

Beyond Functional Sequence |

The Cartography of
Syntactic Structures,
Volume 10 |

Edited by
Ur Shlonsky

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EDITED BY UR SHLONSKY

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1

Can the Metrical Structure of Italian Motivate Focus Fronting?

GIULIANO BOCCI AND CINZIA AVESANI

1 Introduction

In languages like Italian, Catalan, and Hungarian—*rigid* languages in terms of Vallduví (1992a, 1993)—discourse-related properties profoundly impact on the order of the constituents in the sentence and their prosodic properties at the same time. In Italian, for instance, specific contextual conditions license fronting of a focus element to the left periphery of the clause: this results in a marked syntactic configuration, which associates with a distinctive prosodic pattern. What is observed is a systematic interplay between discourse-related properties, syntax, and prosody. How this interplay between prosody, syntax, and information structure is to be conceptualized is lively debated in the literature. The theoretical relevance of this issue is not marginal, because it gives rise to several core questions with regard to the architecture of the grammar.

According to the cartographic approach (Rizzi 1997; Cinque and Rizzi 2008; and much related work), some discourse-related properties are encoded as active features in the syntax, and focus fronting is an instance of feature-driven syntactic movement. Reinhart (1995, 2006) proposes a radically different view: focus and d-linking are encoded at PF (Phonetic Form). Building on Reinhart's work, Szendrői (2001, 2002) develops a model in which PF information is directly available at the conceptual-intentional interface. Under this approach, discourse-related phrasal movement is not feature driven, but takes place to repair potential mismatches at the PF-LF interface. Focus movement in Italian is analyzed as prosodically motivated by the need to align focus with main prominence and to destress *given* information (in the sense of Schwarzschild 1999). The key component of this analysis is that postfocal elements in Italian are extraprosodic and destressed.

The aim of this paper is twofold. First, we want to address the issue of the metrical representation of postfocal and *given* constituents in Italian. Second, we want to ascertain on empirical grounds the prosodic assumptions underpinning the stress-based approach to focus movement.

On the basis of a production experiment, we propose an analysis of the metrical structure of Italian according to which phrasing and head assignment apply exhaustively. We show that postfocal elements, though *given*, are assigned phrase-level metrical heads by virtue of default syntax-prosody mapping rules. Accordingly, we claim that Italian fails to destress *given* information, and that RIGHTMOSTNESS of prosodic heads is violated when focus does not occur in sentence-final position: postfocal constituents are neither extraprosodic nor destressed. These conclusions strongly undermine the stress-based approach. On the basis of a comprehension experiment, we further support the validity of our analysis showing that the distribution of phrase-level metrical heads and boundaries in postfocal contexts are used by listeners in sentence comprehension.

The paper is organized as follows. In section 2 we briefly present some properties of focus fronting in Italian, while in section 3 we introduce the cartographic approach and the stress-based approach. In section 4 we present the experimental results and discuss our analysis.

2 Focus Fronting in Italian

Focus fronting in Italian is licensed by precise semantic conditions (Bianchi 2013), characterized by specific syntactic properties (Rizzi 1997; Benincà 2001, a.o.), and associated with a distinctive prosodic pattern (Bocci 2013). Consider (2) in the context of (1). (1) illustrates an example of focus fronting, where the direct object (O) is fronted to the left periphery of the clause and bears main stress.

- (1) –A: Maria si era messa uno straccetto di H&M ieri
 Maria REFL be.PST.3SG put.PP a cheap dress of H&M yesterday
 sera.
 evening
 “Maria wore a cheap dress from H&M last night.”
- (2) –B: Un ARMANI si era messa, non uno straccetto di H&M.¹
 an Armani REFL be.PST.3SG put.PP not a cheap dress of H&M
 “An Armani (dress) (she) wore, not a cheap dress from H&M.”
 (adapted from Bianchi and Bocci 2012:3).

Before presenting the main properties of focus fronting, a consideration is relevant. Focus fronting in Italian cannot be viewed as a pure “stylistic” phenomenon

¹ For convenience, fronted foci are indicated in capital letters.

occurring in the PF branch of the derivation, because its availability strictly depends on the interpretative properties of the context (Bianchi and Bocci 2012). In much of the recent literature, it is generally assumed that a focus element can only be fronted if it conveys a contrastive focus interpretation, as opposed to an informational focus interpretation occurring in *wh*-question/answer pairs (see Belletti 2004, but also Brunetti 2004 for a different claim). However, Bianchi (2013) has recently proposed a more specific characterization arguing that a merely contrastive import of focus as defined in the alternative semantic approach (Rooth 1992 and related work) does not license focus fronting in Italian.

