Bakalářská práce

The impacts of mother tongue on the implementation of stress patterns in English among Czech students

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V teoretické části se práce zaměří na porovnávání slovního přízvuku v anglickém jazyce a v českém jazyce, a dále se bude zabývat jazykovým transferem. V českém jazyce je z pravidla přízvučná první slabika, v anglickém jazyce se pozice přízvuku liší. Proto je možné, že čeští žáci a studenti budou chybovat v realizaci přízvuku v anglických slovech. V praktické části kvantitativního výzkumu se vychází z hypotézy, že chybovat se bude zejména u slov, která mají slovní přízvuk na jiné než na první slabice. Cílem je zjistit, jak se počet chyb bude měnit u žáků a studentů v závislosti na dvou proměnných, věku a úrovni anglického jazyka. Pro tento účel bude proveden výzkum rozlišený pro tři věkové skupiny a bude provedena analýza chyb v realizaci slovního přízvuku.

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Phonetic Aspects of Strongly-Accented Czech Speakers of English." AUC Philologica 2019, no 2.
Odlin, Terence. 1993. Language Transfer: cross-linguistic Influence in Language learning.
Cambridge: University Press, vol. 3. Cambridge applied linguistics series. ISBN 0-521-37809
Hůrková, Jiřina. 1995. Česká výslovnostní norma. Scientia, spol. s.r.o., pedagogické
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25. dubna 2023   Anna Pachelová

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Anotace:

V první teoretické části práce jsou charakterizovány a následně porovnávány pravidla pokládání slovního přízvuku v českém a anglickém jazyce. Dále práce pojednává o jazykovém transferu a srozumitelnosti žákovy nebo studentovy výslovnosti jako kritérium výuky anglického jazyka. V druhé empirické části práce bylo zkoumáno, zda měli čeští žáci a studenti tendenci chybně klást slovní přízvuk na první slabiku ve víceslabičných anglických slovech s lexikálním přízvukem na jiné než první slabice. Tedy zda docházelo k mezijazykovému vlivu přízvukových vzorců. Bylo zjišťováno, jak se měnila chybovost v kladení přízvuku v závislosti na různém věku a jazykové vybavenosti respondentů. Pro účely výzkumu byla provedena poslechová analýza nahrávek českých žáků a studentů. Následně byla realizována akustická analýza problematických slov v programu pro analýzu řeči Praat.

Klíčová slova:

Slovní přízvuk, suprasegmentální fonologie, jazykový transfer, čeští mluvčí, zvuková analýza, Praat

Abstract:

The first theoretical part of the thesis deals with the description and comparison of Czech and English stress patterns. Furthermore, language transfer and intelligibility as a criterion for teaching English pronunciation are discussed. The second practical part of the thesis investigated whether Czech pupils and students tended to wrongly put word stress on the first syllable in multisyllabic English words with assigned lexical stress on syllables other than the first; thus, if language transfer of stress patterns occurred. Moreover, it was examined how the error rate of stress placement changed based on respondents' different ages and language proficiency. For the purpose of the research, an auditory analysis of the voice recordings of Czech pupils and students was conducted. Additionally, an acoustic analysis of problematic words was done in a software program for speech analysis called Praat.

Keywords:

Word stress, suprasegmental phonology, language transfer, Czech speakers, auditory analysis, Praat

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List of abbreviations

AmE – American English

BrE – British English

CEFR – The Common European Framework of Reference

Chap. – chapter

dB – Decibels

EFL – English as a foreign language

ELF – English as a Lingua Franca

Hz – Hertz

IPA – International Phonetic Alphabet

Max. M. – Maximum measure

s – seconds

Introduction

The thesis deals with the suprasegmental aspects of speech, which fall under the study of phonology; more specifically, it deals with stress patterns. Since stress patterns in English and Czech are very different, the research investigates whether Czech pupils and students transfer any Czech stress patterns while speaking English. In Czech, stress is always on the first syllable, whereas in English, the position of stress changes. The research investigates whether Czech pupils and students of various ages and language proficiency tend to place stress in English words automatically on the first syllable, even in cases where it is not correct in English. Therefore, the research focuses mainly on English words in which syllables other than the first are stressed.

