Final compression in French as a phrasal phenomenon*

Caroline Féry
University of Frankfurt

Final compression in French is examined from a theoretical perspective and illustrated with experimental data. In French, only final prosodic domains that are at least the size of a prosodic phrase (Φ-phrase) may be subject to final compression. Prosodic units that are smaller than Φ-phrases, such as prosodic words (ω-words) or syllables, cannot be compressed. Therefore, final compression is a phrasal phenomenon. This conclusion is confirmed in a comparison between sequences consisting of a noun + adjective and verb + argument on one hand, and verb + adjunct on the other. Syntactic expressions of the first kind are integrated into single Φ-phrases, and final compression does not take place. Syntactic sequences of the verb + adjunct variety, however, form separate Φ-phrases, and final compression may occur.

1. Introduction

In this chapter, compression of register as a consequence of the givenness of final constituents is examined for European French. I argue that compression (sometimes called 'deaccenting' or 'dephrasing') cannot take place at the level of the prosodic word (ω-word) and propose that, in French, register compression triggered by information structure takes place in prosodic domains of at least the size

* Many thanks to Fatima Hamlaoui for her contribution to this chapter. Without her, this chapter would not have been possible. She partly designed the experiment, made the recordings in Paris, and conducted the statistical analysis of the data on which the tendencies shown in the present paper are based. Discussions with her have been very fruitful for sharpening my thoughts on many of the issues contained in this paper. Thanks also to Anja Arnhold, Shinichiro Ishihara, Sara Myrberg, and Christelle Portes for helpful comments on a previous version of this chapter, to Kirsten Brock for correcting my English, and to Sascha Coridun, Viviana Haase, Katrin Müller, and Anna Roth for their technical help. Last but not least, my deep gratitude goes to Stacey Katz Bourns and Lindsy L. Myers for their editorial work and many useful comments. I am solely responsible for the content of the chapter.

of a prosodic phrase (Φ-phrase). Because of this property, French differs from Germanic languages, which can compress any prosodic constituent, as long as it is, at the minimum, the size of a syllable.

The experiments presented in this chapter compared the prosodic realization of focused and post-focal given material in noun phrases with that in sentences containing an argument or an adjunct. The noun phrases investigated consisted of a noun and an adjective, and the sentential constituents consisted of an adjunct or an argument inserted into complete sentences. The pragmatic framework for this study employs Lambrecht's (1994) terminology. Focus is defined as "the semantic component of a pragmatically structured proposition whereby the assertion differs from the presupposition" (213). The given part of the discourse (or what Lambrecht refers to as "presupposed") is that which is mentioned in the preceding discourse (see also Krifka 2008 for definitions of focus and givenness).

The differences between utterances containing an adjunct and those containing an argument lead to a new approach to the study of the prosodic structure of French sentences, based primarily on properties of prosodic phrasing, and less so on the notion of 'accent.' Variations in pitch due to information structure take place at the level of the Φ-phrase, and not at the word- or syllable-level. This property is related to the fact that French words do not have designated syllables that can be assigned pitch accents in the same way as in Germanic languages. The results reported in this chapter are limited to French, but they may be incorporated into a larger perspective on intonational typology. It is important to question whether the tone primitives discovered by Bruce (1977) and Pierrehumbert (1980) may be adopted for other languages without any modifications or whether some adjustments may be necessary. The analysis of French intonation offered in this chapter shows that the second option may be better.

In the next section, the theoretical background of French prosody is reviewed. In Sections 3 and 4, experimental results are summarized: Section 3 examines post-focal compression in the noun phrase, and Section 4, final compression in the sentence. Section 5 contains a discussion and a conclusion; the results are discussed and incorporated into a phrasal approach to prosodic structure.

2. Background

Articles by Jun and Fougeron (2000, 2002) contain the first formal approach to French prosody couched in the framework of autosegmental intonation, and their work is often taken as a reference for investigations into French intonation (for some of the most recent and influential works, see Post 2000; Delais-Roussarie et al. 2002; Beyssade, Marandin and Rialland 2003; Dohen and Loevenbruck 2004; Welby 2006; Astésano, Bard and Turk 2007; Beyssade et al. 2009; D'Imperio and

Michelas 2010; German and D'Imperio 2010; and Portes, D'Imperio and Lancia 2012). The results presented below, however, do not always agree with the previous literature, and some changes in the theoretical framework are proposed.

Jun and Fougeron claim that the primary tonal pattern of a non-final Φ-phrase (which they call "Accentual Domain" or AD) is characterized by an initial rise at the beginning and a final rise at the end of the domain. They analyze the first rise as a phrasal boundary and the second one as a pitch accent. The initial rise is called LHi and the final rise LH*, a terminology that is not adopted here for reasons that will become clear below. All other tonal patterns in the AD are variations of this primary tonal configuration. Jun and Fougeron propose that the four tones standing for the two rising contours just described are always present in an underlying form but are often truncated in surface realizations. One or two tones may be absent. Furthermore, the last high pitch accent may be replaced by a low pitch accent, leading to a large diversity in tonal realizations and to a model that is nearly impossible to falsify. The contours explicitly allowed are: LHiLH*, LH*, LLH*, LHiH*, HiLH*, LHiH*, LHiL* and LHiLL*, all accounting for different tonal patterns. The only common feature of these contours is that they have at least one bitonal contour, which can be rising or falling.

Important developments and applications of Jun and Fougeron's analysis are found in the work of Welby (2006), who investigated (through a series of experiments) the patterns derived from the basic LHiLH* that are actually used in declarative sentences containing a focus, concentrating on how the tones are anchored to the text and aligned phonetically. She finds that the initial low is most often located on the boundary between the first function word and the first content word and that it can stretch backward to mark the beginning of the domain. The following high tone is less stable and can be associated with the first, second, or third syllable of the first content word. The low and high tones of the final rise may be aligned with the same final syllable, but the low starting point may also be located on the preceding syllable.[1] Welby finds "huge" variation in the anchoring of this low tone, but the last H is consistently aligned with the last syllable. In sum, the peripheral tones (L in the case of the initial rise, and H in the case of the late rise) are anchored in a stable way, but the internal tones (H in the initial rise, and L in the final rise) vary greatly in their association behavior. She also finds an important difference between the two rises in duration data, which corroborates results of other studies, such as Jun and Fougeron's (2000, 2002) and Rolland and Loevenbruck (2002). The last H is accompanied by syllable lengthening, while the first one is not. Results of articulatory studies also reveal that the first H is articulated more weakly than the last one (see Rolland and Loevenbruck 2002). Welby thus confirms Jun and Fougeron's (2000, 2002) distinction between the initial and the final rise but at the same time proposes

1. See also Post (2000) for a similar finding, albeit within a different framework.

that the difference between them is structural. In the conclusion of her paper, she tentatively suggests that both the initial and the final contours, and not only the initial one, mark boundaries, emphasizing the difference between French and English with regard to the role played by pitch accents. Due to variation in alignment, the rises in French do not behave like typical pitch accents since they cannot be claimed to be associated with a metrically strong syllable.

It should be noted that the function of the two rises is the subject of a larger debate in the literature. The late rise is sometimes called 'primary phrase-Final Accent' or 'FA' and the early rise 'secondary Initial Accent' or 'IA' (see Astésano, Bard and Turk 2007, who use this terminology in recent work). In this approach, both the initial and the final rises are accentual. This view aligns with previous studies on French that distinguish between the so-called *accent logique* or *accent grammatical* for the final tonal contour and the *accent d'insistance* for the initial one (see, for example, Grammont 1933; Malmberg 1969; Léon 1972; Martin 1975, 1980; Rossi 1980; Dell 1984; and Mertens 1990). Some scholars, however, distinguish the initial accent from the *accent d'insistance* (see, for example, Di Cristo 1998: 198).

