Italian Troncamento: the syntax-prosody interface and eurythmic effects

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December 12, 2007

1 Introduction

In her 2005 paper, Meinschaefer investigates troncamento, a particular deletion rule in standard Italian. Troncamento involves deleting mid-vowels: word-final /e/ deletes when it follows a sonorant consonant. Word-final /o/ also deletes in some environments, but Meinschaefer restricts her focus to the cases with /e/. She analyzes this rule as applying only within the prosodic domain of the phonological phrase. According to the analysis, troncamento applies obligatory within the phrase, and fails to apply between phrases. In some environments troncamento appears to apply optionally. Meinschaefer argues that in these cases the rule applies obligatorily, but the phrasing can optionally restructure, giving the appearance of optional application of the rule.

We will follow this primary approach, with troncamento applying obligatorily within the phonological phrase. However, in this paper we will use a very different syntax-prosody interface, one which is much more restrictive than Meinschaefer's somewhat ad-hoc system. This approach is sketched out in Truckenbrodt 2007, whose analysis of Italian is in turn influenced by Ghini 1993.

2 Meinschaefer's Φ-formation algorithm

Meinschaefer provides the following algorithm for the creation of phonological phrases.

(1) Phonological phrase in Italian, Meinschaefer 2005 p. 9
   a. a phonological phrase consists of the lexical head of a maximal projection,
   b. including an element on its non-recursive side (i.e., on its left) that is contained within the domain of the maximal projection and that is not itself a maximal projection
   c. and a following non-branching constituent that is not itself a maximal projection.

After the phrases have been created, they can undergo an optional restructuring.

(2) Phonological phrase restructuring, Meinschaefer 2005 p. 10

a. A phonological phrase P1 can be joined with a phonological phrase P2 on its [right] if a lexical head X contained in P1 c-commands the XP corresponding to P2 and if P2 is prosodically non-branching. [Prosodic branching is defined as containing more than one prosodic word.]
b. Phonological phrase restructuring is directional. In Italian, it applies from right to left.

This algorithm may provide the correct phrasing for troncamento, but it is complicated and unwieldy. In particular, it is formalized in such a way that there are no inherent restrictions on the mapping between syntax and prosody. If we adopted such an algorithm for phrase creation and restructuring, we would be implicitly assuming that the syntax-prosody mapping system has reference to all these notions (c-command, non-recursive sides, branchingness, containment, directionality, etc.). It would be advantageous to have a restricted formalism for the mapping between syntax and prosody, especially if we wish to argue, as many have, that the mapping system does not have the same descriptive power as the syntax or phonology proper.

We will try to derive the same effect using a small number of Optimality Theoretic constraints. These constraints have limited power when compared to the syntax proper, which allows us to claim that the mapping system only focuses on some aspects of the syntactic structure. Moreover, we can see the interaction between mapping constraints and constraints on prosody. In Meinschaefer's algorithms, the roles of mapping principles and those of prosodic principles are conflated.

3 Truckenbrodt's analysis of Italian

Truckenbrodt compares the following two Italian sentences. (3) has an AP with two prosodic words, while the AP in (4) only has one.

(3)

		[	[		]$_{AP}$]$_{NP}$	...		
(Le	citta)$_\Phi$	(molto	nordiche)$_\Phi$			(non	mi	piacciono)$_\Phi$
the	city	very	Nordic			not	me	please

'I don't like very Nordic cities.'

(4)

	[	[	]$_{AP}$]$_{NP}$	...		
(Le	citta	nordiche)$_\Phi$		(non	mi	piacciono)$_\Phi$
the	city	Nordic		not	me	please

'I don't like Nordic cities.'

To account for the Italian phrasing pattern in general, and these two examples in particular, Truckenbrodt uses three constraints: Align-XP,R, Wrap-XP, and BinMax. The constraint formulations are taken directly from Truckenbrodt (2007).

(5) **Align-XP,R**: Align(XP, R, Φ, R)
The right edge of each syntactic [lexical] XP is aligned with the right edge of a phonological phrase

(6) **Wrap-XP**: For each [lexical] XP there must be a phonological phrase that contains the XP.

