi-Square test ($\chi^2$), to assess whether they are statistically significant (cf. Davis 1990 e Azzellino & Marcotti 2004). The descriptive statistical analysis as well as the Chi-Square test were performed with SPSS 15.0 for Windows.

4. Overview of the Results
   - The comparison between the data coming from the C-ORAL-ROM Italian corpus and those I elicited in Florence is presented in Table 2:

<table>
<thead>
<tr>
<th>Type of Fnc</th>
<th>Occ. in elided form/overall occurrences</th>
<th>%</th>
<th>Occ. in elided form/overall occurrences</th>
<th>%</th>
<th>M</th>
<th>SD</th>
<th>CV</th>
<th>SV</th>
<th>LV</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td>Determiners</td>
<td>2707/2867</td>
<td>94%</td>
<td>608/1106</td>
<td>55%</td>
<td>101</td>
<td>4</td>
<td>17</td>
<td>96</td>
<td>106</td>
<td>10</td>
</tr>
<tr>
<td>Pronouns</td>
<td>825/1197</td>
<td>69%</td>
<td>339/1719</td>
<td>20%</td>
<td>38</td>
<td>23</td>
<td>535</td>
<td>8</td>
<td>74</td>
<td>66</td>
</tr>
<tr>
<td>Infl. Preposit.</td>
<td>1152/1560</td>
<td>74%</td>
<td>144/283</td>
<td>51%</td>
<td>24</td>
<td>1</td>
<td>0</td>
<td>23</td>
<td>25</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>4684/5654</td>
<td>83%</td>
<td>1091/3108</td>
<td>35%</td>
<td>176</td>
<td>18</td>
<td>340</td>
<td>155</td>
<td>204</td>
<td>49</td>
</tr>
</tbody>
</table>

Table 2: Occurrences of VD in the corpus data compared to the occurrences of VD in the data elicited in Florence ($\chi^2 = 401.16$, $p < 0.001$ for the latter)

(A) The data presented in Table 2 show that:
   - the speakers of the corpus apply VD more frequently (83%) than the Florentine informants (35%);
   - V1 of determiners and inflected prepositions undergo VD more frequently than V1 of pronouns;
   - the frequency of application of VD to V1 of pronouns is sensitive to variation within speakers and across speakers.

5. VD applying to DETERMINERS and INFLECTED PREPOSITIONS final vowels

5.1 SINGULAR Determiners and Inflected Prepositions
The data concerning the application of VD to singular (masculine + feminine) determiners and inflected prepositions are listed in Tables 3-4 and some examples are provided in (11)-(13):
L. Garrapa: Italian Vowel Deletion across Word Boundaries: Phonology or Morphology?

MAS. & Sing. Determiners/Infl. Prepositions

<table>
<thead>
<tr>
<th>Occ. in elided form/overall occurrences</th>
<th>Occ. in elided form/overall occurrences</th>
<th>M</th>
<th>SD</th>
<th>CV</th>
<th>SV</th>
<th>LV</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uno, Lo, Questo, Quello, Dello</td>
<td>1676/1704</td>
<td>63</td>
<td>2</td>
<td>4</td>
<td>59</td>
<td>64</td>
<td>5</td>
</tr>
</tbody>
</table>

Table 3: Application of VD to masculine singular determiners and inflected prepositions

FEM. & Sing. Determiners/Infl. Prepositions

<table>
<thead>
<tr>
<th>Occ. in elided form/overall occurrences</th>
<th>Occ. in elided form/overall occurrences</th>
<th>M</th>
<th>SD</th>
<th>CV</th>
<th>SV</th>
<th>LV</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td>Una, La, Questa, Quella, Della</td>
<td>1438/1482</td>
<td>59</td>
<td>5</td>
<td>22</td>
<td>51</td>
<td>64</td>
<td>13</td>
</tr>
</tbody>
</table>

Table 4: Application of VD to feminine singular determiners and inflected prepositions

(11) V1 followed by unstressed V2

Un/L'/Quell'/Questo/Dell' elenco → un/l'/Quell'/Quest' (rar. Questo)/Dell' elenco, etc.

Una/La/Quella/Questa/Della icôna → un'/l'/Quell'/Quest'/Dell' (rar. Questa) icôna, etc.

(12) V1 followed by V2 bearing secondary stress

Un/L'/Quell'/Questo/Dell' episódio → un/l'/Quell'/Quest' (rar. Questo)/Dell' episódio, etc.

Una/La/Quella/Questa/Della ironia → un'/l'/Quell'/Quest'/Dell' (rar. Questa) ironia, etc.

(13) V1 followed by V2 bearing primary stress

Un/L'/Quello/Questo/Dell' é sito → un/l'/Quell'/Quest' (rar. questo)/Dell' é sito, etc.

Una/La/Quella/ Questa época → un'/l'/Quell'/Quest'/ (rar. questa)/Dell' época, etc.

(B) The data presented in Tables 3-4 suggest that:

- The speakers of the corpus as well as the 9 Florentine informants dropped (nearly regularly) V1 of singular determiners and inflected prepositions.

5.2. PLURAL Determiners and Inflected Prepositions

The data concerning the application of VD to plural (masculine + feminine) determiners and inflected prepositions are listed in Tables 5-6 and some examples are provided in (14)-(16):

<table>
<thead>
<tr>
<th>Occ. in elided form/overall occurrences</th>
<th>Occ. in elided form/overall occurrences</th>
<th>M</th>
<th>SD</th>
<th>CV</th>
<th>SV</th>
<th>LV</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gli, Questi, Quegli, Degli</td>
<td>32/599</td>
<td>0.5</td>
<td>0.5</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 5: Application of VD to masculine plural determiners and inflected prepositions

(χ² = 11.13, p < 0.01 for the data of the experimental study).

<table>
<thead>
<tr>
<th>Occ. in elided form/overall occurrences</th>
<th>Occ. in elided form/overall occurrences</th>
<th>M</th>
<th>SD</th>
<th>CV</th>
<th>SV</th>
<th>LV</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td>Le, Queste, Quelle, Delle</td>
<td>19/204</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 6: Application of VD to feminine plural determiners and inflected prepositions
L. Garrapa: Italian Vowel Deletion across Word Boundaries: Phonology or Morphology?

(14) V1 followed by unstressed V2

Gli/ Quegli/Questi/Degli amici → Gli/ Quegli/Questi/Degli (rar. Quest’) amici, etc.
‘The/Those/These/of the male friends’

Le/Quelle/Queste/Delle olive → Le/Quelle/Queste (rar. L’/Quell’/Quest’)/Delle olive, etc.
‘The/Those/These/of the olives (fem)’

(15) V1 followed by V2 bearing secondary stress

Gli/ Quegli / Questi/Degli animáli → Gli/ Quegli/Questi/Degli (rar. Quest’) ãanimáli, etc.
‘The/Those/These/of the animals (mas)’

Le/Quelle/Queste/Delle àgenzie → Le/Quelle/Queste (rar. L’/Quell’/Quest’)/Delle àgenzie..
‘The/Those/These/of the agencies (fem)’

(16) V1 followed by V2 bearing primary stress

Gli/ Quegli/Questi/Degli ólli → Gli/ Quegli/Questi/Degli (rar. Quest’)/Degli ólli, etc.
‘The/Those/These/of the oils (mas)’

Le/Quelle/Queste/Delle ãree → Le/Quelle/Queste (rar. L’/Quell’/Quest’)/Delle ãree, etc.
‘The/Those/These/of the areas (fem)’

(C) The data presented in Tables 5-6 highlight that:

• The speakers of the corpus as well as the Florentine informants dropped only seldom V1 of plural determiners and inflected prepositions, no matter if V2 of the following noun is unstressed or stressed.

Given that V1 of (singular + plural) inflected prepositions display the same behaviour as the determiners from which they are formed, I will simply refer to determiners and inflected prepositions as determiners.

6. VD applying to PRONOUNS final vowels

6.1. Direct Object Pronouns Lo, La, Li, Le and Glielo/a/i/e followed by Lexical Verbs

The data concerning the application of VD to Lo/a/i/e and Glielo/a/i/e followed by lexical verbs are presented in Tables 7-9 ($\chi^2 = 13.44$, $p < 0.001$) and some examples are provided in (17)-(19). I will distinguish among the following 3 contexts:

• context 1 (C1): V2 of the verb is unstressed;
• context 2 (C2): V2 of the verb bears secondary stress;
• context 3 (C3): V2 of the verb bears primary stress.