The theoretical part describes the nature of stress in English and Czech, its function, and the fundamental rules of stress placement. Subsequently, a comparison between stress patterns in those two languages is provided. The thesis discusses language transfer and the influence of the mother tongue on the acquisition of a foreign language, particularly the influence of stress patterns in students' native languages on the acquisition of English. Furthermore, it focuses on the research already done regarding transferring stress patterns from the native language to English as a second language and mentions different research papers on this topic. It discusses the importance of correct stress placement for the intelligibility of foreign speakers of English.

The practical part of the thesis is conducted using classroom research. The research is done in three different age groups. Ten respondents from each age group are all native speakers of Czech. Respondents are recorded reading English words and sentences; subsequently, an auditory analysis of the recordings of all respondents is made. The

correctness of the placement of primary stress is assessed by two auditors who complete verbal protocols. The analysis is focused on the stress placement in selected English words where the stress carries other than the first syllable. Furthermore, an acoustic analysis of problematic words is performed in a software program for speech analysis called Praat. Recordings of two native speakers of English are available for possible comparison of acoustic stress features in selected words.

The research results may suggest whether Czech pupils and students at different stages of their language learning have acquired the correct stress patterns in English and whether sufficient emphasis is placed on this aspect of the language when teaching English. The analysis of recordings of pupils and students of three different age groups may show how age and language proficiency influence correct stress placement among Czech speakers of English. In addition, a list of the words that were found problematic is included in the appendix, which could be helpful for English teachers in Czech schools or for Czech learners of English at any proficiency level to ensure they have acquired the right lexical stress for the listed words.

1 Theoretical part

1.1 The Phonological role of stress in English

The thesis deals with the sound aspects of the language; more specifically, it is based on a study of phonology. According to Krčmová (2009, Chap. 3.2), phonology deals with those elements of speech that have meaning-forming value. These can be segments or suprasegmental phenomena, which, when replaced, changed, or eliminated, alter the meaning of the language unit or render it meaningless. The basic unit of phonology is the phoneme, the smallest sound element capable of changing the meaning. The meaning-forming value does not only apply to phonemes, thus for the segments of the language, but it also applies to the suprasegmental level.

According to Brinton and Brinton (2010, 64), "suprasegmental features are those articulatory features which are superimposed over more than one segment (i.e., vowel or consonant)". Krčmová identifies, for example, intonation and stress. An intonation change can shift the meaning of the larger language unit (e.g., turn the declarative sentence into a question). The word stress also has a distinctive function in some languages; for that reason, it is sometimes called a suprasegmental phoneme. However, it is only valid for languages with variable stress, such as English or Russian. In those languages, different placements of word stress can change the word's meaning (2009, Chap. 8.2). For example, when the word 'REcord' is stressed on the first syllable, it is a noun, whereas, with stress on the second syllable, it becomes a verb, e.g., 'to reCORD'. Shifting the word stress caused the word class to change even though the spelling remained the same. (Roach 2009, 87)

It is essential to mention that phonology is primarily a study of a specific language or dialect, meaning it is not a universal science for any language in the world (Krčmová 2009,

Chap. 3.2). Some general features can apply to more languages, however, for the matter of this paper, the phonology of Czech and English is described.

1.2 English stress patterns

1.2.1 General characteristics of English word stress

The nature of word stress can be described from various perspectives. Roach introduces two different approaches to how stress can be examined. One is from the production point of view, and the second is from the perceptual point of view. (2009, 73) Brinton and Brinton use different terms for the same phenomena, describing articulatory and acoustic characteristics of stress. (2010, 64) In the articulatory sense (production point of view), "stress involves a rise in air pressure; an increase in the activity of the respiratory muscles forces more air out of the lungs during the articulation of a particular syllable. There may also be an increase in the activity of the larynx, resulting in higher pitch" (Brinton, Brinton 2010, 64). From the hearer's (perceptual/ acoustic) point of view, "the stressed syllable is perceived as longer, louder, and of higher pitch" (Brinton, Brinton 2010, 64).

