Prominence and Melody Mistakes in the Spontaneous Speech of Czech Learners of English

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The differences in English and Czech melody, accentuation, and rhythm patterns are viewed in the article as most likely causes of the Czech learners' intonation mistakes. The article aims at identifying these mistakes to help Czech students achieve better intelligibility of their spontaneous English speech. The results of the auditory and acoustic analyses, including the British native speakers' perceptual assessment of the Czech accent, are employed to identify the problematic areas of L2 intonation acquisition. An attempt is made to link these areas, namely the insufficient expression of prominence, differences in speech segmentation, and the choice of melody patterns, with L1 intonation transfer. The article concludes that although these mistakes do not pose a severe obstruction to communication, focused classroom instruction aimed at overcoming the Czech language interference will significantly facilitate English intonation acquisition and improve the general intelligibility of students' speech.

Keywords: *intonation, melody, prominence, L1 transfer, comfortable intelligibility*

1 Introduction

English native-speakers' reflections on foreign-accented speech demonstrate that it is largely incorrect or confusing intonation that poses a serious impediment to effective communication (van den Doel 2006: 192). Since communicative language teaching primarily focuses on speech intelligibility and meaningful interaction (Lightbrown & Spada 2018: 68), appropriate rhythm, stress, and intonation in a foreign language deserve special attention in the classroom (Celce-Murcia et al. 1996: 319).

Although methodology research calls for more attention to prosodic elements in foreign language teaching (Levis 2005: 376), mastering suprasegmentals of the target language (L2) remains problematic: "the L2 learners' responses suggest that they are either not getting enough instruction or, if they are, they are not benefiting from it" (Derwing & Rossiter 2002: 161). One of the reasons complicating acquiring foreign language intonation patterns is believed to be students' native language (L1) interference (Ellis 2006: 164).

Recent studies of Czech-accented English (Ondráček 2011; Skarnitzl & Rumlová 2019) draw explicit parallels between Czech and English segmental and suprasegmental characteristics to help Czech speakers and teachers of English identify the likely aspects of L1 interference. Nevertheless, making a comprehensive list of features that complicate the intelligibility of Czech speakers is not easy. Skarnittzl and Rumlová (2019: 126), for instance, conclude that the label "a strong Czech accent" can be "filled" in different ways and may refer to "diverse constellations of pronunciation features".

The present study assumes a hypothesis that L1 interference of stress, intonation, and rhythmical patterns of the Czech language is behind most of the mistakes Czech learners make in the accentuation and melody of spontaneous English speech. Identifying the problematic areas of this interference is the main research objective of the present paper, with some more practical tasks being:

- to identify the most common Czech speakers' intonation mistakes in the data set collected,
- to discover which of the suprasegmental mistakes identified obstruct comfortable intelligibility of Czech-accented speech most,
- to compare melody, segmentation, and accentuation patterns of Czech speakers and native speakers of English with the help of control group analysis,
- to trace the possible influence of L1 prosodic transfer using statistical data on the Czech language intonation coming from earlier studies.

2 Previous research

2.1 *The role of L1 interference in foreign language acquisition*

The significance of cross-linguistic interference, or L1 transfer, – the learners' continued use of the linguistic patterns of the mother tongue in a second/foreign language – has long been a controversial issue in EFL methodology and acquisition research. Despite the myriad of studies that have been conducted over the past decades (behaviorist approach, cognitive language learning, error analysis, comparative research), there remains a certain level of confusion and uncertainty in the field concerning when, where, and to what extent L1 interference manifests itself in the L2 learners' use of the target language.

It is generally believed that learners of a foreign language have most difficulties with the features of pronunciation that are different from their mother tongue; however, it has been recognized since the early days of Error Analysis that learners' errors are not the only measure of difficulty, and at times not the most reliable one (Schachter 1974: 210). Research proves that students' successful performance in many areas of L2 acquisition deserves equal attention (Oldin 1989: 36). Such performance analysis makes researchers recognize that L1 interference in the learning process is multidirectional and can take other forms than forward and reverse transfer (Jarvis & Pavlenko 2008: 61).

Concerning foreign language phonology, Ellis (2006: 190) states that the problematic features of L2 acquisition are those which, although available as a result of frequency, recency, or context, "fall short of intake because of one of the factors of contingency, cue competition, salience, interference, overshadowing, blocking, or perceptual learning shaped by the L1". This means that the difficulty in teaching these patterns will depend in part on the native language of the learner as "both the progress and limitations of L2 acquisition derive from the same basic learning principles rooted in the students' mother tongue" (Ellis 2006: 191).

According to the Differential Hypothesis (Eckman 1987: 144), it is predicted that all phonetic and pronunciation features of a target language can be roughly subdivided into several categories depending on the degree of their markedness. The marked features of foreign language phonology are more challenging to learn, especially if they differ from the corresponding patterns in the native language. In the same mode, those areas of the target language which are different from the native language but not marked in the target language will not pose a severe problem to the students primarily because their impact on the intelligibility of discourse is insignificant.