In the same vein, Delais-Roussarie (1995), Post (2000, 2002), and Gussenhoven (2004: 253) propose that the high tones of both the early and the late rise should be treated as pitch accents, similar to those found in the Germanic languages. For Post (2000: 159), only the early L tone is treated as an initial boundary tone, while the second low tone is described as a tone that is inserted between two high pitch accents. By contrast, Hirst and Di Cristo (1996) and Di Cristo (1998) claim that the early rise and the late rise are both delimiting domains called Tonal Units.

To conclude, it is clear that the authors working on the intonation of French agree more on the form of the tones than on their function. I will argue in Section 5 for a decidedly phrasal approach to French intonation, supporting the view that the tonal contours are of a phrasal nature and that they differ functionally from the pitch accents of the Germanic languages (see also Féry 2001 for data investigating the effects of information focus on intonation, and Féry et al. 2010 for spontaneous data containing new and given material).

Some researchers, such as German and D'Imperio (2010) and D'Imperio and Michelas (2010), have investigated how variations in syntax and information structure can be modeled using Jun and Fougeron's prosodic structure. German and D'Imperio (2010) study the optionality of the first rise. Their experiments investigated object phrases such as *le merlan aux navets/aux macadamias* 'the whiting with turnips/with macadamias' in questions. They found that the initial rise is more likely to occur at the left edge of a contrastive focus domain and is also more likely to occur in longer phrases, although phrase length does not influence the extent to which the initial rise correlates with focus.

They also observe that "it is generally agreed that the transition from the focal region to the post-focal region is readily identified in French on the basis

of post-focal deaccenting (for polar interrogatives, a high plateau)" (1). Several authors cited above agree that there is 'post-focal deaccenting' in French. Most of them, however, also find that final compression, as I will call the phenomenon from now on, is an optional feature in French.

Jun and Fougeron (2000), citing Rossi (1985), Touati (1987) and Di Cristo (1998), who had observed deaccentuation with a flat, parenthetical, or subordinate contour in the post-focal part of the sentence, find variation in the realization of given final material. Jun and Fougeron remark that the speakers sometimes paused after a focused constituent; that they sometimes separated the given part prosodically; that they sometimes rephrased the given part of the sentence; and that they sometimes changed its tonal composition. They note that none of these strategies is obligatory.[2, 3] Despite the variations found in the post-focal domain of the sentence, Jun and Fougeron (2000: 231) model the post-focal part of the sentence as the deletion of tones. They propose schematically that the given part, when it is final, forms an intermediate phrase, thus a prosodic domain between their AD and the intonation phrase. As a result, the given part forms a special phrase from which all tones are deleted.

The context for declarative focus used by Jun and Fougeron (2000) was a denial followed by a correction, as illustrated in Example (1):

(1) {Marion won't eat pineapples at breakfast, but…}
Marion mangera des bananes au petit déjeuner.
Marion will.eat some bananas at breakfast

Corrective focus is a special form of focus, which is not necessarily representative of the more neutral *information* focus, elicited with an explicit or implicit WH-question and used below.[4] More research is needed on the phonetic correlates of different kinds of focus in French.

Beyssade, Hemforth, Marandin, and Portes (2009) investigate sentences like (2) in two contexts: narrow focus on the object (2a) and broad focus (2b). The

2. "Speakers sometimes paused after the focus and made the post-focus sequence a new IP, with the same tonal variation (i.e., same phrasing) as in a neutral sentence, or they rephrased the sequence with fewer phrase boundaries than that of a neutral sentence. When there was no pause after focus, however, the post-focus sequence did not show any of the tonal variation observed in a neutral sentence, but was realized either as a low plateau in declaratives or as a high or mid-high plateau in interrogatives" (Jun and Fougeron 2000: 226).

3. See also Delais-Roussarie et al. (2002) for some variation in the post-focal sequences (low plateau, succession of downstep and continuous fall).

4. See also Dohen and Loevenbruck (2004) for acoustic measures of post-focal compression in a corrective context, as well as Di Cristo and Jankowski (1999), who do not specify the context in which they elicited their utterances.

answer to the questions (2a–b) is (2c). They used information focus rather than correction, thus a "weaker" form of focus:

(2) a. {Pour finir, qu'est-ce que tu as élargi ? *Finally, what have you let out?*}
b. {Pour finir, tu t'en es sorti comment ? *Finally, how did you get by?*}[5]
c. J'ai élargi le gilet avec du velour noir.
I let-out the vest with some velvet black
'I let out the vest with black velvet.'

Beyssade et al. (2009) distinguish between **N**uclear **P**itch **A**ccent placement ('NPA' strategy), a pitch accent predicted to be located on the narrowly focused constituent, and **I**ntonational **H**ighlighting ('IH' strategy), in which the narrowly focused constituent forms an independent prosodic phrase with an initial accent.[6] They predict that the narrow focus is always delimited to the right with a pitch accent that ends low and that the remainder of the sentence is simply added to the right. Their hypothesis can be summarized in the following way: when there is an additional adjunct (the prepositional phrase *avec du velour noir* 'with black velvet' in [2c]) to the right of the focused object, it is deaccented without being dephrased (following Di Cristo and Jankowski 1999), a proposal with which Jun and Fougeron (2000) agree. This prediction was not confirmed in their experimental data, however, and Beyssade et al. interpret the lack of consistency in their collected data as resulting from the fact that speakers do not always answer in a congruent way.

In the following sections, the prosody of different kinds of syntactic structures is reviewed in different information structural conditions. First, I discuss the prosodic structure of noun phrases, and second, I consider the prosodic structure of verb plus argument and verb plus adjunct constructions. I show that final adjectives in noun phrases and sentence-final verbal arguments generally do not present final (post-focal) compression, but adjuncts as sentential constituents sometimes

5. A better translation might be 'In the end, how did you manage?'

6. Beyssade et al. (2009) distinguish between the pragmatic properties of the two strategies in the following way: "Placement of NPA in the utterance (with de-accentuation to the right) and Intonational Highlighting are two ways of setting off a phrase in French. Both are used in answers, but with different roles. NPA placement marks the part of content that is specifically asserted, which counts for the new content with respect to the working of assertion. In that respect, placement of NPA is the primary way of marking what is new in answers, and more generally in assertions. On the other hand, IH sets off a phrase for any semantic or pragmatic reason. It may be used to mark a phrase that resolves the question – thus cueing the semantic relation between questions and answers, – but also a phrase endowed with any other discourse role, in particular a role in the generation of the discourse topic."

do. In other words, both syntax and information structure play important roles. The conclusion arising from the experimental results, as well as from what has been reported in the literature, is that final compression in French occurs at a relatively high level in the prosodic hierarchy, as compared to Germanic languages: it is licensed only at the level of the Φ-phrase, and not below.

3. Final compression in noun phrases

Hamlaoui et al. (2012) report on an experiment testing the differences in prosodic behavior between nouns and adjectives as a function of their status as focused and given constituents. For this experiment, twelve speakers of colloquial French were recorded in Paris while uttering noun phrases. To create as natural a context as possible, the participants were asked to help the researcher organize cards containing animals of various colors (4 animals x 4 colors) (see Swerts et al. 2002 for an influential similar experiment conducted in Dutch and Italian). The participants uttered noun phrases where both the animal and the color contrasted with the previous noun phrase (*mulot lilas* 'purple field mouse' after *merlan orange* 'orange whiting'); phrases where only the animal differed (*moineau orange* 'orange sparrow' after *lama orange* 'orange llama'); or phrases where only the color differed (*moineau orange* 'orange sparrow' after *moineau violet* 'purple sparrow'). Altogether 624 utterances with different focus structures – broad focus (a different animal and color), narrow focus on the noun (a different animal), or narrow focus on the adjective (a different color) – were analyzed. The utterances were inspected for maximum and minimum F0 in each syllable of each word, duration, and intensity of each syllable of each word, and breaks between the two words. These values were also calculated for the entire word in each case.