Consider now the exchange in (3) and (4). In this context, the focus structure of B's reply in (4) symmetrically contrasts the focused object *in situ* with an alternative provided in the negative tag. In this case, the focus structure has a merely contrastive import and focus fronting is not licit. As experimentally shown in Bianchi and Bocci (2012), (2) is completely inappropriate in the context of (3).

(3) –A: Maria era molto elegante ieri sera.
 Maria be.PST.3SG very elegant yesterday evening
 “Maria was very elegant last night.”

(4) –B: Si era messa un Armani, non uno straccetto di H&M.
 REFL be.PST.3SG put.PP an Armani not a cheap dress of H&M
 “(She) wore an Armani (dress), not a cheap dress from H&M.”

Bianchi argues that what licenses focus fronting in (2) in the context of (1) is a corrective import of focus, analyzed as a more specific case of contrastive focus. In B's reply corrective focus fronting introduces a complex conversational move that involves a partial denial of the proposition asserted by speaker A: Speaker B replaces the focus part of A's proposition, but leaves the background unaffected.

At the morphosyntactic level, fronted foci are clearly distinct from Cl(itic) L(eft) D(islocated) topics (Cinque 1990; Rizzi 1997; and much related work). The most perspicuous property distinguishing fronted foci from CLDed topics concerns the distribution of resumptive clitics: a CLDed object always involves the occurrence of a resumptive clitic as shown in (5), while a focused object fronted to the left periphery can never be resumed by a clitic (6).

(5) a –A: Quando hai incontrato le sorelle di Gianni?
 when have.2SG meet.PP the sisters of Gianni
 “When did you meet Gianni's sisters?”
 b –B: Veronica, *(la) ho incontrata ieri.
 Veronica her.CL have.1SG meet.PP yesterday
 “(As for) Veronica, I met her yesterday.”

Under this view, syntax and prosody do not constitute two alternative or disjointed strategies/machineries to express discourse-related properties (as in Vall-duví 1992b and Zubizarreta 1998: 92–3). Discourse-related features are encoded in the initial numeration and drive the syntactic computation. At spell out, a syntactic representation in which discourse-related properties are explicitly marked is handed to the syntax-phonology interface. Default and feature-sensitive mapping rules apply to this representation and their interaction outputs the prosodic representation. In (7), for instance, the focus feature specified in the representation in input calls for the application of marked mapping rules that assign main stress to the fronted focus, preventing default rules from applying.

Under this approach, syntax fully mediates between meaning and sound, and a direct link between PF and LF can be dispensed with, in compliance with the T-model of grammar. This, however, does not entail that the phonological computation dissolves into syntax. The phonological computation is fed by the syntactic representation and discourse-related features, however it elaborates on the input in accordance with its *intrinsic rules*. Because of this, the phonological computation does not guarantee in the output representation an invariant one-to-one correspondence between prosodic properties, on the one hand, and syntactic structures and information structure properties, on the other (Ghini 1993; Bocci 2013). Notice that these “opaque” relationships between discourse-related properties and prosodic properties could not be easily derived in the model of Reinhart (2006), in which discourse-related properties are coded at PF.

3.2 FOCUS FRONTING: STRESS-BASED APPROACH

The cartographic assumption that discourse-related notions like focus and topic are coded and active in the syntax is controversial in the literature (see the criticism presented in Horvath 2010, a.o.). Szendrői (2001) argues in detail against the notion of a focus feature, which is rejected as a superfluous and problematic way to encode prosodic information in the syntactic representation. Along the lines of Reinhart (1995), Szendrői develops a model in which the discourse-related properties of focus and d(iscourse)-linking are *prosodically* encoded (see also Reinhart 2006). Departing from the T-model of grammar, it is postulated that PF and LF directly communicate in the grammar: PF information is directly available at the conceptual-intentional interface, where the principles in (8) and (9) apply (Szendrői 2001: 12–15).

(8) *Stress-focus correspondence principle*

The focus of a clause is any syntactic constituent that contains the main stress of the intonational phrase corresponding to the clause (from Reinhart 1995: 62).

(9) *Anaphoric interpretation principle*

Material is discourse-linked if it is unstressed.

When the focus element does not occur in the position to which default prosodic rules assign main stress, operations apply to guarantee the alignment between main stress and focus. Such operations are subject to economy. Languages may apply different repair operations to guarantee the alignment between focus and main stress. In English, phonological operations are preferred to solve cases of mismatch between PF and LF. In other languages, the prosodic system may be more rigid and prosodic operations may be unavailable. Given the assumptions of the model at issue, syntactic processes can be driven by phonological needs, when this is relevant at the interface with the conceptual-intentional system: syntactic movement may be exploited to solve the cases of mismatch.