Rasier & Hiligsmann's studies of Dutch speakers of English (2007: 48) claim that the transfer of the marked L1 suprasegmental patterns, such as word stress, to a foreign language pronunciation occurs less frequently than the unmarked patterns, like melody and rhythm. They

also state that at the early stages of language learning, students tend to "overuse" those aspects of phonology that are alien to their L1 or whose functionality they do not understand, which may become another cause of suprasegmental mistakes, although not directly connected to L1 interference.

Stressing the role of the L1 transfer among Czech learners of English, Ondráček (2011: 69) states that there are two tiers that complicate the accuracy of students' English speech: at the word level Czech-accented English is spoken with "the sounds and word stresses of the Czech language"; at the sentence level English is also spoken "with the intonations and accents" of Czech, which shows that mother tongue interference is multidimensional and affects various aspects of foreign language pronunciation.

2.2 *Accent as an impediment to communication*

Research on the L2 prosody is often linked with the notion of a foreign accent, which is defined as a deviation in the pronunciation of non-native speech compared to the norms of the native speech (Lippi-Green 1997: 44). However, it turns out that not all pronunciation deviations have the same effect on speech perception. That is why, other terms, which are only partially related to accentedness, such as "intelligibility" and "comprehensibility" of speech, have appeared and are currently more commonly used.

Munro & Derwing (1995: 290) demonstrate that even strongly accented speech can be fully intelligible. Listeners may understand the message completely, but they put different efforts into its processing. This way, the "intelligibility" of speech is viewed as a more or less objective assessment of speech quality depending primarily on "the listeners' perceptions of difficulty in understanding particular utterances" (Munro & Derwing 1995: 291). There is not much evidence that improvement in intelligibility results from a change in accent. "Foreign accents rarely disappear, but explicit pronunciation instruction can lead to improvement in intelligibility even for seemingly fossilized learners" (Levis & Zhou 2018: 4).

The importance of teaching the phonology of L2 with the view of achieving comfortable intelligibility is closely associated with a re-evaluation of aims in pronunciation teaching when the former objectives of "sounding like a native" are replaced by the "intelligibility principle" (Levis 2005: 370). As a result, researchers have been trying to identify those features of pronunciation that have the most significant impact on the intelligibility of accented speech.

Cruttenden (2014: 340) believes that the "minimal general intelligibility level" possesses a set of distinctive elements which correspond in some way to the inventory of the phonological system capable of "conveying a message efficiently from a native English listener's standpoint". This kind of pronunciation guarantees a speaker "high acceptability" of their speech, which is achieved "through precision in the phonetic realization of phonemes, and confident handling of accentual and intonational patterns" (Cruttenden 2014: 340).

Pronunciation research distinguishes two basic types of foreign accent, namely a "phonological foreign accent" and a "phonetic foreign accent" (Jilka 2000: 10). The former is attributed to limitations rooted in the wrong or altogether missing in L1 representations of phonological units of the target language. The latter refers to an incorrect productional representation of a phonological category.

Experimental studies indicate that phonological foreign accent at a segmental level, as a rule, has a less detrimental effect on listeners' judgments about the comprehensibility of accented speech than mistakes at the level of suprasegmentals (Thomson 2017: 9). Native

speakers are often more tolerant of segmental errors than intonation mistakes because they do not expect the latter ones (Ondráček 2011: 47).

Tench (2015: 11) reasonably warns that "a mistaken intonation still means something", and the disruptive effect of wrongly chosen intonation patterns can become a severe impediment to further communication. It can change the meaning of an utterance completely or convey contrasting attitudes and emotions without any change in the actual words.

It was found that "suprasegmentals contribute to foreign accent at all levels of experience and that some suprasegmentals are more likely to do so than others" (Trofimovich & Baker 2006: 2). "Altered prosody and accentuation affect performance by seriously impairing discourse comprehension and word recognition" (Cohen et al. 2001: 73). In contrast, when learners of a foreign language master L2 prosody, they supply the listener with essential cues for judging sentence structure and manage attentional and attitudinal resources of the utterance (Tench 2015: 136).

Phonological accent in prosody may consist of many different components with different degrees of significance. In their studies of Czech-accented English speech, Volín et al. (2017: 62) state that intonational foreign accent can mainly be observed in English speech through a narrower pitch range, conspicuous pitch movements, and incorrect intonational phrasing.

2.3 *English and Czech fundamental differences in rhythm, prominence, and melody perception*

Research proves that the listener perceives all intonation parameters of speech in an integrated way (Vaissiere 2005: 239); however, it is necessary that rhythm, prominence, melody, and segmentation differences between English and Czech be viewed in the present paper separately.

