

PAPER TEMPLATE FOR ICPhS 2023 PRAGUE

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ABSTRACT

This French-Czech contrastive study deals with the duration of French vowels in the production of French speakers and Czech learners of French. The considerable differences between the vowel duration in the Czech and French language systems led to four research hypotheses. Based on recordings of the text being read, the analysis examines not only the influence of primary and secondary accent (final accent, initial accent and *accent d'insistance*) on the duration of French vowels, but also the type of syllable in which these vowels are found. The results confirm that the phonetic-phonological habits that Czech speakers apply in their mother tongue have a considerable influence on the production of the language being acquired, here French.

Keywords: vowel duration, final accent, initial accent, closed syllable, open syllable

1. INTRODUCTION

Czech and French are phonetically and phonologically very different languages, both from the phonemic and the prosodic points of view. One of the many differences is the vowel duration.

In Czech, vowel duration has a phonological function, in that it can distinguish the meaning of words. This phonological opposition of vowel duration, which does not depend on the accent or the position of the vowel within the word, is one of the linguistic features of Czech language [1].

In French, the parameter of vowel duration is an important part of the accent. In French, the vowel duration has a phonotactic function [2], as it indicates the appropriate rhythm of a sentence and thus the utterance and its comprehension. It is not strictly connected to the lexical unit because the word is not an independent sound unit in French. In standard French it no longer has a distinctive validity. The number of French words where vowel duration could have a distinctive function is very small. The distinctions between minimal pairs (e.g., *l'être x lettre, maître x mettre, pâte x patte*) are blurred in Standard French; they are maintained only in some regional varieties of French and are highly unstable. The very few cases of minimal pair oppositions that still exist in Standard French today are realized by a

difference in timbre, and these may be complemented by a difference in vowel duration (e.g., *cote/côte, pomme/paume*) [3].

Authors whose research focuses on French vowel duration agree that long vowels occur in accented positions. Some authors approach the issue not only from the perspective of accented/unaccented position, but also take into account the type of syllable [4, 5, 6, 7, 8, 9, 10, 11].

Note that different functions of vowel duration in the two language systems mentioned above (L1) can lead to interference in the production of the acquired language (L2).

2. OBJECTIVES AND HYPOTHESES

The aim of this study is to research the influence of primary (final) accent and secondary accent (initial accent and *accent d'insistance*) on the duration of French vowels in text being read by French and Czech speakers. The phonetic-phonological differences between Czech and French, mentioned in the introduction, led to the formulation of the following hypotheses:

- 1) Czech learners of French produce more accented syllables than French speakers.
- 2) Czech learners of French produce more syllables with an initial accent than French speakers.
- 3) Initial accent and *accent d'insistance* have a quantitative effect on the duration of French vowels for Czech learners of French, but not for French speakers.
- 4) The difference between vowel duration in the final accent and those in unaccented positions is more significant for French speakers than for Czech learners of French.

3. CORPUS AND RESEARCH PARTICIPANTS

For the purpose of this experiment, we searched for a text that would reflect the prosodic features of French, and which would not contain too many words unknown to Czech speakers. For these reasons, we have chosen the beginning of the fairy tale *The Little Red Riding Hood* - namely its narrative part, without dialogue lines. Ten French speakers and ten Czech learners of French were recorded. The French speakers are university students originally from Paris,

Brittany and Burgundy, living in Paris for at least 6 years. In phonetic-phonological terms, they do not show any significant differences to Standard French. In the case of the Czech learners of French, they are first-year students of the Faculty of Education at Charles University in Prague. Their language proficiency in French according to the Common European Framework of Reference is B1. At the time of the recordings, none of the respondents were aware of the purpose of the experiment.

4. METHODOLOGY AND MEASURING

Vowel duration measurements were performed manually using WinPitch software. The marking of accented syllables was based on consensus between two independent speakers. Changes in speech rate (rate coefficient k) for each speaker were normalized using the following equation:

$$(1) \quad k = \frac{D_m}{d_i}$$

D_m = the average duration of the sentence in which the vowel is found,

d_i = the individual duration of a given sentence for a given speaker.

