North East Linguistics Society

Syntactic and Prosodic Properties of Italian Restructuring Verbs

Paola Monachesi
Utrecht University - Uil OTS

Syntactic and Prosodic Properties of Italian Restructuring Verbs

Paola Monachesi

Utrecht University - Uil OTS

1. Introduction

Complex predicates present grammatical frameworks with interesting interface problems. While the issues they raise with regard to the syntax-semantics interface have received considerable attention in the literature, this is not the case for the syntax-phonology interface. In this respect, a particular kind of complex predicate will be addressed which occurs in the presence of Italian restructuring verbs (Rizzi 1982). I will argue that an analysis of these verbs in terms of argument composition can provide a uniform account of clitic climbing as well as of the other syntactic properties that characterize them.[*]

I will follow Rizzi (1982) in assuming that two different syntactic structures should be associated with restructuring verbs. The situation is, however, different at the prosodic level, where there is motivation to assume only one structure. Italian restructuring verbs constitute additional evidence in favor of the non-isomorphism between prosodic and syntactic constituents given that two different syntactic structures correspond to a single prosodic configuration. It becomes thus of crucial relevance to determine the constraints which are responsible for the syntax-prosody mapping. I will discuss different algorithms which have been proposed in the literature to this end. In particular, it will be shown that those suggested by Nespor and Vogel (1986), Selkirk (1986) and Truckenbrodt (1998) make the wrong predictions with respect to the prosodic structure of restructuring verbs. More generally, a shortcoming of these approaches is that prosodic constituency is driven to a large extent by syntactic principles. This is not the case of the algorithm suggested in Ghini (1993) which will be assumed in order to map syntactic structure to prosodic structure in the case of restructuring verbs. It will be shown that the algorithm can properly deal with the relevant data, not only when two restructuring verbs are present, but also when there is a more complex configuration due to the presence of additional restructuring verbs or intervening adverbs.

278   Paola Monachesi

2.   The Data

Rizzi (1982) identifies three classes of restructuring verbs in Italian:

(1)   Restructuring verbs

   • modal verbs
     (e.g. *potere* 'can', *dovere* 'must', *volere* 'want')

   • aspectual verbs
     (e.g. *cominciare* 'to begin', *finire* 'to finish', *continuare* 'to continue')

   • motion verbs
     (e.g. *venire* 'to come', *andare* 'to go', *tornare* 'to come back')

These verbs act as a class with respect to certain phenomena such as clitic climbing, long NP-movement, *tough* constructions and auxiliary selection. In this paper, I will focus on clitic climbing which is one of the most salient diagnostic revealing complex predicate formation:

(2)   a. Martina lo   vuole   leggere.
         Martina cl.(acc) wants to read

         'Martina wants to read it.'

      b. Martina vuole   leggerlo.
         Martina wants to read cl.(acc)

         'Martina wants to read it.'

In this construction, a clitic which originates as dependent of a complement verb can climb and attach to the trigger verb as shown in (2a). The two verbs act thus as a unit with respect to clitic placement and the result is a complex verb. In standard Italian, clitic climbing is optional with restructuring verbs, as shown by example (2b), where the clitic attaches to the embedded verb.

3.   A Lexical Analysis of Italian Cliticization

I will assume a lexical approach to cliticization which treats Italian clitics as affixes (cf. also Miller (1992) for French and Monachesi (1998) for Romanian). Clitics will not be considered lexical items which are located in a specific position by the rules of syntax, but featural information which is provided in the lexicon and used in morphophonology for the realization of the cliticized verb form. I will assume that cliticization is a lexical operation which has both a syntactic/semantic effect and a morphophonological one (cf. also Monachesi (1996), Monachesi (1999), Miller and Sag (1997)). The syntactic/semantic effect is reflected on the fact that clitics satisfy the subcategorization requirements of the verb they are an argument of. A lexical rule can be suggested to obtain this result:

(3) Complement Cliticization Lexical Rule (CCLR)

$$\begin{bmatrix} word \\ \text{HEAD} \quad\quad verb \\ \text{VAL} \mid \text{COMPS} \quad \boxed{1} \bigcirc \boxed{2} \\ \text{CLTS} \quad\quad elist \end{bmatrix} \mapsto \begin{bmatrix} \text{VAL} \mid \text{COMPS} \quad \boxed{1} \\ \text{CLTS} \quad\quad \boxed{2} \text{ list } (cl\text{-}ss) \end{bmatrix}$$

The effect of the rule is that the complements of the verb are removed from the COMPS list and are added as members of the CLTS list. Verbs which have undergone this operation are thus enriched with the relevant featural information, which is used in morphophonology for the realization of the cliticized verb form. Appropriate constraints relate the featural information present on verbs, to the actual phonological realization of the clitic:

(4) Realization of the accusative, third person masculine singular clitic.

$$\begin{bmatrix} complex\text{-}morph \\ \text{STEM} \mid \text{SS} \mid \text{L} \mid \text{C} \mid \text{CLTS} \big\langle \text{NP}[acc]_{3sgm} \big\rangle \end{bmatrix} \rightarrow \begin{bmatrix} \text{AFFIX} \begin{bmatrix} affix \\ \text{PHON} \mid \text{SKEL} \big\langle lo \big\rangle \end{bmatrix} \end{bmatrix}$$

The constraint above states that if a verb contains an accusative, third singular, masculine element in its CLTS list (which encodes the information about those elements that will be realized as clitics), the clitic *lo* must also be present in the structure.