Dankovičová & Dellwo (2007: 1244) report that English and Czech languages belong to different rhythmic groups. Corpus-based accounts indicate that in contrast to stressed-timed English, Czech perception of rhythm is tightly connected with its syllabic structure (Churaňová 2019: 97), placing the Czech language right "between the stress and syllable-timed" languages (Dankovičová & Dellwo 2007: 1244).

These conclusions put the question of emulating stressed-timed English rhythm by Czech learners into psychoacoustic categories. Skarnitzl & Eriksson (2017: 3221) insist that getting command of English rhythmical patterns may pose a severe difficulty to Czech students as their L1 rhythm manifests itself in quite a different way. Being a language in which stress is fixed on the first syllable of a word and is not contrastive, the Czech language does not have a salient acoustic marking of lexical stress, which means that learners of English have to adopt new means of expressing prominence as "in none of the dimensions of accentuation does the Czech stressed syllable show significantly higher values" (Skarnitzl & Eriksson 2017: 3221).

The idea that prominence epitomizes the third level of text organization originally belongs to Halliday (1963: 147), who argues that besides an utterance's syntax and semantic structure, there is a parallel contextual structure for marking contrasting and new information. Halliday also introduced the notion of an "information focus" (also known as a "focus word") to refer to the part of an utterance, which is of particular contextual importance to the speaker.

Levis & Silpachai (2018: 217) identify prominence in English as "the use of pitch, duration, and intensity to mark particular words/syllables in an utterance as salient". However, Kallio et al. (2021: 6) state that learning English prominence patterns does not only involve the placement and adequate acoustic realization of the stressed syllable but also, and perhaps more

importantly, mastering the quality of English unstressed syllables, which tend to have lower intensity and are reduced in length.

This aspect of English prominence has received a lot of attention in the studies of Czech speakers of English, who are not used to reducing vowels in their L1 (Ondráček 2011: 32). In contrast to English, where the vowel length is greatly affected by its position in a stress group, with a vowel in a stressed syllable being perceptually longer than the same vowel in an unstressed syllable (Brown 2014: 121), the stressed vowel in Czech is typically "shorter than the other vowels, although the difference is not significant" (Skarnitzl & Eriksson 2017: 3221). In addition, vowels that appear later in the word tend to be longer than the first (stressed) one and are usually pronounced on a higher pitch (Churaňová 2019: 101), which once again proves that Czech stressed and unstressed syllables do not bear the traditional marks associated with prominence in English.

All in all, the shorter and slightly lower stressed syllables accompanied by the absence of reduction processes in the Czech language may cause difficulties with discrimination and expression of accentuation categories for Czech speakers of English. Above all, accentuation patterns in most Germanic languages are "plastic", whereas they are "non-plastic" in Czech (Skarnitzl & Rumlová 2019:113). This "absence of the adjustment of the words of prominence" coming from the learners' L1 will undoubtedly cause "difficulty when they speak English with the effect that a British person might misinterpret the real focus of information" (Tench 2015: 17).

Another issue that arises from the comparative studies of English and Czech intonation as potentially problematic for the Czech students of English is the prevalence of rising tones in Czech spontaneous conversations. According to Chamonikolasová (2007: 72), the survey of final pitch movements in spontaneous Czech dialogues indicates specific differences between English and Czech. Although terminal units in both languages contain a prevailing number of falling tones (with 10 percent fewer falls in a Czech dialogue than an English dialogue), Czech non-terminal units more frequently contain a rising pitch than a falling pitch, while in English, this ratio is reversed. Furthermore, level and rising tones seem to be more common in all Czech texts due to the above-mentioned peculiarities of the Czech stressed syllables, typically pronounced on a lower pitch than the post-stressed syllables (Churaňová 2019: 101).

With English associating falls with boundary tones and finality of an utterance, the prevalence of rising tones in Czech may also complicate the native speaker's boundary perception of Czech-accented English. As English and Czech belong to different rhythmic groups, it is quite natural for the speakers to rely on divergent mechanisms in boundary perception.

Gussenhoven & Rietveld (1992: 1236) show that native speakers of English tend to lengthen the final element in the given phonetic unit, and listeners expect the duration of the pre-boundary syllable to reflect the rank of the phonological boundary. The reported absence of positional vowel lengthening and dominance of rising tones in Czech make sending this kind of boundary signals problematic for Czech speakers, who give priority in speech segmentation to the use of pauses (Chamonikolasová 2007: 72). However, Henderson & Nelms (1980: 147) report that for native speakers of English, a falling tune is a "relatively more important cue to the perceptual segmentation of speech than is a pause".

To sum up, rhythmical and accentuation differences accompanied by divergent pitch patterns may account for different prosodic means employed by English and Czech speakers to express prominence and tone boundaries. Natural psychoacoustic processes of alternating certain types of contrasts perceived as regular by the L1 speakers may complicate both

perception and production of the intonation in a target language. Therefore, these differences should be seen as potential sources of students' melody and prominence mistakes in the EFL classroom.

