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*On the prosody and syntax of DPs: Evidence from Italian noun adjective sequences**

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Abstract

The opposition between N- and NP-raising is central to the debate about the representation of DPs, yet it often eludes syntactic testing. The two hypotheses are however distinguished by the prosodic phrasing they predict. This paper presents the results of an experiment designed to test the prosodic phrasing of Italian N-A and A-N sequences as signaled by the lengthening effects induced by prosodic boundaries. We show that A and N share the same phonological phrase and that under all models of syntax prosody mapping the attested phrasing requires N-raising. Finally, we propose an analysis reconciling N-raising with Cinque's recent evidence for DP-internal phrasal movement.

1 Introduction

The last fifteen years have seen a still on-going debate about the internal syntactic representation of DPs with a particular focus on Romance N-A sequences. Since Cinque's seminal 1994 study identifying A-N as the base generated order for both Romance and Germanic languages, two main hypotheses have emerged to explain the mirror N-A order found in Romance. The N-raising hypothesis maintains that N raises as a head to the left of a preceding AP projection (see among others Sproat and Shih 1990; Crisma 1991; Valois 1991; Bernstein 1991, 1993; Cinque 1994; Zamparelli 1995; Longobardi 1994, 2001, 2005; Kishimoto 2000; Rutkowski and Progovac 2006; Willis 2006; Pereltsvaig 2006; Airtiagoitia 2006). The NP-raising hypothesis instead proposes that what moves is the entire NP (e.g., Bhattacharya 1998; Laenzlinger 2000; Alexiadiaou 2001; Shlonsky 2004; Knittel 2005; Cinque 2005, 2006). Within a structure à la Cinque (2005) where AP occurs in the specifier

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of a functional projection FP dominated by an agreement phrase as shown in (1), the N-raising analysis requires N moving into Agr° through F° as shown in (2), whereas the NP-raising alternative moves NP into SpecAgrP as shown in (3).

(1) Base-generated structure: $[_{AgrP}\ Agr^{o}\ [_{FP}\ AP\ F^{o}\ [_{NP}\ N\ ]]]$

(2) N-raising: $[_{AgrP}\ N_i\ [_{FP}\ AP\ t_i\ [_{NP}\ t_i\ ]]]$

(3) NP-raising: $[_{AgrP}\ NP_i\ Agr^{o}\ [_{FP}\ AP\ F^{o}\ t_i\ ]]$

The two alternative hypotheses are notoriously difficult to tell apart by syntactic tests alone. They are however neatly distinguished by the prosodic phrasing they predict. As we will discuss in detail, all current major models of the syntax-prosody mapping –e.g. Nespor and Vogel (1986), Selkirk (1986, 2000), Ghini (1993), Truckenbrodt (1995, 1999)– predict that an N-A sequence will be parsed into a single shared phonological phrase like (4a) under N-raising, whereas it would require two distinct phrases as shown in (4b) under NP-raising.

(4) a. $(\ N_i\ AP\ )_{pp}$

b. $(\ NP_i\ )_{pp}\ (\ AP\ )_{pp}$

In this paper we present the results of an experimental reading study testing the prosodic phrasing of these sequences, thus aiming at resolving the opposition in (4). As a robust prosodic cue, the experiment tested syllabic and word lengthening induced by phonological phrase boundaries (Nespor and Vogel 1986; Beckman and Edwards 1987, 1990, 1991; Hayes 1988; Wightman et al. 1992; Ghini 1993; Cruttenden 1997; Post 2000; Vaissière 1983; among others). It uncovered a statistically highly significant lengthening of the second word of A-N and N-A sequences in its entirety, and of its final and lexically stressed syllables (shown in bold in (5) below). These results show that adjective and noun are wrapped in a single phonological phrase (pp) independently of their order, as symbolized by the round parentheses in the examples in (5).

(5) a. (pre.la.to po.**ten**.**te**)$_{pp}$
prelate powerful

b. (po.ten.te pre.**la**.**to**)$_{pp}$
powerful prelate

Our experimental results provide strong independent support for the N-raising hypothesis and the corresponding syntactic representation in (2) above. Yet this outcome may at first appear surprising, since it is at odds with convincing arguments against generalized N-raising and in support of DP-internal phrasal movement in Cinque (2005, 2006). As we show in the second part of this study, closer examination of the syntax of N-raising reveals that it is limited to the closest AgrP and that any further raising of the noun requires pipe-piping of the entire AgrP consistently with Cinque's empirical and theoretical results. Head and phrase raising co-exist, but target distinct syntactic categories within DP.

The implications of the prosodic phrasing attested in our experiment also extend to the analysis of Italian overt subjects, which will be shown to occur in a higher projection than the one hosting raised finite verbs, thus converging with the results in Barbosa (1995), Alexiadou and Anagnostopoulou (1998), Rizzi (2004), Cardinaletti (2004), Frascarelli (to appear). On the prosodic side, we will show that only Truckenbrodt's (1995, 1999) model can consistently extend the syntax-prosody mapping found for N-A sequences to A-N sequences as well.

We start in section 2 with a description of the experiment and its results relative to the prosodic phrasing of A-N and N-A sequences. The syntactic implications of this prosodic phrasing are discussed in section 3, where we show how current models of syntax-prosody mapping require an N-raising representation of A-N and N-A sequences as well as a higher syntactic position than normally assumed for Italian overt subjects. Finally in section 4 we examine Cinque's arguments against generalized N-raising, first showing that they do not exclude local N-raising of the kind advocated in this paper and then arguing for an analysis where N-raising and phrasal raising of functional projection à la Cinque co-exist, with their application governed by the principles responsible for movement locality proposed in Cinque (2005, 2006).

2 The prosodic phrasing of Italian A-N and N-A sequences: an experimental study

The experiment described in this section was designed to test the prosodic phrasing of Italian N-A and A-N sequences. To this end, we investigated domain-final lengthening effects, which have been established as a robust cue to prosodic boundaries in much previous research. As Vaissière (1983, p. 61) points out, there are four kinds of lengthening phenomena that mark the right boundary of a word or phrase: (i) lengthening of the very last syllable of a word or phrase, (ii) lengthening of the last stressed syllable in a phrase, (iii) lengthening of the entire last word in a phrase, and (iv) lengthening of the last sentence in a read paragraph. The first three kinds of lengthening are relevant to our study and were tested for Italian A-N/N-A

sequences. As for the first (lengthening of the very last syllable of a prosodic domain), Cruttenden (1997, p. 33) points out that it is a productive prosodic process attested in most languages and likely to constitute a universal property of prosodic phrasing (see also Hayes 1988; Wightman et al. 1992; Beckman and Edwards 1987, 1991; Post 2000). The syllable immediately preceding a prosodic boundary is lengthened regardless of whether it carries the lexical stress of the word (Cruttenden 1997, p. 33; Beckman and Edwards 1987, 1990, 1991). This is illustrated in (6) where the final syllable of a hypothetical three-syllabic word is lengthened due to the phonological-phrase boundary immediately following it; the affected syllable is shown in bold.

(6) Pre-boundary lengthening: … σ.σ.σ́.σ σ.σ́.**σ:**)$_{pp}$ (σ.σ́.σ …

The second lengthening process affects the syllable carrying lexical stress in the word immediately preceding the prosodic boundary. For example, a three-syllable word with penultimate lexical stress like the one in (7) below would have its penultimate syllable (in bold) further lengthened due to the following boundary. Lengthening in this case is arguably caused by the prosodic head of the pp, which in Italian always falls on the rightmost word of the pp, thus adding additional prosodic prominence to its stressed syllable (Selkirk 1984, 1986, 1995, 2000, 2004; Hammond 1984; Halle and Vergnaud 1987; Edwards and Beckman 1988; Hayes 1995; Truckenbrodt 1995). An Italian example from Ghini (1993) showing vocalic lengthening in the stressed syllables of the pp-final words is provided in (8).

(7) Stressed-syllable lengthening: … σ.σ.σ́.σ σ.**σ́:**.σ)$_{pp}$ (σ.σ́.σ …

(8) (i ca.ri.bú n[a:].ni)$_{pp}$ (sono es.t[i:]n.ti)$_{pp}$
the caribous dwarf are extinct
'Dwarf caribou have been extinguished'

Finally, the last word of a prosodic domain has also been observed to lengthen (Umeda and Quinn 1981; Hellmuth, to appear). For Italian, Nespor and Vogel (1986, p. 176) observe that pp-boundaries induce lengthening of the domain-final word, an effect possibly simply measuring the cumulative effect of the two lengthening processes introduced above. For example, they note how the word 'pasticcini' is longer when it occurs pp-finally in (9b) than when occurring pp-internally as in (9a).