In Italian, default prosodic rules assign metrical heads rightmost at each level of the prosodic hierarchy higher than the phonological word level. RIGHTMOSTNESS holds at the levels of phonological phrase (ϕ), intonational phrase (i), and phonological utterance (v) (see Nespor and Vogel 1986). Unlike English, Italian fails to destress d-linked elements *in situ*. According to Szendrői, Italian exploits two alternative processes to destress d-linked elements: (1) syntactic right dislocation, and (2) prosodic right dislocation.² In case of syntactic right dislocation (RD), RDed elements are assumed to be IP-adjoined. Because of this, they would not be integrated into the prosodic representation of the sentence. As a result, RDed elements would be extrametrical, and thus destressed.

Szendrői argues that when the whole IP is d-linked with the exception of the focus element, syntactic RD is not available, because the d-linked part of the sentence is not a syntactic constituent. Prosodic RD then would apply, giving rise to focus fronting. Consider (10) from Szendrői (2002: 31). Her analysis goes as follows: first, a syntactic movement displaces the focus element to the left periphery (see (11)); second, a special syntax-prosody mapping rule inserts the right edge of the intonational phrase after the focus element. In the resulting configuration (see (12)), postfocal elements would not constitute an intonational phrase on their own: postfocal elements are claimed to be extrametrical, invisible to stress assignment rules, and hence destressed: (9) is fulfilled. Moreover, the focus constituent is the only element within the intonational phrase to which stress rules apply. As a result, focus would be aligned with main stress in compliance with (8) and RIGHTMOSTNESS would be fulfilled.

- (10) LA PIZZA Pietro ha mangiato
 the pizza Pietro have.3SG eat.PP
 ‘The pizza Pietro ate.’

² Samek-Lodovici (2006) proposes an analysis of focus fronting in Italian that is similar to Szendrői proposal in many respects. He argues that focus fronting is not feature driven, but results from RD of postfocal material. A key component of this analysis is that fronted foci do not c-command postfocal elements. Accordingly, a detailed comparison between Samek-Lodovici’s proposal and Rizzi’s analysis lies beyond the purview of the present paper, because it pertains to syntactic aspects (see Bocci 2013).

- (11) ${}_{IP}[\text{Pietro ha mangiato [LA PIZZA]}] \rightarrow [[\text{LA PIZZA}]_i]_{IP}[\text{Pietro ha mangiato } t_i]$
 (12) $[(\text{LA PIZZA})_\phi]_i(\text{Pietro})_\phi (\text{ha mangiato})_\phi$ (adapted from Szendrői 2002: 31)

Szendrői analysis of Italian is based on two specific assumptions concerning the prosodic structure of Italian. First, main stress is assumed to be invariably assigned rightmost within the intonational phrase corresponding to the clause. Accordingly, the element associated with main stress would be always followed by an intonational phrase boundary. Second, any element following main stress is assumed to be extraprosodic and destressed. Postfocal material can thus be interpreted as d-linked in compliance with (9).

Several insights in Szendrői proposal are anticipated in Vallduví's (1992a, 1993) analysis of focus fronting in Catalan. According to Vallduví, Catalan is characterized by a rigid prosodic template: main stress is invariantly assigned to the rightmost element in the sentence and cannot be shifted by prosodic operations. Catalan would exploit syntactic displacement to align the constituents with the relevant slots in the prosodic template. Right dislocated elements are assumed to be external to the prosodic template and, thus, RD allows nonfocal elements to evacuate the main stress position and focus to align with main stress. According to Vallduví, focus fronting in Catalan is an epiphenomenon: it results from (syntactic) RD of postfocal constituents.

4 Metrical Structure and Focus fronting

The cartographic approach and the stress-based approach account for focus fronting in a radically different way and the choice between the two models has strong theoretical consequences. Leaving aside theoretical considerations, whether focus movement is to be analyzed as prosodically motivated or not is an issue that can be empirically addressed. The stress-based approach relies on the specific assumptions concerning the phonological properties of postfocal elements: they are claimed to be destressed and extrametrical.