In English, stress is often described as prominence because the stressed syllable is more prominent than the neighboring unstressed ones. (Roach 2009, 73-74). Skaličková (1982, 45) explains that it is only possible to distinguish stressed syllables by comparing them to other syllables. Stress is therefore considered a suprasegmental matter because it is necessary to examine it in larger units, such as words or sentences, in order to see the contrast between the prominent syllables and the unstressed ones.

1.2.2 Types of stress in English

In English, three different degrees of stress are distinguished. Primary stress is the most prominent one, usually marked by a superscript vertical mark [ˈ]. The following degree of prominence is secondary stress marked by a subscript vertical mark [ˌ]. To the third degree belong the unstressed syllables remaining unmarked. (Collins, Mees, 2013, 131) The previous description of transcribing the stress corresponds to the IPA (International Phonetic Alphabet), where the stress mark stands before the stressed syllable, e.g., explanation /ˌekspləˈneɪʃən/. Other possibilities certainly exist; for instance, in Brinton and Brinton (2010, 64), the stress is marked directly inside the stressed syllable, e.g., èxplanátion. The acute accent (´) represents the primary stress, and the grave accent (`) designates the secondary stress. Since this paper focuses on the word stress and not on the correct pronunciation of the words, the second style of marking stress will be mainly used. In some cases, phonemic transcription will be provided according to IPA written inside the forward slashes, e.g., /ˈfɔː.wəd ˌslæʃ/.

1.2.3 Acoustic characteristics of word stress

Several indicators make the listener recognize the stressed syllable. In English, it is firstly, the greater voice volume; secondly, change in the pitch, most frequently a higher pitch than other syllables; thirdly, the vowel quality where the stressed syllable usually contains its clear pronunciation (thus there is no vowel reduction); and lastly, vowels are generally longer in the stressed syllables than in the unstressed ones (Collins, Mees 2013, 129-130). According to Collins and Mees (2013, 129), vowel reduction is one of the very significant properties of spoken English. They mention that foreign speakers often make mistakes in the vowel reduction principles causing unstressed syllables to have disproportionate prominence.

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In English, it is frequent that in unstressed syllables, vowel reduction occurs; however, it does not mean that a full-quality vowel cannot be pronounced in the unstressed syllable in some cases (Yavas 2020, 93). Syllables can be divided into weak and strong ones. According to Roach (2009,64), a weak syllable equals an unstressed syllable, and a strong syllable carries stress. Giegerich (1992, 67) explains that both primary and secondary stress may contain a full range of vowel pronunciations when words are isolated. However, in unstressed ones, the vowels usually lose their quality. According to Roach (2009, 65), schwa /ə/ is the most frequent vowel to be found in weak syllables. Giegerich states that "in unstressed syllables only schwa and /ɪ/ are possible." (1992, 69)

1.2.3.1 Weak forms in connected speech

In connected speech, syllables with secondary stress may lose their prominence, and the ordinarily full vowel pronunciation tends to be replaced with the schwa sound. (Giegerich 1992, 285-286) Another phenomenon occurring in connected speech are weak forms of function words. Even though function words carry stress when pronounced in isolation, they are usually unstressed and reduced in utterance. (Giegerich 1992, 286) Yavas (2020, 95) states that "auxiliaries, determiners, prepositions, articles, conjunctions, pronouns, and some adverbs" are usually not the focus of the conversation; thus, in connected speech, their pronunciation is reduced.