The interaction of the lexical rule in (3) with the constraint presented above licenses cliticized verb forms like *leggerlo* 'to read it', which occurs in example (2b):

(5) Realization of the cliticized verb form *leggerlo* 'to read it'.

$$\begin{bmatrix} word \\ \text{PHON} \mid \text{SKEL} \big\langle leggerlo \big\rangle \\ \\ \text{MORPH} \begin{bmatrix} complex\text{-}morph \\ \text{STEM} \begin{bmatrix} word \\ \text{PHON} \mid \text{SKEL} \big\langle legger \big\rangle \\ \boxed{1}\, \text{SS} \mid \text{L} \mid \text{C} \begin{bmatrix} \text{HEAD} \begin{bmatrix} verb \\ \text{VFORM } inf \end{bmatrix} \\ \text{VAL} \mid \text{COMPS } elist \\ \text{CLTS} \big\langle \text{NP}[acc]_{3sgm} \big\rangle \end{bmatrix} \end{bmatrix} \\ \text{AFFIX} \begin{bmatrix} affix \\ \text{PHON} \mid \text{SKEL} \big\langle lo \big\rangle \end{bmatrix} \end{bmatrix} \\ \text{SYNSEM} \boxed{1} \end{bmatrix}$$

The description states that the verb doesn't subcategorize for complements. The information

280   Paola Monachesi

about its direct object is encoded in the CLTS list and realized phonologically as the clitic *lo*.[1]

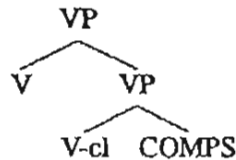### 4.   Restructuring Verbs and Argument Composition

In this section, I will argue that an analysis in terms of *argument composition* can provide an adequate account of clitic climbing while being compatible with the lexical approach to cliticization, which I have just sketched. Argument composition is a lexical mechanism which allows the restructuring verb to inherit the complements of the embedded verb, including those ones which might be realized as clitics (Hinrichs and Nakazawa 1990, Moortgat 1988).[2] Before presenting the analysis, I will address the issue of the syntactic structure of restructuring verbs.

I follow Rizzi (1982) in assuming that while there is motivation to let the embedded verb and its complements form a constituent if no clitic climbing occurs, this is not the case if clitic climbing is triggered. Rizzi proposed four tests based on *Pied Piping, Clefting, Right Node Raising* and *Complex NP shift* which provide support for two different structures in the case of restructuring verbs:

(6)   Flat structure

```
            VP
        ___/ | \___
      cl-V   V   COMPS
```
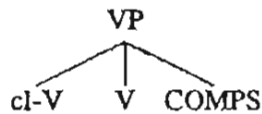
(7)   Hierarchical structure

```
            VP
          _/  \_
         V     VP
            __/  \__
          V-cl    COMPS
```

The flat structure is associated with the clitic climbing configuration while the hierarchical structure represents those cases where the clitic remains attached to the lower verb. There will be (at least) two lexical entries which describe a restructuring verb such as *volere*. It can subcategorize for a verbal complement and the arguments of the latter:

---

[1] An additional constraint, which I have not mentioned here, accounts for the position of the clitic with respect to the host. I refer to Monachesi (1999) for a comprehensive analysis of the morphophonological properties of Italian cliticization.

[2] It can be shown that argument composition can provide a uniform analysis of the other properties of these verbs, that is: long NP-movement, *tough* constructions and auxiliary selection. I refer to Monachesi (1999) for a detailed discussion.

(8)