<table>
<thead>
<tr>
<th>Direct Object Pronouns in C1, cf. (15)</th>
<th>Occ. in elided form/overall occurrences</th>
<th>-</th>
<th>Measures of dispersion</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Lo + Glielo</td>
<td>2/53</td>
<td>4%</td>
<td>0.22</td>
</tr>
<tr>
<td>La + Gliela</td>
<td>9/53</td>
<td>17%</td>
<td>1</td>
</tr>
<tr>
<td>Li + Glieli</td>
<td>15/59</td>
<td>25%</td>
<td>2</td>
</tr>
<tr>
<td>Le+ Glielo</td>
<td>4/45</td>
<td>9%</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>30/210</td>
<td>14%</td>
<td>5</td>
</tr>
</tbody>
</table>

Table 7: Application of VD to Lo/a/i/e and Glielo/a/i/e in context 1

(17) Lo/Li amáva, La/Le usávi → Lo/Li/L’ amáva, La/Le/L’ usávi, etc.
‘S/he loved him/them; S/he used it/them (fem)’

Glielo/Glieli aprívo, Gliela/Gliele usávo → Glielo/Glieli/Glieli’aprívo, Gliela/Gliele/Gliele’usávo..
‘I opened it/them (mas) for him; I used it/them (fem) which belonged to him/her’
L. Garrapa: Italian Vowel Deletion across Word Boundaries: Phonology or Morphology?

Experimental Study - Measures of dispersion

<table>
<thead>
<tr>
<th>Direct Object Pronouns in C2, cf. (16)</th>
<th>Occ. in elided form/ overall occurrences</th>
<th>%</th>
<th>M</th>
<th>SD</th>
<th>CV</th>
<th>SV</th>
<th>LV</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lo + Glielo</td>
<td>3/59</td>
<td>5%</td>
<td>0.44</td>
<td>1</td>
<td>0.5</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>La + Gliela</td>
<td>4/48</td>
<td>8%</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Li + Glieli</td>
<td>12/59</td>
<td>20%</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Le+ Gliene</td>
<td>8/47</td>
<td>17%</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>27/213</strong></td>
<td><strong>13%</strong></td>
<td>5</td>
<td>4</td>
<td>19</td>
<td>1</td>
<td><strong>13</strong></td>
<td><strong>12</strong></td>
</tr>
</tbody>
</table>

Table 8: Application of VD to Lo/a/i/e and Glielo/a/i/e in context 2

<table>
<thead>
<tr>
<th>Direct Object Pronouns in C3, cf. (17)</th>
<th>Occ. in elided form/ overall occurrences</th>
<th>%</th>
<th>M</th>
<th>SD</th>
<th>CV</th>
<th>SV</th>
<th>LV</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lo + Glielo</td>
<td>0/58</td>
<td>0%</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>La + Gliela</td>
<td>1/48</td>
<td>2%</td>
<td>0.33</td>
<td>0.51</td>
<td>0.26</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Li + Glieli</td>
<td>2/59</td>
<td>3%</td>
<td>0.22</td>
<td>0.44</td>
<td>0.19</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Le+ Gliene</td>
<td>6/49</td>
<td>12%</td>
<td>1</td>
<td>1</td>
<td>0.40</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>9/214</strong></td>
<td><strong>4%</strong></td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td><strong>3</strong></td>
<td><strong>3</strong></td>
</tr>
</tbody>
</table>

Table 9: Application of VD to Lo/a/i/e and Glielo/a/i/e in context 3

(D) From the data presented in Tables 7-9 it is clear that:

- The 9 Florentine informants tend to drop V1 of Lo/a/i/e and Glielo/a/i/e optionally and not frequently, but only provided that V2 of the lexical verb does not bear primary stress.
- When VD deletes V1 of pronouns followed by lexical verbs, the morphological specifications of V1 cannot be retrieved from the neighbouring context, which is likely to explain why VD is not so frequent in these contexts.

6.2. Direct Object Pronouns Lo, La, Li, Le and Glielo/a/i/e followed by the auxiliary verb avere plus the past participle of a lexical verb.

The data concerning the application of VD to Lo/a/i/e and Glielo/a/i/e (Fnc) followed by the auxiliary verb avere (Fnc) plus the past participle of a lexical verb (Lex) are shown in Tables 10-11 ($\chi^2 = 73.16, p < 0.001$ for the data of the experimental study) and some examples are provided in (20)-(21):

<table>
<thead>
<tr>
<th>Pronouns</th>
<th>C-ORAL-ROM Italian</th>
<th>Experimental Study</th>
<th>Measures of dispersion</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Occ. in elided form/ overall occurrences</td>
<td>%</td>
<td>Occ. in elided form/ overall occurrences</td>
</tr>
<tr>
<td>Lo + Glielo</td>
<td>284/298</td>
<td>95%</td>
<td>95/131</td>
</tr>
<tr>
<td>La + Gliela</td>
<td>126/126</td>
<td>100%</td>
<td>72/83</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>410/424</strong></td>
<td><strong>97%</strong></td>
<td><strong>167/214</strong></td>
</tr>
</tbody>
</table>

Table 10: Application of VD to Lo/a, Glielo/a in [Fnc Fnc Lex] sequences
L. Garrapa: Italian Vowel Deletion across Word Boundaries: Phonology or Morphology?

(20) \(\begin{align*}
\text{lo ha/aveva dato, glielo ha/aveva perso} & \rightarrow \text{I’/lo ha/aveva dato, glielo/gliel’ ha/aveva perso}., \\
\text{la ho/aveva presa, gliela ha/aveva data} & \rightarrow \text{I’/la ho/avevo presa, etc.}
\end{align*}\)

‘S/he has/had given it (mas); S/he has/had lost it (mas) which belonged to him/her’

(21) \(\begin{align*}
\text{li ha/aveva dati, glieli ha/aveva persi} & \rightarrow \text{I’/li ha/aveva dati, glieli/gliel’ ha/aveva persi, etc.} \\
\text{le ho/aveva prese, gliela ha/aveva date} & \rightarrow \text{I’/le ho/avevo prese, e gliele/gliel’ ha/aveva date.} \\
\text{‘S/he has/had taken them (fem) from him/her; S/he has/had given them (fem) to him/her’}
\end{align*}\)

\begin{table}[h]
\centering
\begin{tabular}{|c|c|c|c|c|c|c|c|c|}
\hline
Pronouns & C-ORAL-ROM Italian & Experimental Study & Measures of dispersion \\
& & - & \\
\hline
\multirow{2}{*}{Li + Glieli} & Occ. in elided form/ overall occurrences & Oocc. in elided form/ overall occurrences & \% & M & DS & CV & SV & LV & R \\
\hline
\multirow{2}{*}{Le + Gli} & 23/57 & 42/113 & 37\% & 5 & 2 & 5 & 1 & 6 & \ \\
\hline
Total & 23/57 & 80/209 & 38\% & 9 & 6 & 38 & 1 & 19 & 18 \\
\hline
\end{tabular}
\caption{Application of VD to \textit{Li/e, Gli/e} in [Fnc Fnc Lex] sequences}
\end{table}

\section*{6.3. The Consonantal Series}

Following Cardinaletti & Shlonski (2006), I will refer to the pronouns \textit{mi ‘me/to me’, ci ‘us/to us’, gli ‘him/to him, le ‘her/to her} as the consonantal series, since the morphological features of gender/number/person/case are assumed to be exhaustively expressed by their consonantal heads \textit{m-}, \textit{c-}, \textit{gl-}, \textit{l-}. Consequently, \textit{-i/-e} (which attach to the pronoun consonantal heads) should be regarded as default epenthetical phonological vowels inserted in morphologically non-salient positions (see Cardinaletti & Repetti to appear)\textsuperscript{viii}. Let’s look first at the indirect object pronouns \textit{gli/le} (see 6.3.1) and then at the indirect/direct object pronouns \textit{mi/ci} (see 6.3.2.).