(9) a. Ho mangiato (dei pasticcini ripieni)$_{pp}$
(I) have eaten some donuts filled
'I have eaten some filled donuts'

b. Ho mangiato (dei pasticcini)$_{pp}$ (ripieni)$_{pp}$ (di cioccolata)$_{pp}$
(I) have eaten some donuts filled of chocolate
'I have eaten some chocolate-filled donuts'

Together, the above lengthening processes provide a powerful tool for determining the prosodic phrasing of Italian N-A and A-N sequences. Consider, for example, the sequences in (10) below, where lexical stress falls on the penultimate syllable in both words (the stressed syllable is shown in bold).

(10) A-N: po.**ten**.te pre.**la**.to
powerful prelate
N-A: pre.**la**.to po.**ten**.te

If both sequences are wrapped into a single pp ending at the right edge of the sequence as in (11), then lengthening will only affect the final word (in bold) and its last two syllables (in capitals). Crucially, the duration of the affected syllables and the word itself is predicted to change according to its position in the sequence, with increased length expected when the word occurs second, i.e. immediately preceding the pp boundary. For example, under the phrasing shown below, the noun 'prelato' and the syllables 'la' and 'to' in it are predicted to be longer under the A-N order than the N-A one. Due to the inherent symmetry of the example, the same holds for the adjective and its final syllables, which are predicted to be longer in N-A sequences.

(11) A-N: ... po. ten.te **pre.LA.TO**)$_{pp}$ (…
N-A: ... pre.la.to **po.TEN.TE**)$_{pp}$ (…

The distribution of word and syllabic lengthening just illustrated is distinctive of the above prosodic phrasing. Let us call it its 'length signature'. Any other conceivable prosodic phrasing has a different length signature. Consider for example the three symmetric phrasings in (12)-(14) below, which together with (11) above exhaust all possible symmetric phrasings. If the sequences are parsed into a single pp but with no pp-boundary following the last word, as in (12), then no lengthening occurs and the relative length of the relevant syllables and words remains constant independently of sequence order; for example, the syllables 'la' and 'to' of the noun 'prelato' would remain equally long across the A-N and N-A orders.

If on the other hand A and N are phrased into distinct pps each preceding a pp-boundary as in (13) then the relevant syllables and word are lengthened across the board, again predicting equal length independently of the sequence order. Finally,

if only the first word immediately precedes a pp-boundary, as in (14), then lengthening only occurs in sequence-initial position. None of these cases thus predicts the increased length in sequence final position associated with (11) above.

(12) A-N: (... po.ten.te pre.la.to ...)$_{pp}$
N-A: (... pre.la.to po.ten.te ...)$_{pp}$

(13) A-N: ... **po.TEN.TE**)$_{pp}$ (**pre.LA.TO**)$_{pp}$
N-A: ... **pre.LA.TO**)$_{pp}$ (**po.TEN.TE**)$_{pp}$

(14) A-N: ... **po.TEN.TE**)$_{pp}$ (pre.la.to ...
N-A: ... **pre.LA.TO**)$_{pp}$ (po.ten.te ...

Many additional possible phrasings are conceivable once we allow for asymmetric phrasing across the two sequences. As the reader may easily verify none of them matches the length signature of phrasing (11) since all mixed cases necessarily involve one of the phrasing described in (12)-(14) for at least one of the A-N and N-A sequences. Consequently, they all predict an asymmetric lengthening distribution once again distinct from the length signature of (11).

In our experiment, we measured the length signature of a set of A-N and N-A sequences embedded in carrier sentences. The results closely match the prosodic phrasing in (11). The details of the experiment are described below.

2.1 Materials

The experimental materials involved 5 adjective-noun pairs, presented under A-N and N-A order. The 5 pairs were contained in 20 carrier sentences, 10 of which were constructed such that the target sequence was the subject of the sentence (cf. (15) and (16)), while the other 10 were constructed such that the target sentence was the object of the sentence (cf. (17) and (18)). For each subject and object position, 5 sentences represented the A-N order (exemplified in (15) and (17)), while the other 5 represented the N-A order (as in (16) and (18) below). Examples (15)-(18) show the four sentence types for one adjective-noun pair. The full experimental materials are provided in the appendix at the end of the article.

(15) Un **po.ten.te pre.la.to** può imporre il suo punto di vista anche al papa
A powerful prelate can impose the his point of view even to-the pope

(16) Un **pre.la.to po.ten.te** può imporre il suo punto di vista anche al papa
A prelate powerful can impose the his point of view even to-the pope

(17) Abbiamo contattato un **po.ten.te pre.la.to** con il permesso del papa
(We) have contacted a powerful prelate with the permission of-the pope

(18) Abbiamo contattato un **pre.la.to po.ten.te** con il permesso del papa
(We) have contacted a powerful prelate with the permission of-the pope

In addition to these items, 35 sentences were part of the materials which were originally designed to test the prosodic phrasing of adverbs in VPs. They were part of another study and thus irrelevant to the present discussion. Moreover, the materials contained 46 filler sentences, adding up to 101 items overall. In the experimental design, these 101 items were pseudo-randomized under the usual restrictions.

2.2 Participant, apparatus and procedure

The experiment was carried out with 12 untrained native speakers of Italian (8 female, 4 male). At the time of the testing, they were unaware of the aim of the study. The target utterances were shown individually on a computer screen, using Microsoft PowerPoint. The participants were instructed to familiarize themselves with each sentence, read it out loud, and then move on to the next sentence. They were asked to produce each sentence as naturally as possible at a normal speech rate. The list of target items was preceded by five practice items to familiarize the participants with the procedure. All utterances were recorded to a Samsung laptop computer using an AKG C444 headset microphone with AKG B29L battery power supply and *Cool Edit*^{TM}*96* software. The recordings were later digitized into individual sound files using the same software. The individual sound files were analyzed in PRAAT (Boersma 2001).

2.3 Data treatment

Overall, the 12 speakers produced 240 target sentences: 60 sentences in each of the four data sets exemplified in (15) to (18) above. Of the 240 sentences, 15 contained speech errors and were discarded from the analysis. For each item that entered the analysis, the length of the two target words (A and N), and the length of the stressed and final syllables were measured, and the mean values calculated. The results were coded with respect to a) the order of A and N, and b) the syntactic function of the relevant constituent (subject vs. object).

2.4 Results

As outlined above, three kinds of final lengthening phenomena were addressed. Overall, the length of all target elements (final syllable, stressed syllable, full word) was clearly affected by the position of the respective word. They were longer when the respective word was second in its target sequence. Specifically, in both subject and object position, the following effects were recorded:

(i) The final syllable of N, the stressed syllable of N, and N itself were longer when N followed A than when N preceded A (cf. Figure 1).

(ii) The final syllable of A, the stressed syllable of A, and A itself were longer when A followed N than when A preceded N (cf. Figure 2).

The results for N and its stressed and final syllables are illustrated by the three panels in Figure 1 below. The first panel shows how the final syllable of N increases in length when N is final in either subject (first row) or object position (second row) than when N precedes A (third and fourth rows). The next two panels in figure 1 show the corresponding lengthening effects for the stressed syllable of N and for N itself according to the same layout. Figure 2 shows the corresponding lengthening effects for A in N-A sequences.