$$\begin{bmatrix} word \\ \text{PHON} \mid \text{SKEL} \langle volere \rangle \\ \text{SS}\mid\text{L}\mid\text{C} \begin{bmatrix} \text{HEAD } verb \\ \text{VAL} \begin{bmatrix} \text{SUBJ} \langle \boxed{1}\,\text{NP}_{\boxed{4}} \rangle \\ \text{COMPS} \left\langle \boxed{2} \begin{bmatrix} w\text{-}ss \\ \text{HEAD } verb \\ \text{VAL} \begin{bmatrix} \text{SUBJ} \langle \text{NP}_{\boxed{4}} \rangle \\ \text{COMPS } \boxed{5} \end{bmatrix} \\ \text{CLTS } elist \end{bmatrix} \right\rangle \oplus \boxed{5} \\ \text{ARG-ST} \langle \boxed{1}\ \boxed{2}\ \boxed{5} \rangle \end{bmatrix} \end{bmatrix}$$
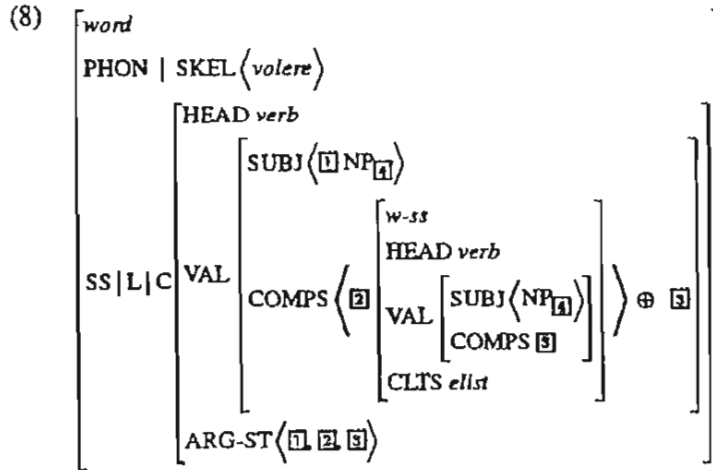
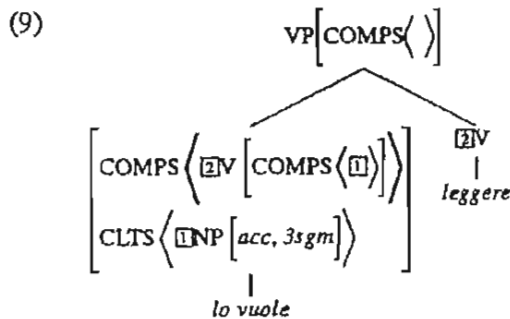This entry plays a role in those cases in which clitic climbing occurs. *Volere* is a subject control verb, there is thus a coindexation between the subject of the infinitival complement and that of the control verb, which is indicated by the tag $\boxed{4}$. It should be noticed that the notation $\oplus$ stands for the append relation while the tag $\boxed{5}$ indicates structure sharing between the elements in the COMPS list of the infinitival and that of the restructuring verb. This is the mechanism of argument composition which makes the complements of the embedded verb become complements of the restructuring verb. The condition CLTS *elist* ensures that argument composition occurs only if the embedded verb doesn't constitute a cliticized verb form.

The interaction of the Complement Cliticization Lexical Rule with the Argument Composition mechanism accounts for clitic climbing:

(2a)   Martina lo   vuole   leggere.
       Martina cl.(acc) wants to read

       'Martina wants to read it.'

The verb *vuole* subcategorizes for the verbal complement and for the arguments of the latter, as shown in the entry (8) above. The Complement Cliticization Lexical Rule can then apply to license cliticized verbs while the constraint in (4) is responsible for the phonological realization of the information contained in CLTS as the clitic *lo*. A flat structure is associated with example (2a), as illustrated here:

(9)

$$\text{VP}\begin{bmatrix}\text{COMPS}\langle\ \rangle\end{bmatrix}$$

$$\begin{bmatrix} \text{COMPS} \left\langle \boxed{2}\text{V} \begin{bmatrix} \text{COMPS}\langle\boxed{1}\rangle \end{bmatrix} \right\rangle \\ \text{CLTS} \left\langle \boxed{1}\text{NP} \begin{bmatrix} acc,\ 3sgm \end{bmatrix} \right\rangle \end{bmatrix} \qquad \begin{array}{c} \boxed{2}\text{V} \\ \mid \\ leggere \end{array}$$

$$\mid$$
$$lo\ vuole$$

An alternative lexical entry will be associated with the verb *volere*, one in which the verb sub-categorizes for a saturated VP (i.e. a VP with an empty COMPS list):

(10)
$$
\begin{bmatrix}
\textit{word} \\
\text{PHON} \mid \text{SKEL}\langle \textit{volere} \rangle \\
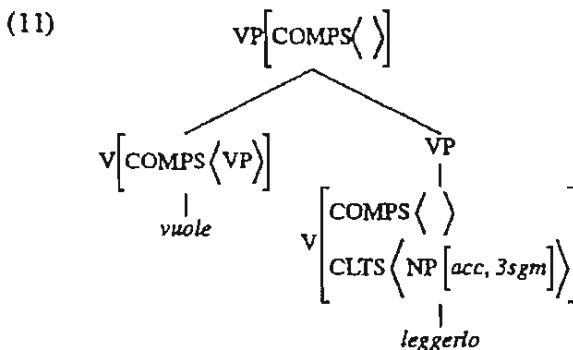\text{SS} \mid \text{L} \mid \text{C}
\begin{bmatrix}
\text{HEAD } \textit{verb} \\
\text{VAL}
\begin{bmatrix}
\text{SUBJ}\langle \boxed{1}\,\text{NP}_{\boxed{3}} \rangle \\
\text{COMPS}\langle \boxed{2}
\begin{bmatrix}
\textit{p-ss} \\
\text{HEAD } \textit{verb} \\
\text{VAL}
\begin{bmatrix}
\text{SUBJ}\langle \text{NP}_{\boxed{3}} \rangle \\
\text{COMPS } \textit{elist}
\end{bmatrix}
\end{bmatrix}
\rangle
\end{bmatrix} \\
\text{ARG-ST}\langle \boxed{1}\,\boxed{2} \rangle
\end{bmatrix}
\end{bmatrix}
$$
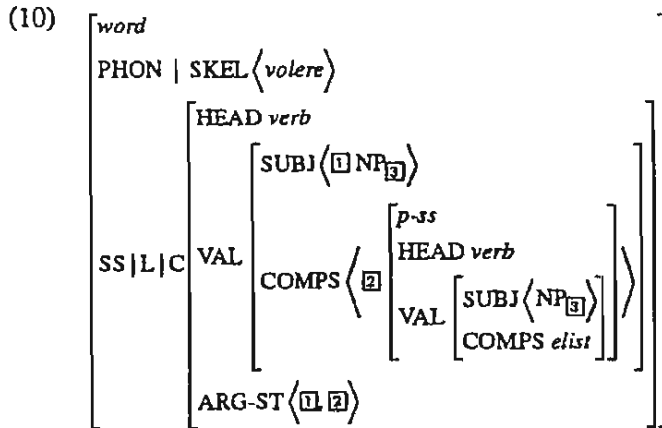
This entry plays a crucial role in the analysis of sentences like (2b), repeated below, in which the clitic doesn't climb:

(2b)   Martina vuole   leggerlo.
       Martina wants to read cl.(acc)

       'Martina wants to read it.'

The restructuring verb subcategorizes for the the VP headed by the cliticized verb form given in (5). In this case there will be a hierarchical structure like the following:

(11)
$$
\text{VP}\big[\text{COMPS}\langle\ \rangle\big]
$$

$$
\text{V}\big[\text{COMPS}\langle \text{VP} \rangle\big]
$$
|
vuole

$$
\text{VP}
$$
$$
\text{V}
\begin{bmatrix}
\text{COMPS}\langle\ \rangle \\
\text{CLTS}\langle \text{NP}\,[\textit{acc, 3sgm}] \rangle
\end{bmatrix}
$$
|
leggerlo

An advantage of the argument composition approach is that it is lexically constrained, therefore the mechanism is triggered only by restructuring verbs.[3]

5.   The Prosodic Representation of Restructuring Verbs

In the previous section, I have suggested that two syntactic structures should be asso-ciated with restructuring verbs: a flat one if clitic climbing occurs and a hierarchical one if

---

[3]Clitic climbing has several additional properties which, for reason of space, cannot be addressed here. I refer to Monachesi (1999) for a detailed discussion.

the clitic combines with the infinitival verb. The situation seems different at the prosodic level where it can be shown that the same representation can be assumed whether clitic climbing occurs or not. A crucial question which needs to be addressed in this respect concerns the kind of prosodic constituent that a restructuring verb and the infinitival one form. A possibility would be that they merge together in a Prosodic Word. This seems a reasonable assumption especially in those situations in which clitic climbing occurs, given that the two verbs form a complex one. However, on the basis of prosodic rules such as Intervocalic s-Voicing and Vowel Raising, which have the Prosodic Word as domain of application, it can be concluded that this is not the case. However, the most convincing evidence against such a proposal comes from the fact that adverbs can intervene between the two verbs. This is a possibility both if clitic climbing occurs (12a) or if it doesn't (12b):

(12)   a. Lo   voglio sicuramente leggere.
             cl. (acc) want to surely   read

    b. Voglio sicuramente leggerlo.
        want to surely   read cl.(acc)

      'I surely want to read it.'

Alternatively, one can assume that the two verbs combine in a Phonological Phrase (Φ). Evidence in favor of this hypothesis will be provided on the basis of the phonological rules of *Raddoppiamento Sintattico*, *Stress Retraction* and *Final Lengthening*. Nespor and Vogel (1986), have argued that these rules have the Phonological Phrase as domain of application.

    Raddoppiamento Sintattico (RS) is a rule which applies in central and southern varieties of Italian. Given a sequence of two words, the rule lengthens the initial consonant of the second word, if the first word ends in a stressed vowel:

(13)   a. Martina ha letto metà [l:]ibro.
        Martina has read half book

        'Martina has read half a book.'

    b. Martina ha letto due libri.
        'Martina has read two books'

As can be seen in (13a), the word *metà* ends in a stressed vowel and RS is triggered; this is not the case in (13b) where the word *due* doesn't end in a stressed vowel. A further condition for the application of RS is that the two words must belong to the same Phonological Phrase:

(14)   a. (Avrà [l:]etto)$_\Phi$ (il libro)$_\Phi$.
        'He will have read the book.'

    b. (Visita)$_\Phi$ (le città)$_\Phi$ // (molto vecchie)$_\Phi$
        'He visits very old cities.'

In example (14a) the two words *avrà* and *letto* belong to the same Φ and therefore RS applies. This is not the case in (14b) where *città* and *molto* belong to different Phonological Phrases. In this configuration, RS doesn't apply despite the fact that the triggering conditions are met. The

Paola Monachesi

double slashes indicate failure of RS. It should be noticed that RS is triggered in the combination of a restructuring verb with an infinitival:

(15) a. Lo   potrò [l:]eggere.
         cl.(acc) can   read
         'I will be able to read it.'

      b. Potrò [l:]eggerlo.
         can   read cl.(acc)

This fact can be used as evidence that the two verbs belong to the same Phonological Phrase.