\subsection*{6.3.1. Gli and Le}

The data concerning the application of VD to the indirect object pronouns \textit{gli\textsuperscript{viii}, le\textsuperscript{ix}} are outlined in \textit{Table 12} and some examples are provided in (22)-(23):

\begin{table}[h]
\centering
\begin{tabular}{|c|c|c|c|}
\hline
Pronouns & C-ORAL-ROM Italian & Experimental Study & Gli + aux avere \textit{avere} \textit{avere} & Gli + lex verb \\
& & & Gli + aux avere & Gli + lex verb \\
& & & \% & \% \\
\hline
Gli & 20/36 & 55\% & 33/71 & 46\% & \textit{0/69\textsuperscript{x}} & \textit{0\%} \\
Le & \textit{---} & \textit{---} & 0/11 & \textit{0\%} & \textit{0/63\textsuperscript{y}} & \textit{0\%} \\
\hline
\end{tabular}
\caption{Application of VD to singular indirect object pronouns.}
\end{table}

\begin{flushleft}
\end{flushleft}

\begin{flushleft}
‘S/he has told him; S/he offered sth. to him’
\end{flushleft}

\begin{flushleft}
(23) \textit{Gli elenchi, Gli obiettava, Gli} aprono \rightarrow \textit{Gli elenchi, Gli obiettava, Gli} aprono, etc.
\end{flushleft}

\begin{flushleft}
‘Gli elenchi, Gli obiettava, Gli aprono, etc.’
\end{flushleft}

\begin{flushleft}
\end{flushleft}

\begin{flushleft}
‘S/he has told him; S/he offered sth. to him’
\end{flushleft}

\begin{flushleft}
Gli elenchi, Gli obiettava, Gli aprono \rightarrow Gli elenchi, Gli obiettava, Gli aprono, etc.
\end{flushleft}

(E) The data presented in Tables 10-11 highlight that:

- The speakers of the corpus as well as the 9 Florentine informants tend to drop very frequently V1 of the pronouns \textit{lo, la, li, le} and \textit{glielo/a/i/e} when followed by the auxiliary verb \textit{avere} and the past participle of a lexical verb. The factors which play a role in triggering VD in such contexts are:
  (1) the \textbf{morphological specifications} realized by the affixal V1 are \textit{recoverable} from the neighbouring context;
  (2) the \textbf{frequency of occurrence of the auxiliary verb \textit{avere} in fluent speech} is higher than the one of other lexical verbs (see frequency lists of lemmas/forms of Cresti & Moneglia, 2005 and De Mauro et al, 1993; Berretta 1985).

- However, V1 of the singular pronouns \textit{lo, la} and \textit{glielo/a} undergo VD more frequently (though not regularly) than V1 of the corresponding plural pronouns. Consequently, the morphological specification of \textit{[plural number]} seems to prevent VD from applying, at least to some degree.
L. Garrapa: Italian Vowel Deletion across Word Boundaries: Phonology or Morphology?

‘You list sth. to him; S/he objected concerning sth. to him; They open sth. to/for him’

(23) Le interess, Le idratava → Le (*l’) interessa, Le (*l’) idratava , etc.

‘She is interested in it/him; It moisturized sth. to her’

Le idrata, Le obiettava, Le imita → Le (*l’) idrata, Le (*l’) obiettava, Le (*l’) imita.

‘It moisturizes sth. to her; S/he objected about sth. to her; S/he imitates sth. to/from her’

(F) The data in Table 12 suggest that

- V1 belonging to singular indirect object pronouns are never dropped by the Florentine informants;
- However, V1 of gli is sometimes dropped by the speakers of the corpus. By contrast, V1 of le is retained systematically.
- Although the application of VD to gli is sensitive to variation across speakers, it seems that the morphological specification of [dative] case prevents VD from applying.

6.3.2. Mi and Ci

6.3.2.1. The Indirect/Direct Object Pronouns

Mi and Ci are used as direct object pronouns as well as indirect object pronouns. I elicited 180 stimuli from the 9 Florentine informants in which Mi and Ci were used as direct object pronouns and 180 stimuli in which they were used as indirect object pronouns. The results are listed in Tables 13-14 and some examples are provided in (24)-(25):

<table>
<thead>
<tr>
<th>Experimental Study</th>
<th>Occ. in elided form/overall occurrences</th>
<th>Measures of dispersion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct Object Pronouns in cf. (22)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mi + lex verb</td>
<td>5/90</td>
<td>5%</td>
</tr>
<tr>
<td>Ci + lex verb</td>
<td>7/88</td>
<td>8%</td>
</tr>
<tr>
<td>Total</td>
<td>13/178</td>
<td>7%</td>
</tr>
</tbody>
</table>

Table 13: Application of VD to mi/ci as Direct Object Pronouns.

<table>
<thead>
<tr>
<th>Experimental Study</th>
<th>Occ. in elided form/overall occurrences</th>
<th>Measures of dispersion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indirect Object Pronouns in cf. (23)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mi + lex verb</td>
<td>4/91</td>
<td>4%</td>
</tr>
<tr>
<td>Ci + lex verb</td>
<td>10/90</td>
<td>12%</td>
</tr>
<tr>
<td>Total</td>
<td>14/181</td>
<td>8%</td>
</tr>
</tbody>
</table>

Table 14: Application of VD to mi/ci as Indirect Object Pronouns.

(24) mi/ci amava (direct object) → mi, m’/ci, c’ amava, etc.

‘S/he loved me/us’

(25) mi/ci elench (indirect object) → mi, m’/ci, c’ elench, etc.

‘You list sth to me/us’

(G) The data presented in Tables 13-14 highlight that:

- contrary to the claim of Vogel et al. (1983), mi/ci as direct object pronouns do not seem to undergo VD more frequently than mi/ci as indirect object pronouns.

6.3.2.2. Mi and Ci followed by lexical verbs in contexts 1-3

The data concerning the application of VD to Mi/Ci followed by lexical verbs are shown in Tables 15-17 (χ² = 10.113, p < 0.01) and some examples are provided in (26)-(28). I will distinguish among the following 3 contexts:

- context 1 (C1): V2 of the verb is unstressed;
L. Garrapa: Italian Vowel Deletion across Word Boundaries: Phonology or Morphology?

- context 2 (C2): V2 of the verb bears secondary stress;
- context 3 (C3): V2 of the verb bears primary stress.

<table>
<thead>
<tr>
<th>Experimental Study</th>
<th>Measures of dispersion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct/Indirect Object Pronouns in C1, cf. (24)</td>
<td>Occ. in elided form/overall occurrences</td>
</tr>
<tr>
<td>Mi</td>
<td>3/60</td>
</tr>
<tr>
<td>Ci</td>
<td>11/59</td>
</tr>
<tr>
<td>Total</td>
<td>14/119</td>
</tr>
</tbody>
</table>

Table 15: Application of VD to Mi/Ci in context 1.

(26) **Mi / Ci amáva, elénchi** → **Mi/Ci, M’/C’ amáva, elénchi, etc.**

‘S/he loved me/us; S/he listed something to me/us’

<table>
<thead>
<tr>
<th>Experimental Study</th>
<th>Measures of dispersion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct/Indirect Object Pronouns in C2, cf. (25)</td>
<td>Occ. in elided form/overall occurrences</td>
</tr>
<tr>
<td>Mi</td>
<td>5/60</td>
</tr>
<tr>
<td>Ci</td>
<td>7/60</td>
</tr>
<tr>
<td>Total</td>
<td>12/120</td>
</tr>
</tbody>
</table>

Table 16: Application of VD to Mi/Ci in context 2.

(27) **Mi/Ci évitáva, àgitáva** → **Mi/Ci, M’/C’ évitáva, àgitáva, etc.**

‘S/he avoided me/us; S/he troubled me/us’

<table>
<thead>
<tr>
<th>Experimental Study</th>
<th>Measures of dispersion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct/Indirect Object Pronouns in C2, cf. (26)</td>
<td>Occ. in elided form/overall occurrences</td>
</tr>
<tr>
<td>Mi</td>
<td>1/61</td>
</tr>
<tr>
<td>Ci</td>
<td>1/60</td>
</tr>
<tr>
<td>Total</td>
<td>2/121</td>
</tr>
</tbody>
</table>

Table 17: Application of VD to Mi/Ci in context 3.

