

A Neglected Factor of French Prosody: The peak variation at the end of rhythmic groups

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<Abstracts>

The aim of this research is to study the functioning of the peak variations at the end of the rhythmic groups in spoken French. For this purpose, the text "60 Voix, 60 Exercices", published by Hachette in 1988, was selected. This textbook is based on interviews with 60 persons who briefly speak in a monolog from on a subject of their choice. 500 hundred different groups were selected and submitted to the auditory judgment of six informants, three French natives and three Japanese natives who had studied French for at least three years. It was found, first, that there exists a tendency to a change of either rising or falling intonation compared with the flat one, and second, that the rising intonation obtains a fairly good score of frequency compared with the two other, ones even if the examined sentences do not pertain to the strict classical types of interrogative or exclamative sentences or dialogs, where affectivity is so often an important factor.

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1. Presentation

Most authors dealing with the problem of accentuation in spoken French acknowledge that the normal accent, also called logical or tonic, is equivalent not to a word accent but to a rhythmic accent; that it is characterized by its length; that this group accent falls on the last syllable; that the vowel which is affected by this accent is, on an average, twice as long as the vowels pertaining to the same group, and finally that this intensity is almost equivalent to the other syllables of the same group (less than 0.5 dB, according to Delattre).

Such observations are more or less explicit among the phoneticians who have dealt with this question. For instance, Grammont (1914, 1933), Fouché (1934), Coustenoble and Armstrong (1934), Varney-Pleasants (1934), Delattre (1951, 1966, 1969), Donahue-Gaudet (1969), Adamczeski and Keen (1973), Malécot (1977, 1979), Wenk and Wioland (1984), Wioland (1991).

In particular, the problem of vocal length has been the one that was mostly investigated, either when it is found in an open syllable or a closed one. As references, we may add Delattre (1939, 130-131), Malécot (1977, 32), Roberge (1995), and Wioland (1983, 43-47). Wioland distinguishes three types of duration levels: a non-marked duration, a marked one and a very marked one. The non-marked duration is formed by an oral vowel followed by a voiced consonant. The marked duration is specified by an oral vowel followed by a voiceless consonant. Finally the highly marked duration is characterized either by an oral vowel followed by the consonants /t/, /v/, /z/, and /ʃ/, by /i/ followed by /j/, or finally by a nasal vowel followed by any kind of consonant.

We have also to mention Grammont, who proposed the following rule that was found later in different manuals of French intonation:

“The ordinary French sentence is always composed of two parts, one is raising, the other one is falling.” (1914, 15).

The Léons were more explicit in this matter, since they showed the possibility of whole strings of raising segments in French. Here is their explanation:

French is characterized by the almost constant use of rising tones on the final vowels of groups.

Je ne sais pas ↑ si on vous a raconté ↑ cette histoire ↑ qui est arrivée à mes amis ↑ la semaine dernière ↑ ...

The contrary is found in a language like English, which is characterized by the falling tone after an accentuated vowel." (Léon, P. and M., 1964, 67).

Obviously, we would like to know more, and the expression "almost constant use" leaves us eager for more details.

Wenk and Wioland(1984) are of particular interest to our research, since they went a step further in the analysis of rising intonation. They noted that, as opposed to the English prosodic changes, the accentuated French syllables, whether found in a rising or a falling environment, even show a pitch variation on the second part of the syllabic duration. To illustrate their statement they presented the spectrograms of the following two sentences, where changes in pitch appear on /m/: "Il est à Rome?" and "Il est à Rome".

Finally, in a study made on spontaneous French (Wioland, 1991), it was shown that

- lengthening appears in 90 % of the cases.
- variation of the fundamental pitch, in 56 %
- intensity, in only 27 %

An analysis of the variations of the fundamental pitch mentioned above revealed that

- 35 % show a rising variation
- 10 % a falling variation
- 11.2 % a flat duration.

From this presentation of different researches, it appears that the authors have mostly been dealing with ready-made sentences, relying on their own personal observations, and working often outside a genuine context of spoken French.

2. Hypotheses

Basing ourselves on listening to spontaneous French as used by native speakers and French spoken by Japanese learners, we can first formulate the two following hypotheses:

- 1) the end of any rhythmic group should show a very important pitch change
- 2) a frequent rising change curve is more important than commonly acknowledged.

Linked with this second hypothesis, we would like to investigate whether it would be possible to be more specific, for instance, in the matter of the place of this rising change, and the influence of the phonetic composition on the choice of this place.

3. Preparation of the survey

In order to deal with these three issues, we selected a method intended for advanced student learners of French, "60 Voix, 60 Exercices", published in 1988 by Hachette. This method contains 60 monologs of 60 different speakers talking about a subject of particular interest to them. The recording was made in ideal conditions: in the subjects' natural environment without any outside pressure. Once they were invited to talk, they would talk without being interrupted. For our purpose, the following fact was of particular interest: interrogative or exclamative sentences were absent from the corpus. By the same token, we were put in contact with a more neutral kind of oral and standard French.