2.4 *Potential difficulties and suprasegmental mistakes in the speech of Czech learners of English*

Acquisition of foreign language prosody is a multi-stage process, including learning to understand and reproduce intonation and rhythmical patterns of the target language, the knowledge of intonation functions, and the student's ability to assign various phonological representations to a particular type of syntactic or pragmatic meaning.

Ondráček's analysis of Czech learners' English speech (2011: 127) accounts for incorrect word stress (14%), lack of reduction (7%), and the inappropriate melody use (3–5%) as the most obtrusive prosodic mistakes in students' spontaneous speech. Skarnitzl & Rumlová (2019: 124) also report that in students' speech, "there are considerably more post-stress rises than there are falls", which may potentially lead to the distortion of finality message as well as incorrect perceptual segmentation of speech by native speakers of English.

Study results also indicate that Czech speakers use a much narrower pitch range than the British speakers and can potentially transfer this use to their English speech (Volín et al. 2015: 109). According to Pell et al. (2009: 108), using a broad repertoire of melodic patterns on a wide pitch range is associated with agreeable emotions. In contrast, the listener may perceive the lack of melodicity in accented speech as disagreeable emotion, which makes us classify the narrow pitch range identified as problematic.

Another difficulty associated with accentuation patterns of Czech learners is the overproduction of pitch accents (Skarnitzl & Ericsson 2017: 3224). As Rasier & Hiligsmann report (2007: 48), "when L2 learners have difficulty in distinguishing between old and new information", they "tend to emphasize nearly every word in the utterance".

Interestingly, this overproduction of pitch accents in L2 speech has been observed in a wide range of interlanguage varieties, with "qualitative difference between marked and unmarked accent patterns reflected in the extent to which they can be transferred from the learner's L1 to their L2 phonology" (Rasier & Hiligsmann 2007: 49). The general picture that emerges from these findings is that prominence can be a problematic prosodic phenomenon to acquire.

By way of concluding the analysis of problematic areas and suprasegmental mistakes of Czech learners, a list of potential difficulties was created (Table 1). It includes both articulatory challenges to Czech speakers appearing due to L1 interference and perception problems arising as a result of systemic differences between English and Czech intonation means.

Table 1: Problematic areas of Czech-accented intonation

Articulatory aspect	*Perceptional aspect*
Difficulties in expressing prominence related to insufficient use of loudness, melody, and lengthening of stressed syllables.	Native speakers' difficulties with focus word identification resulting from their insufficient prominence in Czech-accented speech.

Reliance on pauses rather than melody cues in signaling unit boundaries due to the L1 imposed absence of final lengthening.	Faulty perception of tone boundaries due to improper or excessive use of rising tones and absence of final lengthening.
The L1 determined use of a narrow pitch range and poor intonation variation.	A wrong message sent by narrow pitch range and poor intonation variation.
The Czech language imposed shift to syllable-timed rhythm in English.	Psychoacoustic difficulties rooted in syllable-timed speech and possible overproduction of speech accents.

3 Materials and methods

3.1 *The experimental group characteristics*

A series of recordings was used to assess the quality of Czech students' English speech. The recordings were made at the end of the first year's summer term. All 32 students who participated in the experiment major in English (FP TUL) with an intent to become teachers of English at Czech schools. At the time of the recording (14 – 16 July 2021), they all had B1 – B2 level of English and had already taken an introductory course in English Phonetics and Phonology, which allows us to characterize them as above average experienced speakers of English.

To neutralize the observer's effect, the students were interviewed in pairs (16 interviews). The interviewer (a British native speaker) asked them a series of standard questions about their studies, plans, and interests (sports, hobbies, family). Students took turns to answer the questions. Sometimes further prompts concerning whose turn to speak it was were needed. The average length of an interview was 5 minutes.

Seven speakers (five female and two male students, 20 – 21 years old, with Czech L1) were chosen for further analysis. The recordings were converted into sound WAV files and mildly edited with the help of the Todd-AO Absentia application to get rid of the background hum and noises. The starting greetings of the participants were cut out from the final data set to minimize the role of cliché utterances and exclude the time when the interviewees' awareness of the recording occurring was the highest since the experiment was focused on studying more or less spontaneous interaction. The total duration time of the tapes analyzed was approximately 40 min.

To provide material for comparative analysis and guarantee a certain level of reliability of the conclusions reached, a control group of native speakers in a similar learning situation was needed. For these purposes, two mock Oxford application interviews (2019) given by speakers with a similar profile (female, 19 – 20 years old) were found on YouTube and pre-mastered similarly. Only the episodes where the participants discussed general issues (home town, interests and hobbies, a trip to Oxford) were chosen for analysis. The total time of control group recordings was about 7 min.