The speed coefficients of the individual speakers did not show much variation; thus, the speed of the speakers while reading the excerpts is rather constant. To increase the relevance of the normalization of the duration of the measured vowels, the coefficient was calculated separately for each sentence of the corpus.

To better compare the differences and similarities in the production of French speakers and Czech learners of French, all the syllables in the corpus have been labelled using the following abbreviations. These will be used in the following presentation of the analyses results:

N/o – a vowel in an open syllable, in an unaccented position;

N/f – a vowel in a closed syllable, in an unaccented position;

AF/f – a vowel in a closed syllable, with the final accent;

AF/o – a vowel in an open syllable, with the final accent;

AI/f – a vowel in a closed syllable, with the initial accent or *accent d'insistance*;

AI/o – a vowel in an open syllable, with the initial accent or *accent d'insistance*.

5. RESULTS

The graph below illustrates the differences in the French vowel duration for French speakers and Czech learners of French.

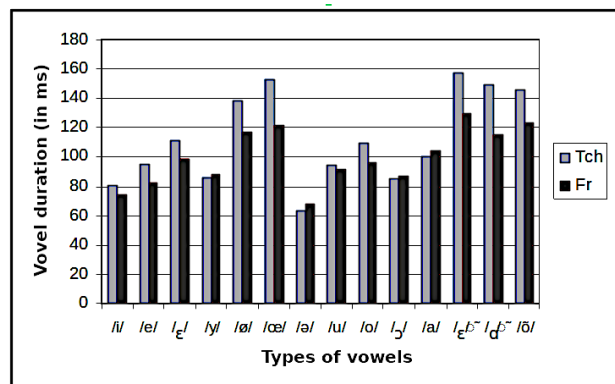


Table 1: French vowel duration in the production of French speakers and Czech learners of French

Note that the biggest difference in the vowel duration between the French speakers and Czech learners of French is in the production of such vowels which do not occur in the phonemic system of Czech language. These are primarily front rounded vowels /ø œ/ and nasal vowels /ɛ̃ ã ð/.

As far as nasality is concerned, the influence of this articulatory feature on the corresponding oral vowels in closed and open syllables in accented and unaccented positions has already been analysed by Delattre and Monnot [12]. The authors found that differences in vowel duration caused by nasality can vary by up to 42%. The corpus for this experiment contains vowels in different accented positions and different syllable types, we can thus subject our measurements to the same analysis and observe differences and similarities in both groups of speakers.

As for the vowels /ɛ/ and /ɛ̃/, the measured values show that for French speakers the differences in duration between the oral and nasal vowels in open syllables in the unstressed position are 28%, and 16% in open syllables carrying the final accent. For Czech learners of French, these differences in the same positions and the same syllable types are even larger: 93% and 31%, respectively.

As for the differences between the vowel duration of /a/ and /ɑ̃/, the biggest differences for French speakers are observed in the unaccented position in closed syllables (62%), with the final accent in open syllables (48%) and with the secondary accent in open syllables (48%). In the case of Czech learners of French, the biggest difference in the duration of these two vowels was found in open syllables with the secondary accent (78%). In case of final accent, we observe an opposite effect for Czech learners than for

French speakers: oral vowels are longer than the corresponding nasal vowels, both in closed and open syllables.

As for the vowels /o/ and /ɔ̃/ in the production of French speakers, we observe the biggest differences in their duration in the unaccented position in open (48%) and closed (48%) syllables. The same is true for Czech learners of French, for whom these differences in duration in the same positions come to 58% and 26% respectively.

The comparison of the measured values shows that in case of French speakers, the differences in duration between the corresponding oral and nasal vowels can reach up to 62%. The values are even higher for Czech learners: up to 93%. Our data therefore reveal even greater differences than those observed by Delattre and Monnot [12].