Stress Retraction (SR) is a rule of northern Italian. Given a sequence of two words, if the first word ends in a primary stressed vowel and the second word has its primary stress on the first syllable, then the final stress of the first word is moved leftward to avoid stress clash. Also in this case, the rule applies if the two words belong to the same Phonological Phrase:

(16) a. (Martina)$_\Phi$ (ha mangiato)$_\Phi$ (metá tórta)$_\Phi$ → (méta tórta)
         'Martina has eaten half a cake'

      b. (La veritá)$_\Phi$ (salta fuori)$_\Phi$ quasi sempre → (*vérita)
         'The truth almost always comes out'

In (16a), the word *torta* is stressed on the first syllable. In order to avoid stress clash, the stress of the preceding word moves thus to the left. It should be noticed that SR can apply because the two words belong to the same Φ. This is not the case in (16b). The relevant words do not belong to the same Φ and SR doesn't apply even though the triggering conditions are met. In the combination of a restructuring verb with an infinitival, SR applies as shown in the example below:

(17) a. Lo   pòtro leggere.
         cl.(acc) can   read
         'I will be able to read it.'

      b. Pòtro leggerlo.
         can   read cl.(acc)

We have thus further support for the hypothesis that the two words belong to the same Phonological Phrase.

Final Lengthening (FL) is a phonological rule that lengthens the vowel bearing main stress in the phonological word which is final in a Phonological Phrase:

(18) a. Ho   mangiato (dei   pasticcini ripieni)$_\Phi$.
         have eaten   some donuts   filled
         'I have eaten some filled donuts.'

      b. Ho   mangiato (dei   pasticc[i:]ni)$_\Phi$ (ripieni)$_\Phi$ (di   cioccolata)$_\Phi$.
         have eaten   some donuts   filled   with chocolate
         'I have eaten some donuts filled with chocolate.'

In example (18b) the word *pasticcini* is final in a Φ and thus the vowel which bears main stress is lengthened. This is not the case in (18a) where the word is not final within a Φ. FL is triggered in the combination of a restructuring verb with an infinitival, showing thus that the two words belong to the same Φ:

(19) a. Lo   poteva l[e:]ggere.
          cl.(acc) can   read

          'I was able to read it.'

      b. Poteva l[e:]ggerlo.
          can   read cl.(acc)

The data presented in this section provide convincing evidence that the restructuring verb and its verbal complement form a Phonological Phrase. Furthermore, the behavior with respect to the prosodic rules considered is the same whether clitic climbing has applied or not. The examples discussed in this section show that the domain of application of the phonological rules considered cannot be defined in terms of syntactic constituents. It is thus necessary to assume appropriate phonological constituents and a way to map syntactic structure into prosodic structure, as argued at length in Nespor and Vogel (1986).

6.   The Syntax-Phonology Interface

Different algorithms have been proposed in the literature to deal with the fact that the domain of application of certain phonological rules is not isomorphic with a given syntactic constituent. In the following section, I will discuss the one proposed by Nespor and Vogel (1986) and the problems it faces when applied to restructuring verbs. Similar shortcomings are encountered by the end-based algorithm proposed by Selkirk (1986). A common feature of these approaches is that Φ-constituency is driven to a large extent by syntactic principles. This is not the case of the algorithm suggested in Ghini (1993) which will be adopted in order to map syntactic structure to prosodic structure in the case of restructuring verbs.

6.1   Nespor and Vogel 1986

Nespor and Vogel (1986) have proposed a two steps algorithm to derive phonological phrase constituency from syntactic constituency. Prosodic structure is derived from syntactic structure by a mapping rule which is supposed to be universal. Since there are languages in which phonological rules can optionally apply, the possibility of Φ restructuring is foreseen:[4]

1. Φ *domain*
   The domain of a Φ consists of a Clitic Group (C) which contains a lexical head (X) and all Cs on its nonrecursive side up to the C that contains another head outside of the maximal projection of X. Only V, N and A are considered lexical heads.

---

[4]As Nespor (1993) notices, the optional restructuring of Φ makes different predictions from the optional application of a given phonological rule. The former predicts that the restructured phrase constitutes the domain of application of all the phonological process which are appropriate for Φ. On the other hand, the latter predicts that a given rule is optional in the Φ domain, but other ones might not be.

Paola Monachesi

2. Φ *construction*
   Join into an n-ary branching Φ all Cs included in a string delimited by the definition of the domain of Φ.

3. Φ *restructuring* (optional)
   A nonbranching Φ which is the first complement of X on its recursive side is joined into the Φ that contains X.

It should be noticed that in Italian, the nonrecursive side is on the left of a head. Furthermore, in the formulation of Nespor and Vogel, a Clitic Group is assumed. However, in Monachesi (1995) I have provided evidence against the existence of this constituent in Italian, therefore Prosodic Words will be considered instead.

According to the algorithm, the restructuring verb and the infinitival complement form a Phonological Phrase in a clitic climbing configuration. In this case, we have a flat structure at the syntactic level and both lexical heads belong to the same maximal projection. Therefore, they will be merged in a Φ:[5]

(20) [[lo potrò]$_V$ [leggere]$_V$]$_{VP}$
      (lo potrò   leggere)$_\Phi$
      'I will be able to read it'

In the previous section, I have shown that both RS and SR apply in this configuration, the algorithm makes thus the right predictions.[6]

The situation is different if clitic climbing doesn't apply. Recall that in this case we have a hierarchical structure; the two heads belong to two different maximal projections and the algorithm predicts that each verb should form its own Φ. However, Φ-restructuring can apply since the verb *leggerlo* is the first complement of the restructuring verb on its recursive side (which is the side on the right of the head in Italian):

(21) [[potrò]$_V$ [leggerlo]$_{VP}$]$_{VP}$
      (potrò)$_\Phi$ (leggerlo)$_\Phi$ $\rightarrow$ (potrò leggerlo)$_\Phi$
      'I will be able to read it'

In this case, we expect both RS and SR to be optional, but this prediction is not borne out since both rules are obligatory.