As for the form of the tonal movement, 513 expressions (85%) of the utterances had a rising contour (continuation contours), and 92 expressions (15%) had a falling contour. In the rising contours, only the final adjective had a rising tone; the noun was mostly falling or flat. In the falling intonation, only the adjective had a falling contour, and the noun was either rising or flat. As a result, the noun and the adjective had different contours in all expressions. The initial rise discussed in the preceding section was not obligatory, but it was found to be dependent on the presence of a falling contour in the following word. By contrast, in the expressions in which the final adjective was rising, there was no initial rise but always an initial fall (or no contour).

The results of the acoustic analysis showed that a narrow focus on the noun, the first word, did not trigger post-focal compression on the adjective (the second word). Not much difference was found in the tonal realization of different kinds of information structure at the level of the noun phrase: there was a slight difference

between the focused and the given words in F0 and intensity. This effect was significant only for the noun, both in broad focused expressions and when the noun was narrowly focused. There were also significant differences in the duration of the noun in all three conditions. This effect did not correlate with focus position in general, however, since the noun tended to be longer in broad focus expressions, but not when it was narrowly focused or given. As for the adjective, no significant difference in F0, intensity, and duration among the three conditions could be observed. For more details, the reader is referred to Hamlaoui et al. (2012).

All in all, the effects of focusing one of the two elements in such noun phrases were only very weak, and they contrasted with the large differences in pitch found in Germanic languages in similar experiments (see Swerts et al. 2002). In particular, there was no post-focal compression on the given adjective. Even though a few expressions with narrow focus on the noun were realized with a flat and low pitch (or high in the case of a continuation rising contour), the effect was not significant in the entire data set.

The results of a subsequent perception study based on the data collected in the production experiment confirmed the lack of significant differences among the three conditions. This finding suggests that French speakers could not reconstruct the appropriate context of a noun phrase from the prosody as correctly as Dutch speakers could (see Swerts et al. 2002 for a comparison).

4. Final compression at the sentence level

This section examines the prosodic structure of arguments and adjuncts in complete sentences with variable information structure. Examples are reported from an unpublished experiment without going into the details of the acoustic measures. In this experiment, eight native speakers of Standard French, raised in the Parisian region and students at the University of Paris 3 or Paris 8, were recorded in Paris while uttering five sets of sentences ending in an argument or an adjunct. All adjuncts and arguments were elicited in contexts triggering focus and givenness; see Examples (3) and (4) below for examples. In the focused context, the argument or the adjunct had not been mentioned in the question and was thus new. In the given context, it had been mentioned in the preceding question.

(3) Contexts for the sentences with an argument
   a. {Narrow focus on the argument: Sa marraine a choisi quel jour ?
   'Which day did his godmother choose?'}
   b. {Given argument: Est-ce que Jeannot a quelque chose de prévu lundi ?
   'Does Jeannot have something to do on Monday?'}

c. Sa marraine a choisi lundi
his godmother chose Monday
'His godmother chose Monday.'

(4) Contexts for the sentences with an adjunct
a. {Narrow focus: Ton copain est parti quand ?
'When did your friend leave?'}
b. {Given: Qu´est-ce qu´il s´est passé lundi ?
What happened on Monday?}
c. Adjunct in short sentence:
Alain est parti lundi
Alain left Monday
'Alain left on Monday.'
d. Adjunct in long sentence:
Alain est parti pour toujours lundi
Alain left for good Monday
'Alain left for good on Monday.'

The sentences consisted of similar strings of words with different syntactic constituency. The argument and the adjunct in each pair were identical, but the carrier sentences (subject and verb) differed. In the adjunct sentences, the verb was intransitive (for example *partir* 'to leave'), and in the argument sentences, it was transitive (for example *choisir* 'to choose').

Constituent length also varied, but only in the sentences containing an adjunct. In this variation, the sentences were identical in the short and the long versions, except that the target adjunct was separated from the verb by an additional constituent. This constituent was not controlled for its status as argument or adjunct. Its only role was to increase the distance between the verb and the target constituent. In the case of the argument sentences, an intervening constituent was not added. It is important to point out that it is possible to separate the argument from the verb with an adverb, but then the argument must be doubled by means of a clitic pronoun, and right-dislocation is the only option. In designing the sentences, compulsory right-dislocation was avoided, but it was also not excluded that speakers might choose to realize the final constituent as right-dislocated. Some approaches claim that a resumptive pronoun is necessary for right-dislocation, but no resumptive pronoun was present in the scripted speech used for the experiment (see more on right-dislocation in the next section).

The aim of the experiment was to control how speakers realize an argument and an adjunct, when they are focused or given. Do the speakers always dislocate a given constituent using prosody? Do they compress only the register of a given constituent? Does one of the two realizations occur more often in the case of an adjunct than in the case of an argument?

A striking result of this experiment was that in most cases, there was no difference in the realization of the sentences with an argument or with an adjunct (except for the fact that the adjuncts were realized on a slightly lower level altogether, but this result was not systematically significant). Except for the long sentences, there was also no difference between the given and focused conditions.

Figures 1 and 2 illustrate the similarity of the realization of the short sentences for one speaker. Figure 1 shows an argument of the transitive verb *accorder* 'to grant,' (a) in a focused context (Did Pierre ask his boss to visit his wife?), or (b) as a given constituent (Did Pierre speak with the judge about a morning to visit his wife?). Figure 2 shows the corresponding sentence *Elle l'a rencontré un matin* 'She met him one morning' with (a) an adjunct in a focus context (At what time of the day did Mélanie meet Bruno?), or (b) the adjunct as a given constituent (What happened one morning to Mélanie and Bruno?)

In all cases, the final constituent was realized with a falling contour and preceded by a high tone (interpreted as a high boundary in the next section) on the verb preceding it.

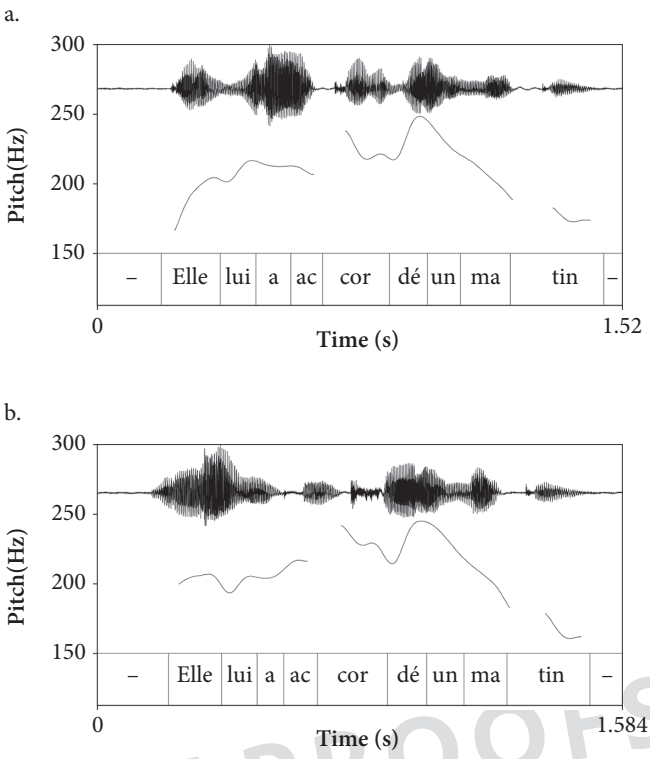

Figure 1. *Elle lui a accordé un matin* 'She granted him a morning.' a. Focused argument, and b. Given argument (Speaker 5).