According to Roach (2009, 90), the most frequent function words appearing in their weak form at the phrasal level are, for example: *the, a, an, and, but, you, him, her, them, can,* and many more. For demonstration, a strong form of 'and' is /ænd/, weak forms can be according to the context and the speech velocity /ənd/, /ən/, or only /n/. (Yavas 2020, 96) More significant reduction happens in faster speech, which can result in a total loss (also called elision) of vowels or consonants in the unstressed syllable. (Giegerich 1992, 287-288)

There are several cases when the function words cannot be reduced. Firstly, when the function word appears at the end of the sentence. For example, a preposition in the middle of a sentence is generally reduced; however, in the final position, the strong form must be pronounced. Secondly, the strong form is used when the speaker wants to emphasize or contrast the usually unstressed word. (Roach 2009, 89-90) Thirdly, strong forms of auxiliary verbs are used when they appear without their main verb or when the speaker speaks slowly. (Yavas 2020, 95)

1.2.4 Stress placement rules in English

According to Dalton and Seidlhofer (2011, 39), the word stress placement principles can be challenging for foreign learners of English. It may seem very disorganized and unpredictable. However, many authors agree that general rules and patterns exist. Before introducing some of the rules, it is necessary to outline the basic characteristics of word stress in English.

English has free, also called variable stress, which means that the stressed syllable can appear anywhere in the word. Unlike in language with invariable stress, where a general rule exists for all the words in that language, for example, in Czech, where stress typically falls on the first syllable (Collins, Mees 2013, 131). Another feature of the English word stress is that it is "lexically designated" (Collins, Mees 2013, 131). Dalton and Seidlhofer (2011, 39) further explain that "every word has its 'own' stress pattern, which is an important part of its identity." For that reason, stress is marked in the phonetic transcriptions.

Roach (2009, 76) mentions that for the non-native speaker, it is better to learn the placement of stress with every word, thus memorizing it with other pronunciation features of the new English word. However, from the point of view that many English native speakers

are able to predict where the stress falls in the unknown terms, it suggests that specific guidelines exist. The problem consists of the matter's complexity and numerous exceptions. Yavas (2020, 180) adds that the set of rules can be formed from different perspectives; for example, the word stress can be examined based on the number of syllables, the quality of the syllable, or the part of speech that the word belongs to.

Collins and Mees (2013, 131-132) provide a rough generalization of predicting stress placement. According to these authors, the most frequent patterns in English are that in two or three-syllable words, the primary stress falls on the first syllable, e.g., móther, mémory. The typical pattern in words with four or more syllables is the antepenultimate stressing, the primary stress falling on the third syllable from the end, e.g., signíficant, terminólogy. The shorter words starting with the prefix typically have stress on the syllable following the prefix, e.g., propóse, conspíracy, unknówn. However, a significant number of nouns are excluded from this principle, e.g., óutset, nónsense. Lastly, Collins and Mees introduce two groups of word endings that might cause the stress falling either on the ending of the word, e.g., -eer (caréer), -self (mysélf); or on a syllable that comes before the word ending, e.g., -ial (inítial), -ciency (proficiency).

Yavas (2020, 187-190) elaborates on how different word endings impact word stress. The author introduces three kinds of suffixes: 'stress-bearing', 'stress-neutral', and 'stress-shifting'. Firstly, stress-bearing suffixes that take over the stress themselves, e.g., -ese (Vietnám - Vietnamése). To the second group belong suffixes that do not influence the stress patterns of the words, e.g., -ness (lónely - lóneliness). Thirdly, some suffixes cause the shift of stress position, but they do not carry the stress themselves, e.g., -ian (véterinary - veterinárian). According to the rules, stress moves to the syllable preceding the stress-shifting suffix (e.g., -ial, -ical, -ity, -ic). However, if the stress already falls on the last

syllable of the original word (syllable preceding the suffix of the new word), no shifting is needed, e.g., "absúrd - absúrdity". The author remarks that there are some suffixes that cannot be classified into any of these three groups.