Similar problems are encountered if two restructuring verbs are present. In this configuration, the clitic can attach to any of the verbs:

---

[5]In this and in the following examples, syntactic structure is represented by square brackets, while prosodic structure by parenthesis.

[6]For reasons of space, only the rules of RS and SR will be considered. Unlike FL, no measurements are necessary to verify their application.

(22) a. $[[\text{lo dovrà}]_V [\text{poter}]_V [\text{leggere}]_V]_{VP}$
(lo dovrà   poter   leggere)$_\Phi$

'He must be able to read it'

b. $[[\text{dovrà}]_V [\text{poterlo leggere}]_{VP}]_{VP}$
(dovrà)$_\Phi$ (poterlo leggere)$_\Phi$

c. $[[\text{dovrà}]_V [[\text{poter}]_V [\text{leggerlo}]_{VP}]_{VP}]_{VP}$
(dovrà)$_\Phi$ (poter)$_\Phi$ (leggerlo)$_\Phi$ →   (dovrà poter)$_\Phi$ (leggerlo)$_\Phi$

In example (22a), we have a flat structure at the syntactic level and the three verbs belong to the same maximal projection. The algorithm will map the three verbs into a Φ. On the other hand, in (22b), the rule of Φ-formation will group the last two verb in a Φ and the first verb in a separate Φ. Since the complement of *dovrà* is branching, restructuring cannot apply. Three different Phonological Phrases are created in (22c), but in this case the rule of restructuring can apply because the first complement is nonbranching. The parsings produced, however, do not account correctly for the data: RS applies equally in the three sentences, but the algorithm predicts no RS in the second one and optional RS in the third one. As for SR it doesn't apply in the following sentences, but the algorithm predicts that it should occur in the first one, while it shouldn't in the second one:[7]

(23) a. $[[\text{lo dovrà}]_V [\text{fare}]_V [\text{leggere}]_V]_{VP}$
(lo dovrà   fare   leggere)$_\Phi$

'He must make (him) read it'

b. $[[\text{dovrà}]_V [\text{farlo leggere}]_{VP}]_{VP}$
(dovrà)$_\Phi$ (farlo leggere)$_\Phi$

The algorithm proposed by Nespor and Vogel makes the right predictions with respect to the rule of RS if an adverb occurs between two restructuring verbs:

(24) a. $[[\text{lo dovrà}]_V [\text{proprio}]_{ADV} [\text{poter}]_V [\text{leggere}]_V]_{VP}$
(lo dovrà   proprio   poter   leggere)$_\Phi$

'He must really be able to read it'

b. $[[\text{dovrà}]_V [\text{proprio}]_{ADV} [\text{poterlo leggere}]_{VP}]_{VP}$
(dovrà   proprio)$_\Phi$ (poterlo leggere)$_\Phi$

c. $[[\text{dovrà}]_V [\text{proprio}]_{ADV} [[\text{poter}]_V [\text{leggerlo}]_{VP}]_{VP}]_{VP}$
(dovrà   proprio)$_\Phi$ (poter)$_\Phi$ (leggerlo)$_\Phi$

In this case RS is obligatory since the modal verb *dovrà* and the adverb merge in a Φ according to the mapping rule. However, we would also expect obligatory SR, but instead it is optional.

---

[7] The causative verb *fare* is present in this example because in order for SR to apply stress should fall on the first syllable of the second word. This is not the case for *potere* which occurs in the previous example since it has primary stress falling on the penultimate syllable. I assume, however, a syntactic representation of causative verbs similar to that of restructuring verbs.

Paola Monachesi

It seems thus that the mapping algorithm proposed by Nespor and Vogel (1986) is faced with serious problems when applied to the restructuring data under consideration. It fails even in the simplest cases exemplified by (20) and (21) since it is not able to predict that different syntactic structures should map into the same prosodic one.

6.2   Selkirk 1986 and Truckenbrodt 1998

Similar problems are encountered if the algorithm argued for by Selkirk (1986) is adopted. She proposed an end-based mapping rule according to which the relation between syntactic structure and prosodic structure can be accounted for by constraints on alignment. She suggested that for any constituent α in syntactic structure, its R or (L) edge coincides with the edge of a constituent of category β in prosodic structure. A reformulation of the algorithm, within current Optimality Theory, would be the following (cf. Selkirk (1995)):

(25)   *Align-XP,R*: Align (XP,R;P,R)
       'For each XP, there is a P, such that the right edge of XP coincides with the right edge of P.'

(26)   *Align-XP,L*: Align (XP,L;P,L)
       'For each XP, there is a P, such that the left edge of XP coincides with the left edge of P.'

In Italian, it is the constraint in (25) that should be adopted. If it is applied to the data presented in the previous section, it would merge in a Φ all the verbs present in a sentence. Whether we have a flat structure or a hierarchical structure, the VP which is aligned with the right edge of a Φ contains all the elements present. This result will make the correct predictions with respect to the application of RS, but not with respect to SR.