4.1 WHAT IS THE PROSODIC STATUS OF POSTFOCAL CONSTITUENTS?

In many languages it is observed that when focus precedes the background, the latter is prosodically subordinated at the intonational level and at the metrical level. With regard to English, it is often claimed that postfocal elements lack prosodic prominence, being destressed and deaccented. In most cases, they are realized with a flat and low pitch contour and do not bear phrase-level metrical prominence (Selkirk 2008, a.o.). Féry and Samek-Lodovici (2006) and Selkirk (2008) argue that the prosodic effects of focus in English are to be

imputed to two distinct rules/constraints interacting with default prosodic rules. The CONTRASTIVE FOCUS PROMINENCE RULE (Truckenbrodt 1995) simply states that a focus phrase must be the most prominent element within its scope. DESTRESS/DEACCENT GIVEN (Féry and Samek-Lodovici 2006) requires that a *given* element (in the sense of Schwarzschild 1999) must be prosodically non-prominent: a *given* phrase cannot associate with a pitch accent and bear phrasal stress. Under this approach, *given* elements in postfocal context are destressed and deaccented/unaccented by virtue of DESTRESS/DEACCENT GIVEN.

While destressing of *given* information is a pervasive phenomenon in Germanic languages, many authors have argued that Romance languages fail to DESTRESS/DEACCENT GIVEN information *in situ* (Swerts et al. 2002; a.o.). Moreover, in many Romance languages, postfocal elements, despite their being *given*, are systematically associated with special compressed pitch accents. For instance, this has been observed in several southern varieties of Italian (D'Imperio 2002; Grice et al. 2005). Tuscan Italian apparently patterns with English because postfocal elements are generally realized with a flat and low contour like in English. However, it has been argued in Bocci (2013) that Tuscan Italian does not substantially differ from other Italian varieties and that postfocal elements in Tuscan are not unaccented, but rather associated with a L^* pitch accent, whose distribution is ruled by the occurrence of a focus phrase.

The empirical observation that postfocal elements are not deaccented in Italian could suggest that they are not extraprosodic. However, it could be the case that the pitch accents occurring in postfocal context are associated with lexical stress, rather than phrase-level metrical heads. If this were the case, we could maintain the view that postfocal elements in Italian are destressed and extraprosodic.

4.2 FOCUS AND PHRASING

Szendrói (2001, 2002) claims that the focus element associated with main prominence is invariably followed by an intonational phrase boundary separating the main intonational phrase from the rest of the RDed clause (see also Samek-Lodovici 2006 and related work). However, this assumption is not substantiated by empirical evidence. On the basis of sandhi phenomena, Frascarelli (2000) proposes that fronted foci are followed by an intonational phrase boundary only when they are not adjacent to the verb, while a phonological phrase boundary occurs in the other cases.

Bocci (2013) carried out a production experiment designed to test the pre-boundary lengthening effect associated with different elements occurring in the left periphery of the clause. He observes that the prosodic boundary associated with contrastive and partial topics is significantly stronger than the boundary associated with fronted foci. Accordingly, he concludes that while these types of topics are followed by an intonational phrase boundary, fronted foci are followed

Table 1.1 Examples of experimental sentences from Bocci and Avesani (2011). The target word *invitare* [in.vi.'ta.re] “to invite” is indicated in boldface.

| Condition | |
|-----------|--|
| A | [Germanico vorrebbe invitare Pierangela] _{BF} 'Germanico would like to invite Pierangela' |
| P | [Germanico] _F vorrebbe invitare Pierangela 'Germanico would like to invite Pierangela' |
| H | [Germanico] _F la vorrebbe invitare [Pierangela] _{RD} 'Germanico her-would like to invite Pierangela' |

conditions is reported in Table 1.1. The goal was to compare the prosodic properties of the infinitival verb form—the target word—across the following conditions: A(ccented), P(ostfocal), H(ead).³

In condition A, the infinitive occurs in a transitive sentence with the basic word order (SVO). The experimental sentence was preceded by a context inducing a broad focus (BF) interpretation. In conditions P and H, the infinitive occurs postfocally, because the context induced a corrective focus interpretation on the preverbal subject. In contrast to condition P, the sentence in H included an object clitic. The occurrence of the object clitic was expected to force the speaker to interpret the object as an RDed topic, because object clitics cannot cooccur with objects *in situ* in Italian.

4.3.1 Rationale

The rationale of the experiment is related to the metrical status of the infinitive—the target word—in H as opposed to A and P. Consider Table 1.2.⁴

In condition A, the infinitive is expected to form a phonological phrase (ϕ) along with its object (Nespor and Vogel 1986). Within this ϕ , the head should be assigned to the object because it occurs rightmost. Accordingly, the infinitive should not bear any degree of prominence higher than lexical stress. Analogously, the infinitive in condition P, being followed by its object, should not qualify as a phrasal head, regardless of the metrical status of postfocal material.

