

# Interpretation– Perception – Analysis

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## Abstract

The aim of this experiment was to prove via perception tests, in what way two groups of phoneticians (i.e. the French phoneticians and Czech phoneticians with proficient knowledge of French) and two control-groups of non-phoneticians (i.e. the French and Czechs with proficient knowledge of French) of listeners perceive the differences in the individual prosodic demonstration of two types of artistic interpretations of the poem “*Mon rêve familier*” by P. Verlaine. At the same time our task was to compare and contrast subjective perceptual levels with objective measurements of F0, intensity and time values conducted in the Praat program. Furthermore, to establish what importance each of these values; the different mother tongues and the specific linguistic means within them, have on influencing the overall perceptual evaluation. If we take into account the fractional representation and the importance of individual values for the accent’s perception, then we can conclude that both the French and Czechs consider the T value as the crucial value. However, the second place in terms of importance of values differs – for Czechs it is intensity followed by frequency (i.e. the pattern is T-I-F0); on the contrary, for the French the pattern is T-F0-I, on second place being frequency followed by intensity.

## 1. Introduction

The issue of interpretation had been dealt with in the past, but the possibilities for acoustic analysis were at the time in their beginnings and furthermore, it was impossible to gain a homogeneous group of both phoneticians and non-phoneticians for the means of testing. Being such we decided to go through this experiment in a way so it would show the connections between prosodic variations and their perception in native speakers and L2 learners’ conceptions.

For our project we chose two stylistically differentiated interpretations of Verlaine’s poem “*Mon rêve familier*” and we wanted to find out how two groups of listeners trained in phonetics – 6 + 6 (and additionally only two smaller control groups of non-phoneticians 3 + 3) perceive the differences in individual prosodic rendering of each of the two interpretations. The examined groups therefore consisted of a) 6 native French speakers – phoneticians (herein referred to as **FRph**); b) 6 native Czechs – phoneticians with academic knowledge of French (herein referred to as **CZph**); c) 3 native French – non-phoneticians; d) 3 native Czechs – non-phoneticians with proficient knowledge of French.

Additionally, after conducting a detailed acoustic analysis of the two interpretations we continued with the perceptual evaluation. This detailed acoustic analysis enabled us to determine the basic differences demonstrated through

measurements of the fundamental frequency (F0), intensity (I) and duration (T) of the individual syllables of each verse. We are of the opinion that the results of this experiment can also be applied from a wider perspective in order to prove the scale of differences in perceiving prosodic parameters. Results can be found not only in the area of perception but also in the study of the objective F-I-T values which then lead to the characterization of the aberration from the physical point of view.

## 2. Description of the experiment

The listeners completed the tests individually according to the instructions given and they wrote down their evaluations into answer sheets. First of all, each respondent heard the first interpretation of the whole poem, which was then followed by the second interpretation.

After hearing both the recordings the respondents were asked to generally compare the interpretations. In the answer sheet they chose one of the three options from the scale: *naturelle (natural)* – *théâtrale (dramatic)* – *pathétique (affected)*. Simultaneously, they had to indicate which realization they prefer and if possible why and what are the greatest positive and negative features.

Following the two listenings of the whole poem, they were supposed to make a detailed analysis of each verse and that by hearing the first interpretation **I-1** and then the second interpreter **I-2**. This means of presentation was chosen so that the listeners can compare the interpretations but at the same time they are enabled to in detail analyze every verse.

### 2.1. Test instructions

- Firstly, the listeners had to underline stressed syllables as they feel them in the first interpretation I-1.
- Secondly, in further detail they had to mark whether the dominant feature in the given accent is related to intensity, melody or duration (lengthening) of the syllable.
- The last point was about the tempo of the given verse. The respondents had to mark which realization from the scale: *très rapide (rapide)* = very fast – *moyen* = average - *très lent (lent)* = very slow had been uttered.

The same procedure was carried out when analyzing the second interpretation (I-2). This approach allowed us to gain an overall characteristic, to make immediate comparison and then to analyze each and every verse of the two different interpretations in detail.

From the total of 14 verses (the complete version of the poem is indicated below) we would like to focus on detailed

analysis of two verses (verses Nr. 2 and 13 – this one being incomplete) that we have found the most representative.

Wide range and differences in T- F0 – I values illustrate not only the varied concepts of the two interpretations but also the reactions of listeners.