Another repeatedly mentioned stress principle is based on the part of speech, namely nouns, and verbs. According to this generalization, nouns tend to have initial stress, and verbs incline to have the final stress, i.g. noun - tránsport, verb - transpórt; noun - úpdate, verb - updáte (Brinton, Brinton 2010, 65). Collins and Mees (2013, 132) call this phenomenon "switch stress". According to Minkova and Stockwell in Brinton and Brinton (2010, 65), "this is a finite class of words consisting of approximately 130 word pairs." Thus, this rule is not universal and has many exceptions; for instance, "respéct and rewárd are both a noun and a verb (Brinton, Brinton 2010, 65)."

1.2.4.1 Different stress placement in American and British English

Sometimes the lexical stress differs in British English (BrE) and American English (AmE). For example, in certain two-syllable nouns of French origin, stress falls on the last syllable in AmE (e.g., ballét, cliché, café), while in BrE, the initial stress is utilized (e.g., bállet, clíche, cáfe). For another group of two-syllable nouns it applies the other way around, in AmE the first syllable is stressed (e.g., wéekend, móustache, áddress), in BrE those words are stressed on the final syllable (e.g., weekénd, moustáche, addréss). Two-syllable verbs ending with the suffix '-ate' are also stressed differently in American and British English, these verbs usually carry the initial stress in AmE (e.g. mígrate, frústrate, rótate) and the final stress in BrE (e.g., migráte, frustráte, rotáte). However, there are several exceptions to this rule where the verbs carry the final stress in both AmE and BrE (e.g., creáte, reláte, debáte). (Yavas 2020, 192-193)

Sometimes the primary stress remains the same, but the difference between AmE and BrE words lies in whether a specific syllable has a secondary stress or the vowel reduction appears on the identical syllable. This phenomenon can occur in both ways, either when there is secondary stress in AmE: /ˈseməˌteri/, /ˈmætrəˌmoʊni/; and reduced vowel in BrE: /ˈsemətri/, /ˈmætrɪməni/. Or reversely, when the secondary stress appears in the BrE form: /ˈfræˌdʒaɪl/, /ˈməʊˌbaɪl/; and reduced vowel appears in AmE: /ˈfrædʒəl/, /ˈmoʊbəl/. (Yavas 2020, 193-195)

1.2.5 English stress patterns in connected speech

At the phrasal level, English speakers do not stress every word; thus, some words lose their stress in connected speech. Furthermore, English is often described as a stress-timed language, which means that stressed syllables appear in fairly regular intervals. (Brinton, Brinton 2010, 68) When linguists describe stress patterns in utterance, they often use the term rhythm. The base unit of rhythm is the foot which contains only one stressed syllable, always positioned at the beginning. (Roach 2009, 108)

Traditionally, languages were divided into two groups, one with stress-time rhythm and the second with syllable-time rhythm. Stress-timed languages were believed to have the same time intervals between the stresses, and it was assumed that each syllable takes the same amount of time to pronounce in syllable-timed languages. However, this classification is oversimplified, and phoneticians whose mother tongue is supposed to be syllable-timed do not fully support this theory. (Dalton and Seidlhofer 2011, 40-41) For that reason, Dalton and Seidlhofer (2011, 42) provide a different definition saying that "stress-timed languages maximize the difference between stressed and unstressed syllables, while syllable-timed languages do not."

Sometimes, the unstressed syllables are compressed, and the pronunciation is simplified to achieve the regularity of intervals between the stresses. (Skarnitzl and Rumlová 2019, 114) As a result, weak forms of words and contracted forms of phrases appear. These weak forms of phrases are present in English so frequently that they have their own written form; nevertheless, they are primarily used in informal writing. An example of contraction is when 'do not' is written as 'don't' or when 'you are' is contracted to 'you're'. (Roach 2009, 89) Collins and Mees (2013, 131) add that to make the intervals between the stresses look regular, sometimes the unstressed syllables need to be squeezed when there is a lot of them, and sometimes the unstressed syllables spread out when there are fewer of them.