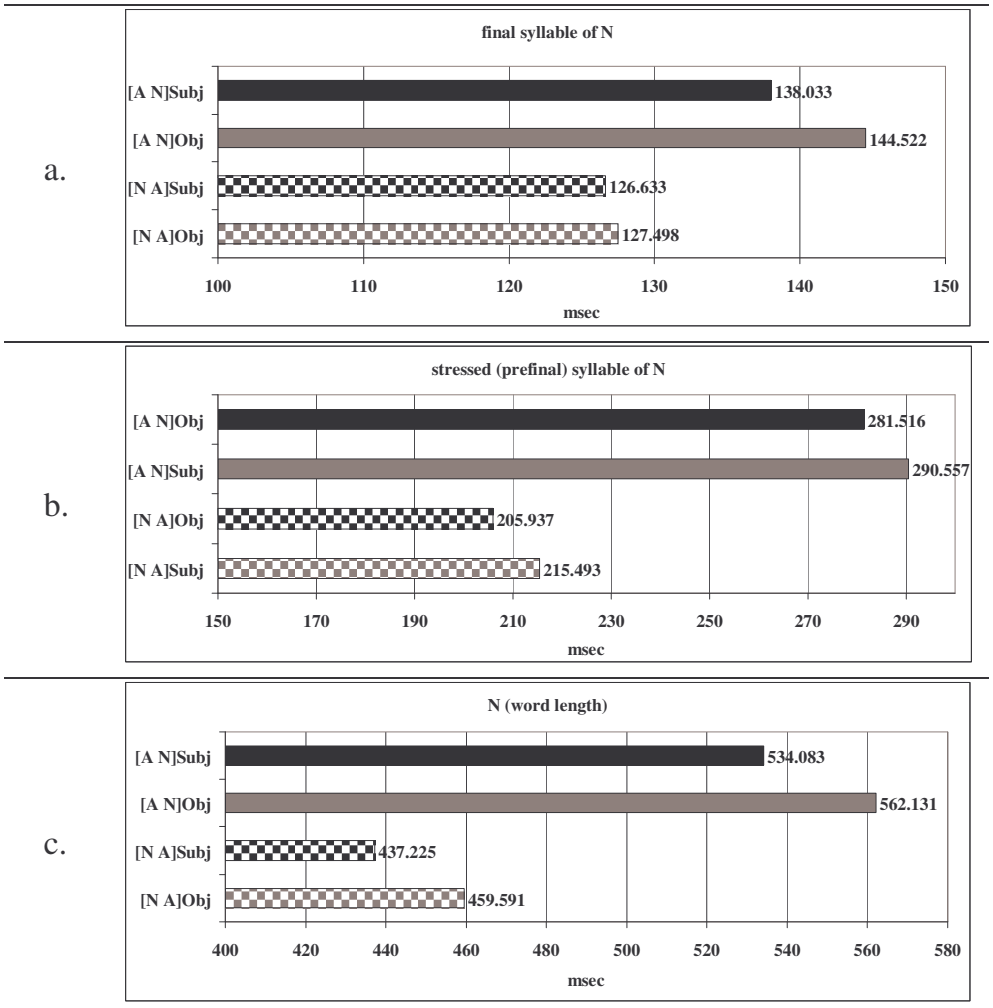

Figure 1 Length of the final syllable of N (panel a), the stressed syllable of N (panel b) and the full N (panel c) in the two word orders, in subject and object position

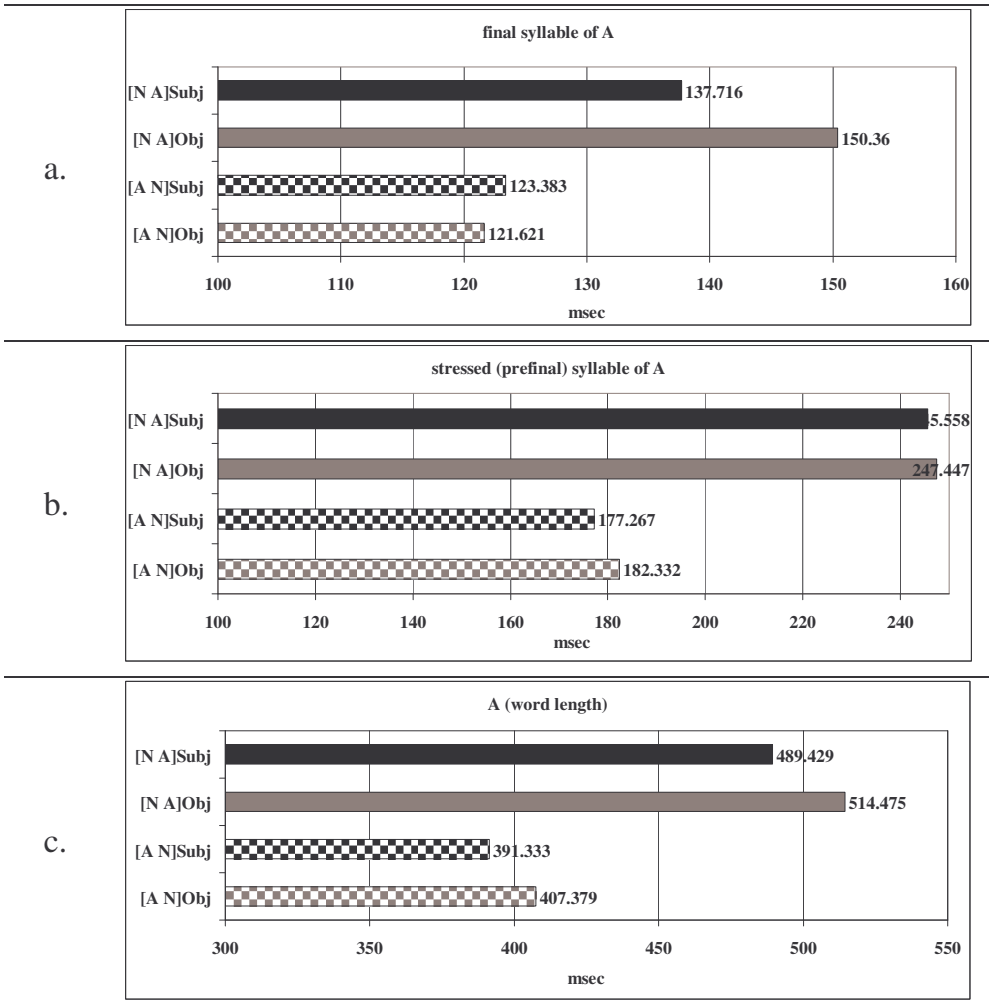

Figure 2 Length of the final syllable of A (panel a), the stressed syllable of A (panel b) and the full A (panel c) in the two word orders, in subject and object position

The duration values were submitted to an analysis of variance with the factors POSITION (2 levels: A-N/N-A) and SYNTACTIC FUNCTION (2 levels: subject vs. object). The scores were pooled over both speakers and items, and the α level determining the significance threshold was set at 0.05 (significant)/ 0.02 (highly significant). The most relevant results for the present study concern the factor POSITION. The variance analysis showed that the lengthening of A and N in their entirety was highly significant in both the item and speaker analyses. POSITION was also highly significant across item and speaker analyses for the stressed syllable of both A and N. As for the final syllable, POSITION was highly significant in the speaker analysis for A and in the item analysis for N.

The SYNTACTIC FUNCTION factor –less relevant to the goals of this paper– was found significant only in the subject analyses and only for full A and N and for the stressed syllable of N, showing that these elements may be longer in object position than they are in subject position. At present, we can only speculate that these results might be related to the temporal organization of the sentence such that initial parts of the sentence are said more quickly than later parts since more material is yet to be produced, but nothing hinges on this in this paper. More importantly, no interaction was found between the factors POSITION and SYNTACTIC FUNCTION in any of the subparts of the analysis, confirming that POSITION affects the length of the target element in subject and object constituents alike.

In conclusion, the statistical analysis confirms the lengthening effects described above which in turn entail the following two conclusions:

(i) There is a pp-boundary after the target sequence in both word orders and regardless of whether the sequence functions as subject or object of the carrier sentence.

(ii) There is no pp-boundary separating A and N in either order, neither in subject nor in object position.

Needless to say, these are exactly the properties uniquely characterizing the prosodic phrasing in (11) above. The next section will examine what underlying syntactic representation may determine the attested prosodic phrasing.

3 The syntactic representation of Italian N-A and A-N sequences

Since the seminal research by Bernstein (1991) and Cinque (1994), a rich variety of studies have shown that Romance and Germanic nominal expressions share an identical underlying hierarchical structure where adjectives are generated to the left of nouns (but see Larson and Marušič 2004 for a different position). Cinque (2005) is particularly convincing in this respect as he shows that given some general necessary restrictions on the possible movement types, only the universal base-generated order <D # A N> (where '#' stands for 'numeral') provides a suitable basis for the derivation of the crosslinguistically attested orders of D, #, A, and N among the 24 that are logically possible. We therefore assume the order <A N> as the base-generated order from which A-N and N-A sequences are derived.

As for the specific structural position of A, while some studies follow Abney (1987) in allowing it to be part of the main spine of the structure as in (19a) below –e.g. Artiagoitia (2006)– we follow the majority of scholars and assume that A is generated in the specifier of a corresponding functional projection as in (19b); see

for example Crisma (1991), Zamparelli (1995), Laenzlinger (2000), Shlonsky (2004), Knittel (2005), and Cinque (2005, 2006).

(19) a. … $[_{AP1}\ A_1\ [_{AP2}\ A_2\ [\ \ldots\ [_{NP}\ N\ ]$

b. … $[_{FP}\ AP_1\ F\ [_{FP}\ AP_2\ F\ [\ \ldots\ [_{NP}\ N\ ]$ (assumed in this study)

N-A sequences do not match the above structure and must therefore arise from movement of the noun to a functional projection above the adjective. For the sake of concreteness we identify this projection as Cinque's (2005) AgrP projection although the exact nature of this projection is irrelevant to the argument developed in this work. More relevant to our goals is the disagreement concerning whether the N-A order is obtained via N- or NP-raising to the left of the adjective. Under the above assumptions the N-raising hypothesis yields the structure in (20a), whereas the NP-raising hypothesis yields the structure in (20b).

(20) a. N-raising: $[_{AgrP}\ \_\_\ \ N_i\ [_{FP}\ AP\ \ t_i\ \ [_{NP}\ t_i\ ]]]$

b. NP-raising: $[_{AgrP}\ NP_i\ \ Agr\ \ [_{FP}\ AP\ \ F\ \ t_i\ \ ]]$

The main syntactic arguments supporting these opposite claims are examined in section 4; in this section we focus instead on the prosodic phrasing predicted by each representation under current models of the syntax-prosody mapping, which we then compare against the prosodic phrasing attested in our experiment. We start with N-A sequences and then move to A-N sequences in section 3.2.