### Mon rêve familial

1. Je fais souvent ce rêve étrange et pénétrant
2. D'une femme inconnue, et que j'aime, et qui m'aime,
3. Et qui n'est, chaque fois, ni tout à fait la même
4. Ni tout à fait une autre, et m'aime et me comprend
5. Car elle me comprend, et mon coeur transparent
6. Pour elle seule, hélas ! cesse d'être un problème
7. Pour elle seule, et les moiteurs de mon front blême

8. Elle seule les sait rafraîchir, en pleurant
9. Est-elle brune, blonde ou rousse ? – Je l'ignore
10. Son nom, je me souviens qu'il est doux et sonore
11. Comme ceux des aimés que la Vie exila
12. Son regard est pareil ! au regard des statues
13. Et pour sa voix lointaine, et calme, et grave, elle a
14. L'inflection des voix chères qui se sont tues.

## 2.2. Analysis

### 2.2.1 Example of analysis and comments on the evaluation of verses

Verse 2	Int.	D'une	femme	in	co	nnue	pause I-1, I-2	et	que	j'aime	pause I-2	et	qui	m'aime
4,091 s	I-1	306	420	166	140	333	0,911	96	184	543	0	88	210	613
4,503 s	I-2	219	271	105	180	284	0,972	74	162	534	0,972	105	175	440
Hz	I-1	124/165	159	123	80	64		122	159	134/170/154		148	123	82/54
Hz	I-2	87	89/86	84	81	81		79	84	85/78		78	78	79/77
dB	I-1	70,4	75	72	70	66/56		72	82	84/72		77	72	71/51
dB	I-2	72	73	68	68	66/51		68	73	72/55		64	57	67/53

Table 1: Analysis of verse 2.

2. *D'une femme inconnue, et que j'aime, et qui m'aime* (11syll) In the evaluation of the French and Czechs in both interpretations, listeners shared the same opinion and marked the words: *j'aime, m'aime*. In both interpretations we can observe prominent lengthening of the syllables; abrupt melodic change; and intensity fall within one syllable. It is interesting that in most of the cases of prominence, the respondents identified prolonged duration and melodic change. This verse should also be mentioned as there is a small range in the evaluation of other stressed syllables *femme* and *inconnue*; in all the other verses we can find 1 to 3 syllables that only a very small percentage of listeners analyzed as stressed.

Verse 13	Int.	Et	pour	sa	voix	pause I-2	loin	taine	pause I-1	et	calme	pause I-1, I-2	et	grave
5,381 s	I-1	117	233	200	437		398	783	0,443	129	833	0,427	120	751
7,072 s	I-2	91	236	198	365	0,901	253	738		89	764	0,783	91	686
Hz	I-1	96	140	145	140		78/128	91/63		106	105		110	123
Hz	I-2	92	92	89	85/100		85	98		79	83		77	77
dB	I-1	78	83	84	79		77	77		77	79		81	81
dB	I-2	66	68	68	71		71	70		63	67/50		69	73

Table 2: Analysis of verse 13.

13. *Et pour sa voix lointaine, et calme, et grave, elle a* (12syll.) In this verse four syllables (i.e. *voix, lointaine, calme, grave*) reoccurred a number of times both in the evaluations of the French and Czechs. In the opinion of the Czech respondents prominence can be found in all four syllables and the two interpretations, however, the French listeners agreed on the prominence in I-1 in the word *grave* (additionally 5 times in I-2). In this word, there is an evident lengthening in the two interpretations that is also accompanied by high F0 and intensity values in I-1. Syllables in the words *lointaines, calme, voix* can be characterized by changes and distinctive values of F0 in both interpretations; accompanied by a higher intensity in I-1.

### 2.2.2 Overview of the duration of the syllables and pauses in I-1 and I-2

The following table (Table 3) shows total durations of each verse of the two interpretations (I-1, I-2), the number of syllables in each verse, the number of pauses made by each interpreter within the verse and the last column indicates the average duration of the syllable (this parameter measured without pauses and in ms).

Table 3: Duration of the syllables and pauses in I-1 and I-2.

