Emphasis does not always coincide with phrasal boundaries in spontaneous spoken French

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RÉSUMÉ _____

L'accentuation emphatique ne s'aligne pas toujours avec une frontière prosodique en français parlé

La prosodie française se caractérise par un lien étroit entre la proéminence et la découpage du flux de parole en unités prosodiques. Les chercheurs se mettent d'accord sur la proéminence de la syllabe finale (pleine) de la plus petite unité. Mais la possibilité de mettre de l'emphase sur d'autres syllabes peut créer des proéminences qui ne se situent pas dans la position pré-frontière. Ici nous présentons des exemples de parole spontanée tirés de deux émissions radiophoniques où les auditeurs perçoivent l'emphase sans l'occurrence d'une frontière prosodique. Ensuite, nous examinons quelques-uns des modifications prosodiques que peuvent employer les locuteurs pour communiquer l'emphase avec ou sans la présence d'une frontière prosodique. Nous concluons que, à la différence de la proéminence, l'emphase ne se situe pas toujours en fin du syntagme.

ABSTRACT _____

The prosodic structure of French involves a tight connection between the location of prominent syllables and locations where the flow of speech is divided into prosodic units. Researchers agree that the final (full) syllable of the smallest prosodic unit is prominent. The possibility remains that other syllables or words may be emphasized that do not precede a prosodic boundary. This paper examines cases from two radio broadcasts where emphasis is found without a boundary, and illustrates some prosodic modifications that speakers use to create emphasis with or without boundaries. The data demonstrate that emphasis is not tied to a specific phrasal position, even though words preceding a boundary are more prominent than other words.

MOTS-CLÉS : syntagmes prosodiques, proéminence, perception de la prosodie, français.
KEYWORDS : phrasing, prominence, perception of prosody, French.

1   Introduction

In French, prominence and phrasing are largely co-dependent. The location of prominence is coincident with syllables receiving accent by virtue of their position in the prosodic unit (Di Cristo 1999, 2000). Mertens (2006:70) is particularly explicit about this connection, saying that "final stress entails a right hand boundary of the intonation unit." The smallest prosodic unit has prominence (stress, according to Mertens) on the final non-schwa syllable, and may also have an initial prominence on its first or second syllable. (This unit consists of a single lexical word with optional preceding function words – the *Unité Tonale* of Di Cristo (2000), Phonological Phrase of

Post (2000), and Accentual Phrase of Jun and Fougeron (2002).) The initial accent is often associated with the expression of emphasis (e.g., Di Cristo 2000), although this has been challenged (see below). These analyses have been most clearly validated for prepared speech, such as reading aloud, but also for spontaneous speech.

However, spontaneous speech frequently includes emphasis that does not fit so cleanly into the prosodic structure described above. The term 'emphasis' is used here to refer to the paralinguistic expression of an attitude or emotion towards what is being said, in contrast to prominence, which relates to linguistic organization. Words can be emphasized without being in the phrasal positions for either initial or final accent. Both initial and final accents are generally associated with pitch rises (or falls, utterance-finally), but in emphatic speech, speakers may use more intonational possibilities than the basic LH pattern (Dahan and Bernard 1996). Surveying the ways that emphasis can be conveyed in French, Ferré (2011:2) suggests that "Prosodic emphasis is understood as some unusually strong word onset (this is unusual since French normally carries primary stress on the last syllable of the word and nuclear stress falls on the last syllable of the intonation group) ..." Selting (1994) showed that German speakers use rhythm, accent density and f0, in addition to syntax and lexical cues, to communicate emphasis. Although the details are likely to be language-specific, we might expect some of the same dimensions to be manipulated in French, despite the great differences between the prosodic systems of French and German.

Defining emphasis is a challenge in itself. Dahan and Bernard (1996:342) say that: "To highlight specific information in an utterance, a speaker can prosodically focus the word that conveys most information by producing an emphatic accent." In their study of emphasis in French sentences read aloud, an f0 increase on the first syllable of a word was the best predictor of listeners' perception of emphasis, and the length of a pause before the emphasized word was also helpful for emphasis perception. A rather different prosodic method for communicating emphasis in French was identified by Simon and Grobet (2005). They studied rhythmic scansions (passages of speech in which prominent syllables recur at intervals perceived as isochronic), many of which are perceived as emphatic. They found that slow speech rate and dynamic f0 movement contributed to the perception of emphasis.