1.2.5.1 Stress shifting in connected speech

According to Collins and Mees (2013, 131), in languages where every word has its own stress pattern, word stress "cannot, as a rule, be shifted in connected speech." Even though English belongs to the lexically designated languages, some exceptions exist. Brinton and Brinton (2010, 69) explain that stress placement may change based on the word's position in the sentence. As stress is expected to appear in roughly the same intervals in connected speech, some polysyllabic words (for example, adjectives) tend to change the stress position when they are in the attributive position (in front of the noun). On the other hand, when they appear at the end of the sentence, they keep their original stress pattern. The authors provide an example of the word 'artificial' in the attributive position ("Alex is an ártificial person.") and at the end of the sentence ("Alex is very artificial."). (Ibid 2010, 69)

Giegerich (1992, 277) calls this phenomenon 'stress reversal', meaning that the position of stressed and unstressed syllables switches to avoid two stressed syllables standing next to each other. He provides an example of the word 'thirteen': in isolation, stress falls on

the second syllable (thirtéen), while at the phrasal level, stress moves onto the first syllable (thírteen kíds).

1.3 Czech stress patterns

1.3.1 General characteristics of Czech word stress

Czech belongs to the languages with fixed word stress, meaning that the stress, as a rule, falls on the first syllable when a word is in isolation (Palková 1997, 157). Skarnitzl and Eriksson (2017, 3221) state that Czech word stress is not "manifested by clear prominence markings on the first, stressed syllable." Their research showed that the only indicator of the stressed syllable is that it "tends to be shorter and slightly lower" than the following syllable (Ibid 2017, 3224). They explain it is because, in Czech, word stress does not have contrastive functions; thus, it does not need to be as prominent as it is, for example, in English. (Ibid 2017, 3222)

1.3.2 Czech stress patterns in connected speech

According to Grepl et al. (1995, 44), in the speech flow, certain words become unstressed and connect with the neighboring words creating one unit, also called a stress group. A stress group can consist of one or more words but only one primary stress (Krčmová 2009, Chap. 4.2).

Words that tend to unite with other words forming a stress group are called clitics (Krčmová 2009, Chap 4.2). Enclitics are usually added to the proceeding stressed expression and become unstressed; in Czech, these are, for example, some pronouns or auxiliary forms of the verb to be. Proclitics are words that do not have any stress but form one stress group with the following expression, e.g., conjunctions. (Grepl et al. 1995, 44-45)

The main reason for word clustering into one stress group is the Czech rule against "stress clash" on two successive syllables (Volín, Skarnitzl 2020, 695). Grepl et al. (1995, 44) state that stress groups are usually not very long (2-3 syllables), and longer than six syllables are rare. Skarnitzl and Volín (2018, 72) argue that nowadays, apart from monosyllabic clitics, polysyllabic Czech words commonly lose their stress and join the neighboring words forming even seven-syllable stress groups.

The unification of words into one stress group also occurs in the case of monosyllabic prepositions. In Czech, prepositions often form one sound unit with the following term and carry the stress themselves. (Grepl et al. 1995, 45) In this rule, exceptions exist; for example, when the word following the preposition is long, it keeps its stress on the first syllable, and the preposition remains unstressed. (Skarnitzl, Volín 2018, 67) According to Hůrková (1995, 40), other exceptions are non-original, also called secondary prepositions, meaning that they originate from another word class, primarily from adverbs. These secondary prepositions are usually unstressed as other enclitics.

According to Volín and Skarnitzl (2018, 72), deciding where the speaker forms a stress group is subordinate to the meaning of the words in the utterance. Some monosyllabic words are permanent clitics in Czech, usually grammar words without semantic meaning (Ibid 2018, 69). In certain cases, however, the speaker omits stress even in multisyllabic full-meaning words when they do not consider it essential to make it prominent in a given context. (Ibid, 2018, 72) Therefore, Volín and Skarnitzl (2018, 73) offer a new possible term, "accent-group," meaning the actual realization of clustering syllables into one sound unit of a particular speaker. According to the authors, the older term 'stress group' could represent the potential, presumable stress placement.