(28) **Mi/Ci évita, ágita** → **Mi/Ci, M’/C’ évita, ágita, etc.**

‘S/he avoid me/us; S/he troubles me/us’

**(H)** From the data presented in Tables 15-17 it is clear that:

- The 9 Florentine informants tend to drop V1 of Mi/Ci followed by lexical verbs optionally and not frequently, only **provided that V2 of the lexical verb does not bear primary stress** (see § 7.1.).
- Although morphologically underspecified, V1 of Mi/Ci do not tend to undergo VD when they are followed by lexical verbs. I believe that two factors are at work here:
  a) The frequency of occurrence of Mi/Ci in fluent speech is lower than the one of Lo/a/i/e (see frequency lists of lemmas/forms of Cresti & Moneglia, 2005 and De Mauro et al, 1993; Berretta 1985);
  b) The consonantal heads of Mi/Ci realize the non-default value for the Person Feature, i.e. the [1\text{st}] person, (see also Harley & Ritter 2002 and Table 19).

7. **FACTORS influencing the application of ItalianVD**

The application vs non-application of VD to V1 of determiners and pronouns seems to be determined by the interplay of the following 3 factors: (i) the type of Fnc and their frequency of occurrence (see § 7.1); (ii) the morphological specifications realized by the affixal V1 and their recoverability (see § 7.2); (iii) the metrical and rhythmic structure of the [Fnc Lex] and [Fnc Fnc Lex] sequences (see § 7.3.). Let’s look at them individually.
7.1. The Type of Fnc and their Frequency of Occurrence

- Both the data coming from the experimental study in Florence and those coming from the C-ORAL-ROM Italian corpus show that determiners undergo VD more frequently than pronouns.

(I) V1 of singular determiners are regularly elided in prevocalic contexts, no matter if V2 of the nouns are unstressed/stressed. (see § 7.1.) By contrast V1 of singular and plural pronouns are likely to undergo VD only provided that: (i) their morphological specifications are recoverable from the contexts (see § 7.2.); (ii) that V2 of the lexical verbs do not bear primary stress (see § 7.3.).

- Frequency effects (or word frequency), i.e. the frequency with which individual words/morphemes, sequences of words/morphemes or frequently-used stretches of speech are activated (stored or online constructed) in the individual speakers mind, have already been invoked to explain various phonological phenomena (see, among others, Hooper, 1976; Myers & Li, 2005 and Russi, 2006).xv

(J) I believe that the application of VD correlates with the Fnc frequency of occurrence (see frequency lists of lemmas/forms of Cresti & Moneglia 2005 and De Mauro et al. 2001). Consequently,

1) V1 of singular determiners are elided more frequently since determiners are activated more frequently in the mental lexicon of individual speakers;

2) V1 of singular (and plural) pronouns are elided less frequently since pronouns are activated less frequently in the mental lexicon of individual speakers.

- Within the class of pronouns, lo/a/i/e (and the compound pronouns glielo/a/i/e) seem to occur more frequently in fluent speech than mi/ci, gli/le, which would also explain why V1 of the former is dropped slightly more frequently than V1 of the latter (see Tables 7-9 and 15, 17).

7.2. The Morphological Specifications of V1 and their Recoverability

- I will consider all the determiners listed in Table 1 as well as the pronouns lo/a/i/e, glielo/a/i/e as formed by a root + an affixal vowel (which realizes the morphological features of the portmanteau morpheme). By contrast, I will consider the pronouns mi/ci, gli/le as formed by a consonantal head + an epenthetic phonological vowel (i.e. a morphologically entirely underspecified vowel inserted in morphologically non-salient positions, see also Cardinaletti & Repetti, to appear)xvi.

- Taking as point of departure some assumptions about the phonological as well as morphological underspecification (see Harley & Noyer, 1999; Embick & Noyer, 2005, among others), I will assume that the affixal/epenthetic V1 are underspecified for the morphological features they can realize. Consequently, I will distinguish between DEFAULT (unmarked, represented as [-]) values vs NON-DEFAULT (marked) values for the 4 morphological features involved, as you can see in (L):

(L)

a) CASE feature: [-] for accusative (default) vs. [dat] for dative (non-default);

b) PERSON feature: [-] for 3rd (default) vs [1st] (non-default);

c) NUMBER feature: [-] for singular (default) vs [plur] for plural (non-default);

d) GENDER feature: [-] for masculine (default) vs [fem] for feminine (non-default).

- The morphological specifications realized by V1 of determiners, inflected prepositions and pronouns are listed in Tables 18-20:
L. Garrapa: Italian Vowel Deletion across Word Boundaries: Phonology or Morphology?

7.2.1 Determiners and Inflected Prepositions

- **V1 underspecified for the number feature**, i.e. /a, o/, are regularly elided before vowel-initial nouns (no matter if the noun begins with a/an stressed/unstressed V2).

- **V1 specified for the number feature**, i.e. /i, e/, tend to refuse VD nearly categorically (no matter if the noun begins with a/an stressed/unstressed V2).

---

### Table 18: Lexical Entries, Morphological Specifications and Deletion Rates of determiners V1.

<table>
<thead>
<tr>
<th>Lexical Entries</th>
<th>Morphological Specifications</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fnc</strong></td>
<td><strong>Fnc Type</strong></td>
<td><strong>Definite/Indefinite</strong></td>
</tr>
<tr>
<td>Lo</td>
<td>Det</td>
<td>Def</td>
</tr>
<tr>
<td>La</td>
<td>Det</td>
<td>Def</td>
</tr>
<tr>
<td>Gli</td>
<td>Det</td>
<td>Def</td>
</tr>
<tr>
<td>Le</td>
<td>Det</td>
<td>Def</td>
</tr>
<tr>
<td>Uno</td>
<td>Det</td>
<td>Indef</td>
</tr>
<tr>
<td>Una</td>
<td>Det</td>
<td>Indef</td>
</tr>
<tr>
<td>Questo</td>
<td>Det</td>
<td>Def</td>
</tr>
<tr>
<td>Questa</td>
<td>Det</td>
<td>Def</td>
</tr>
<tr>
<td>Questi</td>
<td>Det</td>
<td>Def</td>
</tr>
<tr>
<td>Queste</td>
<td>Det</td>
<td>Def</td>
</tr>
<tr>
<td>Quello</td>
<td>Det</td>
<td>Def</td>
</tr>
<tr>
<td>Quella</td>
<td>Det</td>
<td>Def</td>
</tr>
<tr>
<td>Quegli</td>
<td>Det</td>
<td>Def</td>
</tr>
<tr>
<td>Quelle</td>
<td>Det</td>
<td>Def</td>
</tr>
</tbody>
</table>

---

### Table 19: Lexical Entries, Morphological Specifications and Deletion Rates of inflected prepositions V1.

<table>
<thead>
<tr>
<th>Lexical Entries</th>
<th>Morphological Specifications</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fnc</strong></td>
<td><strong>Fnc Type</strong></td>
<td><strong>Case</strong></td>
</tr>
<tr>
<td>Dello</td>
<td>Inf. Prep.</td>
<td>-</td>
</tr>
<tr>
<td>Della</td>
<td>Inf. Prep.</td>
<td>-</td>
</tr>
<tr>
<td>Degli</td>
<td>Inf. Prep.</td>
<td>Plur</td>
</tr>
<tr>
<td>Delle</td>
<td>Inf. Prep.</td>
<td>Plur</td>
</tr>
</tbody>
</table>

---

**I assume that the Morphology contains the Hierarchy of the Morphological Features** in (29):

(29) **Case > Person > Number > Gender**

CASE features dominate (e.g., are ranked higher than) PERSON features, PERSON features dominate NUMBER features and NUMBER features dominate GENDER features. The latter do not seem to affect VD.

7.2.1 Determiners and Inflected Prepositions
I propose that

a) the full forms as well as the elided allomorphs of Italian singular determiners are listed in the Mental Lexicon. Once the noun has been selected (or constructed online) in the Lexicon, the phonological form of this one will determine the selection of the full form of the determiner (before C-initial nouns) or of the elided allomorph (before V-initial nouns) which will precede it. (VD applies in the Mental Lexicon).

b) Only the full forms of plural determiners are listed in the Mental Lexicon. Once the noun which follows a plural determiner has been selected (or constructed online) in the Lexicon, the phonological form of this one will play no role for the selection of the Fnc (VD can seldom apply during the Postlexical Phonology/Morphology interface, see 9.3).