(7) **BinMax**: Phonological phrases consist of maximally two prosodic words

BinMax is similar to Meinschaefer's caveat that phrase restructuring (in (2)) can only take place if the right phrase in prosodically non-branching (in other words, containing one prosodic word). In Truckenbrodt's approach, BinMax is a eurythmic constraint, while Align-XP,R and Wrap-XP are both mapping constraints, each motivated by independent principles. The constraints involved in mapping are unconcerned with the weight of each element, but the effects fall out of the interaction between the mapping constraints and BinMax.

To be sure, the mapping constraints in (5) and (6) have some of the same computational power as Meinschaefer's algorithms, in that they know which elements are contained in which syntactic phrases, they know what the maximal projections are, and so on. I don't know how to formally compare the two approaches in terms of the precise amount of knowledge they have about the syntax, but it appears that using only Alignment and Wrap constraints makes the syntax-prosody mapping system as weak as possible. It could be that the phrase creation and restructuring algorithms know the same as Align-XP,R and Wrap-XP, but on the surface it seems that Meinschaefer's algorithms are far too powerful.

Moreover, the two mapping constraints are motivated independently and cross-linguistically. Any additional mapping constraint would need corroborating evidence before being accepted as a proper mapping constraint at face value. Such a restriction is not possible with Meinschaefer's algorithms, where we could add on extra caveats and addenda without a formal penalty.

Returning to the sentences in (3) and (4), we see how BinMax and Wrap-XP work together to provide the correct form in tableau (8). The phrasing in (a) is bad because it has a phrase with more than two prosodic words, and (c) is bad because both the NP and the AP fail to be wrapped in a phrase. This suggests that the ranking is BinMax >> Wrap-XP. Truckenbrodt assumes Align-XP,R is undominated, resulting in the ranking shown in the tableau.

(8)

Le [citta [molto nordiche]$_{AP}$]$_{NP}$		Align-XP,R	BinMax	Wrap-XP
a.	(Le citta$_\omega$ molto$_\omega$ nordiche$_\omega$)$_\Phi$		*!	
b. ☞	(Le citta$_\omega$)$_\Phi$ (molto$_\omega$ nordiche$_\omega$)$_\Phi$			$*_{NP}$
c.	(Le citta$_\omega$ molto$_\omega$)$_\Phi$ (nordiche$_\omega$)$_\Phi$			$*_{NP}*_{AP}$!

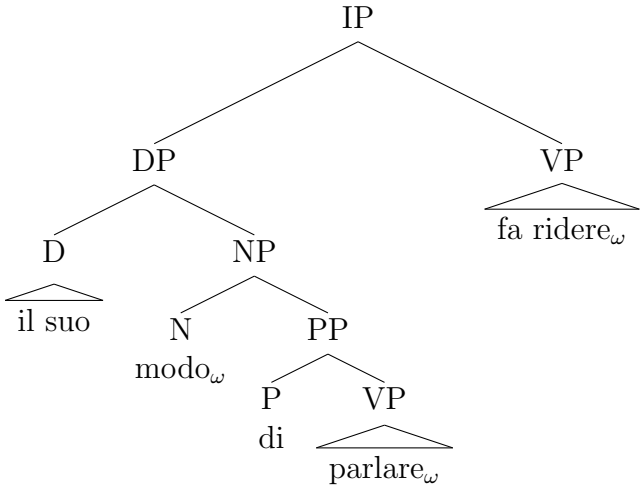
When the AP is only one prosodic word, then the entire DP can be a phrase: (le citta nordiche)$_\Phi$. This satisfies Align-XP,R because both the NP and the AP have a right phrase boundary at their right edges. BinMax is satisfied because the phrase is only two words, and Wrap-XP is satisfied because the NP and AP are in a phrase.