1.4 Comparison of English and Czech stress patterns

A complete comparison of Czech and English phonetics is presented in Alena Skaličková's (1979) book, where the author also mentions the differences between stress patterns in both languages. Firstly, Czech has fixed stress, which always falls on the first syllable. On the other hand, English has a variable stress meaning that stress can occur on any word syllable. (Skaličková 1979, 298) Secondly, a vowel in an unstressed syllable does not lose its acoustic character in Czech. In English, it is common that any strong vowel can turn into a weak one in the unstressed syllable. (Skaličková 1979, 148-149) Thirdly, the role of stress is different in both languages. According to Skaličková (1979, 149), in English, stress has a distinctive function implying that the shift of the stress in a word can change the word's meaning (for example, a change of the word class). In Czech, stress simply indicates the beginning of the word.

Another difference between Czech and English stress is the contrast between the stressed and unstressed syllables in those two languages. According to Eriksson and Heldner's research, stressed vowels in English have a noticeably higher fundamental frequency than unstressed ones, perceived as a higher pitch. Stressed syllables also have a greater duration than unstressed ones. (2015, 42-43) On the other hand, according to Skarnizl and Eriksson's research, the Czech stressed syllable does not exhibit considerably increased values in the acoustic aspects compared to the unstressed syllables. (2017, 3224) The results suggest that Czech speakers have the propensity to make the stressed syllable lower in pitch and slightly shorter than the remaining syllables. Additionally, it was discovered that a post-stress rise in pitch exists in Czech, where the fundamental frequency of the second (post-stressed) syllable was often measured somewhat higher than of the first stressed one. (2017, 3222)

In connected speech stress also has a different function in both languages. In English, the stress group is mainly a rhythmical unit; in Czech, the stress group is rather a semantic unit (Skaličková 1982, 176). In Czech, stress often suggests the word boundary, whereas, in English, the stress group may begin or end in the middle of a word or a semantic unit. Thus, a stand-alone stress group is sometimes meaningless in English unless we have the context of adjacent stress groups. Therefore, it may be difficult for Czech listeners to distinguish the words apart in an English sentence. (Skaličková 1982, 171-172) Another difference is that the Czech sentence usually begins with a prominent syllable. By contrast, the beginning of an English sentence is very often unstressed. (Skaličková 1982, 176)

1.5 Language transfer

Jarvis and Pavlenko (2008, 1) define language transfer (also called cross-linguistic influence) as "the influence of a person's knowledge of one language on that person's knowledge or use of another language." Odlin (1989, 27) specifies that transfer does not need to only refer to native language influence but also any other language previously learned. Despite this statement, the thesis will mainly focus on the impact of the mother tongue on second language acquisition (e.g., Czech's influence on English acquisition).

Language transfer can be positive or negative. Positive influence is when similarities between the native language and the target language make learning easier, whether it is similar vocabulary or similarities in other aspects of language. (Odlin 1989, 26) The negative transfer comes from differences between the two languages leading to different types of errors. (Odlin 1989, 36)

The phenomenon of language transfer can be also categorized into two types: 'borrowing transfer' and 'substratum transfer'. When a second language influences our mother

tongue, it is called borrowing transfer. Then substratum transfer refers to a cross-linguistic influence of a source language (usually a native tongue) on learning the target language. (Odlin 1989, 12) Odlin (1989, 13) explains that borrowing transfer will more likely have an influence on the lexicon and the syntactic structures and not so much on phonetics and phonology; on the other hand, the substratum transfer tends to be much more influential in the pronunciation and syntax than in the vocabulary.

An important aspect of second language acquisition is 'language distance'. Odlin (1989, 32) suggests that some languages are more correlated than others; for example, Spanish is more related to French than English. The similarities between the native and second languages can lead to errors (e.g., false friends) but are more likely to bring benefits (Odlin 1989, 153). It was shown that learning a closely related foreign language to one's mother tongue might take less time to master than a language of greater distance (Odlin 1989, 39-40).