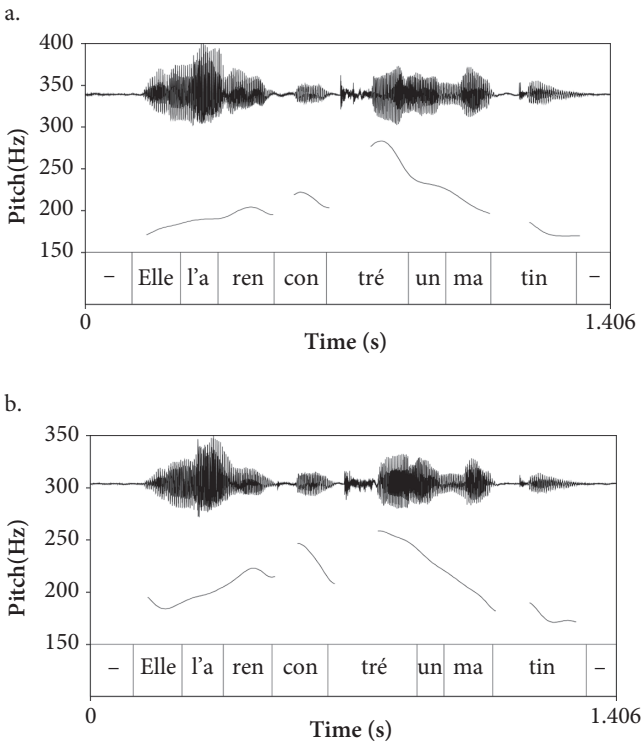

Figure 2. *Elle l'a rencontré un matin* 'She met him one morning.' a. Focused adjunct, and b. given adjunct (Speaker 5).

Let us turn next to some variations in the contours of the sentences of the corpus illustrated with the adjunct *à Milan* 'in Milan'. In both the focused (Figure 3a) and the given (Figure 3b) realizations of the sentence *Marion enseigne la bio à Milan* 'Marion teaches biology in Milan', each non-final prosodic word (ω-word, roughly equivalent to a lexical word, see next section) has its own rising contour LH. The whole sentence is mapped to an intonation phrase (ι-phrase), which is the domain of downstep: a high tone is usually lower than the preceding one. A formal account of all realizations is given in the next section.

There are interesting variations in the realization of the adjunct in long sentences. First, downstep was not always present, as can be observed in Figure 4. This speaker did not realize the given and the focused adjunct in the same way. In the focused version, she assigned a high tone to the first syllable of *Milan*, separating the high tone at the end of *bio* from the remainder of the sentence (the given counterpart for the same speaker appears in Figure 6). It should be noted that the high tone of the focused adjunct is downstepped relative to the high tone at the end of *bio*. This variation affects the tonal structure, but it does not change the phrasing of the affected constituent.

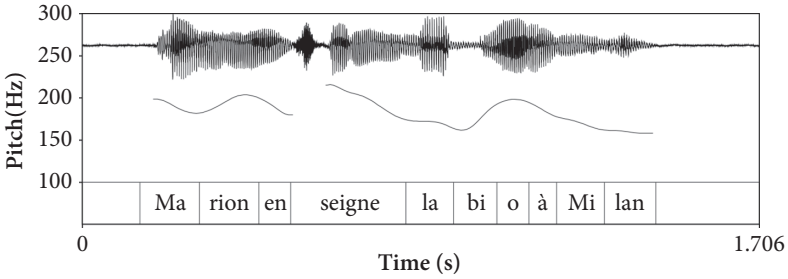

Figure 3a. *Marion enseigne la bio à Milan* 'Marion teaches biology in Milan.' Focused adjunct in a long sentence (Speaker 3).

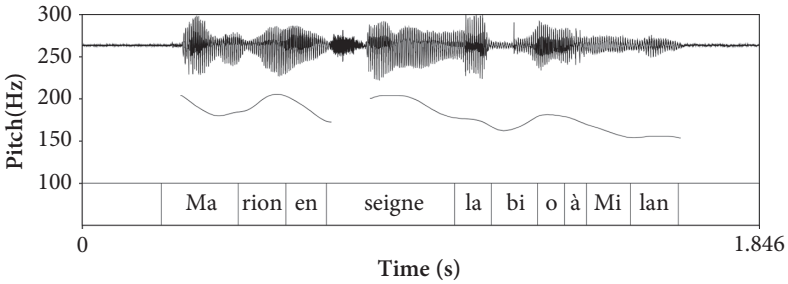

Figure 3b. *Marion enseigne la bio à Milan.* 'Marion teaches biology in Milan.' Given adjunct in a long sentence (Speaker 3).

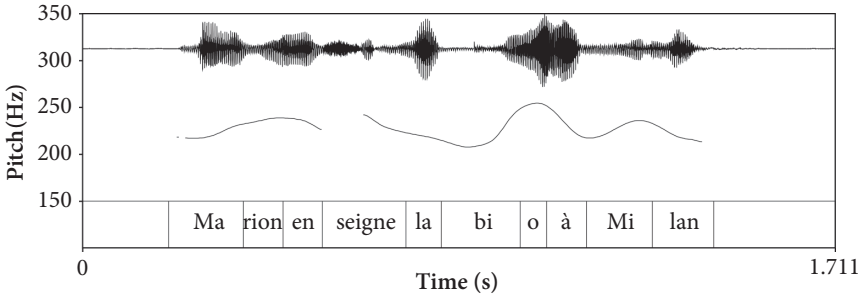

Figure 4. *Marion enseigne la bio à Milan.* 'Marion teaches biology in Milan.' Focused adjunct in a long sentence (Speaker 6).

The second variation concerns an optional break. Sometimes the focused constituent was separated from the rest of the sentence with a break, as shown in Figure 5a. The high tone preceding the break is much higher than the high tone on *bio* in Figures 2 and 3. Figure 5b is the given adjunct counterpart by the same speaker. It is similar to Figure 2a.

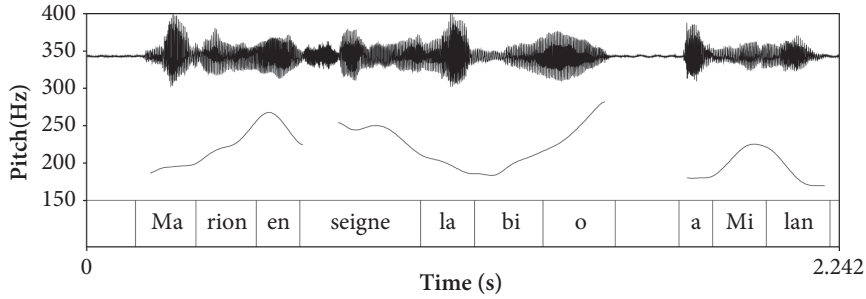

Figure 5a. *Marion enseigne la bio à Milan.* 'Marion teaches biology in Milan.' Focused adjunct in a long sentence (Speaker 5).

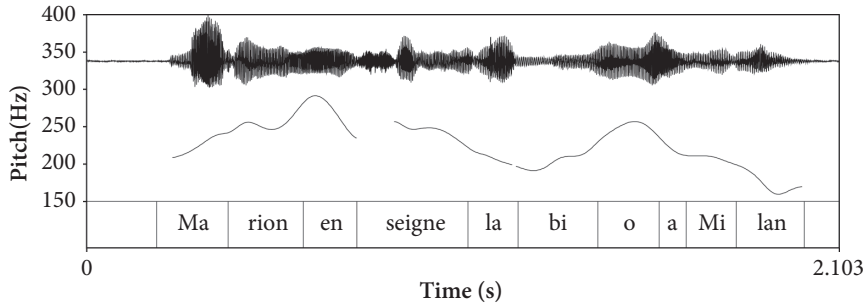

Figure 5b. *Marion enseigne la bio à Milan.* 'Marion teaches biology in Milan.' Given adjunct in a long sentence (Speaker 5).

