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Focus and Phrasing in French

Caroline Féry

1. Introduction

The present paper¹ addresses the phonological realization of focus in French and claims that this language uses a single strategy to signal focus, namely phrasing. A second, associated claim is that the tonal variation accompanying focus is due to boundary tones, and not to pitch accents. As a correlate, it is postulated that the different syntactic strategies, often used in French to identify a focussed constituent like clefting and fronting have a phonological motivation: they enhance the phrasing.

Prosodic phrasing is highly sensitive to focus structure, not only in French, but probably in all languages, judging from the large amount of literature on the subject (to cite a few examples, see Gussenhoven 1984 on English, Beckmann & Pierrehumbert 1986 and Kanerva 1990 on Chichewa). Different languages use different methods to signal phrasing, like segmental alternations (see below for French), tones (Chinese is well studied, especially w.r.t. the third tone sandhi phenomenon, see Shih 1990, among others), lengthening or absence of shortening (as in Kimatuumbi, see Odden 1997), and, of course, intonational structure.

However, phrasing is just one way to express focus domains. Beside phrasing, stress is widely used, as in all Germanic and most Romance languages, but some languages also use morphological markers: Wolof, as described in Rialland & Robert (2000), is one example, Swahili another. Finally, the order of constituents is also crucial in many languages, as for example in Hungarian (see Kenesei 1986). These methods can also be combined.

¹ Different versions of this paper were presented at workshops on prosody in Freudental in March 1998 and in Nijmegen in October 1998, at talks given in Tübingen, Oslo, Jena, Osnabrück and Potsdam, as well as in a poster at the 1st North American Phonology Meeting in April 2000 in Montreal. I would like to thank the organizers and participants of these events. Furthermore, my thanks go to Kirsten Brock, Gisbert Fanselow, Jennifer Fitzpatrick-Cole, Carlos Gussenhoven, Vieri Samek-Lodovici, Daniela Lentge, Anja Mietz, Annie Rialland, Lisa Selkirk, Arnim von Stechow, Hubert Truckenbrodt, Ede Zimmermann and two anonymous reviewers for helpful comments and criticisms.

In a series of papers, von Stechow and a co-author (von Stechow 1981, 1990, von Stechow & Uhmann 1986) have shown that the focus structure of German and English depends on syntactic and semantic factors, as well as on the linear ordering of constituents (see also Chomsky 1971, Cinque 1993, Höhle 1982, Schmerling 1976, Selkirk 1986, a.o). In German, stress is assigned to the most deeply embedded constituent in a neutral situation, as shown in (1), or to the rightmost constituent. The stress on *Buch* is ambiguous for several focus structures, because the focus feature realized by this stress can percolate or be projected onto larger constituents according to principles of focus projection or other mechanisms, the details of which can be ignored in the present paper. All focus structures in (1a–e) can be expressed by a pitch accent on *Buch*.

- (1) Arnim hat Alla ein russisches Buch geschenkt.
 Arnim has Alla a russian book given
 'Arnim has given Alla a russian book'
- a. Arnim hat Alla ein russisches [_FBuch] geschenkt.
 b. Arnim hat Alla [_Fein russisches Buch] geschenkt.
 c. Arnim hat Alla [_Fein russisches Buch geschenkt].
 d. Arnim hat [_FAlla ein russisches Buch geschenkt].
 e. [_FArnim hat Alla ein russisches Buch geschenkt].

In French, due to the absence of lexical stress, the phonological counterpart of focus is different from that one of many other European languages, and can by no means receive the same kind of analysis as has been offered by von Stechow and the other authors mentioned above. It is conspicuous that French intonation is often analysed in the same terms as German, English or Italian, though the tools used for these languages do not consistently deliver the right results for French. Traditionally, French is analysed as having final stress (see Mertens 1990 and Post 2000, for instance), where final is relative to a certain prosodic domain defined in different ways by different authors. Some of the names given to this constituent are Phonological Phrase (Nespor & Vogel 1986), Rhythmic Group (Grammont 1933, Coustenoble & Armstrong 1934, Dell 1984, Di Cristo 1998), Major Phrase (Selkirk 1986) and Accentual Phrase (Jun & Fougeron 1995). The final syllable is characterized by final lengthening and/or tonal activity. However, the analysis of these properties as accentual may have been influenced by research on Germanic and other Romance languages, which typically have stress, both lexical and phrasal.

In the present paper, an analysis of French intonation is proposed which assumes the complete absence of any kind of stress. It is proposed that lengthening and tonal movements are not indicative of stress or accent, but should be properly analysed as suprasegmental correlates of phrasing (for similar views of French intonation, see Rossi 1980 and Vaissière 1983). In a rather neutral, non-contrastive utterance, the boundary tone is located at the right edge of the Phonological Phrase, whereas a narrow or contrastive focus leads to an initial boundary tone, usually high. The hypothesis

explored in the following sections is that French makes use of prosodic phrasing to a much greater extent than other languages, because it is the only device to realize focus domains and other discourse structural entities that it has at its disposal. Other Romance languages, like Catalan (Vallduví 1992), Italian (Samek-Lodovici 1997) and Portuguese (Costa 1998) have also been shown to make a great deal of use of syntactic restructuring. However, these languages have lexical stress as well, and are thus mixed cases. Only one level of phrasing is considered here, though other levels of phrasing exist in French which are used to delimit smaller or larger units of information.

This paper is structured as follows. Section 2 considers the intonation of French. The first part examines the tonal structure of French and in the second part, several approaches to the formation of Phonological Phrases are compared. After that, in section 3, the notion of focus is introduced and exemplified for French. In the fourth section, an experiment conducted with native speakers of French is presented and the results and theoretical consequences are summarized. The last section presents some closing remarks.

2. Intonation

2.1 Tonal Structure

Bruce (1977) and Pierrehumbert (1980) have developed the so-called tone sequence analysis, which accounts for the tonal structure of intonation languages with the help of discrete tones, in the spirit of the Africanist tradition. In this framework, Beckman & Pierrehumbert (1986) identify three kinds of tones for English intonation: pitch accents, which can be monotonal (H^* and L^*) or bitonal (H^*+L , $H+L^*$, L^*+H , $L+H^*$), phrase accents (H^- or L^-) and boundary tones ($H\%$ or $L\%$). Pitch accents are associated with syllables which are stressed as a consequence of a semantically or pragmatically conditioned focus, or as a consequence of the neutral or normal or default accent (Chomsky 1971, Höhle 1982, Gussenhoven 1984). Boundary tones delimit tonal phrases, like Intonation Phrases or Phonological Phrases (Intermediate Phrases in Pierrehumbert & Beckman's terminology), and phrase accents determine the melody of the phrases between the Intonation Phrase's last pitch accent and the final boundary tone.

This phonological analysis, a sequence of tones, is translated into a phonetic contour by a series of implementation rules and principles. Only the tones are given a phonetic value in Hz. The segmental material between the tones is realized according to two different mechanisms. In interpolation, the melody is interpolated from one tone to another in a smooth and continuous way, and in spreading, the value of one tone is spread over several otherwise unspecified syllables.