We had fixed the number of rhythmic groups to 500. In order to reach this objective, the first 48 recordings were necessary. Out of these, six were disregarded for the following reasons:

- R 7 pauses were not sufficiently clear-cut
- R 8 the transcript and the recording did not match
- R 22 the subject dealt with was more proper to a scientific conference than to an everyday monolog
- R 26 it was the recording of a person speaking meridional French
- Rs 41 and 47 hesitations were too numerous to allow easily recognizable stops.

Finally a total of 42 recordings were selected. The average number of pauses per recording was 11, 9, deviation being between four pauses for recording R 15 and 23 for recording R10.

The recordings were rather short, since they were limited to a time bracket of 40 to 80 sec., but we could profit from the advantages offered by a rich variety of :

- contributors: men/women of different ages, adults/infants/youngsters
- different professions and social backgrounds: student, journalist, retired people, social helper, caretaker, wife of a wine producer, army general, intellectual, hairdresser, teacher, wife of a delicatessen dealer, librarian, housewife, etc.
- subjects the contributors were interested in: audio-visual, summer beach, summer holiday, tanks, house expenses, the French newspaper France-Soir, production of wine, Paraguay people, etc.
- people speaking standard French with very few minor local variations most of which came from articulatory problems

In short, we could claim that this corpus constitutes a reliable, authentic and sufficiently homogeneous sample of oral and contemporary French.

In order to avoid any subjective influence, the task of fixing the different rhythmic groups was assigned to a third person, a Japanese speaker who is a specialist of French phonetics, a good piano player, and having an excellent pronunciation of French. He was given the following instructions.

He was told not to take into account pauses that are de facto simple repetitions of words, filled pauses, false starts or syllables that are in habitually lengthened. He was also asked to eliminate systematically all the stylistic pauses within or among the constituents. These pauses may be explained by the need felt by the speakers to make certain words more expressive. Being stylistic by nature, they remain, we felt, a part of a larger unit, the rhythmic group. Usually they are unexpected on the part of the hearer and, accordingly, play an evident stylistic role in the sense that they differ from the normal pauses. Otherwise, the effect of surprise would not be produced.

Finally, once the possibility of a stop was noticed, this person was invited to ask himself whether this stop coincided with a full sentence, a nominal or verbal group of some importance and made up of a sufficient number of syllables. In other words, he had to keep in mind the concept of communication as defined by Goldman-Eisler, the specialist on this matter:

Speakers co-operate with listeners by presenting their message in a form made easy to the listener's task of decoding. Ideally these pauses should be found between phrases, at the joint points between clauses or at the end of sentences: in short they should be semantically determined and occur at grammatical junctures (1968, 13). Other specialists on the question of pauses follow the same line, Cruttenden (1986), Handel (1993, 426), for instance.

The test was carried out with three adults whose mother tongue was French and three whose mother tongue was Japanese. The Japanese subjects had spent three years studying French and at least one of these years in France. Judging from their pronunciation, they had a good, if not an excellent, ear. Each of the six informants was given one recording of the 42 chosen lessons plus the corresponding transcript as found in the manual "60 Voix, 60 Exercices". Each rhythmic group was given a designated number that appeared both on the transcript and the answer sheet. Here is the explanation given to the six informants in written form :

"While listening to these recorded documents, we would like to ask you to be so kind as to pay attention to the endings of the rhythmic groups. Each end corresponds to a number shown both in the text and the answer sheet. If you think that this ending is

- rising, please write **M** (for Montant)
- falling, please write **D** (for Descendant)
- at even level, please write **E** (for Egal)
- If you have any doubt, please write simply **X**

Then, only in the case where, according to your judgment, there would be a raising tone, please indicate on what syllable falls its peak, on the last syllable, on the penultimate syllable or on the antepenultimate one. Thanks!"

4. Examination of the results

A general examination of the results showed that in 74.3% of the cases a change of pitch occurred in the proposed monologs our subjects were listening to. They found no change of pitch in 24.8% of all cases and in 0.9% they could not give any positive answer. Second, the six subjects decided that a little less than half of the rhythmic groups pertained to the group of raising intonations. This result is significant at $p < .001$ compared with the three other possibilities. (Table 1)

All six informants, both the French and the Japanese, acknowledged about the same number of cases for the four possibilities of choices: for the raising intonation, the deviation was 53 cases; for the falling one, there was found a deviation of 43 cases; and for the flat intonation, the deviation reached 40 cases. Considered together, this shows a certain common agreement among the informants. Moreover, although they could abstain from making a judgment in difficult cases, they availed themselves of this privilege in only less than 1% (28 cases out of 3,000). This means that the choice and recording of the texts for this particular research was clear enough to allow them to make a reliable judgment.