Table 1 shows the number of phrase breaks in the entire corpus. It is clear that both focus and length have an effect, albeit a small one, on the number of phrase breaks. In most cases, only focused constituents are separated from the preceding constituent with a break. Long adjuncts are preceded by a break more often than short ones and also more often than focused arguments.

Table 1. Phrase breaks in the different conditions

	Focused	Given	n
Arguments	4	0	40
Short adjuncts	1	0	48
Long adjuncts	9	1	48

The third and fourth variations are two variants of optional final compression on the adjunct, as illustrated in Figures 6 and 7. In Figure 6, the preceding word *bio* ends on a high tone, as before. The falling contour starts on the first syllable of the given adjunct. As such, the fall on *à Milan* is steeper than in Figures 2 and 5, and

most of the adjunct is realized with a flat and low pitch. By contrast, in Figures 3b and 5b, in which final compression was absent, the final falling contour on this word continued until the end of the first syllable, so that the fall was smoother. Perceptively, the difference between an utterance with and without final compression is not to be missed.

In most occurrences of final compression in the corpus, the entire given adjunct is assigned a low and flat contour. In these cases, the final falling tone of the sentence is realized in the syllable preceding the adjunct, as illustrated in Figure 7. The first syllable of the adjunct (*un*) just finishes this fall.

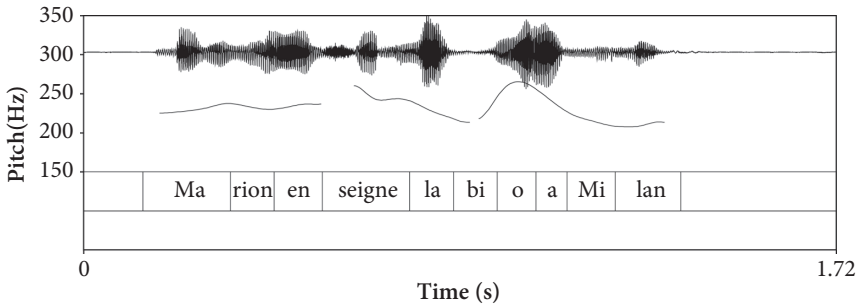

Figure 6. *Marion enseigne la bio à Milan.* Given adjunct in a long sentence (Speaker 6).

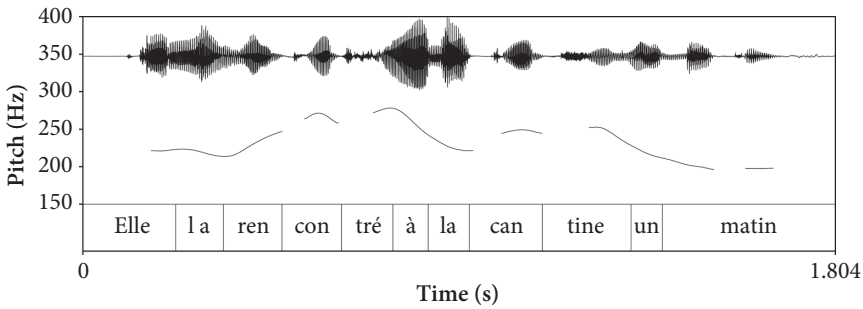

Figure 7. *Elle l'a rencontré à la cantine un matin* 'She met him in the restaurant one morning.' Given adjunct in a long sentence (Speaker 6).

Table 2 shows the number of sentences with a clear final compression. Nearly all of them occurred in given adjuncts, both in short and in long sentences. There was not a single case of final compression in the arguments. As the table reveals, information structure has an influence on the presence of final compression. As a result, both syntactic structure and information structure are decisive in determining the presence or absence of final compression.

Table 2. Number of perceived final compressions in the different conditions

	Focus	Given	n
Arguments	0	0	40
Short adjuncts	1	14	48
Long adjuncts	2	16	48

To conclude this section, it is important to point out that even though the sentences in given and narrow focus conditions were realized in a similar way in the corpus as a whole, some sentences could be analyzed as exemplifying the final compression often taken for granted in the literature. This pattern was limited to adjuncts, both when they were adjacent to the verb and when they were separated from the verb by an additional constituent. It can also be argued that information structure has an effect on triggering final compression, although there were three sentences with final compression of a focused adjunct. In the next section, I analyze the results more formally.

5. Discussion: Prosodic phrasing, tonal structure and final compression

The following results have emerged from the analysis of the data and will serve as the basis for the discussion in this section. First, final compression was not found in noun phrases or in sentences containing an argument. Second, final compression was sometimes found in sentences containing an adjunct: this happened in 30 out of 96 sentences with an adjunct (31%). Third, information structural status had an influence on the presence of final compression, although givenness did not force final compression. Fourth, final compression did not have just one realization, but at least two.

Let us start with prosodic phrasing, since it is crucial for the presence of final compression. Three prosodic domains are assumed for French: a small domain at the level of the prosodic word (ω-word), a domain called Φ-phrase for prosodic phrase, and a larger one called ι-phrase for intonation phrase, all of which can be recursive.[7] Following standard conventions, lexical words are mapped onto ω-words (see McCarthy and Prince 1995); syntactic phrases are prosodically

7. A constituent of roughly the size of a Φ-phrase has been given many different names in the literature: '*continuation mineure*,' '*groupe accentué*,' and '*groupe de sens*' by Delattre (1966); '*intonème continuatif mineur*' by Rossi (1980, 1985); '*syntagme prosodique*' by Vaissière (1997); '*arc accentuel*' by Fónagy (1979); 'intonation group' by Mertens (1990); 'rhythmic unit' by Di Cristo (1999); '*groupe rhythmique*' by Delais-Roussarie (1995); and many more.

mapped onto Φ-phrases; and sentences are prosodically mapped onto ι-phrases (see Selkirk 2011 for a formal account of such a view). In the examples below, the tonal structure is also indicated. Tones can be assigned at the level of the ω-word, the Φ-phrase, or the ι-phrase. A declarative sentence has a falling melody: its last tone is a low one L_ι assigned at the level of the ι-phrase. The subscripts on tones indicate their scope; H_Φ stands for a high tone at the level of the Φ-phrase, and L_ι stands for a low tone assigned at the level of the ι-phrase. No pitch accent is assumed here, thus there is no H* or L* assigned to an accented syllable. In the model of French intonation presented here, French is a language without pitch accents, if a pitch accent is understood in the sense of signaling a designated syllable for stress. I assume that all tones are assigned to prosodic domains: ω-word, Φ-phrase, or ι-phrase. In a sense, French does not have pitch accents, but only 'phrasal' tones or boundary tones.

A sequence of a noun followed by an adjective is mapped onto two prosodic words grouped together in a Φ-phrase, as shown in (5a), at least when both the noun and the adjective are short. This sequence consists of a head noun and a modifying adjective and forms a maximal projection in syntax. Following Nespor and Vogel (1986) and Dehé and Samek-Lodovici (2009) for Italian, I propose that the syntactic structure of such a sequence is as in (5b). The post-nominal adjective is also a maximal projection in itself, and thus it forms its own Φ-phrase. The entire NP forms a recursive Φ-phrase. The tonal structure is such that the first word has a demarcative high tone (H_ω) at the level of the ω-word, and the tonal structure of the second word, the adjective in (5), interpolates to the final low boundary of the ι-phrase. However, an additional high tone on the final constituent, in parentheses, is always possible. If it is present, it is a phrasal tone assigned to the embedded Φ-phrase. The tone in parentheses could be assigned at the level of a ω-word or of a Φ-phrase, and the second alternative is consistently chosen. If a tone can be assigned at two levels, I propose to assign it systematically at the higher level.