4 Troncamento

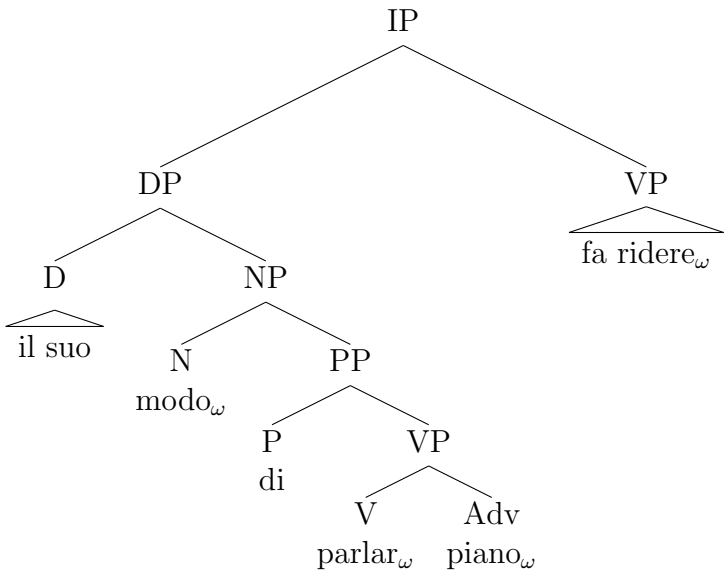
4.1 Parlar piano vs. parlare fa ridere

Meinschaefer gives the following example sentences to demonstrate her phrasing construction and restructuring algorithms.

(9) Il suo modo di parlare fa ridere.
'His way of speaking makes one laugh'



(10) Il suo modo di parlar piano fa ridere.
'His way of speaking low makes one laugh'



In (9), the verb *parlare* is followed by a VP *fa ridere*. This following constituent is a maximal projection, so it cannot be included in the original phrase for *parlare*. Moreover, there can be no restructuring to include *fa ridere* in the phrase, because *parlare* does not c-command *fa ridere*.

In (10), on the other hand, the following adverb is not a maximal projection, so it is phrased with *parlare* by the construction algorithm. This means that troncamento should be obligatory in this situation, and Meinschaefer's prediction is confirmed. The verb is *parlar*, without the final [e].

(11) *Il suo modo di parlare piano fa ridere.

We can achieve similar results with Truckenbrodt's analysis. For example (9) without the adverb, we get the following tableau.

(12)

	Il suo modo di parlare fa ridere	Al-XP,R	BinMax	Wrap-XP
a. ☞	(Il suo modo$_\omega$ di parlare$_\omega$) (fa ridere$_\omega$)			
b.	(Il suo modo$_\omega$) (di parlar$_\omega$ fa ridere$_\omega$)	$*_{NP}!*_{VP}$		$*_{NP}$
c.	(Il suo modo$_\omega$ di parlar$_\omega$ fa ridere$_\omega$)	$*_{NP}!*_{VP}$	*	
d.	(Il suo modo$_\omega$) (di parlare$_\omega$) (fa ridere$_\omega$)			$*_{NP}!$

Align-XP,R does most of the work, eliminating (b) and (c) because they do not have right phrase boundaries at the right edges of NP/VP (i.e. at the right edge of *parlare*). Wrap-XP prevents the phrasing where all prosodic words get their own phrases (d) because then the NP *modo di parlare* is not contained in a phrase. This leaves (a) as the winning candidate. Because there is a phonological phrase break between *parlare* and *fa ridere*, the final /e/ of *parlare* successfully avoids troncamento.

When the adverb is added, as in (10), Truckenbrodt's analysis correctly predicts troncamento. We are assuming a high-ranking NoRecursion constraint.

(13)

	Il suo modo di parlare piano fa ridere	Al-XP,R	BinMax	Wrap-XP
a. ☞	(Il suo modo$_\omega$) (di parlar$_\omega$ piano$_\omega$) (fa ridere$_\omega$)			$*_{NP}$
b.	(Il suo modo$_\omega$ di parlare$_\omega$) (piano$_\omega$) (fa ridere$_\omega$)			$*_{NP}*_{VP}!$
c.	(Il suo modo$_\omega$ di parlar$_\omega$ piano$_\omega$) (fa ridere$_\omega$)		*!	
d.	(Il suo modo$_\omega$ di parlar$_\omega$ piano$_\omega$ fa ridere$_\omega$)	$*_{NP}!*_{VP}$	*	

Align-XP,R forces a phrase break at the end of *piano*, ruling out (d). BinMax outranks Wrap-XP, so the entire NP (which consists of three prosodic words) cannot be in one single phrase, as in (c). The only option is to break up the NP into two phrases, and Wrap-XP favors the one where *parlar piano* is phrased together. This gives us troncamento in this case, while preventing troncamento with (9). Our predictions match those of Meinschaefer.