An intonational grammar defines the grammatical sequences of tones in a certain language. In English, for instance, each Intonation Phrase must consist of at least one pitch accent (possibly more), one phrase accent and one boundary tone, located on the last syllable of the Intonation Phrase.

This conception of the tonal structure depends heavily on the presence of pitch accents on stressed syllables, which function as highlights in the melodic pattern of sentences. In Pierrehumbert's original model, only pitch accents are associated with stressed syllables. In the last few years, an alternative view of intonation has arisen, in which phrase accents can also associate with stressed syllables, though these syllables are crucially only secondarily stressed (Arvaniti 1998, Grice, Ladd & Arvaniti 2000, Grice & Truckenbrodt 2001, Gussenhoven 2000, Ladd 1996). This evolution of the theory is particularly interesting since it speaks for a view of intonation in which tones are not strictly conceived as standing for stress or as standing for a boundary, but acknowledges the existence of mixed tones or "hybrid tones", to use an expression coined by Grice & Truckenbrodt (2001).²

Since Pierrehumbert's model presupposes the existence of independently stressed syllables, it cannot be straightforwardly applied to the intonation of French (but see Post 2000 for a proposal along these lines). What has been called "stress" is highly variable in French. In an utterance like (2B), a high tone can be put on *à*, on *son*, or on the first or second syllable of *bébé*. It is also possible to realize just a low tone on the last syllable (see section 4 for more details).

- (2) A: A qui Marie donne-t-elle le biberon?
to whom Marie gives she the bottle
- B: Elle donne le biberon à son bébé.
she gives the bottle to her baby

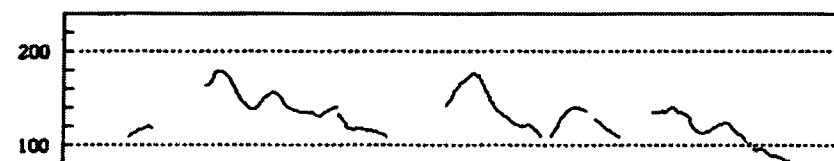
In a model predicting that a certain syllable is lexically stressed and that it will obligatorily get a pitch accent if the word or the larger domain for which it stands is focussed, such variation cannot be accounted for. The location of stress, as conceived by most phonologists, is determined by rules, or alternatively by discourse-structural factors, or by both and is largely predictable. None of this holds for French. Traditionally, researchers working on French intonation (Delattre 1963, Dell 1984, Grammont 1933, Léon 1972, Malmberg 1969, Martin 1975, 1980, Mertens 1990, Pasdeloup 1990, Post 2000 and Rossi 1980 to cite just a few) agree that French speakers use two different intonational strategies.

² Grice & Truckenbrodt's view of hybrid tones is that phrase accents can associate with stressed syllables as a consequence of the need for metrically strong syllables to be tonally marked, and not as a consequence of the need for phrase accents to dock onto stressed syllables. Thus, strictly speaking, the tones are not hybrid, but the association between phrase accents and syllables is variable (thanks to Hubert Truckenbrodt for clarifying this point for me).

- Accent d'insistance or accent emphatique ('insistance or emphatic accent', initial)
- Accent final, also called accent grammatical or accent logique ('final, grammatical or logical accent')

Of these two strategies, the final tonal movement is often described as the normal or unmarked stress pattern in French; see (3) for an example from Di Cristo (1998). The last syllable of the last word of the Phonological Phrase (PhP) has received at least two different analyses. Some authors assume that it is a pitch accent falling together with an obligatory PhP-final stress. This is the analysis proposed by Dell (1984) and by Post (2000), among others. The other approach, taken by Vaissière (1983), Rossi (1980) and others, analyses the PhP-final activity as a boundary correlate. The choice of the one or the other analysis is crucial since most tonal realizations usually claimed to be accents in French are of this type.

- (3) "Accent final" or "accent grammatical" (final)



2a Le FILS du DirecTEUR a VU le PREsident.

Le fils du directeur a vu le président (Di Cristo 1998:203)
'The manager's son has seen the president'

The initial accent is seldom seriously considered in the literature and is often dismissed as a marginal phenomenon. It is usually described as being restricted to exclamatory or emphatic expressions, like those in (4). The emphatic realization goes together with a lengthening of the onset of the first syllable, a phenomenon which has already been noticed by Grammont (1933:118). Notice that in the purely exclamatory expressions the first or the second syllable of a longer word can get the high tone, especially if the first syllable is onsetless. Thus, one can say both *Epouvantable* and *éPOUvantable*, *EXtraordinaire* and *exTRAordinaire*.³

- (4) "Accent d'insistance" or "accent emphatique" (initial)

Epouvantable/éPOUvantable 'terrible'
EXtraordinaire/exTRAordinaire, *extraORDinaire 'extraordinary'

³ This property of initial onsetless syllables is not surprising in view of the fact that exactly these kind of syllables are metrically weak or even invisible in other languages as well (see Downing 1998 and Goedemans 1996).

However, it is striking that the initial high tone is *not* limited to emphatic exclamations but is also found in many other situations, like in narrowly focussed phrases, or even in normally (or widely) focussed domains.⁴ Below we will see examples of expressions with initial high tones that cannot be analysed as purely emphatic or exclamatory, but that must be interpreted as delimiting a focus domain. For the moment, consider the examples in (5), which were recorded from France-Culture. The words in capitals were realized with a high tone and the remainder of the focus domain was low and flat. In the first two cases, a clitic or another kind of function word is realized with a phrase-initial high tone. The first one even contains an initial schwa, which is generally analysed as totally devoid of stress. (Dell 1984).

(5) Function words and schwa can be associated with a high tone

- a. ...quel est le premier thème scientifique de votre premier livre [_F DE science fiction]
'what is the first scientific theme that you have chosen in your first science-fiction book'
- b. ça fait partie [_F D'UNE aventure], il y a des gens qui ...
'it is part of an adventure, there are people who...'
- c. ce sont des gens qui n'ont [_F JAMAIS eu la parole]
'these are people who never could express themselves'

To sum up so far, three properties of tonal marking have been identified which disfavour the analysis of initial and tonal movement in French in terms of stress. First, there is no syllable defined as independently stressed, neither lexically nor phrasally. Second, elements which are often claimed to be "unstressable" can get a high tone. As pitch accents, these high tones are unusual since pitch accents should be associated with stressed syllables. The third property of high tones which disfavour an analysis as pitch accents is their optionality. This is also an unexpected property for a pitch accent associated with stress.