(5) L_Φ H_ω (H_Φ) L_ι

a. $((\text{moineau}_\omega\ (\text{marron}_\omega)_\Phi)_\Phi)_\iota$

b. $[[\text{moineau}]_N\ [\text{marron}]_{AP}]_{NP}$

sparrow brown

'brown sparrow'

Turning now to the sentences reported on in Section 4, Gussenhoven (1992), Selkirk (1995, 2011), Féry (2011), and many others show that for Germanic languages, a verb and an adjacent non-complex argument (6b) are phrased in a single Φ-phrase. I propose that the same kind of mapping is active in French, as shown in (6a). The tonal structure is similar to the one in (5).

L_Φ $(H_\omega L_\omega)$ H_ω (H_Φ) L_ι

(6) a. $((\text{Elle lui a accordé}_\omega\ (\text{un matin}_\omega)_\Phi)_\Phi)_\iota$

b. …[[accordé]$_V$ [un matin]$_{NP}$]$_{VP}$
she him has granted a morning
'She granted him a morning.'

The first low tone is assigned to the large Φ-phrase in (6). It is realized early in the sentence, and it is followed by a high tone that is assigned at the level of the ω-word, since no boundary of a Φ-phrase is present. French is characterized by a succession of pre-final rising contours, which increase in number in longer sequences of syllables. The sequence *elle lui a accordé* contains 6 syllables and can be realized with only one rising contour or with two. In this latter case the added sequence $H_\omega L_\omega$ in parentheses is assigned at the level of the ω-word, since *accordé* is a ω-word. In Figure 1, two rising contours are realized, and in Figure 7, only one. It is also visible in Figure 1 that the succession of rising contours form together a larger rising contour, the first one reaching only mid level and the second one ending higher. This contrast is due to the fact the second H tone is assigned to a Φ-phrase and the first one to a ω-word embedded into this Φ-phrase. The syntactic constituent *un matin* 'one morning' is assigned an optional high tone at the level of the Φ-phrase, and it is followed by the final low tone assigned at the level of the ι-phrase. These tones are not associated with words, as would be the case in the Germanic languages for pitch accents, but they are assigned to prosodic constituents of different levels. Their exact association is not always easy to predict – there are some variations – and for this reason, it is assumed here that they are primarily associated with phrases.

By contrast, a verb and a following adjunct are phrased in different Φ-phrases, as illustrated in (7). The reason is that an adjunct to the clause attaches outside the VP (in the present case to TP/CP; see also Gussenhoven 1992 and Féry 2011 for different analyses of the syntactic structures of adjuncts and arguments in Germanic languages). The participle and the adjunct each form an independent Φ-phrase. Verb plus adjunct often has the same tonal pattern as verb plus argument, as was illustrated in Figures 1 and 2. The high tone at the end of the verb is now assigned at the level of the Φ-phrase, the highest possible prosodic domain in this example. As in (6), an additional tone on the last constituent is possible, as well as additional tones on *rencontré*.

L_Φ $(H_\omega L_\omega)$ H_Φ (H_Φ) L_ι

(7) $(((\text{Elle l'a}$ $\text{rencontré}_\omega)_\Phi$ $(\text{un matin}_\omega)_\Phi)_\Phi)_\iota$
she him. met one morning
a. […][[rencontré]$_{VP}$ [un matin]$_{NP}$]$_{VP}$
'She met him one morning.'

When the adjunct is not adjacent to the verb, the adjunct also forms its own Φ-phrase, as shown in (8). The verb and its argument are phrased in a single Φ-phrase, and the adjunct forms a separate Φ-phrase. Each non-final ω-word has its own rising contour LH. As before, it is H_Φ when it ends a Φ-phrase and H_ω when it ends a ω-word. A high tone at the end of a ω-word is typically lower than a high tone at the end of a Φ-phrase. Example (8) also illustrates that a full DP like *Marion* is phrased by itself and is thus assigned both the initial L_Φ and the final H_Φ of its Φ-phrase.

	L_Φ H_Φ		L_Φ	H_ω	L_ω	H_Φ		(H_Φ)	L_ι
(8)	$((\text{Marion}_\omega)_\Phi$		$(\text{enseigne}_\omega$		(la	$\text{bio}_\omega)_\Phi)_\Phi$	(à	$\text{Milan}_\omega)_\Phi)_\iota$	
	Marion		teaches		bio		in	Milan	
	'Marion teaches biology in Milan.'								

Example (9) differs from (8) in having an additional ι-phrase. The first adjunct ends with a low boundary tone L_ι. The following adjunct can be realized low all the way through, or it can have its own high tone H_Φ. It is a right-dislocated constituent. The low tone on the adjunct has been analyzed as a copy of the final low tone of the first ι-phrase (see Clech-Darbon et al. 1999; Rossi 1999; Beyssade et al. 2003; and Avanzi 2011). If it has an additional high tone, it is best analyzed as an afterthought.[8]

	L_Φ			H_Φ	L_Φ	H_ω	L_ι	(H_Φ)	L_ι
(9)	$((\text{Elle}$	l'a	$\text{rencontré}_\omega)_\Phi$		(à la	$\text{cantine}_\omega)_\Phi)_\iota$		$((\text{un matin}_\omega)_\Phi)_\iota$	
	she	him.	met		in the	cantine		one morning	
	'She met him at the restaurant one morning.'								

Although it was not systematic, final compression occurred much more often in adjuncts than in arguments, a distinction that we can explain if we assume that final compression can only affect entire Φ-phrases, separated from any preceding material by the right boundary of a Φ-phrase and not included in the recursive structure of a larger Φ-phrase. This corresponds to a maximal Φ-phrase in the typology of Ito and Mester (2012).[9]

8. The sentences used in the experiment reported here are not designed for distinguishing between a finally compressed constituent, a right-dislocated one, and an afterthought. This is an area for future research.

9. Shin Ishihara has pointed out to me that Minor Phrases are not subject to post-focal dephrasing in Japanese, as shown in Sugahara's (2003) dissertation, a fact that can also be related to their status as non-maximal Φ-phrases.

A clear effect of givenness on the occurrence of final compression could be established in the experimental sentences. Final compression occurred much more often when the adjunct was given than when it was new.

Several researchers assume that French can right-dislocate given constituents in syntax and in prosody (Lambrecht 1981, 1986, 1994; Jun and Fougeron 2000; De Cat 2007; Beyssade et al. 2009; Hamlaoui 2009; and Ott and De Vries 2012; see also Samek-Lodovici 2005 for Italian; and López to appear for Spanish). I do not take a position on right-dislocation in syntax (see De Cat 2007; Lopez to appear, for right-dislocation in syntax), but I assume that it correlates with the formation of an ι-phrase in the prosody, most often on a given and final constituent. Some authors assume that this syntactic process is reflected in the prosodic structure by a lack of prosodic prominence, as well as by a separate prosodic phrase, an intermediate phrase, or an ι-phrase.[10] Clech-Darbon et al. (1999) and Rossi (1999) propose that the tonal structure of the dislocated constituent is a copy of the phrasal tone structure of the preceding prosodic phrase. Their analysis has been adopted by a number of researchers. Following this line of thought, final compression is an expected pattern: if syntactic dislocation is the consequence of givenness, and if syntactic dislocation is realized in a separate prosodic constituent, we may expect that an adjunct, which forms a separate Φ-phrase anyway, is more easily right-dislocated when it is given than an argument, which is phrased together with the verb. Furthermore, if we assume a preference for French to align its focused constituent with the right edge of a constituent (see Hamlaoui 2009 and Féry 2013), dislocation of a given constituent helps the focused constituent be final in its domain (as suggested in Beyssade et al. 2009). Lambrecht (1986, 1994) claims that topics are not allowed inside focus constituents and that for this reason, they are often realized as right-detached constituents, as 'antitopics,' "allowing the focus accents to fall in normal clause-final position" (1994: 252).