We now turn our attention to the differences in the number of syllables carrying final and secondary accents for the two groups of speakers. It has been observed that Czech learner of French produce on average 63 accented syllables (out of 221 total), 38 of which are with the final accent and 25 with the secondary accent (initial or *accent d'insistance*). French speakers produce on average 51 accented syllables (out of 218 total), 41 of which are affected by the final accent and 10 by the secondary accent. Czech speakers learning French seem to produce more accented syllables than native speakers. The number of secondary accents is also higher for Czech speakers (39.6%) than for native speakers (19.6%). This phenomenon is very likely due to the influence of accenting in the native language, in this case Czech, on the acquired foreign language (French).

The following graph shows that the secondary accent in the production of Czech learners has also a quantitative effect on the duration of French vowels (vowels affected by this accent are on average 15.8% longer than vowels in unaccented positions). For French speakers, the opposite phenomenon can be observed: vowels carrying the secondary accent are even shorter than vowels in unstressed positions (on average 15% shorter). The secondary accent is therefore a quantitative factor for the group of Czech learners of French, but not for French speakers.

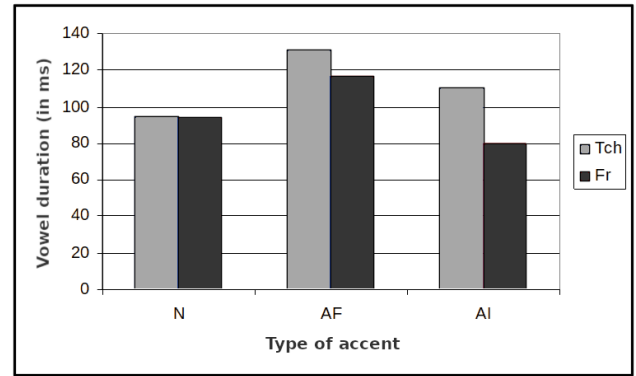


Table 2: Vowel duration in the unaccented position, with final and secondary accents in the production of French speakers and Czech learners of French

The graph also shows that for Czech learners, vowels with final accent are on average 38% longer than vowels in unstressed position. For native speakers, vowels with final accent are on average only 24% longer than vowels in unstressed positions. The results have therefore not supported the fourth hypothesis, where we expected the duration of vowels carrying final accent to be longer for French speakers than for Czech speakers.

Looking at the measured values for the oral and nasal vowels separately, at the type of syllable in which they occur, and also at the presence (or absence) of an accent and its type, we get much more accurate results. The following graph shows that for oral vowels the results for the two groups of speakers do not differ significantly. Here again, we observe a significant lengthening of the vowels carrying the final accent for both groups of speakers (for Czech learners of French again more significant than for French speakers) and a lengthening effect of the secondary accent in the production of Czech learners.

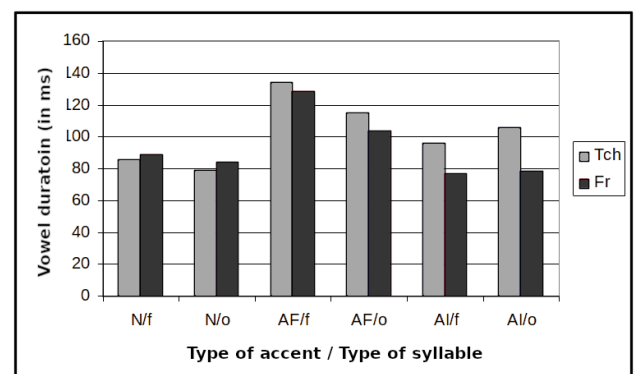


Table 3: The duration of French oral vowels in all possible positions and for all syllable types in the production of French speakers and Czech learners of French

As for nasal vowels (see the graph below), we can observe an absence of influence of final and

secondary accents on their duration for French speakers. For Czech speakers, however, it shows that the most lengthened vowels are those in closed syllables with the secondary accent and those with the final accent.