3.2 *Research methodology*

A combination of auditory, acoustic, and statistical methods was used to study the perception of Czech-accented English intonation, identification of suprasegmental mistakes, and assessment of these mistakes' role in the comfortable intelligibility of the students' spontaneous speech.

The recordings of the students' speech were first assessed by two groups of experts, including native speakers of British English (first group) and non-native speakers of English (second group).

The auditors did not have access to the transcripts of the dialogues and were asked to assess the recordings at conversation speed; however, they were allowed to pause the recordings in case of need to make notes or mark the intonation mistakes. Before starting the experiment, potential suprasegmental problems were categorized in a protocol to be filled in at the end of each interview. The auditors were not supposed to mark the exact mistakes each student made but to mark the overall impressions of their speech. The control group interviews were not subjected to this procedure.

The protocols devised for the experiment consisted of three sets of questions concerning (1) the perceptual parameters (general intelligibility) of speech, (2) the participants' articulatory features, such as the use of tones, loudness, and pauses, (3) the prominence of focus words. Several questions offered a graded scale to reduce possible difficulties in evaluating the recordings.

At the second stage of the experiment, both experimental and control group recordings were subjected to manual statistical analysis to calculate the average length of a tone group, the proportion of rising/falling tones in the students' speech, and the number of prominent focus words in the utterances. The statistical data on the use of the different intonational patterns by the experimental (Czech speakers) vs. control (native speakers) data was used for establishing correlation coefficients between the frequency of similar patterns in the two data sets (although, admittedly, not fully compatible).

At the final stage of the experiment, a partial acoustic analysis of the recordings was conducted to get precise data about the pitch range, F_0 and intensity modulations, and the temporal (pauses and speech rate) characteristics of students' speech. Praat 6.1 software package was used to acquire the data required.

The research had several limitations that are worth considering:

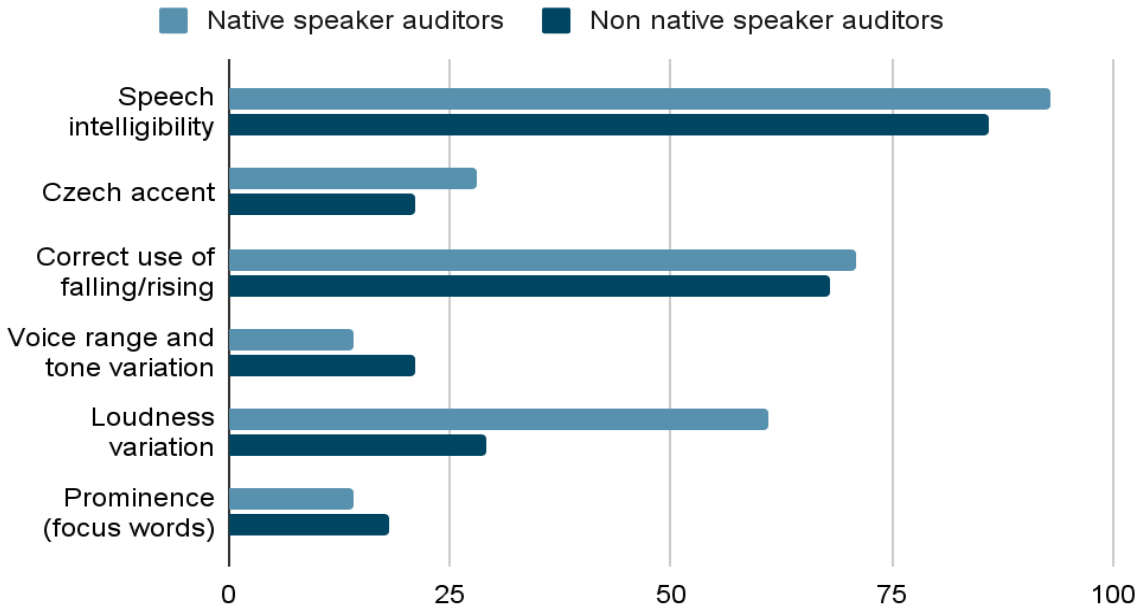
- Students in experimental and control groups, admittedly, had different levels of language proficiency, which may have affected the data under comparison.
- The statistical analysis of the data set, which included initial perceptual identification of focus words and unit boundaries in the data sets, was conducted individually by the author of the present paper and, thus, can be viewed as subjective.
- The auditors in the study were neither supposed to distinguish between phonetic and phonological intonation mistakes nor link particular mistakes to individual students, but rather give a general impression of the accented speech and specify problematic areas that need improving.
- The resulting explanation of the identified mistakes concerning L1 interference remains largely hypothetical and needs further verification.
- It should also be noted that the accuracy of the numerical data received from the acoustic analysis is relative and depends on many factors, including the quality of the recordings, re-mastering of sound files, algorithms of F_0 visualization, and many others.
- The experimental and control groups included a relatively small number of participants (9 speakers).