Table 1. General distribution of the perception of the ending of 500 French rhythmical groups by the six subjects.

Subjects	Rising	Falling	Equal	No answer	Total
FR01	245(49%)	137(27.4%)	116(23.2%)	2(0.4%)	500
FR05	214(42.8%)	144(28.8%)	142(28.4%)	0	500
FR06	233(46.6%)	113(22.6%)	134(26.8%)	20(4%)	500
JP02	227(45.4%)	149(29.8%)	124(24.8%)	0	500
JP03	267(53.4%)	126(25.2%)	102(20.4%)	5(1%)	500
JP04	265(53%)	107(21.4%)	127(25.4%)	1(0.2%)	500
Total	1451(48.4%)	776(25.9%)	745(24.8%)	28(0.9%)	3000

FR = French informants

JP = Japanese informants

The second point that interested us was to know on what syllable the rising intonation peak would fall. Out of the 1,451 cases that were declared to possess such an intonation, 1,059 (73%) were thought to fall on the last syllable, 345 (23.8%) on the penultimate, and only 35 cases (2.4%) on the antepenultimate. Here again the score for the peak of the rising intonation falling on the last syllable as opposed to the three other possibilities was significant at $p < .001$ (Table 2).

Table 2. Distribution of the position of the accent in the 1,451 rhythmical groups ending with rising intonation

Subjects	Number of rising intonations	Last syllable	Penultimate	Atepenultimate	No answer
FR01	245	221(89.0%)	15(6.1%)	5(2.0%)	7(2.9%)
FR05	214	157(73.4%)	43(20.1%)	13(6.1%)	1(0.5%)
FR06	233	149(63.9%)	74(31.8%)	9(3.9%)	1(0.5%)
JP02	227	150(66.1%)	75(33.0%)	2(0.8%)	0
JP03	267	164(61.4%)	102(38.2%)	1(0.4%)	0
JP04	265	221(83.4%)	36(13.6%)	5(1.9%)	3(1.0%)
Total	1451	1059(73.0%)	345(23.8%)	35(2.4%)	12(0.8%)

Next, we examined whether there existed a concordance between the informants' judgments. In 92 cases, there was found a general agreement of all subjects concerning the three kinds of intonations put together and, in 194 cases, among five or six informants for the same three kinds of intonation. A more detailed view of the question is given in Table 3.

Table 3. Relations between the total number of judgments and the concordant ones

Agreement of the five or six informants

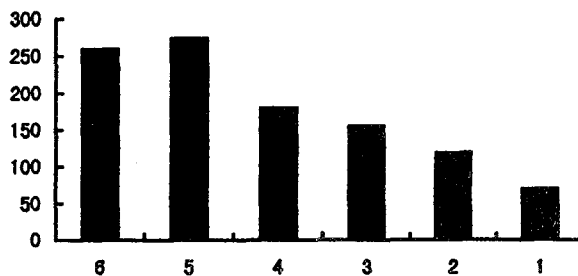
	Rising	Falling	Equal
Total of judgments	1059	776	745
Total of concordant judgments for 5 and 6 informants	550 (45x6+56x5)	378 (33x6+36x5)	139 (14x6+11x5)
Percentage	51.9%	48.8%	18.7%

Agreement of the six informants only

	Rising	Falling	Equal
Total of judgments	1059	776	745
Total of concordant judgments for 6 informants	270 (45x6)	198 (33x6)	84 (14x6)
Percentage	25.5%	25.5%	11.3%

In order to be more concrete and better visualize the agreement distribution among the concordant judgments on the 1,059 rising intonations, the following figure was drawn. We found that in 45 cases all the participants agreed and in 56, five of them. We notice a de facto increase of agreements in the 4, 5 or 6 brackets. Otherwise, random answers would have produced just the opposite curve.

Fig. 1. Distribution of 1,059 rising groups on the last syllable according to the agreement of the concordant judgments.



We then analyzed the phonetic composition of the final syllable to which any of the participants attributed the peak of rising intonation. The results were computerized according to four syllabic types:

- open syllable
- closed syllable with a single continuant consonant
- closed syllable with a single momentaneous consonant
- closed syllable with a double consonant

By “continuant sound” we mean a sound whose pronunciation involves a continuous flow of laryngeal air. Evidently vowels belong to the category of continuous sounds, but we mean here the laterals (r or l), fricatives, and nasals. On the other hand, momentaneous consonants would equate to the occlusives. Here again the results were significant at $p < .001$. (Table 4)

Table 4. Distribution of the total of judgments made by all subjects on the final syllable with their phonetic composition

Type of syllables	Open syllables	Closed syllables: single continuant consonants	Closed syllables: single momentaneous consonant	Closed syllables: double consonant	Total
FR01	118	72	12	16	218
FR05	93	52	10	2	157
FR06	120	24	2	3	149
J02	108	38	2	2	150
J03	131	27	3	3	164
J04	119	83	9	10	221
Total	689	296	38	36	1059

Finally we wanted to know whether the concordant judgments were in line with the phonetic composition of syllables as shown in Table 4. In spite of the small number of cases, none of the syllables of the 36 rhythmic groups ending with double consonants were agreed upon.