Verse	Interp.	Dur.	Syll. (Nr)	Pauses-dur. (Nr.)	Syll. dur. in ms
1	I-1	3,390 s	12	0	285
	I-2	2,439 s	12	0	203
2	I-1	4,091 s	11	0,9 s (1)	290
	I-2	4,503 s	11	1,9 s (2)	236
3	I-1	2,866 s	11	0	260
	I-2	2,287 s	11	0	207
4	I-1	4,671 s	12	1,1 s (2)	297
	I-2	4,671 s	12	2,1 s (2)	211
5	I-1	3,142 s	11	0,4 s(1)	249
	I-2	3,851 s	11	1,2 s (1)	241
6	I-1	3,751 s	10	0,5 s (1)	325
	I-2	3,188 s	10	0,2 s (1)	298
7	I-1	4,514 s	11	0,8 s (1)	337
	I-2	4,203 s	11	1,1 s (1)	282
8	I-1	4,483 s	10	0,9 s (1)	358
	I-2	2,668 s	10	0	267
9	I-1	3,408 s	9	0	378
	I-2	6,159 s	9	3,1 s (3)	340
10	I-1	3,521 s	12	0,7 s (1)	235
	I-2	3,529 s	12	1,3 s (1)	185
11	I-1	2,364 s	11	0	214
	I-2	2,088 s	11	0	190
12	I-1	3,418 s	12	0	284
	I-2	2,352 s	12	0	196
13	I-1	5,381 s	12	0,9 s (2)	373
	I-2	7,072 s	12	2,9 s (3)	347
14	I-1	3,734 s	10	0	373
	I-2	3,443 s	10	0,5 s (1)	294
<b>Total</b>	I-1	52,7s	154	6,2 s (10)	302
<b>Total</b>	I-2	52,5s	154	20,7 s (15)	206

### 3. Discussion

As there were no differences in the evaluations of phoneticians and non-phoneticians, we decided to indicate only the main dissimilarities between the French and Czechs. As apparent from the general comparison a few differences appeared in the realization of the text. These differences were evaluated as fervorous by the French; however Czechs regarded them as neutral. With relevance to the number of reactions, we can conclude that all the listeners (CZ and FR) agreed on only those syllables that are characterized by deviations of all the parameters (eminently for T-F0 values,

less for I value). The shorter the duration of the stressed syllable was, the higher the percentage of reactions made by Czechs was, and that mainly in I-2. This phenomenon can be explained by the different concept of accentuation accenting in the two given languages (Czech has fixed stress on the first syllable, the lengthening of the vowels being of a phonological relevance, while French stress is situated on the last syllable and the lengthening of the vowels can not be considered as a phonological factor in this language). It is possible to assume that Czech listeners, and this especially in the case of artistic interpretation, do not relate accent to the changes in F0 value, but to intensity, whereas French listeners on the contrary feel it closer to variations of intonation.

#### 3.1.1. General comparison of the two interpretations

It has also been proven that the differences in the concept of each presentation influence the overall impression from the concrete demonstrations. While all CZ preferred I-2, this was not the case for FR who evenly voted for the two presentations 3:3. However, we would like to point out the difference in the overall evaluation in which FR perceived I-1 as theatrical whereas CZ found it fervorous. Nevertheless, FR identified I-2 as fervorous but CZ found it natural (although the presentation was simple and natural, most respondents unanimously stressed that the demonstration was too sad and ordinary).

From the total of 14 verses (154 syllables) the listeners were of the same opinion in 6 verses where they indicated stressed syllable unanimously; in two verses they agreed on two syllables (all respondents in both cases); i.e. from the overall number of 154 syllables in the poem (if taken into account both the interpretations a total of 308 syllables). From this final number we can derive the prominence of 24 syllables, which represents 12.83 %. When dealing with all the cases of agreement in the two interpretations, it is remarkable that all CZ unanimously marked 52 stressed syllables out of a total of 308 syllables (27 I-1 + 25 I-2) – i.e. this amounts to 16.88 %. On the contrary FR shared the same opinion on 34 times (20 I-1 + 14 I-2) – this comes up to 11.03 %. In both of the observed groups we can find a relatively higher percentage of similar reactions in I-1.

### 4. Conclusions

The results of this experiment may be divided into two groups. Firstly, we will mention the basic differences in the evaluation of the two interpretations done by the French and Czechs; secondly we will point out the fundamental characteristics of the actors' interpretations and that from the point of view of the main features of acoustic analysis.