3.1 Syntactic structure and predictions made by current prosodic theory

All major models of the syntax-prosody mapping map the N-raising structure (20a) into a single pp, as illustrated in (21a) below, and the NP-raising structure structure (20b) into separate pps as shown in (21b) (when matched against our experimental results NP and AP should of course be conceived as respectively containing a single noun and adjective and no additional modifiers). This identifies the N-raising structure in (20a) as the underlying syntactic representation of the N-A sequences examined in our experiment.

(21) a. (… N AP)

b. (… NP)(AP)

Below we examine how each model reaches the above prediction. While some details may differ, crucially all models dictate that a maximal projection such as NP

in the NP-raising structure is necessarily followed by a pp-boundary, thus determining the distinct predictions in (21).

Nespor and Vogel (1986) – Consider first the detailed study of Italian prosodic phrasing in Nespor and Vogel (1986). Their model requires lexical heads to form their own pps, with an additional optional restructuring rule extending these same pps to the first complement of the head (Nespor and Vogel 1986, p. 168,173)[1]. Under this model N and A would therefore form their own pps in both structures (20a) and (20b). The restructuring rule would then successfully apply to the N-raising structure where AP occurs within the complement of the raised N and place N and AP into a single shared pp. The same rule however would not apply to the NP-raising structure because AP is not part of the complement of N, hence leaving NP and AP each in a pp of its own against the phrasing attested in the above experiment.

Selkirk (1986) – The same prediction is made by the influential model proposed by Selkirk (1986) requiring the right edge of a maximal projection to be always followed by a corresponding pp-boundary. A pp-boundary must then follow the raised NP of (20b) and produce two distinct pps for NP and AP. The raised N of (20a) on the other hand escapes the requirement by being non-maximal, thus letting N and AP share the same pp.

Ghini (1993) – Closely following Selkirk, Ghini too provides a model for the prosodic phrasing of Italian that explicitly assumes a pp-boundary after the right edge of maximal projections. Ghini also examines additional principles of rhythmic organization that at first may appear to enable parsing the NP and AP in structure (20b) as a single pp. Ghini however states very clearly that these rhythmic principles never apply across the right edge of a maximal projection, thus subordinating them to Selkirk's right-edge rule. As Ghini points out, this restriction is necessary to prevent incorrectly phrasing a subject with a following verb, or an object with a following indirect object, postverbal subject, or higher adjunct. In all these cases the first item is a maximal projection separated from the following items by a pp-boundary. Subordinating Ghini's principles to Selkirk's right edge rule ensures that the attested separate phrasing remains unaltered.[2] It follows that

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[1] Nespor and Vogel's restructuring rule joins together the pp of the selecting head with the pp of the complement provided the latter is a non-branching complement. This latter condition ensures that the pp contains at most one 'clitic group', i.e. no more than a single lexical item. The N-A sequences examined in our experiment satisfy this condition because AP contains a single complement-less modifier-free adjective. Indeed Nespor and Vogel (1986:172) provide the example '(caribú nani)' –meaning 'caribou dwarf'– as an N-A sequence sharing a single pp due to the restructuring rule.

[2] Some examples are provided in (22). Unless they are blocked from applying across the right edge of maximal projections, Ghini's principles of *average weight*, *symmetry*, and *increasing*

Ghini's model too predicts a pp-boundary after the raised NP of structure (20b). In fact, since Ghini's rhythmic principles are subordinated to Selkirk's right-edge rule, any analysis of the '(N A)' phrasing attested in our experiment in terms of Ghini's principles necessarily presupposes the lack of an NP-boundary and therefore the N-raising structure in (20a).

Truckenbrodt (1995, 1999) – A post-NP pp-boundary is also predicted under Truckenbrodt's model (1995, 1999, see also the similar model in Selkirk 2000). Truckenbrodt's model is based on Optimality Theory (Prince and Smolensky 1993/2004) and aims at capturing the effects of focus on prosodic phrasing across distinct languages. Since focus and stress do not play a role in our study we can limit our discussion to the two constraints governing the mapping between lexical projections and pp-boundaries. The first constraint, AlignXP(XP,Right,pp,Right), recasts Selkirk's right-edge rule in terms of McCarthy and Prince's (1993) theory of generalized alignment by requiring the edge of every lexical maximal projection XP to be aligned with a pp's right boundary. The effect is to introduce a pp-boundary immediately after every lexical XP, as in Selkirk (1986). The second constraint, Wrap-XP (or 'Wrap' for short), ensures that all the syntactic material dominated by the maximal projection of a lexical item be wrapped into a single pp. Wrap may for example force all the items dominated by a VP-node to be parsed into a single pp.

Together, AlignXP and Wrap predict separate pps for the NP-raising structure (20b). AlignXP requires a pp-boundary to follow the right edge of NP while Wrap is satisfied by the wrapping of NP and AP each on a pp of its own. The opposite holds for the N-raising structure: assuming that raised lexical heads make the functional projections hosting them prosodically lexical (Samek-Lodovici 2005), Wrap requires all material dominated by AgrP, namely N and AP, to be wrapped into a single pp, while AlignXP remains satisfied because the right edge of all available maximal projections, i.e. those of AgrP and AP, are properly followed by a pp-boundary. Crucially, N itself is not maximal and therefore not subject to AlignXP.

Truckenbrodt (1995) – The last model is a variant of the model just examined where AlignXP is replaced by the interaction of two constraints. The first one, StressXP, requires lexical XPs to express the prosodic peak of a pp (this peak, the pp's prosodic head, provides XP with pp-level stress, hence the name of the constraint). The second constraint, Align-pp(pp,Right,Head(pp),Right), ensures that the pp's prosodic head is aligned with the pp's right boundary. Together these two constraints once again ensure that lexical XPs are always immediately followed by

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units, would incorrectly predict a shared single pp for (22a) rather than the attested two. They would also predict the phrasing '(V)(Obj XP)' in (22b) and (22c) rather than the attested '(V Obj)(XP)'.

a pp-boundary. On the one hand StressXP forces an XP to express the head of a pp, on the other hand Align-pp ensures that the same head is immediately followed by a pp-boundary. The overall effect is a pp-boundary after the XP. It follows that under this model too, the NP-raising structure projects two distinct pps to ensure that the NP and AP are each assigned their own right-aligned pp-head. The N-raising structure, on the other hand, allows for a single pp headed on the AP. This phrasing satisfies both constraints because the pp-head on AP is aligned with the pp-boundary and since the AP is in the complement of N the pp-head on AP also lies within the projection headed by N –i.e. AgrP– as required by StressXP (for a detail discussion of how StressXP can be satisfied with respect to a head H by placing a pp-head on its complement see Truckenbrodt 1995).

The convergence of all above models in predicting a pp-boundary after the raised NP of structure (20b) is not accidental. It is dictated by the need to capture the generalization that lexical maximal projections are always followed by a pp-boundary at their right edge (Nespor and Vogel 1986; Selkirk 1986, 2000; Ghini 1993; Truckenbrodt 1995, 1999). This generalization holds for Italian too and is well illustrated by the examples in (22) from Ghini (1993) and Frascarelli (2000) showing maximal projections in different clausal positions all trigerring a pp-boundary at their right edge. Specifically, we have a subject DP in (22a); an object DP followed by an indirect object in (22b) and a postverbal subject in (22c); and finally a left-peripheral topic followed by a subject in (22d) (further examples are available in Nespor and Vogel 1986 and Frascarelli 2000). In so far we expect N-A sequences to follow the generalization illustrated in these examples and accounted for by the above models, the NP-raising structure in (20b) cannot constitute the syntactic representation underlying the single pp experimentally attested for N-A sequences.

(22) a. (La veritá) (vínce)
the truth wins.3sg
'Truth wins'

b. (Daró líbri) (a Gianni)
(I) will-give.1sg books to John
'I will give books to John'

c. (Esamineránno il cáso) (gli espérti)
Will-examine.3pl the case the experts
'The experts will examine the case'

d. (a Gegé) (Páola) (gli parlerá) (dománi)
To Gegé Paola to-him will-speak.3sg tomorrow
'As for Gegé, Paula will talk to him tomorrow'

In contrast, joint prosodic phrasing of a head and its complement of the sort predicted to occur between N and AP under the N-raising structure (20a) is well attested and illustrated by the examples in (23) below[3] (see also Nespor and Vogel 1986; Ghini 1993; Frascarelli 2000). In (23a), a finite verb in T is phrased together with its object, while in (23b) a finite verb in T is phrased with a postverbal subject arguably stranded in specVP position.