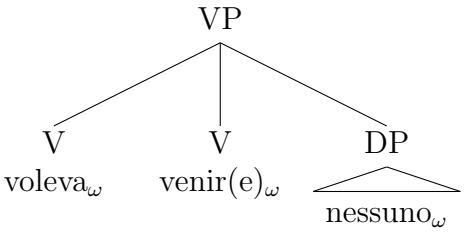
4.2 V + V + DP: optional troncamento if the DP is light only

Meinschaefer gives an example of troncamento that relies on the number of phonological words in a particular phrase. When we have constructions with a double-verb followed by a VP-internal subject, troncamento applies optionally if the subject is light (one prosodic word), and does not apply at all if the subject is heavy (two prosodic words). According to the phonological phrase creation algorithm, regardless of the weight of the subject, the verbs are in one phrase and the subject is in another phrase. Under Meinschaefer's account, optional restructuring will allow the whole VP to be one phrase only when the subject is

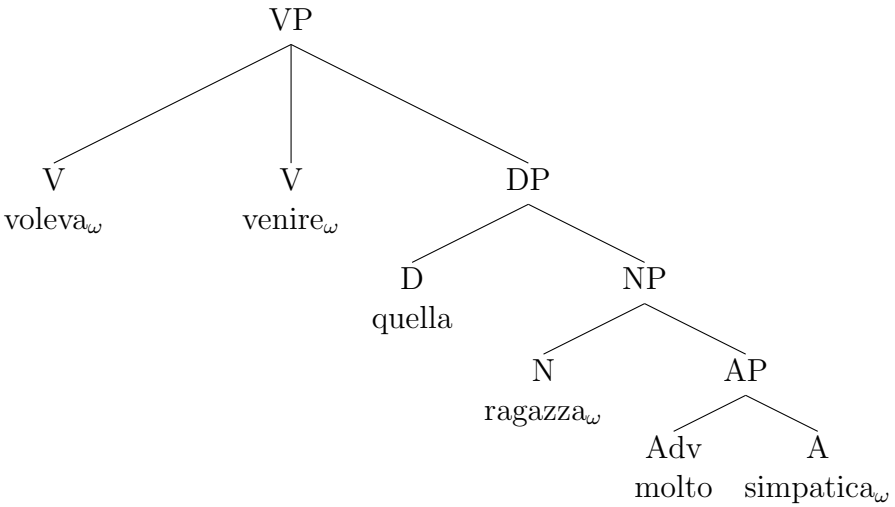
light, resulting in troncamento. Otherwise, restructuring is not allowed, and troncamento does not occur.

A pair of examples is given below, where troncamento can apply only in (14).

(14) Non voleva venir(e) nesuno.
'No one wanted to come.' (light DP, optional troncamento)



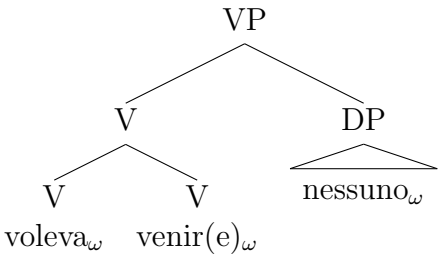
(15) Non voleva venir**e** quella ragazza molto simpatica.
'That very friendly girl did not want to come.' (heavy DP, troncamento forbidden)



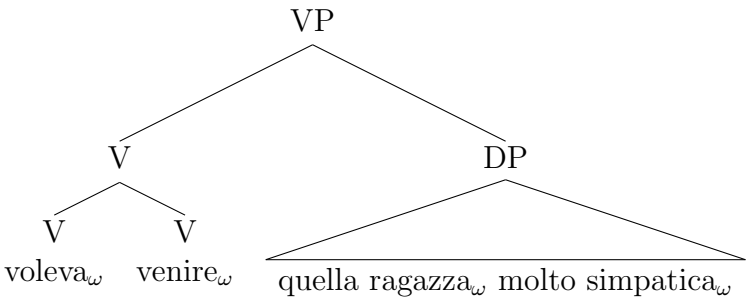
The structures could be as given above (attributed to Abeillé & Godard 2003), with both verbs as sisters to the subject DP. An alternative syntactic structure would have the two verbs dominated by V^0 (attributed to Rizzi 1978).