In many languages, prominence can be signaled by f0 rises, but Welby (2006) argues that in French this is not the case. She includes in this argument the rise on the initial syllable of an Accentual Phrase that has been referred to as the *accent d'insistance*, and shows that the initial f0 rises mark phrasal boundaries, and are not pitch accents, as was proposed by Post (2000). The study of initial accents by Astésano, Bard and Turk (2007) is consistent with Welby's analysis; they found that initial accents have a primarily structural role marking the onset of phonological phrases. However, Astésano et al. analyzed sentences that were read aloud, and thus were not looking for emotional or emphatic productions, so their proposal does not exclude the possibility that initial accent may convey emphasis under some circumstances. This highlights the need to distinguish between prominence, which comes from phrasal structure, and emphasis, which comes from the speaker's attitude towards her topic. The difficulty of identifying prominence has been discussed (Morel et al. 2006); emphasis should be easier to spot as it involves more extreme divergence from 'neutral' prosody. Emphatic words might

be expected to also be prominent, that is, to occur in the prominent phrase-final position, since this would reinforce their salience.

Thus there remain a number of open questions about how emphasis is conveyed in French. Although syntax is employed more extensively than prosody to convey emphasis in French (Ferré 2011), speakers do use prosodic modifications in addition to, or instead of, syntactic constructions. This paper explores the ways that speakers manipulate prosody to convey emphasis, especially in cases where the prosody diverges from what is expected in words that are prominent because of their position in prosodic structure, or where the word is perceived as emphatic but not final in a phrase – the position that would be expected. Looking at cases where there is a perception of emphasis in non-final position may help to isolate the characteristics of these two, which tend to be conflated in French. In addition to lengthening, which marks accented syllables, speakers can also use abrupt changes in rate, f0 manipulations, and repetition of lexical items or prosodic patterns.

This paper first shows that it is possible for a word to be perceived as emphasized without an immediately following phrasal boundary. This finding is based on listeners' perceptions of extracts from a current affairs debate that was broadcast on France Inter radio in December 2008. Next, the prosodic modifications that can be used to express emphasis (with or without a boundary) are illustrated with examples from an interview that was also broadcast on France Inter, in February 2009. This interview was selected because, presumably due to the emotional nature of the topic, it seems to illustrate a very rich use of prosody in expressing emphasis.

2   Data set one: current affairs debate

This corpus of recordings of a current affairs debate broadcast on radio was used in a previous study of listeners' perceptions of boundaries and prominence (Smith 2011). In that experiment, listeners heard recordings of brief extracts from this debate and followed along on an orthographic unpunctuated transcript. One set of listeners were instructed to underline on their transcript any words that they heard as highlighted (*mis en relief*). This definition corresponds more closely to what we are calling emphasis than to the kind of prominence associated with phrasal accent. Another set of listeners were asked to mark at every location where they heard the end of a group of words. This definition was not intended to correspond to any specific phrasal unit. In other work (Smith 2011) it was argued that listeners marked boundaries corresponding approximately to Intonational Phrase-size units.

In general, words that listeners perceived as preceding a boundary were also perceived as more emphasized than words that were not pre-boundary. There was no such tendency for words following a boundary – in fact, there average degree of emphasis was lower than the average over all words, suggesting that at least in the samples of speech used in this study, there was little evidence of phrase-initial accents. In ten extracts (averaging 39 s in duration) from this debate, representing five different speakers, there were 17 words that at least two-thirds of the listeners identified as emphasized, but less than one-third identified as preceding a boundary. This accounts for 40% of the total number of words that listeners perceived as emphasized (43).

2.1   Methodology

In the study of listeners' perceptions, we first identified those words that at least two-thirds of the listeners perceived as emphasized, or where at least two-thirds of listeners perceived a boundary following the word. In general, there was a strong association between these two. More words were perceived as pre-boundary than as emphasized. Of the 85 words perceived as preceding a boundary, 18 were also perceived as emphasized by at least two-thirds of listeners. (Emphasis and boundaries were marked by different sets of listeners.) There were 25 other words that were perceived as emphasized but which fewer than two-thirds of listeners perceived as pre-boundary. Because of the predicted close association between emphasis, or prominence, and boundary perception, the question arises as to why listeners' perceptions of emphasis and boundaries did not coincide at these words. This question was investigated by examining the acoustic characteristics of the words where perceptions were "mismatched". The analysis focused on the words where the mismatch was strongest: the 17 words that more than two-thirds of listeners perceived as emphasized, but fewer than one-third perceived as pre-boundary (this is 20% of the total number of words perceived as pre-boundary). Most of the seventeen were lexical words (nouns, verbs or adjectives). Exceptions were *que* in *est-ce que*, and *ensuite*.