7.2.2. Pronouns

- V1 underspecified for the CASE and NUMBER features, i.e. /a, o/ belonging to lo/a and glielo/a, tend to undergo VD very frequently (but not regularly) provided that the morphological features they realize are recoverable from the neighbouring context, i.e. when they are followed by the auxiliary verb avere plus the past participle of a lexical verb.

- V1 underspecified for the CASE feature but specified for NUMBER feature, i.e. /i, e/ belonging to li/e and glieli/e, can undergo VD optionally but not frequently when they are followed by the the auxiliary verb avere plus the past participle of a lexical verb.

- V1 morphologically entirely underspecified, i.e. /i, e/ belonging to gli/e (whose consonantal heads are specified for the CASE feature) tend to refuse VD nearly categorically (only gli is affected by some variation across speakers). Moreover, -/i/ belonging to mi/ci (whose consonantal heads are specified for the PERSON feature) can undergo VD optionally but not frequently (see 6.3.2.1).

I propose that only the full forms of pronouns are listed in the Mental Lexicon. However, V1 of pronouns are likely to undergo VD only during the Postlexical Phonology/Morphology Interface, only under the condition that the morphological specifications realized by V1 are recoverable from the context and that we are dealing with high-frequency pronouns, (see 7.1).

7.3. The Metrical and Rhythmic Structure

- The data coming from the experimental study in Florence highlight that the metrical and rhythmic structure play a role with regards to VD, especially when lo/a/i/e, glielo/a/i/e and mi/ci are followed by lexical verbs.

- V1 of these pronouns can undergo VD optionally, mostly when they are followed by lexical verbs beginning with an unstressed V2 (VD = 14% for lo/a/i/e, glielo/a/i/e and 12% for mi/ci) or with a V2 which bears secondary stress (VD = 13% for lo/a/i/e, glielo/a/i/e and 10% for mi/ci), see (30)-(31) and Tables 7-8, 15-16:

\[
\begin{array}{c}
\text{(30) } \text{Lo elénco} \rightarrow \text{Lo/L’elénco} \\
\text{‘I list it (m.)’}
\end{array}
\]

\[
\begin{array}{c}
\text{(31) } \text{Lo imitávo} \rightarrow \text{Lo/L imitávo} \\
\text{‘I imitate it (m.)/him’}
\end{array}
\]
L. Garrapa: Italian Vowel Deletion across Word Boundaries: Phonology or Morphology?

- V1 of the same pronouns tend to refuse VD nearly categorically when they are followed by lexical verbs beginning with a **V2 which bears primary stress** (VD = 4% for lo/a/i/e, glielo/a/i/e and 2% for mi/ci), see (32) and Tables 9, 17:

\[
\begin{array}{ccc}
\text{(x )} & \text{(x )} & \\
\text{(x )} & \text{(x )} & \\
\text{L} & \text{L} & \text{L} <L> \\
\sigma & \sigma & \sigma \\
\end{array}
\]

(32) Lo évita → Lo/*L’ évita

\[
\begin{array}{ccc}
\text{(x . )} & \text{(x . )} & \\
\text{L} & \text{L} & <L> \\
\sigma & \sigma & \sigma \\
\end{array}
\]

lo₁, cv₂ vi, ta → *le. vi₂, ta

‘S/he avoids it/him.’

(O) It seems that pronouns V1 followed by lexical verbs can undergo VD provided that:

- **no external segmental material** is inserted into a foot which contains the syllable bearing primary stress (see also Cabrè & Prieto 2005 for Catalan);  
- the application of **VD improves the rhythmic structure** within the [Fnc Lex] sequence, i.e. sequences of two unstressed syllables (the first one belonging to the pronoun and the second one to the lexical verb) are resolved, so that the onset of the pronoun unstressed syllable is syllabified together with the vocalic nucleus of the verbal initial syllable (thus bringing the rhythmic patterns in conformity with the **Principle of Rhythmic Alternation**, see also Dehé 2006 for Icelandic).

8. The Big Picture

8.1. VD applying to Determiners

- VD applying to determiners is to be regarded as **ALLOMORPHY conditioned MORPHOLOGICALLY** (i.e. the morphological specifications realized by V1) as well as **PHONOLOGICALLY** (i.e. the phonological shape of the noun which follow the determiners).

- It is a **lexical phenomenon**, which takes place within the **Mental Lexicon** and for which the **Morphology/Lexical Phonology** interface is also called into action (see 9.3.).

8.2. VD applying to Pronouns

- VD applying to Pronouns is an **optional, postlexical phenomenon** which is likely to take place during the **Postlexical Phonology/Morphology Interface** (see 9.3).

- I will distinguish between two types of VD applying to Pronouns:  
  a) **Optional and frequent VD, conditioned morphologically and phonologically**, which applies more frequently to singular direct object pronouns and less frequently to plural direct object pronouns followed by the auxiliary verb avere plus the past participle of a lexical verb;  
  b) **Optional and not frequent VD, conditioned phonologically**, which is likely to apply to lo/a/i/e, glielo/a/i/e as well as to mi/ci and gli followed by lexical verbs.

8.3. From a Postlexical to a Lexical Phenomenon

Now consider that:

- the **conditioning context** for VD applying to determiners and pronouns is larger than the single Fnc;  
- the **frequency of use** of determiners is higher than the one of pronouns;  
- in Italian as spoken during the 20th century, VD dropped regularly singular masculine determiners V1 and more/less frequently (but not regularly) singular feminine and plural determiners V1 as well as VD dropped pronouns V1 frequently (but not regularly), no matter if they were followed by a lexical or an auxiliary verb (see Garrapa 2007).
Consequently, I would propose that:
• VD applying to Italian determiners was originally a *postlexical phenomenon* but then developed into a *lexical one* and underwent morphological leveling;
• VD applying to pronouns was originally a *postlexical phenomenon* which then lost productivity (VD remained productive only with high-frequency pronouns) and underwent morphological leveling only in some respects.

9. Italian VD integrated into a modular grammar

I will try to integrate Italian VD into a modular, parallel model (Modular Optimality Theory**, in progress) for the architecture of the language faculty. Modular OT is looks like as outlined in Figure 1.

9.1. Properties and organization of Modular OT

Following Jackendoff’s (1997) & (2002) Representational Modularity, Modular OT displays the following properties:

• **Separate modules** are devoted to different levels of encoding. **No mixed representations** within the same level of encoding are allowed**xxi**.

• **Syntax** as well as **Morphology** and **Phonology** are generative grammatical modules.

• Each **module** is characterized by its specific constraints.

• **Interface modules** (consisting of one or more preferably-does interface constraints**xxii**) are posited between modules. They communicate between two modules, establishing a correspondence between two levels of encoding.

• Each interface module has to be interpreted as in (33):

\[
(33) \quad \text{Configuration A belonging to one among the Syntactic/Morphological/Phonological/Phonetic modules must/may/preferably has to correspond to}
\]

\[
\text{Configuration B in one among the Syntactic/Morphological/Phonological/Phonetic modules}^{xxii}
\]

Thus, unlike Classical OT (see, among others, McCarthy, 2002), Modular OT is:

• **modular**, since different levels of encoding are factored by independent but interacting modules;

• **partially serial**, given that the output of a module is mapped into the following module, serving as input for the level of encoding computed in this one.

Modular OT shares a number of properties with other models proposed in the literature:

• The **morphological structure** is an independent level of representation (cf. Embick & Noyer, 2005, among others).

• I assume **late lexical insertion** as the process by which some phonological exponent is assigned to independently generated syntactic and morphological configurations, (see also Embick & Noyer, 2005 and in some respects also Jackendoff, 1997 & 2002).

• I posit at least the **stem level** and the **word level** within the morphological and lexical-phonological components, (see Kiparsky, 1982).
I assume a **lexical phonological component** separated from a **post-lexical phonological component** (see Kiparsky, 1982). Moreover, **within the postlexical phonological component**, I identify 3 independent **submodules**: (i) the prosodic submodule; (ii) the metrical and rhythmic submodule; (iii) the postlexical-phonological operations submodule.