A more promising line of analysis is the one which amounts to considering the initial high tone as a boundary tone or as a mixed tone (half boundary tones, half pitch accents). The optionality of this tone is then no longer a problem since optionality of an initial boundary tone has been observed in several languages and is thus expected rather than problematic. Going a step further, the following pattern emerges. Since initial and final tones coexist in French, it can be assumed that they are two realizations of one phenomenon. Since it cannot be pitch accents, due to the problems mentioned above, I assume that they are both boundary or mixed tones. As will become clear below, important is the fact that they are realized at the edges of phrases, both finally and initially. An analysis of stress as a demarcative phenomenon, as has been proposed

⁴ The initial high tone is often heard in the speech of politicians, news speakers or other kinds of public persons.

by Trubetzkoy (1939:277) and Garde (1968:98) among others, could be an option, since the presence of high tones at the edges of a PhP makes this PhP more salient. See also Hayes & Lahiri (1991) for boundary tones delimiting focus domains in Bengali.

2.2 Phrasing

A major claim of this paper is that in French, phrasing takes over some of the roles traditionally attributed to pitch accents in the marking of discourse-structural domains. As has been repeatedly shown in the relevant literature, prosodic phrasing and syntactic structure coincide as far as possible. Phonologists, according to the introduction in Inkelas & Zec (1990), have distinguished two possible approaches to the syntax-phonology mapping: the direct and the indirect approaches. The direct approach posits that the phonetic indicators of phrasing, like tones, duration and intensity, refer directly to the syntactic structure. The indirect approach, on the other hand, claims that the phonetic indicators of phrasing apply on the prosodic structure, which is built from the syntactic structure. In the latter model, the reference to syntax is indirect and goes through the intermediary of the prosodic structure. Nespor & Vogel (1986) and Selkirk (1986) propose two methods for deriving the phonological structure from the syntactic structure. Whereas Nespor & Vogel refer to the internal head-argument structure of a PhP, thus to its syntactic constituent structure, Selkirk has developed an algorithm (based on Chen 1987) which aligns edges of prosodic constituents with edges of pre-existing syntactic constituents, on the left or right, depending on the language. In both approaches, syntax comes first, and phonology is derived.

(6) Default Phonological Phrase Formation (Nespor & Vogel 1986:168)

The domain of PhP formation consists of a Clitic Group which contains a lexical head and all Clitic Groups on its recursive side up to the Clitic Group that contains another head outside of the maximal projection of X.

(7) Selkirk (1986:389)

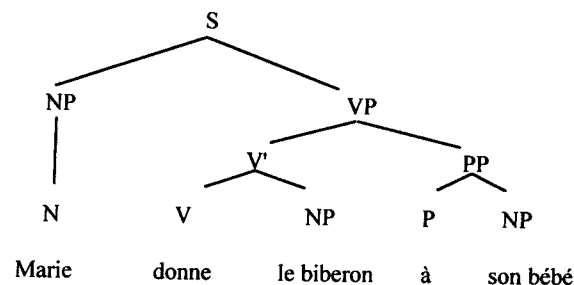
End parameter setting: x_{\max} [or] x_{\max} . The left/right edge of a Phonological Phrase is located at the left/right edge of a Maximal Projection.

The sentence in (8) serves as an illustration of these methods. In (9) and (10), the Phonological Phrase structures of (8), as predicted by Nespor & Vogel on the one hand, and by Selkirk on the other hand, are compared.⁵ In Selkirk's model, which aligns edges of constituents, the end-parameter is set to the right, which means that only the right edges of maximal projections (NP, PP and VP) project a prosodic boundary. This model generally makes better predictions than the head-argument model:

⁵ Nespor & Vogel explicitly state that French is not a restructuring language, which means that the verb and its first complement cannot fuse into a single Phonological Phrase.

under normal, wide or default focussing, *donne* and *le biberon* are grouped together in one Phonological Phrase. However, contrary to Selkirk's predictions, as soon as the verb and the direct object increase in length and weight, they readily have a tendency to build their own Phonological Phrases, as will become clear in section 4. In this case, Nespor & Vogel's predictions are better.

(8) Syntactic structure



(9) Nespor & Vogel's prediction for (8)

[_{PhP} Marie] [_{PhP} donne] [_{PhP} le biberon] [_{PhP} à son bébé]

(10) Selkirk's prediction for (8)

[_{PhP} Marie] [_{PhP} donne le biberon] [_{PhP} à son bébé]

The authors mentioned above, as well as many others after them (see, for instance, many of the papers in Inkelas & Zec 1990, Truckenbrodt 1999, etc.), assume that the syntactic structure is built prior to the prosody, thus that the prosodic structure is mapped onto the syntactic one. However, given an adequate approach, another view is conceivable in which both structures are evaluated relatively to each other. The prosodic structure should correspond to the syntax, but conversely, the syntactic structure should also map onto a possible prosodic structure. The optimality-theoretic Alignment Theory of McCarthy & Prince (1993), which was inspired by Selkirk's edge-based approach, provides a framework in which the simultaneous mapping of syntactic and prosodic structures can be expressed. Output candidates are compared and evaluated in parallel and the one that best satisfies the grammar of the language, which consists of a constraint hierarchy, is the optimal (grammatical) candidate.⁶

⁶ Truckenbrodt (1999) convincingly shows that, at least for some languages, Alignment constraints should be supplemented with a WRAP-XP constraint, formulated as in (i).

(i) WRAP-XP: Each XP is contained in a Phonological Phrase.

(11) Alignment Theory (McCarthy & Prince 1993):

Align(Xmax, Right, PhP, Right): The right edge of a Maximal Projection coincides with the right edge of a Phonological Phrase.

In this paper, it is assumed that syntax and phonology are processed in parallel. An output must be optimal for the syntax and the phonology simultaneously. Neither applies first, and in some cases, as in the prosodic phrasing, each component needs the other one.

The phrasing correlates in French are both segmental and suprasegmental. In this paper, I focus on the intonational correlates, but French has a certain number of segmental correlates of phrasing, as for instance obstruent voicing assimilation, nasal assimilation, enchaînement and schwa insertion. These correlates were studied in a separate experiment, the results of which, couched in an OT analysis, will be reported on in a separate paper.

3. Focus

In this section, attention is given to the way French realizes focus. Focus is understood as the general phenomenon of attributing prominence to a constituent. It has its origins in discourse structure, semantics and pragmatics (see Krifka 1992, Rooth 1985, 1992, Schwarzschild 1999 and von Stechow 1990, among others). Syntax and phonology just signal focus. Only two different origins of focus are considered here:

- (12) a. focus associated with the part of the sentence that gives an answer to a wh-question, and
- b. focus associated with the part of the sentence which is under the scope of a focus operator.