The joint phrasing is confirmed by three phonological processes known to be impossible across pp-boundaries. The first, known as 'raddoppiamento sintattico', lengthens a word's consonantal onset whenever the previous word ends in a stressed syllable. Its effects are visible on the lengthened [p:] and [d:] onsets of the nouns in (23a) and attest the absence of pp-boundaries before those nouns. The second process lengthens the syllable receiving the pp's prosodic peak, here determining the lengthened [e:] and [u:] in the nouns in (23a). The third process solves potential stress clashes by shifting the first stress leftwards whenever a word with word-final stress is followed by a word with word-initial stress. In the examples below, the final stress of the verb shifts to its first syllable, shown in bold.

Sentence (23b) is particularly revealing because its underlying structure, shown in (23c), parallels the N-raising structure in (20a), repeated in (23d). The DP occurs in the specifier of the complement projection of the raised V much like AP does with respect to the raised N. This structural parallelism guarantees that any model blind to categorial labeling that accounts for the shared pp in sentences like (23b) will also necessarily predict a shared pp for N-A sequences derived via N-raising.

(23) a. (**Sof**frirá [p:][é:]ne) (incredibilménte d[ú:]re)
(s/he) will-suffer.3sg afflictions incredibly severe
'S/he will suffer extremely severe afflictions'

b. (**Nuo**terá Giánni)
Will-swim.3sg John
'John will swim'

c. $[_{TP}\ V_i\ [_{VP}$ DP $t_i\ ]]$

d. $[_{AgrP}\ N_i\ [_{FP}$ AP $t_i\ [_{NP}\ t_i\ ]]]$

The above discussion shows that the attested joint phrasing of N-A sequences requires the N-raising structure (20a) as their underlying representation.

[3] The examples also confirm our earlier assumption that raising lexical heads make their target functional projections lexical as far as prosody is concerned. If this were not the case, none of the analyses of syntax-prosody mapping discussed above would account for the attested phrasing, since the finite verb raised to T would no longer count as lexical.

Nevertheless, as a further test of the strength of this conclusion we may consider whether the above prosodic models possibly overlooked some crucial constraint or device that once taken into account would actually predict a single pp even under the alternative NP-raising hypothesis.

For example, extending Truckenbrodt's analysis one could hypothesize the existence of a constraint Wrap-FP requiring all material dominated by a functional projection to be parsed into a single pp. Under the NP-raising structure, repeated in (24) below, Wrap-FP would phrase NP and AP together because they are both dominated by the functional projection AgrP (or any other equivalent functional projection). In Truckenbrodt's analysis this constraint would conflict with AlignXP, but the ranking Wrap-FP>>AlignXP would ensure that AlignXP is violated in order to satisfy Wrap-FP.[4]

(24) NP-raising: $[_{AgrP}\ NP_i\ Agr\ \ [_{FP}\ AP\ F\ t_i\ ]]$

This hypothetical analysis however is inconsistent with the generalization requiring a pp-boundary after lexical maximal projections illustrated by the data in (22) above. For example, the left-peripheral topic in (22d) lies in the specifier of the CP-level functional projection TopicP (Rizzi 1997) yet it is not phrased together with the lower subject as mandated by Wrap-FP. Likewise the subject of (22a) lies in the specifier of TP (or possibly TopicP if they constitute left peripheral topics as argued by several analyses - cf. below), yet it cannot be phrased together with the following verb.

One could counter that in the TP case, TP is made lexical by the raising verb and hence it is no longer subject to Wrap-FP. Italian subjects however remain parsed in a pp of their own even when T is filled by an auxiliary and hence undoubtedly qualifies as functional, see the examples in (25) below. These failures are inevitable and follow from the similarities between the NP-raising structure and the structures for the sentences in (22) and (25). These similarities ensure that any constraint phrasing NP and AP together in the NP-raising structure will also incorrectly require a single pp in sentences like (22) and (25). Nor can this problem be solved via constraint-ranking, since ranking is fixed within a grammar and therefore the ranking for the NP-raising structure carries over to the data in (22) and (25). The only new constraint making the correct distinctions would be a version of Wrap-FP that only applies to DPs, but this would obviously be an ad-hoc uninformative solution.

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[4] In the variant of Truckenbrodt's analysis where AlignXP is replaced by StressXP and Align-pp, the needed ranking would be Wrap-FP>>{StressXP, Align-pp}.

(25) a. (la gabbia) (é giá caduta) (Nespor and Vogel 1986:170)
the cage is already fallen
'The cage has already fallen'

b. (Carlo) (ha portato) (tre bassotti) (alla mostra) (Frascarelli 2000:19)
Carlo has brought three dachshunds to-the show
'Carl brought three dachshunds to the show'

The above discussion leaves little doubt about the underlying syntactic structure of the N-A sequences. All major models of the prosody-syntax mapping unambiguously associate the attested phrasing of N-A sequences with the N-raising representation repeated in (26), which furthermore perfectly fits the empirical generalization holding of Italian syntax-prosody mapping.

(26) N-raising: $[_{AgrP}\ N_i\ [_{FP}\ AP\ t_i\ [_{NP}\ t_i\ ]]]$

Given such a convergence between theoretical and empirical observations we conclude that the attested prosodic phrasing of N-A sequences provides unequivocal evidence for the occurrence of N-raising in Italian.

3.2 Syntactic representation of A-N sequences

Turning to A-N sequences, the joint '(A N)' phrasing attested in our experimental data may at first appear surprising since the initial AP might appear to have to trigger a pp-boundary at its right edge. Once again we should consider the possible underlying representations in detail. The structure in (27a) occurs if N moves to the head of the functional projection hosting AP, while structure (27b) occurs if N does not move.

(27) a. N-raising: $[_{FP}\ AP\ N_i\ [_{NP}\ t_i\ ]]]$

b. No raising: $[_{FP}\ AP\ F\ NP\ ]$

Structure (27b) is clearly inconsistent with the attested phrasing. This structure parallels the NP-raising structure discussed in the previous section, with a lexical XP in the specifier of a functional head that is not targeted by N-raising. In this case all models of syntax prosody mapping predict a pp-boundary after the initial AP for the reasons already explained in the previous section. Since the expected boundary is absent (27b) cannot be the correct representation.

The same models differ in their predictions with respect to (27a). Nespor and Vogel (1986), Selkirk (1986), and Ghini (1993) predict a post-AP boundary and therefore cannot account for the single pp found for A-N sequences. In

Truckenbrodt's model, instead, the phrasing of (27a) depends on the ranking of Wrap and AlignXP relative to each other as illustrated by Tableau 1 below. The raised N makes the entire FP lexical as far as prosodic constraints are concerned. Wrap therefore requires the entire FP to be contained in a single pp. Consequently languages where Wrap dominate AlignXP will phrase (27a) into a single pp even if this phrasing violates AlignXP.[5] Note that the same is not true of (27b), where Wrap only requires AP and NP to be each contained within a single pp but with no condition imposed on the entire FP. Even languages with the Wrap>>AlignXP ranking will therefore choose to satisfy AlignXP and place a boundary after AP as mentioned above.

Tableau 1	Wrap	AlignXP
☞ (AP N)	✔	*
(AP)(N)	*	✔

If AP can be phrased with the following noun in (27a), why are the left-peripheral topics and subjects of the sentences in (22) above parsed in a pp of their own? The crucial difference lies in their syntactic representation. In (27a) AP occurs as the specifier of a projection headed by the raised N. As mentioned above, this makes the projection prosodically lexical and hence subject to Wrap. The same is not true for the examples in (22). Consider for example sentence (22d), repeated as (28) below. The left-peripheral topic 'a Gegé' lies in a TopicP projection at the top of the clause as shown in (28b). The head of TopicP is not filled by a lexical head. Consequently Wrap places no condition on TopicP. The available trivial satisfaction of Wrap in turn enables the satisfaction of the lower ranked AlignXP, determining the pp-boundary immediately following the topic 'a Gegé'.

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[5] The same analysis extends to Truckenbrodt's StressXP and AlignPP variant under the ranking {Wrap, AlignPP}>>StressXP. The condition Wrap>>StressXP ensures that (AP N) is parsed in a single pp as required by Wrap even if (AP)(N) would better satisfy StressXP by providing both items with their own pp-head. The condition AlignPP>>StressXP in turn ensures that within (AP N) the pp-head falls rightmost on N as attested despite the violation of StressXP on AP which is left without a pp-head. The opposite ranking would still predict a single pp (AP N) but by placing the pp-head on AP to satisfy StressXP (since AP is contained within the projection of N, the pp-head on AP also counts as satisfying StressXP relative to N; see Truckenbrodt 1995 for a detailed discussion). The relevant competition is provided in the tableaux below where the item carrying the pp-head is shown in bold.

	Wrap	AlignPP	StressXP
☞ (AP **N**)	✔	✔	*
(**AP** N)	✔	*	✔
(**AP**) (**N**)	*	✔	✔

(28) a. (a Gegé) (Páola) (gli parlerá) (dománi)
To Gegé Paola to-him will-speak.3sg tomorrow
'As for Gegé, Paula will talk to him tomorrow'

b. [$_{\text{TopicP}}$ [a Gegé]$_{\text{PP}}$ Topic$^{\text{o}}$ [….]]