In terms of what might favor the perception of emphasis, 3 acoustic properties listed below were observed on these 17 words. Several words exhibited more than one of the properties listed. The presence of a glottalization at word onset is unusual in French (Ferré's (2011) "strong word onset" to convey emphasis). It creates the impression of a break in the speech even if there is no actual silent period. An f0 rise on the initial syllable of a word is the traditional sign of the *accent d'insistance* (Di Cristo 2000).

- – Initial glottalization sometimes with pause preceding the word   5 words
- – F0 rise on the initial syllable   8 words
- – Marked (over 80 Hz) f0 rise on the final syllable   11 words

Two words in these extracts seemed to be made salient primarily because of properties other than those listed above, although they did both have substantial f0 rises on their final syllables. The *que* was prominent because of lengthening. It was 318 ms in duration compared to 205 ms for another *que* produced by the same speaker in utterance-final position; it may have been produced with extra duration because the speaker is introducing a new topic by asking a question beginning *est-ce que*. Another very prominent word produced by the same speaker was *lasse* in *est-ce que vous avez pas peur que que ça lasse un petit peu le le le public*, in which *lasse* is far louder than the surrounding words. It is not possible to make meaningful comparisons of intensity in these recordings, but in this case the difference is very striking.

The properties discussed here do not answer the question of why no boundary was perceived on these words. In particular, a substantial f0 rise on the final syllable would seem to be an excellent indicator that the word is final in an accent group. The most likely explanation is that the boundary-marking by listeners was more sparse than would be appropriate if they were marking accent groups. In these extracts, listeners marked boundaries on average every 11 words. If they were marking the smallest prosodic unit, we would expect boundaries to have been marked every two or three

words. On the basis of f0 movement and lengthening, the words examined here could all be analyzed as final in an accent group but not an Intonational Phrase.

3   Data set two: interview

The second data source was used to survey the range of prosodic means that speakers have at their disposal to mark emphasis. This interview was transcribed and segmented into breath groups at each change in speaker, and at each pause (silent or filled) that lasted 150 ms or more. Some portions of the interview could not be analyzed because of background music, or because the two speakers occasionally spoke at the same time for extended periods. The interviewee accounts for the vast majority of the speech in this conversation. She is describing an extremely stressful job she held at a web design company that ended when she collapsed at work and was hospitalized. She moves from a fairly straightforward presentation of her job at the beginning of the interview, characterized by grammatically complete utterances, to the more emotional parts of her narration in which there are almost no grammatically complete utterances and the length of a single breath group varies from single syllables to as much as 13.7 seconds. Portions of the interviewee's speech were identified impressionistically by the investigator as involving emphasis of a word or group of words. The examples in the next section illustrate the different prosodic modifications that she produced which contribute to the perception of emphasis.

3.1   Modifications signaling emphasis

3.1.1   Lengthening

Lengthening is well-documented as an indicator of final position in the accent group. It can also signal greater prominence on a single word. In Figure 1, the words *je* and *suis* are lengthened, although they are not final in the breath group. Nor do they have any f0 movement that suggests they are being treated as separate Accentual Phrases. The lengthening seems to be simply a means to convey emphasis.
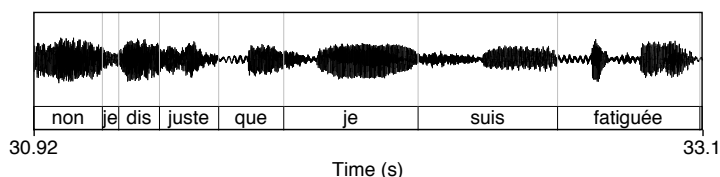

Figure 1. Waveform illustrating non-final lengthening

3.1.2   Abrupt changes in speaking rate

Here the interviewee has been speaking very rapidly, repeating the phrase *on y va*, as she recounts how she worked more and more intensely at her job. Her speaking rate reaches 7.52 syllables / second in the first breath group shown in Figure 2. Then a

pause followed by two very short breath groups at much slower rates (2.00 and 3.31 syllables/s) signals her realization that the more she worked, the more projects she was assigned. The abrupt change in rate draws attention to the transition in her thinking.
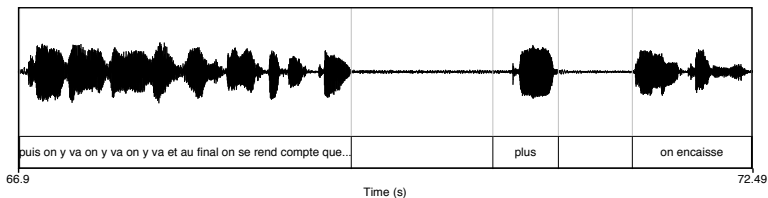