For the former kind of focus, at least the three strategies illustrated in (13) are used in French: fronting (left dislocation, topicalization, link), clefting, or just intonational phrasing (which can be at first sight interpreted as stress in situ, but which I claim is not). However, focus realization in situ is dispreferred in those cases in which focus does not correspond to a default phrasing, and, if permitted by the syntax, clefting or fronting are used.⁷ The decision to front or to cleft a focussed constituent is then decided on the basis of independent factors. Fronting and clefting differ in the following way. Since fronting, especially when it involves topicalization, generally has a rising contour, it establishes a link with another element later in the Intonation Phrase (the

⁷ It is occasionally claimed in the literature that French does not allow deaccenting, or dephrasing in the present approach (see Ladd 1996 or Lambrecht 1994 for instance). I suspect that the preference for building phrases also reflects the avoidance of dephrasing, though dephrasing is a real option.

term link comes from Vallduví 1992, who introduced it for Catalan). In (13a) *Arnim* in the first sentence and *montagne* in the second sentence have a rising intonation. These are syntactically left dislocated elements since they involve clitic doubling. There is a falling contour later in the sentence: *escaladé* or *montagne* in the first case, and *Arnim* or *escaladée* in the second case. In contrast, clefting in (13b) usually involves a single focussed constituent often realized with a falling contour (though it can have several different realizations, some of which involve two or more tonal excursions; see Clech-Darbon, Rebuschi & Rialland 1998 for an overview). Thus, *Arnim* in the first sentence and *montagne* in the second one may have a falling contour. The remainder of the sentence has a low and flat contour.

Finally in (13c), there is no overt syntactic reorganization of the constituents. The subject is in its initial position and the direct object in the final position. A focussed constituent (*Arnim* or *montagne*) projects a Phonological Phrase, which is tonally delimited. In the examples in (13c) a tone can be realized on the first or on the second syllable of the focussed word. In the second example, a high tone can be realized on the determiner *la*. This correlates with the absence of lexical stress and makes French different from English, German or Catalan. In longer constituents, an even greater variation is found: two tones can be realized, one on the first and one on the final syllable (see the results of the experiments below).

(13) a. Fronting

Arnim, il a escaladé la montagne. 'Arnim has climbed the mountain'
La montagne, Arnim l'a escaladée. 'Arnim has climbed the mountain'

b. Clefting

C'est Arnim qui a escaladé la montagne. 'Arnim has climbed the mountain'
C'est la montagne qu'Arnim a escaladée. 'Arnim has climbed the mountain'

c. Special phrasing

Arnim a escaladé la montagne. 'Arnim has climbed the mountain'
Arnim a escaladé la montagne. 'Arnim has climbed the mountain'

We now turn to the second origin for focus phrases in (14) to (16), exemplified with *ne que* 'only', *ne pas* 'not' and *même* 'even'. The optionally realized scope marking particle *ne* has a fixed position, both in *ne que* and in *ne pas*. It is always located before the finite verb, which implies that the scope of *ne* is always the VP. If the subject is focussed, it is clefted in a sentence containing the focus particle (*Ce n'est qu'Arnim qui a présenté Marie à Thomas* 'Only Arnim introduced Mary to Thomas'). The focus-sensitive particle *que* generally bounds the focus domain immediately on its right side, though this is not necessarily the case. Depending on the position of *que*, different constituents can be focussed: *Marie* in (14a), *Thomas* in (14b) and the VP '*présenté Marie à Thomas*' in (14c). It is also possible that only the participle *présenté* is focussed by *que*, but then it must be clearly separated from its arguments (14d). The same is true in (14e-f), in which the phrasing on *Marie* or on *Thomas* can show that *que* focuses these constituents. In all cases, the realization of the focussed phrase is delimited tonally, and

optionally also with the help of short breaks before and after the focussed phrase. When the constituent under focus is unambiguous, the tonal high pitch is often realized on *que*, as in a sentence like *Jean n'aime que Marie* 'John only loves Mary'.

(14) *Ne que* 'only'

- a. Arnim n'a présenté que Marie à Thomas.
'Arnim only introduced [_F Mary] to Thomas'
- b. Arnim n'a présenté Marie qu'à Thomas.
'Arnim only introduced Mary [_F to Thomas]'
- c. Arnim n'a que présenté Marie à Thomas.
'Arnim only [_F introduced Mary to Thomas]'
- d. Arnim n'a que présenté Marie à Thomas.
'Arnim only [_F introduced] Mary to Thomas'
- e. Arnim n'a que présenté Marie à Thomas.
'Arnim only introduced [_F Mary] to Thomas'
- f. Arnim n'a que présenté Marie à Thomas.
'Arnim only introduced Mary [_F to Thomas]'

In the negation *ne pas* 'not', both *ne* and *pas* have a fixed position. In a sentence like (15), *ne* is always located before the auxiliary, as in *ne que*, and the only possible location of *pas* is immediately after the auxiliary, as shown in (15a-d). If the focussed constituent is not adjacent to *pas*, as in (15c,d), it has a clear tonal realization, analysed as a boundary tone since it can be realized on the first or on the last syllable of the focussed constituent. In most realizations the focussed constituent will also be separated by a short break. Alternatively, the negated constituent can be clefted, as shown in (15e-f). This operation has the advantage of bringing *pas* and the negated constituent close together, though again, this is not a necessity.⁸ Thus, in the case of *ne pas*, too, the operator's scope is expressed by phrasing, evidently so in the case of clefts, but also in cases like (15a-d).

⁸ It is also possible to focus part of a cleft constituent, like in (i). In this case, the focussed noun forms a phrase inside the clefted phrase (see below for more on such cases).

(i) Ce n'est pas la voiture [_F rouge] qu'il me faut (mais la bleue).

'I don't need the RED car (but the blue one)'

As compared to (ii), in which the negation is ambiguous in many more different ways than in (i), the ambiguity of (i) is much more restricted.

(ii) Il ne me faut pas la voiture rouge. 'I don't need the red car'

(15) *ne pas* 'not'

- a. Arnim n'a pas présenté Marie à Thomas.
'Arnim didn't [_F introduce Mary to Thomas]'
- b. Arnim n'a pas présenté Marie à Thomas.
'Arnim didn't [_F introduce] Mary to Thomas'
- c. Arnim n'a pas présenté Marie à Thomas.
'Arnim didn't introduce [_F Mary] to Thomas'
- d. Arnim n'a pas présenté Marie à Thomas.
'Arnim didn't introduce Mary [_F to Thomas]'
- e. Ce n'est pas Marie qu'Arnim a présentée à Thomas.
Arnim n'a pas présenté Marie à Thomas.
'Arnim didn't introduce [_F Mary] to Thomas'
- f. Ce n'est pas à Thomas qu'Arnim a présenté Marie.
Arnim n'a pas présenté Marie à Thomas.
'Arnim didn't introduce Mary [_F to Thomas]'

Finally, the operator *même* 'even' allows even less variation in its location. It has a fixed position in the sentence, namely after the finite verb (16a–c), or alternatively it can be located before the subject and then have scope over it (16d). Sentence (16e) is marginal and a sentence like (16f), in which *même* is part of a clefted constituent, is ungrammatical. This operator induces the same ambiguities as before. It can signal focus on the whole VP (by default), on the verb, or on the arguments. In the latter cases, the only possible strategy is to give some clear tonal phrasing to the relevant constituent.

(16) *même* 'even'

- a. Anne a même présenté Marie à Thomas.
'Anne even [_F introduced Mary to Thomas]'
- b. Anne a même présenté Marie à Thomas.
'Anne even introduced [_F Mary] to Thomas'
- c. Anne a même présenté Marie à Thomas.
'Anne even introduced Mary [to _F Thomas]'
- d. Même Anne a présenté Marie à Thomas.
'Even [_F Anne] introduced Mary to Thomas'
- e. ?Anne a présenté même Marie à Thomas.
- f. *C'est même Marie qu'Anne a présentée à Thomas.