(16) Structure with verbs incorporated in V^0

a.



b.



Either syntactic structure is compatible with our analysis. The crucial point, which both analyses share, is that there is only one VP. As long as there is only one VP, Wrap-XP will not try to phrase one of the verbs with the subject to the exclusion of the other verb.

When the subject DP is one prosodic word, as in (14) (or alternatively (16-a)), there are two possible prosodic structures that satisfy Align-XP,R and BinMax, while minimally violating Wrap-XP. Wrap-XP will never be fully satisfied, because the VP consists of three prosodic words, and satisfying Wrap-XP will violate the more highly-ranked BinMax. The tableau below demonstrates this.

(17)

Non volera venire nessuno	Align-XP,R	BinMax	Wrap-XP
a. ☞ (Non volera$_\omega$) (venir$_\omega$ nessuno$_\omega$)			$*_{VP}$
b. ☞ (Non volera$_\omega$ venire$_\omega$) (nessuno$_\omega$)			$*_{VP}$
c. (Non volera$_\omega$ venir$_\omega$ nessuno$_\omega$)		*!	

The phrasing in (a) requires troncamento, because *venire* has the word *nessuno* following within the phonological phrase. On the other hand, the other optimal candidate (b) forbids troncamento. The fact that there are two optimal candidates could be the cause of the optionality. Under this proposal, there is variation with troncamento because either of the two structures can be chosen by the grammar of Italian.

Such a proposal is tempting, but it is not in keeping with other tenets of Optimality Theory. In particular, we would expect that some constraint ranked lower than Align-XP,R, BinMax, and Wrap-XP would decide between (a) and (b). Because (a) and (b) are not identical in terms of violations assigned by all the low-ranking constraints in Italian, one of them should be favored over the other. However, we could still get variation if two of those low-ranking constraints switched rankings between each other. In other words, Constraint X favors candidate (a), and Constraint Y favors (b), and they can freely flip-flop, giving us the optionality of troncamento in this case.

Assuming this model of optionality, we propose two new constraints, ranked below Wrap-XP. These are given in (18) and (19).

(18) **Align-XP,L**: Align(XP, L, Φ, L)
The left edge of each syntactic [lexical] XP is aligned with the left edge of a phonological phrase

(19) **IncreasingUnits**:
Phonological phrases must not decrease in the number of prosodic words contained, going left to right.

Ghini 1993 uses the principle of increasing units in his analysis of Italian phrasing, and this principle proves useful in comparing candidates (17) (a) and (b). Candidate (b) violates IncreasingUnits because the first phrase contains two prosodic words, and the second phrase only contains one. Candidate (a), however, satisfies IncreasingUnits by having the second phrase be larger than the first.

Align-XP,L is simply the left-edge equivalent of Align-XP,R. This constraint is violated by the phrasing in (17) (a), as long as we view the left edge of *nessuno* as the left edge of a lexical XP. If we could say there is some aspect of lexical NP-ness to *nessuno*, then putting *nessuno* at the left edge of a phrase would satisfy Align-XP,L. This means candidate (a) would violate Align-XP,L, because *nessuno* does not begin a new phonological phrase.

We also need Align-XP,L to help with DPs that have overt determiners, and PPs with overt non-lexical prepositions. To shoehorn this into our analysis, we would need to either take Align-XP,L to be somehow gradient, or we would need to say something about function words cliticizing, and clitics not entering into the calculation of Align-XP. This would be somewhat difficult to formulate, but not entirely impossible.

Whatever the case may be, we need some constraint to be violated in (a) but not in (b), as the counterpart of IncreasingUnits. Whenever the three primary constraints (Align-XP,R, BinMax, and Wrap-XP) cannot decide on a single form, there is the possibility of optional troncamento due to re-ranking of IncreasingUnits and Align-XP,L. If the three primary constraints can decide on a single optimal form, then troncamento is either obligatory or forbidden, but never optional.