Truckenbrodt (1998) proposes that an additional constraint should be operative in the syntax-prosody mapping, which demands that each syntactic XP is contained in a Φ:

(27)   *Wrap-XP*: Each XP is contained in a Phonological Phrase.

It should be noticed, however, that in the examples under consideration, the presence of this additional constraint would not affect the predictions made by (25).

6.3   Ghini 1993

A common feature of the algorithms already discussed is that the mapping from syntactic structure to prosodic structure is mainly driven by syntactic principles. This is not the case of the algorithm suggested in Ghini (1993). Under this approach, syntax determines only the domain of Φ-formation which is delimited by the right edge of an XP. This first step incorporates thus the end-based mapping system proposed by Selkirk (1986). However, additional prosodic principles such as that of *uniformity and average weight, symmetry* and *increasing*

units determine the formation of Phonological Phrases within this domain. Φ-constituency is thus sensitive to notions of phonological weight, balance and symmetry:

1. Φ *domain formation*
   The domain of Φ formation is delimited by right-edge Xmax boundaries.

2. Φ *formation*
   Phonological words included in a string delimited by Φ domain formation are distributed according to the principles of:
   A. *uniformity and average weight*
   A string is ideally parsed into the same length of Φ's; the average weight of the Φ's depends on tempo: at an average rate of speech (moderato), a Φ contains two Prosodic Words (PW); the number of PWs within a Φ increases or decreases by one speeding up or slowing down the rate of speech .
   B. *symmetry*
   Strings are symmetrically parsed
   C. *increasing units*
   If strings with an odd number of primitive Φ are not symmetrically parsed according to (b), Φ on the recursive side are heavier than Φ on the nonrecursive side.

The algorithm makes the correct predictions if a restructuring verb and its complement are present and clitic climbing occurs:[8]

(28) $[[\text{lo potrò}]_V \, [\text{leggere}]_V]_{VP}$
      $<(\text{lo potrò} \quad \text{leggere})_\phi >$
      'I will be able to read it'

In this case, the whole VP constitutes the domain of Φ formation while the principle of *uniformity and average weight* ensures that both Prosodic Words are merged within a Φ. RS and SR should be thus obligatory and we have seen that this prediction is borne out. A similar correct result is obtained if clitic climbing doesn't occur:

(29) $[[\text{potrò}]_V \, [\text{leggerlo}]_{VP}]_{VP}$
      $<(\text{potrò} \quad \text{leggerlo})_\phi >$
      'I will be able to read it'

In the example above, the right edge of the VP determines the domain of Φ formation, therefore both verbs are grouped in a Φ according to principle A. The advantages of this algorithm, which is based on prosodic principles, are thus immediately evident. The same prosodic representation is assigned to the combination of a restructuring verb and the infinitival whether clitic climbing occurs or not, which is a desired result. Recall that a relation-based mapping system, such as that of Nespor and Vogel (1986), runs into problems with the examples above. This is because it relies on the syntactic notions of head and complements in the formulation of the mapping rules and not on phonological criteria.

---

[8]In this and in the following examples, angle brackets indicate the domain of Φ formation.

Paola Monachesi

If two restructuring verbs are present as in (30), the whole VP constitutes the domain within which Φs are built. The algorithm parses the first verb in a Φ while the other two verbs form a Φ of their own. This is obtained as result of the interaction of principle A, which requires that Phonological Phrases should contain two PWs and the principle of *increasing units* which states that in asymmetric structures, prosodic units on the right (the recursive side in Italian) are heavier than those on the left:

(30)   a.   [[lo dovrà]$_V$ [poter]$_V$ [leggere]$_V$]$_{VP}$
            <(lo dovrà)$_\Phi$ (poter   leggere)$_\Phi$ >
            'He must be able to read it'

       b.   [[dovrà]$_V$ [poterlo leggere]$_{VP}$]$_{VP}$
            <(dovrà)$_\Phi$ (poterlo leggere)$_\Phi$ >

       c.   [[dovrà]$_V$ [[poter]$_V$ [leggerlo]$_{VP}$]$_{VP}$]$_{VP}$
            <(dovrà)$_\Phi$ (poter   leggerlo)$_\Phi$ >

This parsing, however, predicts that the rule of RS shouldn't apply, since *dovrà* and *poter* belong to two different Φs, while it does. On the other hand, the correct result is obtained in the case of the rule of SR which doesn't apply and the division in Φs correctly accounts for it:

(31)   a.   [[lo dovrà]$_V$ [fare]$_V$ [leggere]$_V$]$_{VP}$
            <(lo dovrà)$_\Phi$ (fare   leggere)$_\Phi$ >
            'He must make (him) read it'

       b.   [[dovrà]$_V$ [farlo leggere]$_{VP}$]$_{VP}$
            <(dovrà)$_\Phi$ (farlo leggere)$_\Phi$ >

If an adverb is present, as well as two restructuring verbs, the algorithm allows two possible representations:

(32)   a.   [[lo dovrà]$_V$ [proprio]$_{ADV}$ [poter]$_V$ [leggere]$_V$]$_{VP}$
            <(lo dovrà   proprio)$_\Phi$ (poter   leggere)$_\Phi$ >
            <(lo dovrà)$_\Phi$ (proprio poter)$_\Phi$ (leggere)$_\Phi$ >
            'He must really be able to read it'

       b.   [[dovrà]$_V$ [proprio]$_{ADV}$ [poterlo leggere]$_{VP}$]$_{VP}$
            <(dovrà   proprio)$_\Phi$ (poterlo leggere)$_\Phi$ >
            <(dovrà)$_\Phi$ (proprio poterlo)$_\Phi$ (leggere)$_\Phi$ >

       c.   [[dovrà]$_V$ [proprio]$_{ADV}$ [[poter]$_V$ [leggerlo]$_{VP}$]$_{VP}$]$_{VP}$
            <(dovrà   proprio)$_\Phi$ (pote   leggerlo)$_\Phi$ >
            <(dovrà)$_\Phi$ (proprio poter)$_\Phi$ (leggerlo)$_\Phi$ >

The rule of Φ formation ensures that the whole VP constitutes the domain within which Φs should be identified. According to principle A, the string will be parsed in two Φ each containing two PWs. On the other hand, the principle of *symmetry* requires that the first and the last PWs constitute independent Φs while the remaining PW's are merged in a Φ. Two different representation are thus produced. Also in this case, the parsing makes the correct predictions

with respect to the rule of SR which is optional in this configuration, but not with respect to RS which should be obligatory.

It seems thus that the algorithm proposed by Ghini is more successful than the other ones I have discussed in accounting for the relevant data. However, the rule of Raddoppiamento Sintattico constitutes a problem for it. It could be the case that different types of RS should be distinguished as suggested by Esposito and Truckenbrodt (1998). They distinguish a *short RS* which applies across Φ when the triggering conditions are met and *long RS* which applies within a Φ. An experimental study is thus necessary to measure if the RS which occurs in (28) is the same as the one which occurs in (30).

7.   Conclusions

Restructuring verbs constitute an interesting test case for the syntax-prosody interface. I have shown that their syntactic properties can be adequately accounted for in terms of the lexical mechanism of argument composition. I have followed Rizzi (1982) in assuming that two different representations should be associate with restructuring verbs at the syntactic level. However, this is not the case at the prosodic level where the restructuring verb and the infinitival complement constitute individual prosodic words that merge into a Phonological Phrase. The same prosodic representation occurs whether there is clitic climbing or not. I have discussed different mapping algorithms which have been proposed in the literature to relate syntactic structure to prosodic structure. I have shown that the one proposed in Ghini (1993) is the most appropriate for the data considered. It still faces some problems with respect to the rule of *Raddoppiamento Sintattico* which might suggest that different types of RS might indeed exist.

References

Esposito, A. and H. Truckenbrodt (1998)"A note on Raddoppiamento Sintattico and the Phonological Phrase in Italian." IIASS and Rutgers University. Ms.

Ghini, M. (1993)"Phonological Phrase formation in Italian: a new proposal." In: *Toronto Working Papers* . University of Toronto

Hinrichs, E. and T. Nakazawa (1990)"Subcategorization and VP structure in German." In: Hughes, Shaun & Salmons (eds.) *Proceedings of the third symposium on Germanic linguistics*. Benjamins, Amsterdam

Miller, P. (1992)*Clitics and constituents in Phrase Structure Grammar*. Garland, New York

Miller, P. and I. Sag (1997)"French clitic movement without clitics or movement." Natural Language and Linguistic Theory 15.3:573–639

Monachesi, P. (1995)"On the status of the Clitic Group." *Paper presented at the 18th GLOW colloquium*, Trömso. (GLOW Newsletter 34:36-37)

Monachesi, P. (1996)"A grammar of Italian clitics." Tilburg University, PhD dissertation

292   Paola Monachesi

Monachesi, P. (1998)"The morphosyntax of Romanian cliticization." In: P. Coppen, H. Van Hal-
        teren and L. Teunissen (eds.) *Proceedings of Computational Linguistics in The Nether-
        lands 1997.* Rodopi, Amsterdam - Atlanta, pp. 99–118

Monachesi, P. (1999)*A lexical approach to Italian cliticization.* CSLI publications and Cam-
        bridge University Press, Stanford

Moortgat, M. (1988)*Categorial investigations: logical and linguistic aspects of the Lambek
        calculus.* Foris, Dordrecht

Nespor, M. (1993)*Fonologia.* Il Mulino, Bologna

Nespor, M. and I. Vogel (1986)*Prosodic phonology.* Foris, Dordrecht

Rizzi, L. (1982)*Issues in Italian syntax.* Foris, Dordrecht

Selkirk, E. (1986)"On derived domains in sentence phonology." *Phonology Yearbook*

Selkirk, E. (1995)"The Prosodic structure of function words." In: J. Beckman, L. W. Dickey
        and S. Urbanczyk (eds.) *Papers in Optimality Theory. University of Massachussetts
        Occasional Papers 18.* GLSA, Amherst, pp. 439–469

Truckenbrodt, H. (1998)"On the relation between syntactic phrases and phonological phrases."
        Rutgers University. Ms.

Paola Monachesi
Utrecht University
Uil-OTS
Trans 10
3512 JK Utrecht.
The Netherlands
Paola.Monachesi@let.uu.nl