4. Experiments

4.1 Speakers and Material

This section reports the results of an experiment performed to test the intonational realization of induced focus structures as answers to wh-questions. Ten native speakers of French aged between 19 and 21 years, coming from different regions of France, participated in the experiment. All informants were exchange students visiting Tübingen, Germany for a year, though at the time of recording, they had been in Germany for less than two weeks. The speakers were asked to answer questions asking for different parts of sentences written on cards. In this way, they uttered each sentence in five different ways, with five different focus structures. The informants were told not to feel too tightly bound by the written text, but to make the syntactic changes they felt appropriate. Emphasis was put on the fact that they should sound natural. They had time to make themselves acquainted with the material before recording. Two of the sentences and the questions are given in (17) and (18). The experiment, which included eight sets of sentences, consisted of 40 pseudo-randomized sentences plus 18 additional sentences, which functioned as distractors. The speakers were not aware of the aim of the experiment.

(17) a. Que se passe-t-il à la cuisine?

'What is happening in the kitchen?'
[_F Le marmiton caramélise les navets].
'The cook is caramelizing the turnips'

b. Qui caramélise les navets?

'Who is caramelizing the turnips?'
[_F Le marmiton] les caramélise.
'The cook is caramelizing them'

c. Qu'est-ce que le marmiton caramélise?

'What is the cook caramelizing?'
Le marmiton caramélise [_F les navets].
'The cook is caramelizing the turnips'

d. Que fait le marmiton avec les navets?

'What is the cook doing with the turnips?'
Le marmiton les [_F caramélise].

e. Que fait le marmiton et avec quel légume?

'What is the cook doing and with which vegetable?'
Il [_F caramélise] [_F les navets].

- (18) a. Que fait Marie?
 'What is Marie doing?'
 Marie [_F donne le biberon à son bébé].
 'Marie is giving the bottle to her baby'
- b. Qui donne le biberon à son bébé?
 'Who is giving the bottle to her baby?'
 [_F Marie] donne le biberon à son bébé.
- c. Que donne Marie à son bébé?
 'What is Marie giving to her baby?'
 Marie donne [_F le biberon] à son bébé.
- d. A qui Marie donne-t-elle le biberon?
 'To whom is Marie giving the bottle?'
 Marie donne le biberon [_F à son bébé].
- e. Que donne Marie et à qui?
 'What is Marie giving and to whom?'
 Marie donne [_F le biberon] [_F à son bébé].

The experiments included two transitive sentences, three ditransitive ones and three transitive sentences plus an adjunct. As shown in (17) and (18), the questions asked for whole sentences, the subject, the verbal phrase, the direct object and the prepositional phrase. In two cases, the question induced a focus on just the verb and in four cases, two constituents were asked for in one question. The result of a double question was a double focus.

In the discussion of the results, we will consider the phrasing and the tonal realization in turn. The third subsection introduces additional material bearing on the present issue.

4.2 Focus Induced Phrasing

In most cases, the informants retained the syntactic structure of the sentence, though they sometimes pronominalized constituents already mentioned in the question and they occasionally clefted a focussed constituent: all in all 20 sentences (out of 400) were changed into clefted sentences. The clefted constituent was the subject of the sentence in 13 cases (as in *C'est Jean qui conduit sa mère à Bordeaux* 'It is Jean who is driving his mother to Bordeaux') and the other 7 cases were distributed over 2 different constituents (4 direct objects, as in *C'est son poulet qu'Isabelle mange avec des baguettes* 'It is her chicken that Isabelle is eating with chopsticks' and 3 prepositional phrases, as in *C'est à son bébé qu'elle donne le biberon* 'It is to her baby that she is giving the bottle'). Two examples of pronominalization of mentioned constituents appear at once in *Il le peint en noir* 'He is painting it black' as an answer to *En quelle couleur le garçon peint-il le garage?* 'What color is the boy painting the garage?').

As hypothesized, the phrasing of the sentences was sensitive to their focus structure. The focussed constituent as well as the prefocal constituents formed their own phrase. The focussed constituent was generally realized in a separate phrase, with its own tonal structure, and sometimes with short breaks before and/or after the phrase boundaries. Postfocus constituents, however, were generally dephrased, and realized with a rather low and flat intonation, or alternatively with a high and flat intonation until the end of the sentence, where the melody fell.

Let us next examine concrete examples of the influence of focus on phrasing. First, in case the whole sentence was focussed, all the constituents were tonally marked. Only three sentences, given in (19), were associated with questions asking for the whole sentence. In two cases, the speakers realized separate phrases on the subject, the verb and the direct object. In the last case, however, and for some speakers, the subject, the verb and the direct object were integrated into a single phrase. This variation is probably due to the length and weight of the constituents, which are very short in (19c). This speaks for an analysis in which there can be multiple factors which influence the phrasing. Not only the syntactic structure should be taken into consideration, but also phonological cues, like the syllabic and the segmental composition of the constituents. Sentence (19c) is illustrated in Figure 1. The most prominent cue for the separate phrasing of the prepositional phrase *à Bordeaux* is probably the rising tone on *mère*, which is perceptually more important than the slight fall on the final word.

(19) Whole-focussed sentences

- a. Que se passe-t-il à la cuisine?
 'What is happening in the kitchen?'
 [_{PhP} Le marmiton] [_{PhP} caramélise] [_{PhP} les navets].
 'The cook is caramelizing the turnips'
- b. Que s'est-il passé au port?
 'What happened in the harbour?'
 [_{PhP} Les marins] [_{PhP} ont réparé] [_{PhP} le grand mât].
 'The seamen fixed the mast'
- c. Y a-t-il quelqu'un qui prend la voiture aujourd'hui?
 'Is somebody taking the car today?'
 (Oui,) [_{PhP} Jean] [_{PhP} conduit sa mère] [_{PhP} à Bordeaux].
 (Oui,) [_{PhP} Jean conduit sa mère] [_{PhP} à Bordeaux].
 '(Yes,) Jean is driving his mother to Bordeaux'