The same analysis applies to the subject 'Paola' in (28a) above and any other Italian preverbal subject provided they too are analyzed as located in the specifier of a higher projection not reached by raised finite verbs. While there are differences about the location of this projection (namely whether it is part of CP or the inflectional field) and also about the preverbal subjects that it hosts (i.e. whether they are base-generated and controlling a lower resumptive *pro* or raised all the way up from specVP), its existence is advocated by many of the scholars investigating preverbal subjects in null subject languages; see for example Barbosa (1995), Alexiadou and Anagnostopoulou (1998), Rizzi (2004), Cardinaletti (2004), Frascarelli (to appear). For example, as noted by Alexiadou and Anagnostopoulou (1998) the higher position of overt subjects in languages like Italian follows immediately from the observation that they can be followed by a sentential adverb like 'probably' (cf. (29a)) or by an entire subordinate clause (cf. (29b)). This would be impossible if overt subjects were in a spec-head relation with the inflected verb.

(29) a. Gianni probabilmente ha incontrato Maria.
John probably has met Mary.
'Probably John has met Mary'

b. I bambini se Maria viene andranno via.
The children if Mary comes will go away.
'If Mary comes the children will go away'

The position of the above subjects on the other hand is accounted for if, as proposed for example in Frascarelli (to appear), preverbal subjects are sentential topics sitting in a dedicated topic-related projection ShiftP (for 'aboutness-shift topic') from where they control a lower *pro* subject as shown in (30a) (adapted from Frascarelli; see also Barbosa 1995 and Alexiadou and Anagnostopoulou 1998). The analysis also correctly predicts that the same sentence will be ungrammatical in languages that lack null subjects; see for example sentence (30b) from French (Alexiadou and Anagnostopoulou 1998).

(30) a. [$_{\text{ShiftP}}$ Gianni$_{\text{k}}$ [$_{\text{FP}}$ probabilmente [$_{\text{TP}}$ ha [$_{v\text{P}}$ *pro*$_{\text{k}}$ [$_{\text{VP}}$ incontrato Maria]]]]]

b. *Jean probablement a rencontré Marie
John probably has met Mary.
'Probably John has met Mary'

In conclusion, the single pp found for A-N sequences provides evidence for an N-raising analysis where N moves into the head of the functional projection hosting AP in its specifier. It also supports Truckenbrodt's model of syntax prosody mapping, as all other models incorrectly predict distinct pps for A and N. Finally, it provides further evidence for analyzing Italian referential preverbal subjects as located in a higher topic-related position dominating TP.

4 Head and phrasal movement in DPs

With respect to the debate on whether N-A order in Romance is due to N- or NP-raising our results clearly support the former hypothesis for the reasons provided in the previous sections. It is natural to wonder to which degree this result is consistent with the available syntactic arguments for and against N- and NP-raising. As we will show, once closely examined, these arguments do not support a simple conclusion for or against N- or NP-movement. Arguments provided for either of the two analyses have often been reanalyzed as arguments for the opposite analysis. See for example the stranding of prepositional complements by a raising noun in <N A PP> sequences, proposed as evidence for N-raising in Cinque (1994) and Pereltsvaig (2006) but reanalyzed in terms of NP-raising in Cinque (2006); or the presence of N-raising in English, argued for in Kishimoto (2000) but rejected in Larson and Marušič (2004) and Cinque (2006). There also appears to be robust evidence for phrasal movement, but it appears to apply to functional projections above NP and its application to NP itself is far less obvious.

In this section we examine some of the most relevant evidence concerning the presence or absence of N-movement in detail and eventually argue for an analysis of Italian DPs where phrasal movement of functional projections co-exists with strictly local N-raising. We start in 4.1 with a brief survey of the syntactic evidence supporting the availability of N-raising, then move to the syntactic evidence for phrasal movement and examine its compatibility with the N-raising analysis advocated in the previous sections.

4.1 Head movement

The availability of N-raising has been argued for in several independent studies and across many languages (e.g., Sproat and Shih 1990; Crisma 1991; Valois 1991; Bernstein 1991, 1993; Cinque 1994; Zamparelli 1995; Longobardi 1994, 2001,

2005; Kishimoto 2000; Rutkowski and Progovac 2006; Willis 2006; Pereltsvaig 2006; Airtiagoitia 2006). While evidence based on word order alone cannot distinguish between N- and NP-raising, direct interaction of the raising noun with higher syntactic heads provides the clearest possible syntactic evidence for the existence of N-raising. This interaction may occur in three different ways: (i) replacement of a higher head H with N, yielding a complementary distribution between H and N; (ii) incorporation of N into a higher head H, with H emerging as an affix of N; (iii) blocking of N-raising by a higher head intervening in the path of N. Below we describe an instance of each of the above cases but further instances are available in the literature cited above.

Head-replacement is well illustrated by Longobardi's studies of N-to-D movement, which also provide some of the strongest possible evidence for the availability of N-raising in Italian (Longobardi 1994, 1996, 2001, 2005). Longobardi notices that whenever a determiner is present, a proper name N occurring with possessives or with focusing adjectives like 'solo' (only) requires the D-A-N order. Yet the same noun allows for the N-A order when the determiner is absent, see the paradigm below from Longobardi (2001) (for additional cases of N-to-D across distinct languages see Longobardi 2001 and references listed there).

(31) a. La sola Napoli (è stata prescelta tra le città italiane).
the only Naples (is been chosen among the cities Italian)
'Only Naples was selected among Italian cities'

b. *La Napoli sola (è stata prescelta tra le città italiane).

c. Napoli sola (è stata prescelta tra le città italiane).

d. * Sola Napoli (è stata prescelta tra le città italiane).

As Longobardi remarks, N-to-D raising immediately explains the complementary distribution of N and overt D in DP-initial position. The same is not true for NP-raising since NP would move to specDP and thus allow for the occurrence of D to its right. Longobardi's analysis is more complex and informative than we can expose here, identifying for example the conditions that determine whether N-to-D raising is or is not available to specific classes of nouns. What is relevant in the context of this study is that it shows that N-raising can occur in Italian DPs, providing independent support for the N-raising analysis of N-A sequences advocated in this paper.

Further evidence for N-raising comes from cases where a raising noun incorporates into D, with D surfacing as a suffix of the noun. This is best illustrated by Scandinavian languages, including the Danish examples in (32a) below where the determiner 'en' emerges as a suffix of the raised noun 'hest' (horse) (Delsing 1993; Embick and Noyer 2001). The original post-determiner position of the noun

is visible in (32b), where N-raising is blocked by the intervening adjective 'rode' (red).

(32) a. hest-en
horse-def
'the horse'

b. den rode hest
def red horse
'the red horse'

The third type of interaction, N-raising blocked by an intervening head, is already illustrated by the above Danish data.[6] An interesting case is also examined in Pereltsvaig's (2006) analysis of Russian approximative inversion (but see also her discussion of Hebrew and Artiagoitia's 2006 discussion of Basque). As (33) shows, a noun raising to the left of its numeral specification determines an approximative interpretation of the numeral. Following Bailyn (2004), Pereltsvaig maintains that the numeral occurs in the specifier of a higher NumP projection when assigned genitive case but in the head of the same projection when assigned instrumental case. Correspondingly, N-raising to the even higher projection associated with the approximative interpretation is possible under genitive case but not instrumental case, where the intervening overt Num head blocks N-raising; see the examples in (33) and (34) from Pereltsvaig (2006:277, 283).

(33) a. desjat' kardinalov
ten cardinals
'ten cardinals'

b. kardinalov desjat'
cardinals ten
'approximately ten cardinals'

(34) a. Džejms Bond vypil rjumok desjat' vodki.
James Bond drank-up glasses.GEN ten vodka.GEN
'James Bond drank up approximately ten glasses of vodka.'

[6] The fact that in the above data N-raising is blocked by intervening adjectives might support a view of adjectives as heading projections that are a direct part of the main spine of the DP structure as in Artiagoitia (2006). The same analysis however does not apply to languages like Italian where adjectives show no corresponding blocking effects.

b. *Džejms Bond napilsja rjumkami desjat'ju vodki.
James Bond got-drunk glasses.INSTR ten.INSTR vodka.GEN
'James Bond got drunk from approximately ten glasses of vodka.'

In conclusion, there is substantive independent syntactic evidence for N-raising in both Italian and other languages. As discussed in the next section, this does not exclude the presence of phrasal movement within Italian DPs but neither is the presence of phrasal movement sufficient to exclude N-raising.

4.2 Phrasal movement

The evidence for DP-internal phrasal movement is compelling, see among others Laenzlinger (2000), Knittel (2005), and Cinque (2005, 2006). Here we examine Cinque's 2005 and 2006 studies because we find them particularly informative and also because they explicitly argue against N-movement. We show that while they provide clear evidence for the occurrence of phrasal movement in Italian DPs, on close inspection they do not exclude the N-raising analysis found necessary for the adjectives and nouns tested in our experiment.