As has been repeatedly discussed in the literature, however, final compression is unusual in French (see Jun and Fougeron 2000; Beyssade et al. 2009; Avanzi 2011; among others; see also footnote 2). It is possible only in a constituent with the appropriate prosodic structure, but it is never obligatory. Therefore right-dislocation cannot be the only explanation for final compression. The optionality of final compression in French contrasts with its being mandatory in Germanic languages, such as English and German. In these languages, the topline of the

10. See, for instance, the following description by Lambrecht (1981: 85–86): "The most striking formal correlate of the pragmatic status of antitopics is their complete lack of *stress*. Unlike topics, which were described as having secondary sentence stress, antitopics are completely stressless, or more accurately, their degree of stress contrasts sharply with the immediately preceding intonation peak, which falls on the last clause-internal element."

register used in a particular Φ-phrase is determined by its highest pitch accent. In other words, each Φ-phrase has the register of its highest tone, which is typically defined by the head of the phrase: its pitch accent. In a sequence of Φ-phrases, realized in an all-new sentence, and thus without narrow focus or given elements, downstep occurs obligatorily. Absence of downstep is highly informative and signals narrow focus. Post-focal deaccenting is also highly informative and expresses givenness. Post-focal compression changes the height of individual accents; downstep is canceled; and the whole phrase is felt to be deaccented. In sum, in Germanic languages, the height of high tones directly correlates with prominence.

In French, the correlation between the height of tones and prominence is only indirect. Narrow focus is not necessarily expressed by an increase in pitch. Consequently, the notion of pitch accent does not make much sense, because French does not have lexical stress to which a pitch accent can be assigned. High tones are phrasal tones assigned to entire prosodic phrases, rather than to individual syllables. High tones are often assigned to final syllables of prosodic phrases. They are demarcative and can signal that the phrase itself is prominent, or that the following phrase is backgrounded. Downstep is not systematic in all-new sentences (see Féry et al. 2010), and, as a result, register differences are less informative in French than in the Germanic languages. French is part of a group of languages called 'phrase languages,' which are characterized by the systematic use of phrasal tones. This category of languages was first introduced for Indian languages (Féry 2010) and has found some resonance in the literature since then (see, for instance, Arnhold 2013 for Finnish and Güneş 2012 for Turkish).

6. Conclusion

In this chapter, final compression in French has been examined from a theoretical point of view and illustrated with experimental data. It has been shown that final compression in French is a phrasal phenomenon. Only final prosodic domains of at least the size of a prosodic phrase (Φ-phrase) are subject to final compression. Prosodic units that are smaller than Φ-phrases, such as prosodic words (ω-words), cannot be compressed. This finding has been confirmed in a comparison between sequences consisting of a noun + adjective and verb + argument on the one hand, and verb + adjunct on the other hand. Syntactic expressions of the former kind are integrated into single Φ-phrases, and final compression does not take place, whereas syntactic sequences of the latter kind form separate Φ-phrases. In this latter case, final compression can occur.

Final compression is optional and differs from the post-focal deaccenting found in the Germanic languages. In French, downstep and final compression are not obligatory (recall the discussion in Section 2). Nevertheless, information structure does play a role: givenness of the final constituent favors final compression. In Section 2, we saw that some authors attribute givenness to right-dislocation (such as Lambrecht 1981, 1994). Lambrecht's research, and especially his 1994 book, has inspired and encouraged scholars to look for correlations among syntax, information structure, and prosody. In this chapter, I hope to have made a contribution to this area of research and to have continued Knud Lambrecht's important work.

References

Arnhold, Anja. 2013. Finnish Prosody: Studies in Intonation and Phrasing. Ph.D. diss., Frankfurt.

Astésano, Corine, Ellen Gurman Bard, and Alice Turk. 2007. "Structural Influences on Initial Accent Placement in French." *Language and Speech* 50 (3): 423–446.

Avanzi, Mathieu. 2011. "La dislocation à gauche en français parlé. Etude instrumentale." *Le français moderne* 2.

Beyssade, Claire, Barbara Hemforth, Jean-Marie Marandin, and Cristel Portes. 2009. "Prosodic Markings of Information Focus in French." In *Proceedings of the conference "Interface Discours and Prosodie,"* ed. by Hi-Yon Yoo and Elisabeth Delais-Roussarie, 109–122. Paris, France.

Beyssade, Claire, Jean-Marie Marandin, and Annie Rialland. 2003. "Ground/Focus Revisited. A Perspective from French." In *A Romance Perspective on Language Knowledge and Sse: Selected papers of LSRL 2001*, ed. by Rafael Nuñez-Cedeno, Luis López and Richard Cameron, 83–98. Amsterdam: John Benjamins.

Bruce, Gösta. 1977. "Swedish Word Accent in Sentence Perspective." *Travaux de l'Institut de Linguistique de Lund* 12. Gleerup, Lund: Lund University Press.

Clech-Darbon, Anne, George Rebuschi, and Annie Rialland. 1999. "Are there Cleft Sentences in French?" In *The Grammar of Focus*, ed. by Georges Rebuschi and Laurice Tuller, 83–118. Amsterdam: John Benjamins.

De Cat, Cécile. 2007. "French Dislocation without Movement." *Natural Language and Linguistic Theory* 25 (3): 485–534.

Dehé, Nicole and Vieri Samek-Lodovici. 2009. "On the Prosody and Syntax of DPs: Evidence from Italian Noun Adjective Sequences." *Natural Language and Linguistic Theory* 27: 45–75.

Delais-Roussarie, Elisabeth. 1995. Pour une approche parallèle de la structure prosodique: Etude de l'organisation prosodique et rhythmique de la phrase française. Ph.D. diss., Université de Toulouse: Le Mirail.

Delais-Roussarie, Elisabeth, Annie Rialland, Jenny Doetjes, and Jean-Marie Marandin. 2002. "The Prosody of Post-Focus Sequences in French." *Proceedings of Speech Prosody 2002*, ed. by Bernard Bel et I. Marlien, 239–242. Aix en Provence.

Delattre, Pierre. 1966. "Les dix intonations de base en français." *The French Review* 40: 1–14.