³ The experiment tested six conditions, but for the sake of simplicity the discussion will focus only on three. We refer the reader to Bocci and Avesani (2011) for a detailed presentation of the experiment.

⁴ The heads assigned to the last constituent were not experimentally tested. Because we conclude that the head to the infinitive is assigned only by virtue of default mapping rules concerning the prosodic well-formedness, we generalize the assignment of a head to every constituent.

Table 1.2 **Metrical structures proposed in Bocci and Avesani (2011).**

| | | | | |
|-----------|---|-----------------------------|------------------------------|--------------|
| A | { | * | } | _v |
| BF | [| * |] | _t |
| | (| * |) | _φ |
| | Germanico | vorrebbe invitare | Pierangela | |
| | 'Germanico would like to invite Pierangela' | | | |
| P | { | * | } | _v |
| initial F | [| * |] | _t |
| | (| * |) | _φ |
| | [Germanico] _F | vorrebbe invitare | Pierangela | |
| | 'Germanico would like to invite Pierangela' | | | |
| H | { | * | } | _v |
| initial F | [| * |] | _t |
| RDed O | (| * |) | _φ |
| | [Germanico] _F | la vorrebbe invitare | [Pierangela] _{RDed} | |
| | 'Germanico her-would like to invite Pierangela' | | | |

In condition H, however, the occurrence of the object clitic should induce the speaker to interpret the object as right dislocated. Because of this, the object in H should be phrased into an independent intonational phrase and an *t*-boundary should be inserted after the infinitive to set apart the RDed object. If this is the case, then the inflected verb and the infinitive occur between the *φ*-boundary closing the focused subject and the *t*-boundary setting apart the RDed object. Accordingly, they should be wrapped in an independent *φ*. If this is correct, then the infinitive in H is rightmost within a *φ*. At the same time, however, the infinitive occurs in postfocal context and is d-linked and part of the background. Given this configuration, it is possible to formulate two alternative hypotheses concerning the metrical status of the infinitive in H:

- i. If default prosodic rules apply in postfocal context, the *φ* containing the infinitive in H should be assigned a *φ*-head. This is expected under standard assumptions on prosodic well-formedness: each prosodic constituent must be headed (Nespor and Vogel 1986; Selkirk 1995). As a result, the infinitive should bear a *φ*-head, because it occurs rightmost within the phonological phrase.
- ii. If default rules cannot assign phrasal stress to *given*, d-linked elements occurring postfocally, the prosodic constituent wrapping the infinitive should be left unheaded.

If the first hypothesis is correct and default prosodic rules assign a *φ*-head on the infinitive in H, the stressed syllable of the infinitive should be more prominent

in condition H than in A or P, because in the latter cases, the infinitive does not qualify as a phrasal head. On the contrary, if the second hypothesis is correct and postfocal constituents cannot bear phrasal stress, the stressed syllable of infinitive should not be more prominent in H than in A and P: in all the conditions the infinitive would bear only lexical stress.

4.3.2 Results and Discussion

The results clearly showed that the object in H was phrased as an independent intonational phrase. The occurrence of a *t*-boundary between the infinitive and the object in H was shown by a strong effect of preboundary lengthening: the final vowel of the infinitive in condition H was significantly longer than in A and P. See Figure 1.2. In condition H, therefore, the infinitive actually occurred rightmost within a postfocal prosodic constituent. This made it possible to test the two alternative hypotheses concerning the assignment of stress in postfocal context.

Leaving aside F0, all the acoustic parameters of prominence pointed to the conclusion that the infinitive was realized with a higher degree of prominence in H than in A and P. The stressed vowel of the target word in H was characterized by significantly longer duration values, more extreme formant trajectories, and higher spectral emphasis. Notably, the stressed vowel in H resulted to be 75 milliseconds longer (i.e., 79 percent) than in A and P. These phonetic parameters clearly index hyperarticulation and increase in articulatory effort.

These findings show that postfocal elements are not destressed. A postfocal element, although *given* and part of the background, is assigned phrasal stress when it occurs in a metrically strong position. This is so because default stress rules apply in postfocal context: the target word in condition H can be assigned a phrasal metrical head only by virtue of prosodic well-formedness conditions imposing a head on the prosodic constituent created by the occurrence of the *t*-boundary. An alternative view could be that the occurrence of the head derives