Figure 2. Waveform illustrating an abrupt change in rate

3.1.3   Schwa insertion with repetition of intonation

The interviewee frequently adds schwa-like vowels to the ends of words, a phenomenon well-known in contemporary spoken French (e.g., Carton 1999). Among the authors who have studied these are Hansen and Hansen (2003), who refer to them as parasitic schwas (*schwas parasitaires*). They say their most important function is "to attract the attention of the interlocutor to an important element in the discourse" (2003:105) (*d'attirer l'attention de l'interlocuteur sur un élément important du discours*). They also describe these parasitic schwas as associated with a characteristic melodic pattern.

The example in Figure 3 shows the f0 trace for a breath group that for convenience has been sub-divided into three short phrases. Each of these ends with a "parasitic schwa". The final lexical syllable of each short phrase (*tôt, heures, fond*) is produced at an f0 peak in the contour. F0 falls during the prolonged schwa following each of these syllables. The fall is more extensive and more rapid on the final one, which is also the end of the breath group. The repetition of this intonational contour emphasizes the words at the end of each group. The words gain prominence due to their final position in the phrases, as these coincide with the end of Accentual Phrases.
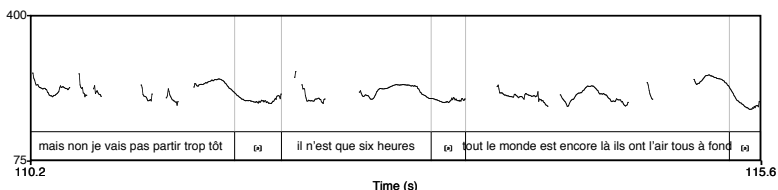

Figure 3. F0 trace (in Hz) illustrating a repeated melodic pattern

3.1.4   Accent clash

Potentially, phrasal prominence can occur on the final syllable of one Accentual Phrase and the initial syllable of the next, resulting in two adjacent accented syllables. Such

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"clash" is avoided in many languages. In the example of Figure 4, the clash draws attention to the two words, as the interviewee emphasizes the company's requirement that employees express a positive attitude at all times. The especially high f0 on the final syllable of *énergie* may add even more to the dynamic impression.
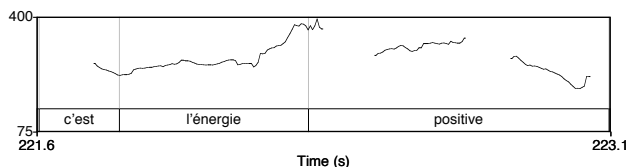

Figure 4. F0 trace (in Hz) illustrating a clash between the final accent of *énergie* and the initial accent of *positive*

4   Discussion

This paper has investigated ways that emphasis can be conveyed either without the presence of a perceptible boundary, or by using other prosodic means to convey emphasis in addition to the presence of a boundary. Speakers of French, exemplified by the interviewee studied here, use some of the same cues to emphasis as speakers of other languages, such as Selting's (1994) German speakers. These include expanded f0 movement, durational lengthening, and changes in speaking rate. But French also has language-specific ways of marking emphasis, such as the addition of parasitic schwas which may occur in conjunction with a repeated, stereotypical pitch contour. An important French-specific marker of emphasis is the initial *accent d'insistance*. In order to test its perceptual salience, it would be necessary to obtain syllable-level perceptual judgments, which was not done here.

The prosodic marking of emphasis is of interest in situating French relative to other languages such as English, for example, with a very different relation between emphasis and boundaries. Pitch accents in English are not the head of any prosodic unit, so phrasal structure and intonational structure do not have the same linkage as in French. Thus there would be no reason to suspect a role for phrasal structure in creating emphasis. The possibility shown here that emphasis can be perceived without a phrasal boundary in French suggests that this relative flexibility in the occurrence of emphasis may be widespread. Speakers may choose to emphasize words in any position in a phrase. The position of a word before a phrase boundary implies that it will be more prominent than it would be in other positions (Smith 2011), but emphasis (perhaps an extreme form of prominence) does not imply that a word will be positioned before a boundary. Paralinguistic factors such as the expression of emotion, which can be reflected by emphasis, are believed to contribute to the determination of prosodic structure. But they may also be somewhat independent of it.

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