Dell, François. 1984. "L'accentuation dans les phrases en français." In *Forme sonore du language*, ed. by François Dell, Daniel Hirst and Jean-Roger Vergnaud, 65–122. Paris: Hermann.
Di Cristo, Albert. 1998. "Intonation in French." In *Intonation Systems: A Survey of Twenty Languages,* ed. by Daniel Hirst and Albert Di Cristo, 195–218. Cambridge: University Press.
Di Cristo, Albert. 1999. "Le cadre accentuel du français contemporain." *Langues* 3.2: 184–205.
Di Cristo, Albert, and Ludovic Jankowski. 1999. "Prosodic Organisation and Phrasing after Focus in French." *Proceedings of XIVth ICPhS*, 1565–1568. San Francisco: USA.
D'Imperio, Mariapaola, and Amandine Michelas. 2010. "Embedded Register Levels and Prosodic Phrasing in French." *Proceedings of the International Conference on Speech Prosody 2010*, 100207: 1–4. Chicago, USA.
Dohen, Marion, and Hélène Loevenbruck. 2004. "Pre-Focal Rephrasing, Focal Enhancement, and Post-focal Deaccentuation in French." *Proceedings of the 8th International Conference on Spoken Language Processing (ICSLP)*: 1313–1316. http://www.isca speech.org/archive/interspeech_2004.
Féry, Caroline. 2001. "Focus in French." In *Audiatur Vox Sapientiae. A Festschrift for Arnim von Stechow*, ed. by Caroline Féry and Wolfgang Sternefeld, 153–181. Berlin: Akademie-Verlag.
Féry, Caroline. 2010. "The Intonation of Indian Languages: An Areal Phenomenon." In *Problematizing Language Studies. Festschrift for Ramakant Agnihotri*, ed. by Imtiaz Hasnain and Shreesh Chaudhury, 288–312. New Delhi: Aakar Books.
Féry, Caroline. 2011. "German Sentence Accents and Embedded Prosodic Phrases." *Lingua* 121: 1906–1922.
Féry, Caroline. 2013. "Focus as Alignment." *Natural Language and Linguistic Theory* 31 (3). 683–734. DOI 10.1007/s11049-013-9195-7.
Féry, Caroline, Robin Hörnig and Serge Pahaut. 2010. "Phrasing in French and German: An Experiment with Semi-Spontaneous Speech." In *Intonational Phrasing at the Interfaces: Cross-Linguistic and Bilingual Studies in Romance and Germanic*, ed. by Christoph Gabriel and Conxita Lleó, 11–41. Amsterdam: John Benjamins.
Fonagy, Ivan. 1979. "L'accent français: accent probabilitaire." *Studia phonetica* 15: 123–133.
German, James, and Mariapaola D'Imperio. 2010. "Focus, Phrase Length, and the Distribution of Phrase-Initial Rises in French." *Proceedings of the International Conference on Speech Prosody 2010*, 100207: 1–4. Chicago, USA.
Grammont, Maurice. 1933. *Traité de phonétique.* Paris: Librairie Delagrave.
Güneş, Güliz. 2012. *Limits of Prosody in Turkish: A Typological Perspective.* University of Groningen. Ms.
Gussenhoven, Carlos. 1992. "Sentence Accents and Argument Structure." In *Thematic Structure. Its Role in Grammar*, ed. by Iggy Roca, 79–106. Berlin: Foris.
Gussenhoven, Carlos. 2004. *The Phonology of Tone and Intonation.* Cambridge: University Press.
Hamlaoui, Fatima. 2009. Le focus à l'interface de la syntaxe et de la phonologie : le cas du français dans une perspective typologique. Ph.D. diss., Université Paris III.
Hamlaoui, Fatima, Sascha Coridun, and Caroline Féry. 2012. "Expression prosodique du focus et du donné au sein des groupes nominaux [N A] du français." *Congrès Mondial de Linguistique Française* 12. Lyon.
Hirst, Daniel, and Albert Di Cristo. 1996. "Ya-t-il des unités tonales en français?" In *Actes des XXIèmes journées d'étude sur la parole:* 223–226.
Ito, Junko, and Armin Mester. 2012. "Recursive Prosodic Phrasing in Japanese." In *Prosody Matters: Essays in Honor of Elisabeth Selkirk*, ed. by T. Borowsky, S. Kawahara, T. Shinya and M. Sugahara, 280–303. London: Equinox Publishers.

Jun, Sun-Ah, and Cécile Fougeron. 2000. "A Phonological Model of French Intonation." In *Intonation: Analysis, Modeling and Technology*, ed. by Antonis Botinis, 209–242. Dordrecht: Kluwer.

Jun, Sun-Ah, and Cécile Fougeron. 2002. "The Realizations of the Accentual Phrase in French Intonation." *Special Issue on Intonation in the Romance Languages*, ed. by J. Hualde. *Probus* 14: 147–172.

Krifka, Manfred. 2008. "Basic Notions of Information Structure." *Acta Linguistica Hungarica* 55: 243–276.

Lambrecht, Knud. 1981. *Topic, Antitopic, and Verb-agreement in Non-standard French*. Amsterdam: John Benjamins.

Lambrecht, Knud. 1986. Topic, Focus, and the Grammar of Spoken French. Ph.D. diss., University of California-Berkeley.

Lambrecht, Knud. 1994. *Information Structure and Sentence Form: Topic, Focus and the Mental Representations of Discourse Referents*. Cambridge: University Press.

Léon, Pierre R. 1972. *Prononciation du français standard. Aide mémoire d'orthoépie à l'usage des étudiants étrangers.* Paris: Didier.

López, Luis. Forthcoming. "Dislocation and Information Structure." In *OUP Handbook of Information Structure,* ed. by Caroline Féry and Shinichiro Ishihara. Oxford: University Press.

McCarthy, John J. and Alan S. Prince. 1995. "Prosodic Morphology." In *Handbook of Phonology,* ed. by John Goldsmith, 318–366. Oxford: Basil Blackwell.

Malmberg, Bertil. 1969. *Phonétique française.* Lund: Liber Läromedel.

Martin, Philippe. 1975. "Analyse phonologique de la phrase française." *Linguistics* 146: 35–67.

Martin, Philippe. 1980. "Sur les principes d'une théorie syntaxique de l'intonation." In *Problèmes de Prosodie.* vol 1. Studia Phonetica 17, ed. by Léon Rossi, 91–101. Paris: Didier.

Mertens, Pierre. 1990. "Intonation." In *Recherches sur le français parlé,* ed. by Claire Blanche-Benveniste, Mireille Bilger, Christine Rouget and Karel van den Eynde, 159–176. Paris: CNRS Éditions.

Nespor, Marina, and Irene Vogel. 1986. *Prosodic Phonology.* Dordrecht: Foris.

Ott, Dennis, and Mark de Vries. 2012. *Right-Dislocation as Deletion*. Ms. University of Groningen.

Pierrehumbert, Janet. 1980. The Phonology and Phonetics of English Intonation. Ph.D. diss., MIT.

Post, Brechtje. 2000. *Tonal and Phrasal Structures in French Intonation.* The Hague: Holland Academic Graphics.

Portes, Cristel, Mariapaola D'Imperio, and Leonardo Lancia. 2012. "Positional Constraints on the Initial Rise in French." In *Proceedings of the Speech Prosody 2012 Conference*. Shanghai.

Post, Brechtje. 2002. "French Tonal Structures." In *Proceedings of the Speech Prosody 2002 Conference*, ed. by Bernard Bel and Isabelle Marlien, 11–13. Aix-en-Provence.

Rolland, Guillaume, and Hélène Loevenbruck. 2002. "Characteristics of the Accentual Phrase in French: An Acoustic, Articulatory and Perceptual Study." In *Proceedings of the Speech Prosody 2002 Conference,* ed. by Bernard Bel and Isabelle Marlien, 611–614. Aix-en-Provence.

Rossi, Mario. 1980. "Le français, langue sans accent?" In *L'accent en français contemporain.* (Studia Phonetica 15), ed. by Ivan Fónagy and Pierre P. Léon, 13–51. Montréal: Didier.

Rossi, Mario. 1985. "L'intonation et l'organisation de l'énoncé." *Phonetica* 42: 135–153.

Rossi, Mario. 1999. *L'intonation, le système du français – description et modélisation*. Paris: Ophrys.

Samek-Lodovici, Vieri. 2005. "When Right Dislocation Meets the Left-Periphery. A Unified Analysis of Italian Non-Final Focus." *The Linguistic Review*: 687–755.

Selkirk, Elisabeth O. 1995. "Sentence Prosody: Intonation, Stress and Phrasing." In *Handbook of Phonological Theory,* ed. by John Goldsmith, 550–569. Blackwell.
Selkirk, Elisabeth O. 2011. "The Syntax-Phonology Interface." In *The Handbook of Phonological Theory* [2nd edition]. Ed by John Goldsmith, Jason Riggle and AlanYu, 550–569. Blackwell.
Sugahara, Mariko. 2003. Downtrends and Post-FOCUS Intonation in Tokyo Japanese. Ph.D. diss., University of Massachusetts at Amherst.
Swerts, Marc, Emiel Krahmer, and Cinzia Avesani. 2002. "Prosodic Marking of Information Status in Dutch and Italian: A Comparative Analysis." *Journal of Phonetics* 30: 629–654.
Touati, Paul. 1987. *Structures prosodiques du suédois et du français.* Lund University Press.
Vaissière, Jacqueline. 1997. "Langues, prosodies et syntaxe." *Traitement automatique des langues* 38: 53–82.
Welby, Pauline. 2006. "French Intonational Structure: Evidence from Tonal Alignment." *Journal of Phonetics* 34: 343–371.