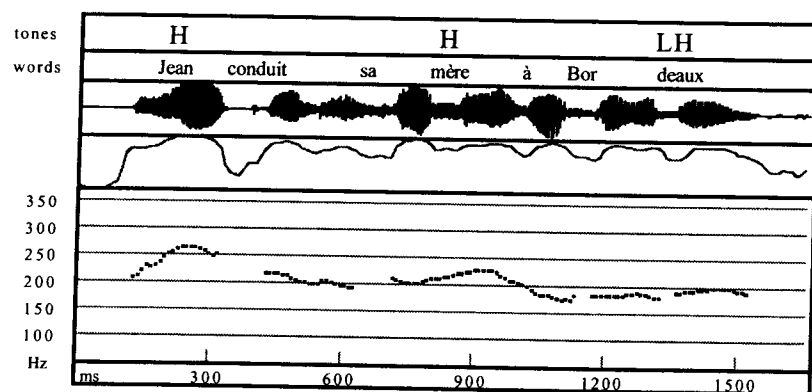


Fig. 1 *Jean conduit sa mère à Bordeaux* in a whole-focus realization

When only the verbal phrase was focussed, the complements and the adjuncts projected their own phrases, as before, and the verb was either phrased separately or included in the phrase of the first complement. Since the subject was mentioned in the question, it was expected to be included in the following phrase. However, this was only rarely the case. The subject, though pre-mentioned, was phrased separately in most cases (with the same provision as before), though the correlates of phrasing were weaker as in the all-focus case. As a comparison with (19), consider (20). According to the syntactic theory of phrasing, there should be no difference in the phrasing of whole focus sentences as compared to those with a focussed VP. The verbal phrase is phrased according to the general principles of phrasing, such as those of Nespor & Vogel (1986) or Selkirk (1986) discussed in section 2, and the prefocal subject is phrased separately. Sentence (20c) is illustrated in Figure 2, which can be compared to Figure 1. Here, too, the separate phrasing of the prepositional phrase is made more salient by the rising tone on *mère*. Notice that *Jean* has a shorter duration, a weaker intensity and a smaller tonal excursion when the verbal phrase is focussed than in a whole-focussed realization.

(20) The verbal phrase is focussed

a. Qu'ont fait les marins?

'What did the seamen do?'

[_{PhP} Les marins] [_{PhP} ont réparé] [_{PhP} le grand mât].

'The seamen fixed the mast'

b. Que fait le garçon?

'What is the boy doing?'

[_{PhP} Le garçon] [_{PhP} peint le garage] [_{PhP} en noir].

[_{PhP} Le garçon] [_{PhP} peint] [_{PhP} le garage] [_{PhP} en noir].

'The boy is painting the garage black'

c. Que fait Jean?

'What is Jean doing?'

[_{PhP} Jean] [_{PhP} conduit sa mère] [_{PhP} à Bordeaux].

[_{PhP} Jean conduit sa mère] [_{PhP} à Bordeaux].

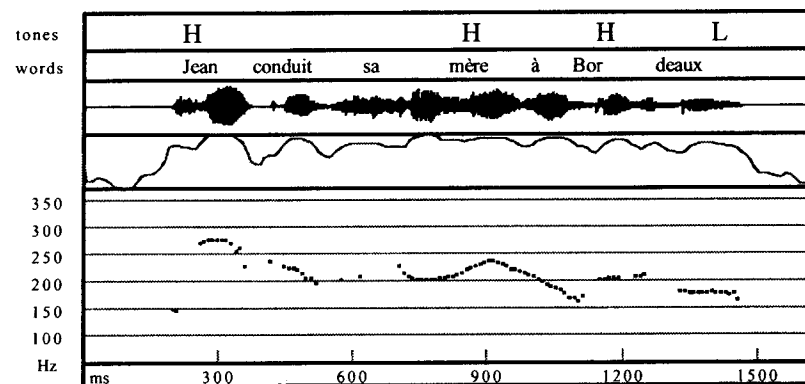


Fig. 2 *Jean conduit sa mère à Bordeaux* in a realization with a focussed VP

In sentences asking for the subject, this constituent always formed a phrase and the remainder of the sentence was usually dephrased⁹ (it was not dephrased in only 2 realizations out of 80, by 2 different speakers in 2 different sentences). When dephrased, it was realized with a low intonation and no correlates of phrasing. As mentioned above, 13 clefts were spontaneously realized in sentences with a narrow focus on the subject (in spite of the written cards). In the cleft sentences, the tonal realization was similar to the sentences without clefts: only the clefted part containing the subject was intonated. The remainder of the sentence was flat and dephrased. Some examples of sentences in which the subject is focussed are given in (21). In these cases, it is conspicuous that

⁹ I am agnostic as to the theoretical status of dephrasing. I use the term to qualify strings of sentences without tonal realization, and do not assign them a PhP structure. In an analysis requiring exhaustive prosodic parsing, they should be integrated into a PhP to their left or right.

focus-induced phrasing overrides syntax-induced phrasing. Compare Figures 3 to 5 in the next section.

(21) The subject is focussed

- a. Qui peint le garage en noir?
[PhP Le garçon] peint le garage en noir.
- b. Qui mange du poulet avec des baguettes?
[PhP Isabelle] mange du poulet avec des baguettes.

In sentences asking for the object, the object was always phrased separately. The following prepositional phrase, if present, was usually flat and dephrased, but the preceding subject was not. The verb was sometimes independently phrased and sometimes dephrased, depending on its prosodic weight. The verbs *caramélise* and *ont réparé*, for example, always projected their own phrases.

(22) The object is focussed

- a. Qu'est-ce que les marins ont réparé?
'What did the seamen fix?'
[PhP Les marins] [PhP ont réparé] [PhP le grand mât].
- b. Qui Daniel promène en laisse?
'Who does Daniel walk on the leash?'
[PhP Daniel] promène [PhP son chien] en laisse.
'Daniel walks his dog on the leash'

When the prepositional phrase was focussed, the phrasing was similar to that produced by a focussed verbal phrase. Subject, verb and first complement were usually phrased separately. The PP always formed its own phrase.

(23) The prepositional phrase is focussed

- a. A qui Marie donne-t-elle le biberon?
'To whom is Marie giving the bottle?'
[PhP Marie] [PhP donne le biberon] [PhP à son bébé].
- b. Comment les deux enfants vont-ils l'école?
'How do the two children go to school?'
[PhP Les deux enfants] [PhP vont à l'école] [PhP en vélo].
'The two children go to school by bike'

Two cases remain to be considered. First, the two sentences produced as answers to questions asking for the verb only, as shown in (24), and second, the double questions asking for two complements, as illustrated in (25). The results are not surprising. In the first case, the verb was phrased separately and the following complements were rather

flat, as a consequence of dephrasing. In the case of the double question, each focussed constituent was phrased separately.

(24) The verb is focussed

- a. Que fait le marmiton avec les navets?
'What is the cook doing with the turnips?'
[PhP Le marmiton] [PhP caramélise] les navets.
- b. Qu'ont fait les marins avec le grand mât?
'What did the seamen do with the mast?'
[PhP Les marins] [PhP ont réparé] le grand mât.

(25) Two constituents are focussed

- a. Que donne Marie et à qui?
'What is Marie giving and to whom?'
[PhP Marie] donne [PhP le biberon] [PhP à son bébé].
- b. Que mange Isabelle et comment?
'What is Isabelle eating and how?'
[PhP Isabelle] mange [PhP du poulet] [PhP et avec des baguettes].