4 Results and discussion

4.1 *The results of the auditory analysis*

It is generally hypothesized that the perceptual mapping of intonational categories is sensitive to the structural properties of individual phonological systems; therefore, there were two groups of auditors to provide different viewpoints on the students' performance – a group of two native speakers (both of British origin, one of them being a specialist in English phonology) and a group of two proficient English speakers (of Russian and Czech origin, both specialists in English phonology). All assessments were conducted individually. The point of attracting different types of assessors to participate in the perceptual analysis was to compare the data on the native speakers' perception of accented speech with the data on the potentially problematic areas obtained from specialists in phonological training.

Chart 1: The results of the auditory analysis



The results of the auditory analysis (Chart 1) show that assessments coming from different groups of auditors are quite compatible. Research has indicated only a limited number of mismatches in the assessments by the two groups, with general conclusions about the students' performance in the experiment being relatively positive[1]. Both groups of auditors assessed the experimental group speech as highly intelligible (86 – 93%), with the mid-to-low presence of Czech accent (21 – 28%).

The assessment of suprasegmental features of the interviews revealed certain pronunciation difficulties, which, although not obstructing understanding of Czech-accented speech, may serve as an impediment to effective communication.

[1] The students' performance was qualified as "correct" or "positive" when the native-speaker auditors did not consider the speakers' intonational accent as an impediment to the communicated meaning. The intonation was called "mistaken" when the auditors identified a discrepancy between the intonation of the utterance and the communicative intention of the speaker (e.g., a statement was pronounced with intonation of a question).

First of all, although the assessment of correct use of melody patterns was rather high (68 – 71%), it nevertheless, means that around one-third of all tones were misplaced or misused. The protocols quote "a rising tone followed by a long pause" as the most typical example of this incorrect melody placement. Native speakers found these rises especially problematic in spontaneous dialogues as the perceived absence of finality, in their opinion, sends a wrong signal to the other participant of the interchange and slows down interaction. What is more, both groups of auditors marked the voice range and melody variation employed by the students as "narrow" and "insufficient".

Secondly, around 30% of the students did not have "sufficient" loudness variation in the native speakers' opinion, with this figure reaching 69% according to non-native speakers' assessment. This poor loudness variation may account for the fact that both groups of auditors had difficulties with "focus word" identification in the dialogues assessed. Experts were unanimous about the fact that only a few students from the experimental group used prominence efficiently enough to mark the semantically new or important information (14% in and 18% by native speakers and non-native speakers respectively).

All in all, the results of the auditory analysis show that although occasional melody misplacements and the near absence of prominent focus words in the utterances of spontaneous interaction do not significantly decrease the general intelligibility of speech, understanding Czech-accented speech undoubtedly requires more effort on the listener's part. The poor range and pitch variation, at the same time, may contribute to the perception of the students' Czech accent as "unenthusiastic" and "uninterested".

4.2 *The results of the statistical and acoustic analyses*

The results of the statistical data analysis accompanied by the acoustic analysis of selected speech segments (Table 2) allowed us to identify certain discrepancies in the use of suprasegmental parameters by the experimental group (Czech speakers, 01CZ – 07CZ) vs. the control group (British speakers, 01BR – 02BR).

Table 2: The results of the statistical and acoustic analysis

The recording title (CZ- experimental group, BR - control group)	O1CZ	02CZ	03CZ	04CZ	05CZ	06CZ	07CZ	01BR	02BR
The duration of the talk (min)	5,15	6,29	5,05	7,25	5,22	5,13	3,39	4,05	3,21
The ratio of falls/rises/level tones identified (%)	14/81/4	35/45/20	30/63/7	46/42/12	57/23/20	31/65/4	60/13/27	64/20/16	69/19/12
The pitch range (st1)	8,4	7,88	21,58	13,59	17,51	15,1	17,63	17,74	19,46

The difference in intensity between a focus word (max.) and Mean (dB)	13,11	16,0	14,99	15,1	20,99	12,99	11,229	16,44	12,54
The number of focus words identified (per 60 s/SD)	21(8)	20(6)	30(9)	24(8)	35(13)	26(7)	15(4)	25(11)	16(3)
The average length of a tone group (words/SD)	4(3)	3(2)	6(3)	4(2)	3(2)	2(2)	4(2)	8(3)	6(2)
The mean pauses between the tone groups (s)	0,94	0,76	0,42	0,74	0,69	0,57	0,42	0,39	0,53

The statistical analysis of melodic fluctuations demonstrates an inverse correlation of falling and rising tones in the experimental group vs. the control group. The number of rising nuclear tones in the speech of four out of seven Czech speakers considerably exceeds the number of falling tones (63% of nuclear rises vs. 28% of nuclear falls). Only two Czech speakers (05CZ and 07CZ) had their falling/rising tones ratio similar to that of the native speakers (01BR, 02BR). However, even these speakers had a slightly higher share of final rises than the British speakers, namely 26% of rises vs. 54% of falls in the experimental group, and only 20% of rises vs. 66% of falls in the control group. Furthermore, the Czech speakers with the closest to the native speaker fall/rise ratio demonstrated a higher proportion of medium levels at the end of their tone groups (20% vs.14% in the control group).