**Figure 1: A Sketch of Modular OT**

### 9.2 The Mental Lexicon
- Following the evidence provided by recent psycholinguistic studies (see Schreuder & Baayen, 1995; Say & Clahsen, 2002; Baayen et al., 2002 and references cited therein), I assume that the mental lexicon is **partially redundant** and allows **storage** as well as **online computation**.
- The **lexical items stored** in long-term memory can be **smaller** as well as **larger than a single word**. As far as VD is concerned, I assume that at least the following lexical items are stored:
  
  a) **Productive morphological affixes** of gender/number/person/case, i.e. the following ones for Italian pronouns, determiners, nouns and adjectives:
     - **-a [mas & sing (& acc & 3rd person)]**,
     - **-o [fem & sing (& acc & 3rd person)]**, etc;
  
  b) **Fnc are listed** in their whole paradigm:
     - **singular determiners** and **inflected prepositions** are listed as full forms as well as reduced allomorphs, lo/a and l’, uno/una and un/un’; quello/a and quell’; questo/a and quest’;
     - **plural determiners** and **inflected prepositions** are listed only as full forms, gli, le, quegli, quelle, questi/e, prep+gli/le;
     - **singular and plural pronouns** are listed only as full forms, lo/a/i/e, glielo/a/i/e, mi, ci, gli, le.

  c) **Frequently used stretches of speech**, i.e.
     - determiners il/lo/l’ o uno/un’ + high-frequency masculine singular nouns;
     - determiners la/l’ o una/un’ + high-frequency femmine singular nouns;

### 9.3. The Functioning of Modular OT.

- **The Interfaces** which are relevant for the application of VD (the continuous arrows in Figure 1) are the following two:

  a) The **Mental Lexicon/Lexical Phonology interface** as well as the **Lexical Phonology/Morphology interface** for VD applying to determiners and inflected prepositions;

  b) the **Postlexical Phonology/Morphology interface** for VD applying to pronouns. Actually, contrary to Kiparsky (1982) and Embick & Noyer (2005), among others, the data concerning Italian VD suggest that the Postlexical Phonological component can look back into the Morphological component.

- Now let’s look at how the different grammatical and interface modules should function with regard to the application/non-application of VD

<table>
<thead>
<tr>
<th>Steps</th>
<th>Grammatical Module</th>
<th>What does happen?</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td>An intended meaning has to be conveyed.</td>
</tr>
<tr>
<td>1</td>
<td>Syntax (S)</td>
<td>The ‘basic’ syntactic structure of the utterance is built.</td>
</tr>
<tr>
<td>2</td>
<td>Syntax/Morphology Interface</td>
<td>The ‘basic’ syntactic structure is mapped into the morphological one.</td>
</tr>
<tr>
<td>3</td>
<td>Morphology (M)</td>
<td>The abstract morphological structure of single words is built. The <strong>abstract Lex stems/roots</strong>, i.e. <em>l-, quest-, un-</em> (for determiners), <em>l-, gliel-, m-</em> (for pronouns), etc., and <strong>abstract portmanteau morphemes</strong> for the appropriate grammatical features, i.e. {–a, –o, –i, –e}, or the <strong>abstract morphs</strong> for {–i, –e} (later realized as epenthetic phonological vowels) are assembled together.</td>
</tr>
<tr>
<td>4</td>
<td>Morphology/ Lexical Phonology Interface</td>
<td>The abstract morphological structure of words is mapped into the lexical phonological one.</td>
</tr>
<tr>
<td>5</td>
<td>Lexical Phonology</td>
<td>Some phonological exponent should be assigned (if needed) to abstract stems/roots, to abstract portmanteau morphemes and to abstract morphs.</td>
</tr>
<tr>
<td>6</td>
<td>Mental Lexicon/ Lexical Phonology Interface</td>
<td>The phonological component looks within the mental lexicon for the appropriate lexical items which can realize the abstract stems/roots + portmanteau morphemes/abstract morphs of Fnc and Lex. First nouns and verbs are selected/composed online and only after that determiners (in full form before C-initial nouns but in reduced form before V-initial nouns) and pronouns (only in full form) are selected.</td>
</tr>
</tbody>
</table>
| 7     | Lexical Phonology | Once the phonological component has found the single lexical items, each of these is inserted into the corresponding configuration. Stress assignment (if not lexically encoded) and word-internal readjustment operations take place.

| 8     | Lexical Phonology / Morphology Interface | For the **determiners**, it verifies that those portmanteau morphemes which were specified for the non-default value of the number feature have received some phonological exponent. Consequently: 1) an **affixal V1 –i, –e** must have been inserted instead of determiners portmanteau morphemes specified for the [plural] number feature and followed by V-initial or C-initial nouns; 2) no affixal V1 –a, –o must be inserted instead of the determiners portmanteau morphemes underspecified for the number feature and followed by V-initial nouns. For the **pronouns**, it verifies that: 1) an **affixal V1** has been inserted instead of the portmanteau morphemes, no matter if the pronouns are followed by a lexical or an auxiliary verb; 2) an epenthetic phonological vowel (V1 = –i, –e) has been inserted after the consonantal heads, i.e. in morphologically non-salient positions, *m-, c-, gl-, l-*, etc. |
| 9     | Prosodic Bracketing | Phonological phrases, Intonational structures and Utterances are built. |
| 10    | Metrical and Rhythmic Structures | The metrical and rhythmic structures (internal to prosodic constituents) are built. |
| 11    | Postlexical Phonological Operations | Sequences of unstressed syllables as well as vowel sequences across word-boundaries are likely to be resolved, etc. |
| 12    | Postlexical Phonology/ Morphology Interface | This interface is called into action only as far as pronouns followed by lexical/auxiliary verbs are concerned. The **Morphological component** will allow the Postlexical Phonological one to drop pronouns affixal V1 only provided that they are followed by the auxiliary verb *avere* plus the past participle of a lexical verb. However, sometimes the Postlexical Phonological component deletes affixal/epenthetic V1 in order to improve the metrical/rhythmic structure and without ‘asking’ the Morphological component, i.e. when pronouns are followed by lexical verbs. |
Postlexical Phonology/Phonetics Interface

After all postlexical phonological operations have been accomplished, [Fnc Lex] and [Fnc Fnc Lex] embedded in a given utterance are performed. For each sequence, 2 are the possible outputs:

Output 1 (the most frequent one, morphologically determined):
1a) V1 of singular determiners are dropped before V-initial nouns;
2a) V1 of plural determiners are not dropped before V-initial/C-initial nouns;
3a) V1 of pronouns followed by vowel-initial lexical verbs are not dropped;
4a) V1 of pronouns followed by the auxiliary verb avere tend to be dropped.

Output 2 (the least frequent one, phonologically determined): the opposite of 1a)-4a) listed under Output 1.

Table 21: A Sketch for the Functioning of Modular OT.

After having tried to integrate Italian VD into a Modular Theory of the Language faculty, I will identify the optimal theoretic constraints which are relevant for it.

10. Stochastic OT Analysis

- So far, I have shown that the application of VD in spoken Florentine Italian is crucially determined by 3 factors:
  a) the type of Fnc and their frequency of occurrence (see § 7.1);
  b) the morphological specifications realized by the affixal V1 and their recoverability (see § 7.2);
  c) the metrical and rhythmic structures of the [Fnc Lex] and [Fnc Fnc Lex] sequences (see § 7.3).

- Consequently, I will recur to different phonological, morphological and interface constraints to account for the application vs. application of VD to V1 of determiners and pronouns.

- The Stochastic Analysis has been computed by means of OT Soft (Hayes, B., B. Tesar & K. Zuraw, 2003) The two constraint sets proposed in (34)-(36) were processed through the Gradual Learning Algorithm (see Boersma & Hayes 2001).

10.1 Determiners and Inflected Prepositions

- The relevant constraints are listed in Table 22:

<table>
<thead>
<tr>
<th>Mental Grammatical Module</th>
<th>Constraint Type</th>
<th>Markedness</th>
<th>Faithfulness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lexical Phonology</td>
<td>Markedness</td>
<td>Onset</td>
<td>Max-WI</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Max-IO</td>
<td></td>
</tr>
<tr>
<td>Phonology-Morphology Interface</td>
<td>-</td>
<td>Real-Morph</td>
<td></td>
</tr>
</tbody>
</table>

Table 22: Constraints which account for VD applying to Determiners and Inflected Prepositions.