The generalizations arising from this section are the following. First, phrasing as a consequence of focus respects by and large the neutral phrasing presented in section 2. Phonological Phrases usually respect the boundaries introduced by the syntax, though this is an artefact of the fact that the questions always asked for constituents of the size of such a syntactic phrase. Second, there is a clear asymmetry between pre- and postfocal constituents. Prefocal constituents are always phrased, but postfocal ones are mostly (though crucially not always) dephrased. Third, there is a small margin of variability in the formation of Phonological phrases based on the length and weight of the constituents. Short constituents have a tendency to be integrated into adjacent constituents. This was shown with the monosyllabic subject *Jean* and with verbs like *vont* and *conduit*.

4.3 Tonal Realization

The tonal make-up of the phrases is more surprising. Most of the sentences were realized in several ways by different speakers, even in case the phrasing was the same (see also Jun & Fougeron 1995 for variation in the way the tone sequence LHLH of their Accentual Phrase is realized). To start with, consider the different tonal realizations of the narrowly focussed subjects in (26) and (27). The last tone of the phrase, high or low, was always on the last syllable, which is fully compatible with a view of this tone as a boundary tone. However, the tonal make-up of the preceding syllables was subject to a great deal of variation. The first example, in (26), shows a single word preceded by

an article (*le marmiton*). This noun was realized with two or three tones. In the realizations with two tones, these were distributed over the last two syllables, or over the first and the last ones. In the tritonal realizations, the three tones were distributed over all three syllables. The last tone of the phrase was high or low, and the initial tone was high or low as well. Thus high tones are found on the first, the second or the third syllables of *marmiton*. In the second example in (27), even more variation was present. Here the first high tone was either on *deux*, or on one of the two syllables of *enfants*. Again, *deux* was either low or high and again the final tone was either high or low, too. Notice that even if most speakers realized the remaining of the sentence with a flat and low intonation, one speaker intoned the remaining of the sentence, as well, which is perfectly acceptable in French. Figure 3 to 5 show three realizations of *les deux enfants vont à l'école en vélo* with focus on *les deux enfants*.

(26) Qui caramélise les navets?

HL

- a. [Le marmiton] caramélise les navets/les caramélise (six speakers)

H L

- b. [Le marmiton] les caramélise (three speakers)

H L H

- c. [Le marmiton] les caramélise (one speaker)

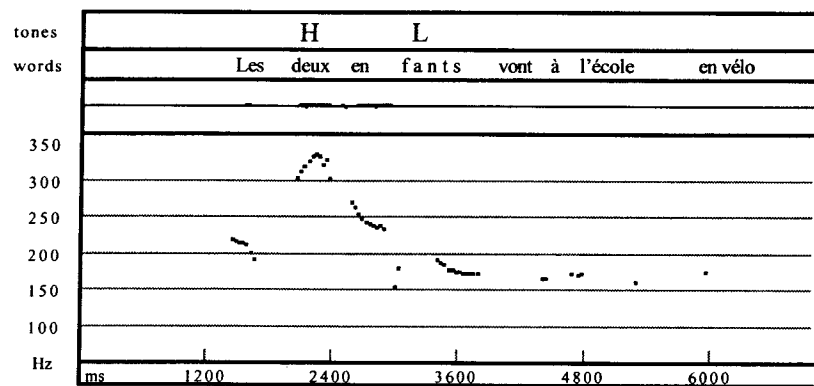


Fig. 3 Realization (27a) of *Les deux enfants vont à l'école en vélo* with focussed subject

(27) Qui va à l'école en vélo?

H L

- a. [Les deux enfants] vont à l'école en vélo (three speakers)

H L H L

- b. Ce sont [les deux enfants] qui vont à l'école en vélo (one speaker)

H L

- c. [Les deux enfants] vont à l'école en vélo (two speakers)

LH L

- d. [Les deux enfants] vont à l'école en vélo (two speakers)

LH H HL

- e. [Les deux enfants] [vont à l'école] [en vélo] (one speaker)

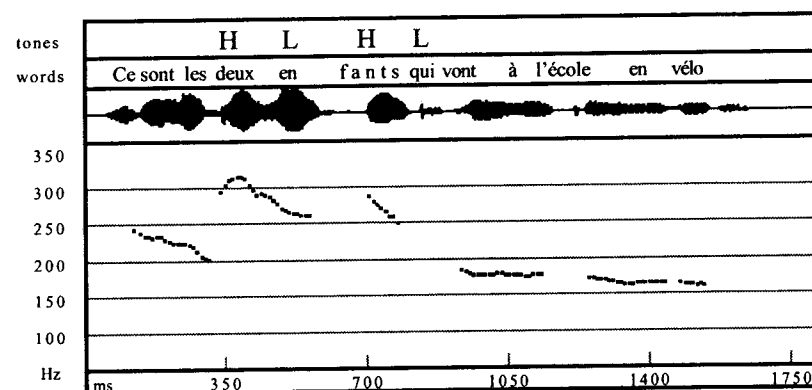


Fig. 4 Realization (27b) of *Les deux enfants vont à l'école en vélo* with focussed subject

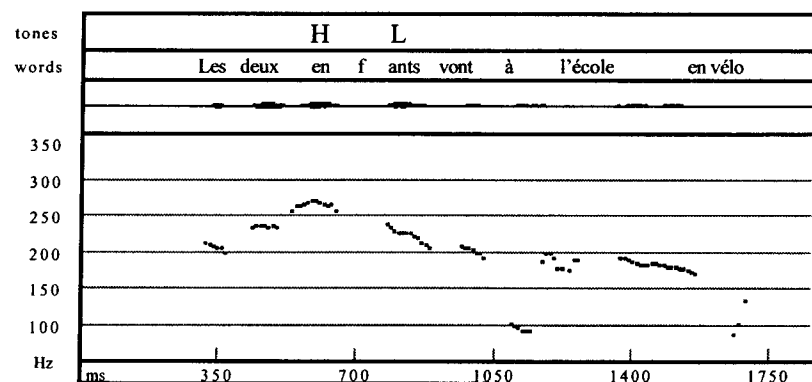


Fig. 5 Realization (27c) of *Les deux enfants vont à l'école en vélo* with focussed subject

Not only the focussed subjects showed a great deal of variation in their tonal realization, but most phrases did as well. Phrases with just one or two syllables did not vary a lot, but as soon as the phrases were longer, more tonal variation appeared.

A further striking example is the prepositional phrase *à son bébé* in (28). The first high tone has several possible anchoring places: on the preposition *à* (28a), on the possessive pronoun *son* (28b) and on the first (28c) or on the last (28d–e) syllable of the noun *bébé*.

(28) A qui Marie donne-t-elle le biberon?

- a. [Marie] [donne le biberon] [à son bébé] (two speakers)
 H LH H L
 b. [C'est à son bébé] que Marie donne le biberon (one speaker)
 H L
 c. [Marie/Elle donne le biberon] [à son bébé] (four speakers)
 LH H L
 d. [Marie donne le biberon] [à son bébé] (two speakers)
 LH LH
 e. [Marie] [donne le biberon] [à son bébé] (one speaker)
 H LH HL

The variation in the location of the first high tone can be explained in the following way. As shown before, the focus domain is conditioned by the question, but some in-

determinacies remain: it may include the preposition and the possessive pronoun, or just the latter, as shown in (29). The tonal and prosodic structure in (30) reflect the different possible focus structures given in (29).¹⁰

(29) A qui Marie donne-t-elle le biberon?