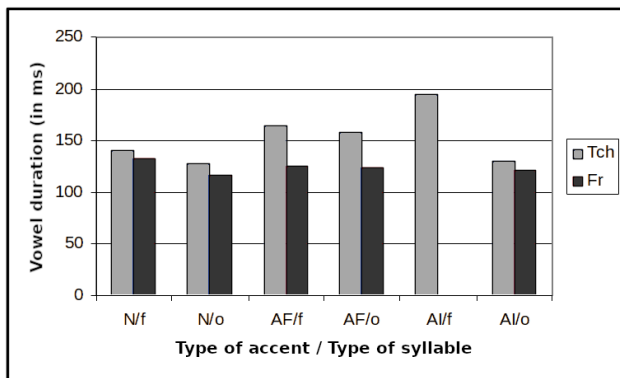


Table 4: Duration of French nasal vowels in all possible positions and syllable types in the production of French speakers and Czech learners of French

As for the effect of open and closed syllables on the duration of French vowels, in the case of oral vowels we observe a significant lengthening in closed syllables carrying the final accent for both groups of speakers, as well as in open syllables carrying the secondary accent for the Czech speakers (see Table 3).

As for nasal vowels, we do not observe any vowel lengthening that would be caused by syllable or accent type in case of French speakers. However, in the production of Czech learners of French we can find lengthening of nasal vowels carrying final accent and also longer duration of French nasal vowels in closed syllables with secondary accent. Unfortunately, we cannot compare these results with those of French speakers, because our corpus does not contain any occurrence of this syllable type or accent type in their production.

6. DISCUSSION AND CONCLUSION

This contrastive study reveals the existence of differences and similarities in the production of French vowel duration by French speakers and Czech learners of French.

The analysis of the results shows that the most problematic for Czech learners in terms of vowel duration production are the front rounded vowels /ø œ/ and nasal vowels /ɛ̃ ɑ̃ õ/.

The effect of syllable type on vowel duration was also studied. The data analysis shows that the factor does not play a significant role for Czech learners of French. For French speakers, however, it is the closed syllables in which the duration of vowels is longer.

Furthermore, we followed the study of Delattre and Monnot [12] who investigated the effect of nasality on vowel duration in closed and open syllables and in accented and unaccented positions. As for the French speakers, the most significant differences between oral vowels and their nasal counterparts were found in the case of /a/ and /ɑ̃/: 62% in closed syllables in the unaccented position, in open syllables with secondary accent (48%), and in open syllables with final accent (47%). Almost the same values, 48% and 60%, were measured for the vowels /o/ and /õ/ in the unaccented position in open (48%) and closed (48%) syllables, respectively. For Czech learners of French, these differences reach even higher values: 78% for /a/ and /ɑ̃/ in open syllables with an adjacent accent, and 93% for /ε/ and /ε̃/ in open syllables in unstressed positions. In general, these vowels are the longest when carrying final accent for both groups of speakers; however, for the Czech learners of French the longest vowels are found also with the secondary accent.

Based on the data analysis, we can confirm or disconfirm the research hypotheses:

Hypothesis 1 - Czech learners of French produce a greater number of accented syllables than French speakers - has been confirmed. The data show that the occurrence of accented syllables is higher for Czech speakers. In general, it can be pointed out that Czech speakers produce shorter rhythmic groups (i.e., a higher number of rhythmic groups) in French than native speakers, which can probably be explained by their intermediate language proficiency.

Hypothesis 2 - Czech learners of French stress initial syllables more than native speakers - has also been confirmed. The data show that the occurrence of secondary accents is higher for Czech speakers (39.6%) than for native speakers (19.6%). The influence of the native language of Czech learners on L2 production is therefore evident.

Hypothesis 3 - the initial accent and the *accent d'insistance* have a quantitative effect on the realization of vowel duration for Czech learners of French, but not for French speakers - has also been confirmed. The lengthening of vowels in syllables carrying a secondary accent is produced by Czech learners of French, but not by French speakers. The opposite tendency seems to be valid here.

Hypothesis 4 - the difference between the duration of vowels carrying final accent and those in unstressed positions is greater for French speakers than for Czech learners of French - has not been confirmed. The data show that both groups of speakers produce longer vowels in positions with final accent, with Czech speakers producing even longer vowels than French speakers.

6. REFERENCES

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