The acoustic analysis of pitch range, quite expectedly, demonstrated a somewhat narrower mean range employed by the Czech speakers (14,5 st1) in contrast to the British speakers (18,6 st1), which was entirely in line with the data received from the auditory analysis. The narrowest pitch range, though, was demonstrated by male speakers from the experimental group (01CZ – 8,44 st1; 02CZ – 7,88 st1), which was twice narrower than the range of almost all other speakers (females), including the female speakers from the control group. Excluding the males from the counts makes the ranges of the Czech female speakers almost identical to the British female speakers from the control group (17,5 st1 and 18,6 st1 respectively).

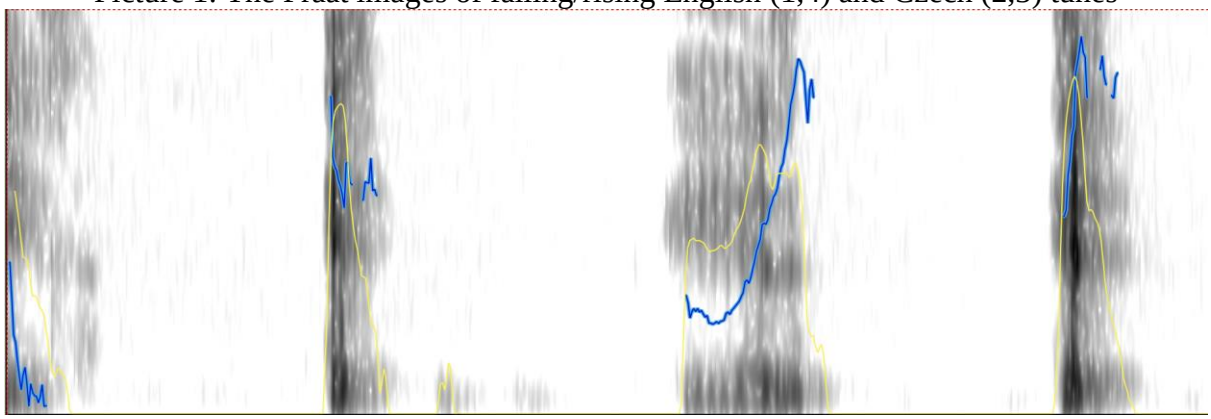
As mentioned earlier, the results of the auditory analysis showed that both groups of experts had difficulties with focus words identification. Since it was proved in earlier experiments that due to L1 interference, Czech speakers do not typically follow the rules of unstressed vowel reduction, keeping the length of stressed and unstressed syllables unchanged (Skarnitzl & Rumlová 2019: 113), loudness variation was expected to be the fundamental marker of focus words in the utterances. However, the results of the acoustic analysis did not support this hypothesis. The difference between the max. intensity on the focus words and the

mean intensity on the unstressed stretches of the utterance in both the experimental group (14,92 dB) and the control group (14,49 dB) was almost the same.

Only one of the speakers in the experimental group (05CZ) had an acoustically registered (20,99 dB) and perceptually verified larger than in the control group difference between the stressed and unstressed syllables, which led us to believe that it is a pitch variation character (falling or rising tune) rather than the loudness variation that played a more prominent role in the auditors' perception of prominence in the experimental texts.

The difficulty that the auditors had with focus word identification can, therefore, be connected with incorrect production of English falls and rises by Czech students, which is again most probably explained by L1 phonetic transfer. Picture 1 illustrates the four acoustic images of pitch line contours (the dark lines) extracted from four different speakers using the Praat program.

Picture 1: The Praat images of falling/rising English (1,4) and Czech (2,3) tunes



The first two images illustrate the realization of a falling tone by the British speaker (1) and the Czech speaker (2). It is evident from the images that the native speaker's pitch drops to the very bottom of the pitch range, whereas the Czech speaker's falling tunes is shorter and is realized in the middle of their pitch range, which, by the way, may serve as the explanation of a larger ratio of mid-level tones in place of nuclear falls reported by the auditors.

Images (3) and (4) (Picture 1) depict the pitch contours of rising tones produced by the Czech speaker (3) vs. the British speaker (4). The Czech-accented rise (3) is different from the native speaker's rise by a more extended time to pronounce it (0,22 s.), resulting in a lower-angle pitch line, which is again more typical of the Czech language intonation and, allegedly, rooted in L1 transfer. Czech-accented rises tend to be longer and, thus, more perceptually relevant for the listener.