(20) Troncamento optional: variable ranking between IncreasingUnits and Align-XP,L

Non volera venire nessuno	Al-R	BinMax	Wrap	IncrUnits	Al-L
a. ☞ (Non volera$_\omega$) (venir$_\omega$ nessuno$_\omega$)			$*_{VP}$		$*_{NP}$
b. ☞ (Non volera$_\omega$ venire$_\omega$) (nessuno$_\omega$)			$*_{VP}$	*	
c. (Non volera$_\omega$ venir$_\omega$ nessuno$_\omega$)		*!			$*_{NP}$

Returning to the double-verb construction, when the subject DP is heavy, only one structure is optimal. This structure prevents application of troncamento, and there is no optionality, as seen in tableau (21). IncreasingUnits and Align-XP,L don't come in to play at all, because the three primary constraints decide on (a) alone as the optimal candidate.

(21) Troncamento forbidden: Non voleva venire quella ragazza molto simpatica

Non voleva venire quella ragazza molto simpatica	Al-R	BinMax	Wrap-XP
a. ☞ (Non voleva$_\omega$ venire$_\omega$) (quella ragazza$_\omega$ molto simpatica$_\omega$)			$*_{VP}$
b. (Non voleva$_\omega$) (venir$_\omega$ quella ragazza$_\omega$) (molto simpatica$_\omega$)			$*_{VP}*_{NP}$!
c. (Non voleva$_\omega$ venire$_\omega$) (quella ragazza$_\omega$) (molto simpatica$_\omega$)			$*_{VP}*_{NP}$!

Our theory is dependent on Wrap-XP, which is a somewhat more global constraint. It is global in that the phrasing of something high in the syntactic tree might impact the phrasing of a low element, and vice versa, as long as the end result is the highest number of XPs wrapped. That means our theory might break down when the NP consists of three

prosodic words, not just two. Meinschaefer does not provide an example of such a sentence, but it might include a double-verb, a noun (one prosodic word), and an AP that is two prosodic words long. An example like this is sketched (22). The second prosodic word provides the environment for possible application of troncamento, and this is represented as *-e*.

(22) $[\omega\ \omega\text{-e}\ [\omega\ [\omega\ \omega]_{AP}\ ]_{NP}\ ]_{VP}$

Meinschaefer 2005 would predict that troncamento would fail to apply in this case, because the material following the double-verb is prosodically branching (more than one prosodic word). Using Truckenbrodt's constraints, and the two new low-ranked constraints, we also predict that troncamento cannot apply.

(23) Troncamento forbidden in $[\omega\ \omega\text{-e}\ [\omega\ [\omega\ \omega]_{AP}\ ]_{NP}\ ]_{VP}$

$[\omega\ \omega\text{-e}\ [\omega\ [\omega\ \omega]_{AP}\ ]_{NP}\ ]_{VP}$	Align-XP,R	BinMax	Wrap-XP	IncrUnits	Align-XP,L
a. ☞ $(\omega)\ (\omega\text{-e})\ (\omega)\ (\omega\ \omega)$			$*_{VP}*_{NP}$		
b. $(\omega\ \omega\text{-e})\ (\omega)\ (\omega\ \omega)$			$*_{VP}*_{NP}$	*!	
c. $(\omega)\ (\omega\ \omega)\ (\omega\ \omega)$			$*_{VP}*_{NP}$		$*_{AP}$!

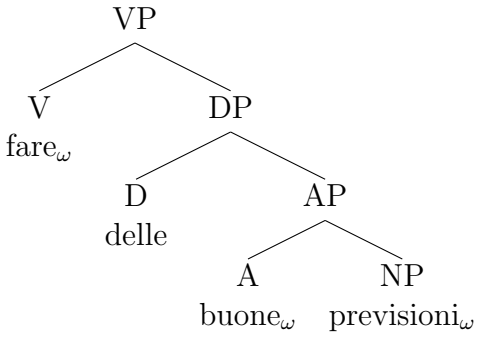
So far, Truckenbrodt's analysis, with the addition of a few low-ranking constraints, has provided the same results as Meinschaefer's analysis for V + V + subject DPs. Because the syntax is relatively similar, this OT account also works the same for V + V + PP, and V + V + any type of DP. The following section shows that optional troncamento might need a different account for single-verb constructions, departing from Meinschaefer's unified analysis of optional troncamento in that environment.