We also notice that the more a syllable tended to be prolonged, the more chances it had of being agreed upon. This conclusion applies to both the concordant judgments of five or six subjects and to the concordant judgments of six subjects, albeit with a slight difference. (Table 5)

Table 5. Comparison between independent judgments and concordant judgments taking into account the phonetic composition of the final syllable.

Concordant judgments for five or six subjects

Type of syllables	Open syllables	Closed syllables: single continuant consonants	Closed syllables: single momentaneous consonant	Closed syllables: double consonant	Total
Total of judgments	689	296	38	36	1059
Total of concordant judgments for five subjects or more	453 (38x6+45x5)	91 (6x6+11x5)	6 (1x6)	0	550 (45x6+56x5)
Percentage	65.7%	30.7%	15.8%	0%	51.9%

Concordant judgments for six subjects

Type of syllables	Open syllables	Closed syllables: single continuant consonants	Closed syllables: single momentaneous consonant	(Closed syllables: double consonant	Total
Total of judgments	689	296	38	36	1059
Total of concordant judgments for five subjects or more	228 (38x6)	36 (6x6)	6 (1x6)	0	270 (45x6)
Percentage	33.1%	12.2%	15.8%	0%	25.5%

5. Discussion

The rhythmic groups with a change of pitch at their end are more numerous than is generally admitted and observed in the classrooms of French as a foreign language. This is particularly true of the rising intonation. Of course, had we examined for the same purpose texts in a dialog with questions and answers, affective sentences, we would have encountered in all probability a better view of reality and obtained a much better score.

We would like to add that it would be worthwhile to review the classical interpretation of a sentence divided into two sections, one rising and the other one falling, since intonations often cross over the narrow frame of a sentence. We were able to observe a continuous stretch of rising intonation in our texts where many sentences or rhythmic groups followed one another to end with a final falling intonation. They gave us the impression of forming a sort of superstructure overcoming each group taken individually. The fact that almost half of the intonations were rising, twice as many as the falling and the flat ones, gives us an idea of the importance of this phenomenon. It even happened that some recordings, for instance R1, R 15, and R 19, ended with a raising intonation.

We are told that a similar tendency for rising intonations is also observed in Welsh English, among the Queensland regional English. But the difference here is that our corpus contains a large variety of informants coming from different sexes, social backgrounds and regions, so we have good reasons to believe that this tendency is not adventitious but pertains to the central phonetic nature of French language as such.

We have to recognize that not only the lengthening of the vowel of the last syllable, so often mentioned in the classic literature, but also the peak of the rising intonation, at least following our limited data, fall approximately on the same ending of rhythmic groups. This indicates the typical regularity of French prosody. Being deprived of these useful and frequent particles we find, for instance, in Japanese, *ne, na, yo, zo*, etc. French has only one way to offer to its users: they have to have recourse to peak variations, a means that gives this language a rather poor prosody system.

6. Conclusions

We believe that this research should have some pedagogical impact. In teaching French as the mother tongue or as a foreign language, there would be a great benefit in seeing that a change of tone and, even more, a change of rising tone appear more often in finals, even if the context is neither specially affective, nor a dialog with interrogative or exclamative sentences. This is a characteristic of everyday living French. Unfortunately the teacher's and students' attention is concentrated on the use of or search for an adequate term of vocabulary, syntactic errors, and phonetic substitutions. The teacher is simply happy to have his student perform in his language. Both of them either forget to give or allow a real French touch in the oral productions.

More often than not, the student is allowed to produce sentences without any peak variation. Such sentences leave the native speaker with the impression that the person in front of him is simply sick, suffering from some kind of fever, that he is moaning a monolog of his own of no special communicative importance or that he does not want anyone to pay attention to what he is saying.

Although students' performances are correct, linguistically speaking, the lack of intonation peaks may go as far as to make the language classes extremely boring from the viewpoint of communication and, alas, useless for integration at the level of the brain.

Further research is necessary. One study would be to try to find out how the syllable endowed with a rising intonation is affected by the composition of the previous syllables. For this, both phonetic and acoustic analyses would in all probability shed some light on this important factor of the prosody of spoken French.

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