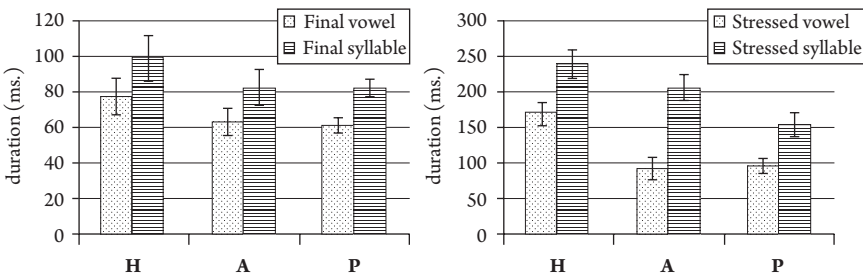


Figure 1.2 Duration values of the target word across conditions (C.I. 95 percent): final vowel/syllable (left panel) and stressed vowel/syllable (right panel).

from the discourse-related properties of the infinitive. But this cannot be the case. The insertion of the ι -boundary before the object in H may be viewed as necessitated by the syntactic configuration involved in RD or by the discourse-related properties characterizing RDed topics. In any event, these properties pertain to the object, not to the infinitive. Indeed, the discourse-related properties associated with the infinitive do not differ between H and P⁵, nor does the infinitive occupy different positions in the syntactic representation. What differs is the position in which the infinitive occurs within the prosodic structure.

Let us now consider how these results can be accounted for. It is nearly uncontroversial that RDed elements form independent intonational phrases. For the sake of argument, let us simply imagine that this results from a rule: IWRAPRDTOPIC. Recall from section 4.1 that Féry and Samek-Lodovici (2006) and Selkirk (2008) argue that both the CONTRASTIVE FOCUS RULE and DESTRESS/DEACCENT GIVEN, interacting with default rules, govern the distribution of prosodic prominence in English. As for Italian, we propose that DESTRESS/DEACCENT GIVEN is not active, whereas the CONTRASTIVE FOCUS RULE holds. The interaction of default rules, the CONTRASTIVE FOCUS PROMINENCE RULE, and IWRAP-RD TOPIC straightforwardly derive the prosodic structures in Table 1.2, as the reader can easily verify.

As for condition H, IWRAP-RD TOPIC calls for a ι -boundary to coincide with the right edge of the RDed topic, and this forces the infinitive to appear rightmost within an independent phonological phrase. At the φ -level, all the phonological phrases are then rightmost headed by default rules (DESTRESS GIVEN being inactive). At the ι -level and the ν -level, the CONTRASTIVE FOCUS PROMINENCE RULE applies and imposes the relevant heads on focus, preventing default rules from assigning heads rightmost.

Because postfocal material is not destressed and phrasal metrical heads are assigned in postfocal context, rightmost is not inviolable in Italian when main stress occurs in nonfinal position. The alignment between focus and main prominence must involve a special procedure like the CONTRASTIVE FOCUS PROMINENCE RULE, because it cannot be achieved by making postfocal elements extraprosodic. Therefore, the prosodic structure of Italian is not rigid in the sense of Vall-duví. Given the proposed analysis, we can conclude that the prosodic system of Italian is rigid in the sense that it fails to destress *given* information and that postfocal constituents must be exhaustively phrased and headed.

These conclusions disconfirm the prosodic assumptions of a stress-based approach in which focus fronting results from the prosodic need to destress *given* elements and to align focus to the position in which it is invariantly assigned in

⁵ Beaver et al. (2007) show that second occurrences of focus in English are not associated with pitch accents, but are marked by a special degree of metrical prominence. Crucially, the infinitive in H does not qualify as a second occurrence of focus.

compliance with RIGHTMOSTNESS. In our view, our results exclude an analysis of focus movement as prosodically motivated. First, postfocal *given* elements are neither destressed, nor extraprosodic in Italian. Second, focus fronting gives rise to marked prosodic structures in which RIGHTMOSTNESS is violated by the occurrence of postfocal heads. This means that focus fronting gives rise to exactly the configurations that it should prevent. In a language like Italian, in which given information cannot be destressed and in which the heads are assigned rightmost, leftward focus movement cannot be prosodically motivated. Consider again (2): the object moves from the rightmost position to occupy a left peripheral position. In light of our analysis, it means that a focus element leaves the position where main prominence is assigned by default to occupy a prosodically marked position. Moreover, after focus movement, the verb forms an independent ϕ : accordingly, focus movement triggers the assignment of a ϕ -head to the given verb.

4.4 COMPREHENSION EXPERIMENT: THE PSYCHOLOGICAL REALITY OF THE POSTFOCAL PHRASAL HEADS

The results of Bocci and Avesani lead to the conclusion that that Italian fails to destress given information and that postfocal constituents are associated with phrase-level heads. However, one may question the validity of these results, which are obtained by means of a laboratory phonology experiment using read speech. To confirm the validity of the prosodic model discussed in section 4.3.2, we carried out a comprehension experiment using manipulated stimuli.