4.3 Single V + DP: an extension to our analysis

In addition to double-verb constructions, Meinschaefer takes a look at examples with single verbs + DP objects. She analyzes these constructions in the exact same way as the double-verb examples, and so the predictions are the same—light objects will have optional troncamento, and heavy objects will prevent troncamento.

Our analysis of V + V + DP constructions crucially relied on the fact that there were two prosodic words in the VP before the DP. With only one verb, we have different predictions. For heavy object DPs, our analysis agrees with Meinschaefer's.

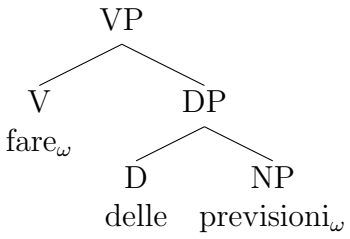
(24)



For (24), the phrasing is (fare$_\omega$) (delle buone$_\omega$ previsioni$_\omega$), satisfying BinMax and Wrap-XP for the AP.

Our analysis is different than Meinschaefer's when it comes to light objects: we predict troncamento to **obligatorily** apply.

(25)



In the example above, the only optimal phrasing is (far$_\omega$ delle previsioni$_\omega$). This phrasing satisfies Align-XP,R, BinMax, and Wrap-XP perfectly. Because this is decided by our three primary constraints, we predict there to be no optionality, with troncamento applying all the time. If we would like our formalism to capture the optional application of troncamento, we will need some other system to create a phrase boundary between *fare* and *delle previsioni*.

One way to do this is to optionally 'upgrade' a prosodic word into a phrase. Utilizing such an option would give us (fare$_\omega$) (delle previsioni$_\omega$), correctly avoiding troncamento. The key is to prevent this optional 'upgrading' from targeting the adverb *piano* in *parlar piano* from (10), because Meinschaefer describes this as a place where troncamento obligatorily occurs. One way to get around this is to only allow lexical XPs to upgrade to phrases. This would allow *delle previsioni*, the prosodic word associated with an NP, to upgrade to a phrase, but not *piano*, which is not a full lexical XP. Thus, our previous analyses are safe, and we can still account for the optionality in V + object DP constructions.

If we accept this optional upgrading, then double-verb constructions may have two sources of variability: the re-ranking of IncreasingUnits and Align-XP,L, and the optional upgrading of the object DP. If *nessuno* in (14) can upgrade to a phonological phrase, then all we need for an analysis consistent with the facts is for a candidate like (non volera$_\omega$) (venir$_\omega$ nessuno$_\omega$) to be the winner before the effects of upgrading are taken into account. Optional upgrading of *nessuno* would provide (Non volera$_\omega$) (venire$_\omega$) (nessuno$_\omega$) or (Non volera$_\omega$ venire$_\omega$) (nessuno$_\omega$), both of which prevent troncamento. It is possible that both principles are necessary, but there is no evidence here that the previously outlined re-ranking analysis is strictly necessary. Even so, that analysis of optionality came almost directly from Truckenbrodt's constraints and rankings, with the addition of a few principles from Ghini 1993. There is no need to dismiss the re-ranking analysis out of hand.

5 Conclusion

This paper has provided an analysis of troncamento that appears to be superior to Meinschaefer 2005, at least in terms of grammar architecture. By formulating the system in Optimality Theory, there can be a clear distinction between syntax-prosody mapping constraints and eurithmicity constraints, and the different constraints interact in predictable ways due to their ranking. By making these two types of constraints distinct, we can make the stronger claim that eurithmicity is not part of the syntax-prosody mapping system at

all—it's part of the phonology. The mapping system can also be weak in that it only has knowledge of a subset of the principles involved in syntax. Therefore, the mapping system has only partial access to the syntax proper and the phonology proper, and there doesn't appear to be an argument for making it more powerful, at least not for Italian.

On the other hand, our analysis is an affirmation of Meinschaefer's general approach: that troncamento is an obligatory, phonological phrase-internal process. The constraints we used were not hand-picked to make troncamento work—Truckenbrodt 2007 does not even mention troncamento. He calls upon these constraints to account for Italian phrasing in general, and yet they work very well for troncamento. This provides evidence that troncamento is strongly tied to the phonological phrase.

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