- a. Elle donne le biberon [_F à son bébé]
 b. Elle donne le biberon à [_F son bébé]
 c. Elle donne le biberon à son [_F bébé]

(30) A qui Marie donne-t-elle le biberon?

- a. Elle donne le biberon [_{PhP} à son bébé] H L
 b. Elle donne le biberon à [_{PhP} son bébé] H L
 c. Elle donne le biberon à son [_{PhP} bébé] H L
 d. Elle donne le biberon à son [_{PhP} bé bé] HL

Some further cases from the experiment confirm the importance of phrasing for signalling the focussed phrase. The first one is the fact that focus forces the preceding constituent to also be phrased separately since it is not included in the same phrase. The sentence (31) shows that focussing *en laisse* induces a clear break before this constituent and as a consequence, *son chien* has a final high tone (or *promène* in case of pronominalization of *son chien*). I postulate that this high tone is present to indicate both the end of a phrase and the beginning of a new one.

(31) Comment Daniel promène-t-il son chien?

- a. [Daniel promène son chien] [en laisse] H L HL
 b. [Daniel promène son chien] [en laisse] H HL
 c. [Il le promène] [en laisse] H HL

¹⁰ Such variability in the focussed structure may exist in German or English, as well, but since the focus structure in these languages is signalled by the accents and the accent rules do not assign a pitch accent on a preposition or a possessive pronoun, the difference is not reflected in the tonal realization.

H H H L
d. [Daniel promène] [son chien] [en laisse]

H H L HL
e. [Daniel] [promène son chien] [en laisse]

And finally when two constituents are focussed, the phrasing of the two foci is clearly marked. Notice that a thinkable realization of a sentence like (32) would be with just one phrase including both foci. But this never happens.¹¹

(32) Double focus

Que donne Marie et à qui?
Marie donne [_F le biberon] [_F à son bébé]
[_{PhP} Marie] [_{PhP} donne le biberon] [_{PhP} à son bébé]

The tonal realization discussed in this section is fully compatible with the hypothesis that tones in French are boundary or mixed tones. There is a great deal of variation in the association of tones, as illustrated in the examples. A falling tone, for example, can be entirely associated with the final syllable of a Phonological Phrase or alternatively it can be distributed over the last two syllables. A high tone marking the beginning of a focus domain is also subject to some variation, but, as shown above, this can be explained by a focus domain's variable size. In any case, the fact that tonal realization has such freedom confirms the non-pitch-accentual nature of tones. Or, in an alternative view, if tones stand for accents in French, the definition of accents must be made less restrictive.

4.4 Additional Evidence for the Phrasing Hypothesis

In the cases described in the preceding sections, the Phonological Phrase boundaries always coincide with syntactic phrasing, and the formation of PhPs is in many cases identical to the unmarked one (except for the postfocal dephrasing). This final section presents some cases in which additional phrase boundaries were introduced at the edges of a focus domain which did not fall together with the normal or unmarked phrasing of the sentence, as shown in (33) and (34). In these sentences, focus was on a constituent smaller than the one coinciding with a default Phonological Phrase. For instance, in (33) the focus domain is the word *petite*, though the unmarked PhP would be *la petite décapotable de Marie*. In (34) focus is on the word *minutes*, though a PhP is expected to be built on *six minutes*. Most speakers ameliorated the phrasing not

¹¹ Most speakers realized the sentence *Isabelle mange son poulet (et) avec des baguettes* as an answer to *Que mange Isabelle et avec quoi?* 'What is Isabelle eating and with what?' with the conjunction *et* between the two focussed phrases. Notice that *avec des baguettes* is an adjunct, and a bigger break is possibly expected. No conjunction was ever realized between two arguments, or between a verb and a following argument.

corresponding to a natural one by clefting the focussed constituent. However, some speakers realized the focus in situ in these sentences. When they did so, they marked a break both before and after the focussed word and dephrased the remainder of the sentence.

(33) a. Marie a deux voitures, une grande et une petite décapotables. Jean conduit la petite décapotable de Marie. On vous dit: "Jean conduit la grande décapotable de Marie." Comment corrigez-vous?
'Marie has two cars, a big and a small convertible. Jean is driving Marie's small convertible. Someone tells you: "Jean is driving Marie's big convertible." What is your correction?'

b. C'est la [_F petite] décapotable de Marie que Jean conduit. / Jean conduit la [_F petite] décapotable de Marie. 'Jean is driving Marie's small convertible'

(34) a. Un pilote de course a fait le tour de la piste en six minutes. On vous dit: "Il a fait le tour de la piste en six secondes."
'A race car driver drove the course in six minutes. Someone tells you: "He drove the course in six seconds."'

b. Non, c'est en six [_F minutes] qu'il a fait le tour de la piste. / Non, il a fait le tour de la piste en six [_F minutes]. 'No he drove the course in six minutes'

Really interesting is the exaggerated phrasing on the focussed word. When the identification of a focus really matters, it is important for the phrasing to be unambiguous, and this cannot be achieved by tones only since in French, the tonal realization is subject to too much variation, as discussed in the preceding section. This kind of realization to identify focus clearly contrasts with what is found in English, German or other languages using pitch accents.

5. Conclusion

The hypothesis formulated at the beginning of this paper was that French signals focus with phrasing and not with pitch accents. Consequently, the tonal excursions associated with the phrase boundaries, both at the beginning and at the end of phrases, are boundary tones, or, alternatively, mixed tones with a crucial demarcative function.

Several properties of French tones speak for this analysis, like their variability, their optionality and the fact that they can associate with metrically weak syllables. The crucial property of French is that it does not have lexical stress, and all kinds of syllables can bear tonal movements, as well as articles, prepositions and schwa syllables. Boundary tones do not avoid such elements. The variability of tonal association also finds a natural explanation. The only function of tones is to delimit the edges of phrases arising through the interaction of syntax, phonology and focus structure. The

strategies to achieve this can vary within certain limits. This is not expected under a pitch accent model since stress is much more invariant.

These properties of tones were confirmed by an experiment in which speakers had to realize sentences with different focus domains. Three important facts were brought to light by this experiment. First, the tonal phrasing is more clearly marked under narrow than under wide focus. Narrow focus is often signalled by an initial boundary tone, whereas unmarked or wide focus is often indicated only by the presence of a final falling tone. A hypothesis that should be verified is that more prominence increases the probability for an initial tone. The second important result was the variation in the number and location of high tones inside of a focus domain. A high tone can be realized on the first syllable of a focus phrase. Third, the results of the experiment contradict the thesis that French does not allow deaccenting/dephrasing of backgrounded material. Under narrow focus the prenuclear phrasing is preserved, but the postnuclear material is dephrased.

The last remark is that the tendency to cleft or topicalize focussed constituents is also explained. Clefted constituents have a very clear phrasing structure, and this is what French tries to achieve.

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