4.4.1 *Rationale*

The rationale of the comprehension experiment is based on two morphosyntactic properties of Italian. First, a clitic cannot double a focus element. Second, RDed objects always involve a resumptive clitic, whereas subjects do not.

Recall that according to our analysis, the occurrence of the object clitic in Condition H forced the object to be interpreted by the speaker as right dislocated: an ι -boundary was thus inserted between the RDed object and the infinitive, and this determined the assignment of a ϕ -head to the latter. The right dislocated status of the object is thus prosodically signaled by the occurrence of the ι -boundary and the ϕ -head (see Table 1.3).

That said, consider the following reasoning. If we manipulate a sentence produced under Cond. H by deleting the object clitic from the segmental string, in the resulting sentence the ϕ -head of the infinitive and the ι -boundary at its right edge still cue the final proper name (DP2) as right dislocated: see Table 1.3, Cond. H1. However, because there is no object clitic, DP2 cannot be interpreted as a RDed object. Consider now that the first proper name (DP1) is focused and could thus be interpreted either as a focused subject or as a fronted focused object. Given

Table 1.3 Comprehension experiment conditions.

| | |
|---|--|
| <p>Cond. H1 (Deleted clitic)</p> <p><u>Unmanipulated</u> prosody: +head; + boundary</p> $\left\{ \begin{array}{c} * \\ * \\ * \end{array} \right\}_v$ $\left[\begin{array}{c} * \\ * \end{array} \right]_i \left[\begin{array}{c} * \\ * \end{array} \right]_i$ $\left(\begin{array}{c} * \\ * \end{array} \right)_\varphi \left(\begin{array}{c} * \\ * \end{array} \right)_\varphi \left(\begin{array}{c} * \\ * \end{array} \right)_\varphi$ <p>[Germanico]_F la vorrebbe invitare [Pierangela]_{RDeD}</p> | <p>Cond. P1</p> <p><u>Manipulated</u> prosody: added head and boundary</p> $\left\{ \begin{array}{c} * \\ * \\ * \end{array} \right\}_v$ $\left[\begin{array}{c} * \\ * \end{array} \right]_i \left[\begin{array}{c} * \\ * \end{array} \right]_i$ $\left(\begin{array}{c} * \\ * \end{array} \right)_\varphi \left(\begin{array}{c} * \\ * \end{array} \right)_\varphi \left(\begin{array}{c} * \\ * \end{array} \right)_\varphi$ <p>[Germanico]_F vorrebbe invitare [Pierangela]_{RDeD}</p> |
| <p>Expected interpretation:</p> <p>DP1=O_F would like to invite DP2=S_{RDeD}</p> | <p>Expected interpretation:</p> <p>DP1=S_F DP2=O_{RDeD}</p> |
| <p>Cond. H0 (Deleted clitic)</p> <p><u>Manipulated</u> prosody: deleted head and boundary</p> $\left\{ \begin{array}{c} * \\ * \\ * \end{array} \right\}_v$ $\left[\begin{array}{c} * \\ * \end{array} \right]_i \left[\begin{array}{c} * \\ * \end{array} \right]_i$ $\left(\begin{array}{c} * \\ * \end{array} \right)_\varphi \left(\begin{array}{c} * \\ * \end{array} \right)_\varphi \left(\begin{array}{c} * \\ * \end{array} \right)_\varphi$ <p>[Germanico]_F la vorrebbe invitare [Pierangela]_{RDeD}</p> | <p>Cond. P0</p> <p><u>Unmanipulated</u> prosody: -head; -boundary</p> $\left\{ \begin{array}{c} * \\ * \\ * \end{array} \right\}_v$ $\left[\begin{array}{c} * \\ * \end{array} \right]_i \left[\begin{array}{c} * \\ * \end{array} \right]_i$ $\left(\begin{array}{c} * \\ * \end{array} \right)_\varphi \left(\begin{array}{c} * \\ * \end{array} \right)_\varphi \left(\begin{array}{c} * \\ * \end{array} \right)_\varphi$ <p>[Germanico]_F vorrebbe invitare Pierangela</p> |
| <p>Expected interpretation:</p> <p>DP1=S_F would like to invite DP2=O_{in situ}</p> | <p>Expected interpretation:</p> <p>DP1=S_F would like to invite DP2=O_{in situ}</p> |

the morphosyntactic and prosodic properties of the sentence in H1, we expect the sentence to be interpreted in comprehension as OVS, DP1 being interpreted as a focused object fronted and the DP2 being interpreted as an RDed subject. OVS is the only interpretation compatible with the prosodic and morphosyntactic properties.