The statistical analysis also showed that Czech speakers tend to divide their utterances into shorter tone groups separated by longer pauses. The average length of a tone group (a stretch of an utterance between two pauses typically ending with a nuclear tone, with hesitations and contact interjections excluded from the counts) of the Czech speakers was four words (SD=1), whereas the British speakers had somewhat longer utterances with an average of 7 (SD=1) words. Shorter tone groups, consequently, resulted in a higher number of the experimental group's focus words (24, SD=6) per minute of speaking time in comparison to the control group (20 SD=6), which, in the long run, created a feeling of a "syllable-timed" rhythmicality of the Czech-accented English speech.

Another factor that may have contributed to the syllable-timed rhythmicality of the accented speech was the above-mentioned long pauses. The acoustic analysis of the control group utterances allows for a clear distinction between at least two types of intersegmental pauses, namely the not perceptually relevant shorter ones (0,2 s.) between the short tone groups and more perceptually relevant longer ones (0,6 – 0,74 s.) following the final falls of longer tone groups. At the same time, four of the seven experimental group speakers failed to demonstrate any variation in the choice of the pauses correlating with the tone group length.

Speakers 01CZ, 02CZ, 04CZ, and 05CZ had pauses of nearly similar length throughout the whole talk (0,69 - 0,94 s.), which had an explicitly recurring nature and were nearly twice as long as the control group pauses. Such a choice, in our view, can again be explained both by L1 intonation transfer, as Czech speakers reportedly use shorter tone units divided by more or less regular intervals in their L1 (Chamonikolasová 2007: 46), and, on the other hand, the longer time needed for the cognitive effort, since the experimental group speaks English as a foreign language.

5 Conclusions and implications for teaching

The present research was focused on identifying those suprasegmental features of Czech learners' speech that can potentially undermine the intelligibility of what is being said or the ease with which it is understood. An attempt was made to link Czech-accented English with a phonetic/phonological accent that appears to be the result of the Czech language intonation transfer.

The conducted experiment illustrates that certain aspects of the Czech-accented English intonation, reported by the native-speaker auditors as "complicating comfortable intelligibility", namely the dominance and the character of rising tones, insufficient loudness and pitch variation on the focus words, and different speech segmentation, are also detectable in the instrumental analysis of speech as deviations from the acoustic norm of the target language (or, in our case, the British control group).

The comparative interpretation of the auditory and acoustic analyses results allows us to say that the Czech accent in terms of intonation and other suprasegmental parameters does not pose a severe impediment to communication in English. However, an improvement in the choice of nuclear tones, achievement of more significant prominence effect, and the change of speech segmentation patterns would help the Czech learners of English archive more comfortable intelligibility with native speakers of English.

Another issue that became evident in the course of the study, which may have important implications for teaching intonation, is that when working with intonation patterns of a target language, the traditional linguistic paradigms, such as the criteria of distinctiveness and differentiation of linguistic functions do not straightforwardly expose themselves. If students wish to improve their intonation performance, they have to realize that all suprasegmental speech parameters are interconnected in one way or another.

Consequently, the correctional work on the better prominence effect will not only imply more significant loudness variation but also encompass the work on the melody on the nuclear syllables (as a seemingly more perceptually relevant criterion for native speakers in focus word identification) as well as further reduction of unstressed syllables, which, judging by the results of previous experiments, is a particularly problematic area of Czech English speakers.

Students have to learn to consider intonational meaning as involving both contrasts (falling vs. rising tunes) on the one hand and correlation (pitch and loudness in the expression of prominence) on the other. In addition to this, differences in a pitch range employed by the students are commonly assumed to have a continuous rather than immediate effect on the listeners' perception, such as typifying them as emotionally un/involved in the speech exchange.

Although it is difficult to precisely identify the interference of Czech intonation and rhythm patterns in the English acquisition process, specific observations concerning L1 transfer can still be made. First of all, Czech students of English unconsciously transfer the melody patterns of their L1, including the greater frequency and the character (more profound and more extended) of rising tunes. The near absence of positionally determined length and loudness variation in Czech excludes these parameters as relevant for the speakers from their expression of prominence in English.

In terms of speech segmentation, it was established that the experimental group fails to discriminate between types of intersegmental pauses and transfers pausation and segmentation patterns of their mother tongue. Shorter tone groups, typical of the Czech language, contribute to additional segmentation of utterances in English, which, as a result, due to the insufficient reduction of unstressed syllables (also transferred by the speakers from the Czech language), may give the listener the perception of a syllable-timed rhythm, alien to a British native speaker.

By way of concluding the present paper, it should be restated that, although the present study has several limitations (the main being the relatively small size of the experimental and study groups), the study results can be used for developing a set of exercises on intonation correction, which will assist Czech students in acquiring more natural intonation patterns of the English language.

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