As mentioned, Cinque (2005) convincingly argues for a universal merge order <Dem # A N>. His study also examines what movement restrictions are necessary to prevent the derivation of unattested orders reaching two important conclusions. The first one is that remnant movement must be disallowed. If this were not the case unattested orders would become derivable. For example, the impossible <Dem A # N> order becomes derivable as shown in (35) by first raising N or NP to the left of A and then moving the remnant FP containing the adjective to the left of #. Moved constituents are shown in square brackets.

(35) <Dem # A N> → <Dem # [N] A t_N> → <Dem [$_{FP}$ A t_N] # N t>

The second conclusion concerns the necessity of pied-piping in order to derive those attested orders that seem to defy the universal <Dem # A N> hierarchy (see also Shlonsky 2004). For example, as (36)a shows the order <N A # Dem> can be derived by pied-piping the complement of the projection hosting the raised noun (i.e. pied-piping of the '*picture of who*' type in Cinque's terminology), while (36)b shows how the order <# N A Dem> follows from pied-piping the projection immediately above the raising noun (pied-piping of the '*whose picture*' type). In contrast, no amount of pied-piping will ever derive orders that require a different initial merge-order. For example, the impossible <Dem A # N> or <# N Dem A> would respectively require merging A before # in one case and merging # before Dem in the other. Given these restrictions, the ten universally unattested orders can

be characterized as those that defy the <Dem # A N> hierarchy while remaining underivable via noun movement and pied-piping (Cinque 2005).

(36) a. <Dem # A N> → <Dem # [N] A> → <Dem [N A] #>
→ <[[N A] #] Dem>

b. <Dem # A N> → <Dem # [N] A> → <[# [N] A] Dem>

Cinque's analysis provides strong evidence for phrasal movement, since without it pied-piping could not occur and several attested orders would be incorrectly predicted impossible. Cinque, however, also claims N-movement to be impossible. This claim is made in the context of a more general theoretical goal aiming at keeping all syntactic movement phrasal. Yet we could not find any specific evidence directly linking N-movement to the derivation of one of the unattested orders (a similar conclusion is reached in Artiagoitia 2006:22).[7] As far as we can see all instances of NP-movements proposed by Cinque can be recast in terms of N-movement with no analytical loss but for the theoretical goal mentioned above. For example, nothing prevents the orders <Dem # [N] A>, <Dem [N] # A>, and <[N] Dem # A> derived via NP-movement by Cinque from being reanalyzed as derived by N-movement. Nor does N-movement enable the derivation of any of the unattested orders provided remnant movement remains banned. All in all, while keeping all movement phrasal might be theoretically desirable, the case against N-movement is not empirically supported. The evidence for N-raising presented in the previous sections and the evidence for phrasal movement in Cinque's research instead suggest that DP-internal phrasal and head-movement might co-exist, with phrasal movement affecting functional projections and head-movement restricted to N-raising.

Cinque (2006) further refines the argument for DP-internal phrasal movement by arguing for its obligatoriness in Italian. To understand his argument we have to first recapitulate some of Cinque's findings. In an impressive comparative study of the distribution of nouns and adjectives in English and Italian Cinque (2006) shows that adjectives divide into two main classes: adjectives expressing indirect modification, best analyzed as reduced relative clauses, and adjectives expressing

[7] Many of the claims against N-movement in Cinque (2005) reject it in combination with remnant movement. As such these claims are of course correct but the problem in these cases is remnant movement itself, which gives rise to incorrect predictions even in absence of N-movement (as also noticed by Cinque 2005: 324, fn30). In a recent personal communication Cinque agrees that the main argument favoring NP-movement over N-movement is conceptual, related to the goal of keeping all movement phrasal. He also notes that under N-movement the impossibility of remnant movement must be stipulated, whereas under NP-movement it can be derived from Kayne's (2005) closeness driven movement analysis (see Cinque 2005:326).

direct modification[8] (see also Alexiadou 2001 and Knittel 2005). Furthermore the set of possible pre-nominal and post-nominal adjectives in Italian and English are shown to differ according to the linear distributions shown in (37).

(37) a. Italian: Direct Mod. > **N** > Direct Mod. > Indirect Mod.

b. English: Indirect Mod. > Direct Mod. > **N** > Indirect Mod.

As Cinque points out, these distributions suggest that the two adjectival classes are merged in distinct positions within the DP. Yet, Cinque notes, it is impossible to posit a universal merge order while at the same time deriving the above distributions via N-movement alone. For example, the universal hierarchy in (38a) is incompatible with Italian because movement of N into the middle position yields the incorrect distribution of pre- and post-nominal adjectival classes, while movement into the leftmost position yields the incorrect order for post-nominal classes. The alternative hierarchy in (38b) in turn is incompatible with English because the order for pre-nominal classes becomes unreachable with or without N-movement.

(38) a. Indirect Mod. > Direct Mod. > **N**

b. Direct Mod. > Indirect Mod. > **N**

This impasse provides Cinque with a persuasive argument in support of phrasal movement in Italian. Assuming (38a) as the universal merge order, yielding the base order in (39), the Italian distribution is reached as shown in (40a) and (40b) below by obligatorily moving the lower section of the DP containing the direct modification adjectives (i.e. FP3) to the left of the phrase containing the indirect modification adjectives (i.e. into specFP1). The NP itself may or may not move to the left of the direct modification adjectives (i.e. in specFP3)[9]. If it remains

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[8] A full description of the two classes is provided in Cinque (2006) and cannot be replicated here for reasons of space. In general indirect modification adjectives constitute reduced relative clauses and systematically associate with stage-level, restrictive, intersective, relative, and propositional interpretations. Direct modification adjectives instead associate with individual-level, non restrictive, non intersective, absolute, specificity-inducing, and evaluative interpretations. For example, Cinque points out how 'visible' in prenominal position in 'the visible stars include Aldebaran and Sirius' is ambiguous between a stage-level and an individual-level reading, whereas it may only take a stage-level reading when occurring postnominally in 'the (only) stars visible are Aldebaran and Sirius'. In Italian, a similar adjective necessarily has an individual-level reading when prenominal and only becomes ambiguous when postnominal.

[9] Whether movement past direct modification adjectives occurs or not also depends on the particular subclass of adjectives. Cinque (2006) notes that movement is obligatory with

unmoved the final order is <Dir.Mod N Ind.Mod>, see (40a). If it moves, the final order becomes <N Dir.Mod Ind.Mod.>, see (40b). Crucially, in both cases the final structure matches the attested distribution of Italian adjectives in (37a).

(39) $[_{FP1}\ F_1\ [_{FP2}\ AP_{Ind.Mod.}\ F_2\ [_{FP3}\ F_3\ [_{FP4}\ AP_{Dir.Mod.}\ F_4\ NP\ ]]]]$

(40) a. $[_{FP1}\ [_{FP3}\ F_3\ [_{FP4}\ AP_{Dir.Mod.}\ F_4\ NP\ ]]_i\ F_1\ [_{FP2}\ AP_{Ind.Mod.}\ F_2\ t_i\ ]]$

b. $[_{FP1}\ [_{FP3}\ NP_k\ F_3\ [_{FP4}\ AP_{Dir.Mod.}\ F_4\ t_k\ ]]_i\ F_1\ [_{FP2}\ AP_{Ind.Mod.}\ F_2\ t_i\ ]]$

Once again Cinque's analysis provides strong evidence for the presence of phrasal movement of functional projection within Italian DPs but does not provide direct evidence against N-movement with respect to adjectives of direct modification. Cinque's observation that unbounded N-movement determines the incorrect order <N Ind.Mod Dir.Mod> also applies to unbounded NP-movement (for example NP-raising to specFP3 followed by NP-movement to specFP1 while assuming no FP3 movement). What Cinque's study truly shows is that nouns cannot raise above indirect modification adjectives, whether via N- or NP-movement. Within the lower section of the DP, however, N-raising remains a viable hypothesis.[10]

4.3 A combined analysis of N- and phrasal raising for Italian DPs

Is it possible to simultaneously derive Cinque's results on phrasal movement and the head-raising representation shown necessary in the previous sections? One possibility is to combine the two analyses and maintain a representation of Italian DPs like (40) above where N raises as a head to F4 and optionally to F3, as required by the attested prosodic phrasing of N-A and A-N sequences, but never beyond F3, as required by Cinque's analysis of Italian adjectives. As Cinque notices, once movement is so restricted only direct modification adjectives can occur in both the N-A and A-N orders whereas indirect modification adjectives necessarily follow the noun. This is a welcome result as it explains why symmetric N-A and A-N sequences necessarily involve direct modification adjectives.

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classificatory adjectives and adjectives of provenance/nationality but optional with higher direct modification adjectives of color, shape, size, value, etc.