Now, suppose that we further manipulate the sentence in H1 by deleting the phonetic correlates of the ϕ -head on the infinitive and of the ι -boundary at its right edge as illustrated in Table 1.3, Cond. H0. Because no prosodic cue marks DP2 as right dislocated, a SVO order should be restored, the object being *in situ*.

Consider now a sentence produced under condition P, reported in Table 1.3 as Cond. P0. It should be analyzed as SVO; however, if we add the phonetic correlates of the ϕ -head and of the ι -boundary, the resulting sentence (Cond. P1) should be interpreted as OVS like the analogous sentence in H1.

4.4.2 Methodology

We tested these hypotheses by means of a forced-choice comprehension experiment. Twelve native speakers of Tuscan Italian were asked to identify the agent (i.e., the subject) in sixty-four experimental stimuli (presented along with sixty-four fillers). Out of the sentences produced by four speakers in the production experiment, we collected a first set of sixteen sentences produced in condition P and a second set of sixteen sentences produced in condition H. Following the design in Table 1.3, each set was tested twice: as P0 and P1 and as H1 and H0: $(16 \times 2) + (16 \times 2) = 64$.

The sixteen sentences originally from P were not manipulated at all when tested as P0. When presented as P1, the sentences were manipulated by increasing the duration of the segments belonging to the stressed syllable and to the final syllable of the infinitive: *invi*[¹ta.re] (respective coefficients = *1.17; *1.77; *1.05; *1.27). As for the sixteen sentences from H, we manually deleted the object clitic. When tested as H1, the sentences did not undergo any other manipulation process. When the sentences were tested as H0, we additionally shortened the segments of the stressed syllable and of the final syllable.

The durations were manipulated using Praat scripts by applying the coefficients calculated after the production experiment. Notice that to transform the prosodic structure (i.e., $\pm \phi$ -head; $\pm \iota$ -boundary), we manipulated only the duration values of the infinitive, although the stress vowel differed between H and P with regard to other parameters. The pitch contour was not manipulated.

The presentation was pseudorandomized and fully counterbalanced. The trial started after 1,000 milliseconds of white noise followed by 2,000 milliseconds of silence. The 2×2 design included as factors: "condition in production" (from H vs. P) and "prosodic properties of the infinitive" ($+\phi$ -head; $+\iota$ -boundary vs. $-\phi$ -head;

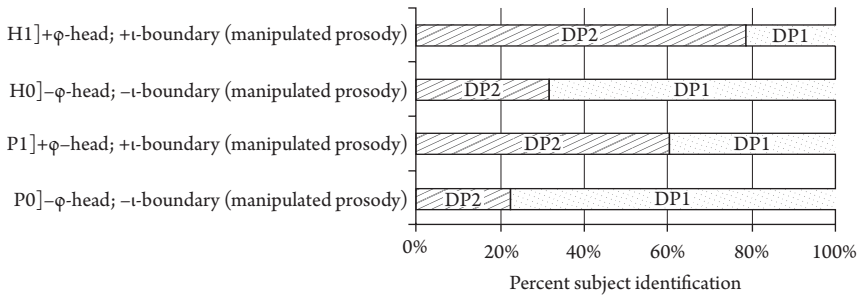


Figure 1.3 Comprehension experiment results.

-ι-boundary). The response data were fitted into a mixed-effect logit model (item and subject specified as random factors).

4.4.3 Results

The predictions were borne out, as shown in Figure 1.3.

When the infinitive is characterized by the durations correlating with the φ-head and the ι-boundary, the preferred interpretation is OVS. When the φ-head and the ι-boundary do not occur, the preferred interpretation is SVO. The factor “prosodic properties of the verb” significantly impacts the interpretation of DP2 as the subject ($p < .001$), while the factor “condition in production” does not ($p > .05$). Notably, the interaction between the two factors was not significant ($p > .05$). This indicates that the prosodic properties of the infinitive affect the interpretation of the subject, regardless of the fact that the prosody is manipulated or unmanipulated.

These results demonstrate the psychological reality of the analysis proposed on the basis of the production experiment: postfocal material is phrased and headed and the distribution of heads and boundaries in postfocal context is used by speakers in comprehension.

In conclusion, we want to emphasize that these findings demonstrate the central role of Prosodic Phonology, which mediates between the phonetic realization of an utterance and its abstract syntactic representation: small duration differences in relevant positions lead to a specific metrical representation and this, in turn, leads to a specific syntactic representation.

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