Max-Word-Initial $\rightarrow$ Max-WI
Every word-initial segment (i.e. the nouns/auxiliary and lexical verbs initial vowels) in the input must have a corresponding segment in the output (see also Casali, 1997; Bisol, 2003; Lléo, 2003 and Colina, 2006).
$\rightarrow$ One violation mark will be assigned for the deletion of each word-initial segment.

Max-Input-Output $\rightarrow$ Max-IO
Every segment in the input must have a corresponding segment in the output (cf. McCarthy & Prince, 1995; Bisol 2003). We have assumed that singular determiners are listed as full forms (to be inserted before consonant-initial nouns) and elided allomorphs (to be inserted before vowel-initial nouns), while plural determiners and pronouns are listed only as full forms in the mental lexicon (cf. 9.2).
$\rightarrow$ A violation mark will be assigned whenever a singular determiner/inflected preposition will be inserted in its full form before a vowel-initial noun or whenever the final vowels of plural determiners and inflected prepositions will undergo VD in prevocalic contexts.
Onset
Syllables must have onsets, which militates against hiatus (see also Bisol, 2003 and Cabré & Prieto, 2005)

Realize-Morpheme → Real-Morph
(Portmanteau) morphemes realizing some of the non-default values of the morphological features of case ([-] for accusative –default- vs. [dat] for dative -non-default-), person ([-] for 3rd -default- vs [1st] -non-default-), number ([-] for singular –default- vs. [plur] for plural -non-default-) must be assigned some phonological exponent (i.e., realized as affixal vowels, see also Iscrulescu, 2003; Lléo, 2003 and Colina, 2006).

→ If the affixal vowel will not be inserted (singular determiners are listed as full forms and as elided allomorphs in the mental lexicon) or will be deleted during the postlexical phonology / morphology interface (plural determiners and pronouns are listed only as full forms in the lexicon), one violation mark will be assigned for each of the non-default values of the morphological features realized by the portmanteau morpheme. Given that the morphological feature of gender ([-] for masculine - default- vs. [fem] for feminine –non default-) plays no role in triggering/blocking deletion of affixal vowels, no violation mark will be assigned if the morpheme was specified for the non-default value of this feature.

• The constraints listed so far have the ranking value given in Table 26:

<table>
<thead>
<tr>
<th>Constraint</th>
<th>Ranking value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max-WI</td>
<td>102,000</td>
</tr>
<tr>
<td>Real-Morph</td>
<td>102,000</td>
</tr>
<tr>
<td>Max-IO</td>
<td>102,000</td>
</tr>
<tr>
<td>Onset</td>
<td>96,000</td>
</tr>
</tbody>
</table>

Table 23: Ranking value assigned to the constraints which account for VD applying to Determiners and Inflected Prepositions

• The proposed cross-modular constraint ranking is the one in (34) and some examples are provided in (35a-b):

(34) Max-WI >> Real-Morph, Max-IO >> Onset

<table>
<thead>
<tr>
<th>(35a) ‘The male friend’</th>
<th>Max-WI</th>
<th>Real-Morph</th>
<th>Max-IO</th>
<th>Onset</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i) lo.a.mi.co</td>
<td></td>
<td>*</td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>(ii) la.mi.co</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(iii) lo.mi.co</td>
<td>*!</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>(35b) gli amici ‘The male friends’</th>
<th>Max-WI</th>
<th>Real-Morph</th>
<th>Max-IO</th>
<th>Onset</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i) gli.a.mi.ci</td>
<td></td>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(ii) gla.mi.ci</td>
<td></td>
<td></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>(iii) gli.mi.ci</td>
<td>*!</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

• The constraint ranking proposed in (34) predicts the correct output in 95% of the occurrences and accounts for:
  ♦ singular determiners, whose V1 undergo VE regularly in prevocalic context;
  ♦ plural determiners, whose V1 tend not to undergo VE regularly in prevocalic context.
10.2. Pronouns

The relevant constraints are listed in Table 24:

<table>
<thead>
<tr>
<th>Constraint Type</th>
<th>Mental Grammatical Module</th>
<th>Constraint Type</th>
<th>Ranking Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Markedness</td>
<td>Postlexical Phonology</td>
<td>* Lapse</td>
<td>Max-WI</td>
</tr>
<tr>
<td>* Lapse</td>
<td>Onset</td>
<td>Max-Io</td>
<td></td>
</tr>
<tr>
<td>* Lapse</td>
<td>Metr-Str_F</td>
<td>Max-MF</td>
<td></td>
</tr>
<tr>
<td>Frequency</td>
<td>Morphology/Postlexical Phonology Interface</td>
<td>Max-MF</td>
<td></td>
</tr>
<tr>
<td>Frequency</td>
<td>Lexicon</td>
<td>Real-Morph</td>
<td></td>
</tr>
</tbody>
</table>

Table 24: Constraints which account for VD applying to Pronouns

For **Max-WI, Max-Io, Onset** and **Real-Morph**, see § 10.1

**Metrical-StructureFoot** → **Metr-Str_F**
Do not insert foreign segmental material into a foot containing the syllable bearing primary stress.

* Lapse
Avoid sequences of unstressed syllables (see also Anttila, 1997)

**Max-Morphological-Feature** → **Max-MF**
Input morphological features must have correspondents in the output.
→Max-F is violated when the morphological featural information is lost due to the application of VD in contexts like direct object pronoun + lexical verb (as *lo amavo* → *l’amavo*, where *l’ = lo/a/i/e*), but not when the direct/indirect object pronoun is followed by a lexical verb (as *mi amava* → *m’amava*, where *m’ = mi*).

**Frequency**
Portmanteau morphemes belonging to **high-frequency pronouns** (*lo/a/i/e*) do not need to be assigned any phonological exponence, provided that no morphological featural information is lost due to the application of VD in contexts like pronoun + lexical verb. The epenthetic vowels (i.e. morphologically entirely underspecified vowels inserted in morphologically non-salient positions) of **low-frequency pronouns** (*mi/ci, gli/le*) should not undergo VD.

The constraints listed so far have the ranking value and belong to the stratum given in Table 25:

<table>
<thead>
<tr>
<th>Constraint</th>
<th>Ranking Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max-WI</td>
<td>108,000</td>
</tr>
<tr>
<td>Max-MF</td>
<td>108,000</td>
</tr>
<tr>
<td>Frequency</td>
<td>106,000</td>
</tr>
<tr>
<td>Real-Morph</td>
<td>104,000</td>
</tr>
<tr>
<td>Metr-Str_F</td>
<td>104,000</td>
</tr>
<tr>
<td>Max-Io</td>
<td>100,000</td>
</tr>
<tr>
<td>Lapse</td>
<td>96,000</td>
</tr>
<tr>
<td>Onset</td>
<td>92,000</td>
</tr>
</tbody>
</table>

Table 25: Ranking value assigned to the constraints which account for VD applying to pronouns

The proposed cross-modular constraint ranking is the one in (36) and some examples are provided in (37a-e):

(36) **Max-WI >> Max-MF >> Frequency >> Real-Morph, Metr-Str_F >> Max-Io >> Lapse >> Onset**
The constraint ranking in (36) predicts the correct output in $82\%^{xxii}$ of the occurrences and accounts for:

- $lo/a/i/e$ and glielo/a/i/e whose V1 tend not to undergo VE when followed by a lexical verb (87%);
- $lo/a$, glielo/a whose V1 undergo VE optionally but frequently when followed by the auxiliary verb avere and the past participle of a lexical verb (78%);
- $li/e$, glieli/e whose V1 undergo VE optionally but not frequently when followed by the auxiliary verb avere and the past participle of a lexical verb (38%);
- $mi, ci$ whose V1 tend not to undergo VE when followed by a lexical verb (92%);
- $gli, le$ whose V1 never undergo VE when followed by a lexical verb (100%).