[10] Cinque's results also raise the issue of the location of D in view of Longobardi's N-to-D raising. One possibility is that D in Italian is merged immediately above FP3; see for example the hypothesis allowing for the existence of an indefinite determiner projection in this position in Cinque (2006).

As for why N-raising co-exists with phrasal raising of higher functional projections, a possible answer is suggested by Cinque's (2005) proposal that DP-internal movement is subject to a version of Kayne's constraint on remnant movement (Kayne 2005, p. 54). Kayne's constraint restricts the set of syntactic items that can legitimately move to the specifier of a head H to the closest category distinct from the complement of H. Under a bare-structure representation à la Chomsky (1995) the noun of the simple N-A and A-N sequences examined in our experiment would simultaneously count as head and maximal projection. Raising the noun as a head would form a shorter chain and thus be preferable to phrasal movement on economy considerations, explaining the occurrence of N-raising. The same choice, however, is not available to higher functional projections because they necessarily involve a complement and therefore count as phrasal, explaining Cinque's findings on the phrasal movement of higher functional projections.

The proposed combined analysis also makes fine-grained predictions that could potentially highlight subtle syntactic differences not easily testable with syntactic means alone but potentially revealed by prosodic phrasing. The first prediction concerns N-A sequences involving unambiguous indirect modification adjectives. Following Cinque (2006), the combined analysis assigns to them a structure similar to (41) below, where AP is preceded by an entire NP encapsulated within the raising FP3 projection. Consequently N and A would be predicted to occur in two separate pps, since NP triggers a pp-boundary to its right. We thus expect the structural difference between N-A sequences involving direct modification adjectives, based on N-raising, and sequences involving indirect modification adjectives, formed via phrasal raising, to be reflected in their prosodic phrasing. If borne out, this prediction would at once provide significant support for Cinque's analysis as well as for the N-raising representation for N-A and A-N sequences advocated here.

(41) $[_{FP1} \quad [_{FP3}\ F3\ [_{FP4}\ F4\ NP\ ]]_i \qquad F_1 \quad [_{FP2} \quad AP \quad F_2 \quad t_i\ ]]$

The second prediction concerns the analysis of expressions like (42) below adapted from Cinque (1994) where an adjective intervenes between a noun and its complement.

(42) L'invasione brutale di Parigi
the invasion brutal of Paris
'the brutal invasion of Paris'

There are two possible structural analyses of (42). The more traditional one, proposed in Cinque (1994) and reconsidered in Pereltsvaig (2006), maintains that the noun raises above the adjective as a head, stranding its prepositional

complement behind as shown in (43). This analysis is inconsistent with Kayne's remnant movement constraint which would require the entire NP to move to specFP3, PP-complement included.

(43) $[_{FP3}\ \ N_i\ \ [_{FP4}\ \ AP\ \ F_4\ \ [_{NP}\ t_i\ PP\ ]]]$

Cinque (2006) proposes an alternative analysis based on Kayne (1999, 2000, 2002) where the preposition 'di' introducing the complement is supplied at the top of the DP and the complement of the noun moves to get case leaving the noun able to raise as a complement-free NP. The main derivational steps are shown in (44). Stage (i) provides the initial configuration. Stage (ii) follows from merge of K(ase) and attraction of the complement DP to its specifier. Stage (iii) follows from merge of the preposition 'di' (of) at the top of the structure and the attraction of the remnant 'la brutale invasione' (the brutal invasion). Stage (iv) follows from raising the entire NP above the adjective.

(44) i. [La [brutale [invasione [Parigi]]]

ii. $[[\text{Parigi}]_k$ K [la [brutale [invasione t_k]]]]

iii. $[[\text{La [brutale [invasione t]]}]_s$ di [[Parigi] K t_s]]

iv. $[[\text{La } [[\text{invasione t}]_i$ [brutale t_i]]$_s$ di [[Parigi] K t_s]]

Once again the two analyses predict a distinct prosodic phrasing of the resulting N-A sequence. The analysis of Cinque (1994) predicts a joint pp, whereas the Kaynian analysis in Cinque (2006) predicts two distinct pps, because the raised NP would trigger a pp-boundary at its right edge. If borne out, the latter prediction would thus provide at once evidence for the NP-raising analysis argued for in Cinque (2006) as well as new independent support for Kayne's model of syntactic derivations.

5 Conclusion

The robust generalizations available on Italian prosodic phrasing and current models of the syntax-prosody mapping converge in dictating an N-raising analysis for simple N-A and A-N sequences involving adjectives of direct modification. An alternative analysis based on NP-raising would directly contradict the joint phrasing that was experimentally attested, as well as current understanding of how prosodic phrasing is determined in Italian and other languages.

This result was shown to have important syntactic and prosodic implications. From a prosodic perspective, it lends support to Truckenbrodt's model of the

syntax-prosody mapping, which alone among the models examined here can predict the joint prosodic phrasing of both N-A and A-N sequences. From a syntactic perspective, we showed that the N-raising analysis is consistent with the equally necessary phrasal movement discussed in Cinque (2005, 2006). What emerges is a complex model of Italian DPs where limited, local, N-raising co-exists with phrasal movement of higher functional projections. Furthermore the occurrence of N- vs. NP-raising was shown to be potentially determined by the type of items contained in the DP itself, depending for example on the class of adjectives preceding or following the noun as well as the presence of a complement of the noun.

We also showed how prosodic phrasing can test and determine fine-grained properties of syntactic analysis that range from the syntactic representation of Italian overt subjects and complex DPs to the precise conditions constraining movement in UG and the distinct available models of syntactic derivations.

Appendix: Experimental Materials

- **[A N]$_{Subj}$ V Obj**

1. Un **po.TEN.TE pre.LA.TO** può imporre il suo punto di vista anche al papa
   A powerful prelate can impose the his point of view even to-the pope

2. Un **pro.VET.TO ten.NIS.TA** dovrebbe evitare un errore così plateale
   An experienced tennis-player should avoid a mistake so evident

3. Un **TI.pi.CO pre.TES.TO** comporta il dichiararsi malati anche se in ottima salute.
   A typical excuse involves the self-declaring sick even if in optimal health

4. Un **BRUT.TO POR.TO** diminuirebbe il valore touristo della nostra città
   An ugly harbor would-lower the value tourist of-the our town

5. Un **cor.RET.TO con.TAT.TO** determina l'accensione della spia verde.
   A correct contact determines the switching-on of the light green

- **[N A]$_{Subj}$ V Obj**

1. Un **pre.LA.TO po.TEN.TE** può imporre il suo punto di vista anche al papa
   A prelate powerful can impose the his point of view even to-the pope

2. Un **ten.NIS.TA pro.VET.TO** dovrebbe evitare un errore così plateale
   A tennis-player experienced should avoid a mistake so evident

3. Un **pre.TES.TO TI.pi.CO** comporta il dichiararsi malati anche se in ottima salute.
   An excuse typical involves the self-declaring sick even if in optimal health

4. Un **POR.TO BRUT.TO** diminuirebbe il valore touristo della nostra città
   An harbor ugly would-lower the value tourist of-the our town

5. Un **con.TAT.TO cor.RET.TO** determina l'accensione della spia verde.
   A contact correct determines the switching-on of the light green

- **Subj V [A N]$_{Obj}$ X**

1. Abbiamo contattato un **po.TEN.TE pre.LA.TO** con il permesso del papa
   (We) have contacted a powerful prelate with the permission of-the pope

2. Abbiamo bisogno di un **pro.VET.TO ten.NIS.TA** per la squadra olimpica
   (We) have need of an experienced tennis-player for the team Olympic

3. Gli studenti hanno usato un **TI.pi.CO pre.TES.TO** con pessimi risultati.
   The students have used a typical excuse with terrible results

4. Vorremmo evitare un **BRUT.TO POR.TO** proprio al centro della città
   (We) would-like to-avoid an ugly harbor at-the centre of-the town

5. Le componenti elettriche devono stabilire un **cor.RET.TO con.TAT.TO** prima di ogni accensione.
   The components electric must establish a correct contact before of every switching-on

- **Subj V [N A]$_{Obj}$ X**

1. Abbiamo contattato un **pre.LA.TO po.TEN.TE** con il permesso del papa
   (We) have contacted a powerful prelate with the permission of-the pope

2. Abbiamo bisogno di un **ten.NIS.TA pro.VET.TO** per la squadra olimpica
   (We) have need of a tennis-player experienced for the team Olympic

3. Gli studenti hanno usato un **pre.TES.TO TI.pi.CO** con pessimi risultati.
   The students have used an excuse typical with terrible results

4. Vorremmo evitare un **POR.TO BRUT.TO** proprio al centro della città
   (We) would-like to-avoid a harbor ugly at-the centre of-the town

5. Le componenti elettriche devono stabilire un **con.TAT.TO cor.RET.TO** prima di ogni accensione
   The components electric must establish a contact correct before of every switching-on

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