The following figures (i.e. Figure I and Figure II) show the differences in perceptual preferences. The **duration** of the syllable plays an important role in the evaluation of both groups of listeners. This also fully corresponds to the values measured in the computer analysis (Praat). With relevance to both interpretations, and bearing in mind that there were no cases of marking an accented syllable without there being more or less apparent or multiple lengthening of the duration of the given syllable. The values of these accented syllables are in the range:

- I-1 - 282 ms - 804 ms, the shortest syllables - 70 ms
- I-2 - 196 ms - 697 ms, the shortest syllables - 55 ms

Nonetheless, there is a certain difference in the percentage that this domain takes up- FR accounted the duration of an overall of 43%; CZ 47% (for further information see Figures I and II).

A clear difference can be seen in the next perceptual evaluation. Whereas the French unmistakably perceived even the slightest *melodic* changes (i.e. the changing of F0 values with relevance to the neighbouring syllables or in connection with the changes of F0 values within one syllable) - amounting to 31% of all entries, Czechs indicated only 16% of the instances caused by the changes in F0 values.

Changes in **F0 values** in the interpretation I-1 also occurred in an outstanding majority of marked accents (and that appeared in both groups). This interpretation could be characterized by abrupt melodic changes within one syllable or influenced by the nearest neighbouring syllables (for illustrative purposes we can use F0 values from the following verse “- *et que j’aime*” - *et* 122 Hz, *que* 159 Hz, *j’aime* 134 / 170 \ 154 Hz within one syllable).

Maximum range of F0 values is for:

**I-1:** 204 Hz – 54 Hz

**I-2:** 117 Hz – 71 Hz (although the melodic pattern is a lot more stable, we can still find that the accent is related to the more or less abrupt changes of F0 values).

On the contrary the Czech listeners clearly indicated that intensity plays an important role in determining accent (37% of reactions in opposition to 16% of reactions recorded on the bases of melodic patterning). In these instances, it is not possible to talk about the relationship between marked syllables (by either Czechs or the French) and higher values of intensity. The range of intensity values (measured on the vowel forming the nucleus) in both interpretations is a lot more stable than the melodic pattern and its duration

**(I-1:** 91-51 dB,

**I-2:** 79 – 41 dB).

The fact that the Czech listeners considered **intensity** to be the dominant factor in 37 % of the syllables can be attributed to the influence of the mother tongue in which the component of intensity is potentially present in the regular accentuation of the first syllable.

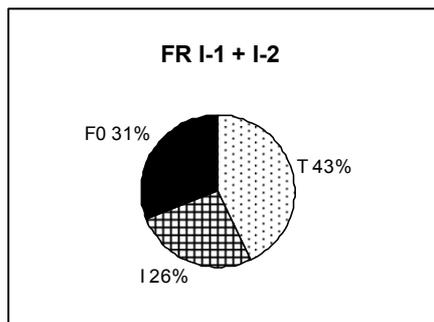


Figure 1: Overall percentage of measured values (F0, I, T) noted down by FR.

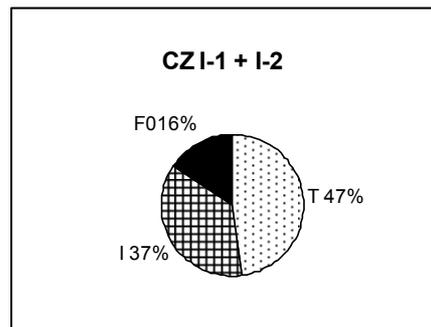


Figure 2: Overall percentage of measured values (F0, I, T) noted down by CZ.

Deviations in perception of prosodic differences of the two interpretations are also interesting from the psychological point of view because it is obvious that they are more or less in variant options due to the fact that the listener (both native and L2 learner) in nearly all cases defines the accentuated point. However, the difference lies in which component of the accent is felt as dominant – whether it is intensity, duration or a melodic change. The difference between individual evaluation and the measured values then becomes an interesting sign, from which one can take inspiration needed in other experiments. The results of further experiments can then contribute to the development in the accessibility of prosodic synthetic speech signal and furthermore they can supply inspiration in the area of methodology. For learning purposes this can help to explain the prosodic characteristics of foreign language learning. Specifically, in the case of Czech students it can determine the sensibility to prominence (that occurs in various forms) in the prosodic structure of French.

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