11. Conclusions

- Various morphological and phonological factors as well as frequency effects militate for or against the application of Italian VD.
- VD applying to Italian determiners is clearly to be regarded as allomorphy conditioned morphologically and phonologically. It is a lexical phenomenon which takes place within the Mental Lexicon and also involves the Lexical Phonology/Morphology interface.
- VD applying to Italian pronouns is an optional, postlexical phenomenon which is likely to take place during the Postlexical Phonology / Morphology Interface. We can distinguish between:
  
  a) Optional and frequent VD, conditioned morphologically and phonologically, which applies frequently to the direct object pronouns followed by the auxiliary verb avere plus the past participle of a lexical verb
L. Garrapa: Italian Vowel Deletion across Word Boundaries: Phonology or Morphology?

b) Optional and not frequent VD, phonologically conditioned, which is likely to apply to lo/a/i/e, glielo/a/i/e as well as to mi/ci and gli followed by lexical verbs beginning, in their turn, with unstressed vowels.

- At the beginning, VD was a single postlexical phenomenon. Subsequently, VD applying to determiners developed into a lexical phenomenon and underwent morphological leveling, while VD applying to pronouns only lost productivity and underwent morphological leveling in some respects.

Acknowledgements

I am indebted to Judith Meinschaefer, Mirko Grimaldi, Stefano Canalis, Lori Repetti and Anton Stasche for helpful comments, suggestions and discussion on previous versions of this paper as well as for constant encouragement. I am also grateful to Salvatore De Masi and Martin Schuetzner for helping me with the statistical analysis. Needless to say, all remaining errors are mine.

This study was financially supported by the Deutsche Forschungsgemeinschaft through its research project ‘Morphophonological variation at word edges: evidence from Romance’ Sonderforschungsbereich 471 ‘Variation and development in the mental lexicon’ at the University of Konstanz (Germany).

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Notes

1 I will use the following abbreviations: adj. for adjective, qlo. for qualcosa ‘something’, m/mas. for masculine, f/fem. for feminine, s/sing. for singular, p/plur. for plural; occ. for occurrences; aux for auxiliary verb, lex verb for lexical verb; V1 for the final vowel of determiners, inflected prepositions and pronouns, V2 for the initial vowel of nouns/lexical and auxiliary verbs, [Fnc Lex] sequence for sequences formed by
L. Garrapa: Italian Vowel Deletion across Word Boundaries: Phonology or Morphology?

determiners/inflected prepositions + nouns or pronouns + lexical verbs, [Fnc Fnc Lex] sequence for sequences formed by pronouns + auxiliary verb + past participle of a lexical verb, Infl. Prepositions for inflected prepositions, V-initial for vowel-initial, C-initial for consonant-initial.

ii The results on the application of VD to dello/a, degli/delle will be extended to the other inflected prepositions.

iii I am native speaker of Italian as spoken in Salento, Apulia/Southern Italy, and in this variety VD is regularly applied only to V1 of the singular determiners uno/una, quello, lo/la and of the inflected prepositions formed with the latter.

iv Note that it is quite difficult to understand whether the final /-i/ of gli, quegli, degli is retained or dropped in prevocalic context, because of the palatal consonant which precedes it. Given that the final /-e/ of the corresponding feminine plural determiners is retained (nearly) regularly, I would think that /-i/ too is retained nearly regularly.

v In the C-ORAL-ROM Italian corpus, the pronouns Lo/a/i/e and Glielo/a/i/e followed by lexical verbs undergo VD with the following deletion rates: lo + gielo 51%, la + gielia 76%, li + gielie 14%, le + gielie 0%. However, it is difficult to distinguish whether VD takes place more frequently when V2 of the lexical verb is unstressed or stressed.

vi It is generally agreed that auxiliary verbs occur as functional verbs when they precede lexical verbs; in this case, they lose their selectional and semantic properties and just retain their morphological properties, (see Cardinaletti & Shlonski, 2006; Cardinaletti & Giusti, 2001; among others). As far as the forms avevo/a ‘I he/she had’ are concerned, the initial vowel of them is generally assumed to be unstressed. As far as the forms ho/ha ‘I have/he, she has’ are concerned, I propose that -o, -a are unstressed.

vii Cardinaletti & Repetti (to appear) claim that the -o is the default epenthetic morphological vowel, inserted in morphologically salient positions which have no morphological content.

viii See note iv.

ix In 8/71 instances the 9 Florentine informants realized the feminine indirect object pronoun le as gli. I excluded these instances from those we presented in Table 12. Berretta (1985: 180, 205) states that in fluent speech gli is often used instead of le and also instead of loro. Consequently, we are faced with a simplification of the clitic system, at least in fluent speech.

xii As far as the results of the C-ORAL-ROM Italian corpus are concerned, the pronouns Mi and Ci followed by lexical verbs undergo VD with the following deletion rates: Mi 52%, Ci 20%. However, it is difficult to distinguish whether VD takes place more frequently when V2 of the lexical verb is unstressed or stressed.

xiii The consonantial head of Ci also realizes the [plural] Number feature.

xiv Harley & Ritter (2002: 486-488) state that the 3rd person is unmarked if compared to the 1st and 2nd persons (associated respectively, with the speaker and the addressee).

xv See Hooper (1976) for English word-internal lenition, Myers & Li (2005) for syllable contraction in Taiwanese and Russi (2006) for the selection of masculine singular Italian determiners il ~ lo before consonant-initial words.

xvi Cardinaletti & Shlonski (2004) point out that the final vowel of clitics surface as [e] when it is preceded by a coronal consonant in singleton clitics, e.g. le, ne, or it is followed by a coronal consonant in clitic clusters, e.g. me lo, me ne, and so forth, because of the /i/-to-[e] lowering process. By contrast, it surfaces as [i] otherwise, e.g., mi, ti, si, ci, vi. Consequently, the following clitics are subject to the [i]–[e] alternation: mi–me, ti–te, si–se, ci–ce, vi–ve.

xvii See also Noyer (1992).

xviii However, Cabré & Prieto (2005) focus on the application of VD within [Lex Lex] sequences.

xix I have drawn this conclusion after having consulted the historical/descriptive grammars Battaglia & Pernicone (1962), Migliorini (1963), Regula & Jerney 1965, Rohlf’s (1968), Tekavcic (1980) and Brunet (1979), (1981), (1986). The majority of these grammars make reference to written Italian.

xx I am indebted to Judith Meinschaefer for inspiring the name Modular OT and for discussing with me many details of the theory in progress.

xxi A parallel model (instead of a derivational one), seems to fit better in the architecture of the mind, especially if we take into account aphasia evidence, among others. Aphasia evidence shows that different lesion sites produce different language breakdowns, which reinforces the view that different sites in the brain are correlated with different linguistic abilities/difficulties (cf. Fromkin 1997, among others).

xxii Interface constraints should be regarded as preferably-does constraints, i.e. there is no one-to-one mapping between elements/configurations/structures belonging to two different modules.

xxiii It is clear that configurations A and B cannot belong to the same grammatical module.

xxiv The idea of abstract morphemes is not new and was already put forward in the DM approach, (cf. Embick & Noyer, 2005).

xxv Through word-internal readjustment operations I mean those operations which are likely to (re)adjust (if some readjustment is needed) the phonological details after a morphological operation has created derived/inflected words as well as in compound words (see Scalise 1994: 151-180).
A Stochastic Grammar is one in which each constraint does not occupy a fixed ranking value; rather, it is a grammar which allows a continuous ranking scale, on which at every evaluation of the candidate set, a small noise component (according to the Standard Deviation of 2.0) is added to the ranking value of each constraint. Consequently, the resulting actual ranking values determine the selection points which are relevant for the position of each constraint in a given tableau. What is more, such a grammar can produce variable outputs and can learn variation (see Boersma & Hayes 2001).

The default parameters used by the GLA are the following ones: (i) Number of times to test the grammar: 2000 (cycles); (ii) Number of times to go through forms: 50000 (learning trials); (iii) Initial Plasticity: 2.0; (iv) Final Plasticity: 0.0. Moreover, all constraints started out at the default value of 100.

CV is the typologically unmarked syllable as well as the most recurring in Italian, see Tonelli et al. (1998) and references cited therein.

Fatal violations are allowed only for Max-WI.

The remaining 5% of the occurrences can be handled as lexical exceptionalities.

Fatal violations are allowed only for Max-WI.

The remaining 18% of the occurrences can be handled as variation/lexical exceptionalities and can be accounted for by positing constraint re-ranking.