According to some authors, language proficiency also plays a role in language transfer. Some studies showed that the transfer of phonological features as well as the word order transfer are more common in less advanced speakers of English (Odlin 1989, 133). However, these findings only considered the negative transfer; thus, it was not proved that the more experienced the speaker, the less he relies on his mother tongue (Odlin 1989, 133). Odlin (1989, 134) adds that "transfer can occur whenever a structure seems new, and therefore problematic, to a learner."

1.5.1 Language transfer of stress patterns

According to Odlin (1989, 117), cross-linguistic influence also applies to suprasegmental features. Odlin provides the results of a study by Andrews where French speakers had a tendency to put stress on the final syllables of English words, which is

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probably because, in French, the stress is fixed on the last syllable. In addition, he proved that non-native speakers of other languages implemented different stress patterns than French speakers. (1989, 117-118).

Similar research has been done by Skarnitzl and Rumlová (2019, 121), where they analyzed Czech speakers of English with "strong accents". According to them, "lexical stress was misplaced to the first syllable of the word in about 50% of the cases, regardless of word length," as Czech has fixed stress on the first syllable. Volín and Weingartová (2014) investigated Czech speakers reading English sentences. According to their results, when Czech speakers wrongly shifted stress, it was mainly to the first syllable. (Ibid 2014, 178) These findings suggest that language transfer influences foreign speakers' stress placement.

1.6 Intelligibility as a criterion for teaching English pronunciation

Several authors agree that correct stress placement when speaking English is crucial to sound more natural as a foreign speaker. Roach (2009, 72) states that the theory of segmental phonology serves as a basis; however, "the strong/ weak syllable distinction and the overall prosodic characteristics of words and sentences are essential to intelligibility." According to Kenworthy (1987, 13), "intelligibility is being understood by a listener at a given time in a given situation." When learning a foreign language pronunciation, the goal is often not to sound like a native speaker because it would be somewhat unrealistic; however, the aim is to be understood by others. "The pronunciation goal must be comfortable intelligibility." (Kenworthy 1987, 16) The word comfortable is important because when the speaker has to repeat the sentence or the phrase several times, it can lead to frustration and loss of confidence. Even if the listener understands the message at the end, we cannot call it a comfortable conversation.

There are many different aspects of being intelligible, which are also very individual and subjective. Kenworthy (1987, 13) mentions the example of a parent and his child. When a child mispronounces one sound for another, the parent is used to this fact and is able to understand what their child is saying. In Czech, it is common for children to have difficulty pronouncing the sound 'r'. They often replace it with the sound 'l' (i.e., instead of 'rukavice', they will say 'lukavice', which means gloves in English). Their parents will probably understand them not only because they are in the process of putting the winter clothes on but also because they know that their child cannot pronounce the sound 'r' yet. It is a matter of familiarity because the person not aware of the pronunciation pattern of the child will probably have difficulty understanding what the child is saying.

A very similar situation occurs when a non-native speaker speaks English. Kenworthy (1987, 13-15) states that it is less difficult to understand a foreign speaker when he comes from the same country as a listener because they share the same mother tongue and are familiar with the specific language features of that language. It is also much easier to understand a foreign speaker if one is used to particular patterns in his/her English accent. These patterns can be individual, but some common features exist for English as a foreign language (EFL) speakers of the same nationality. For example, Spanish speakers tend to add a short vowel sound in front of English words that start with the letter 's' followed by another consonant (e.g., spell, Spanish, study). (Ibid 1987, 17) The Spanish speaker is noticeably more intelligible to the hearer when familiar with this reality.

While the author provides many other sources of unintelligibility, only the potential problems with the placement of stress will be elaborated on in this paper. "If the learner does not stress one syllable more than another, or stresses the wrong syllable, it may be very difficult for the listener to identify the word" (Ibid 1987, 18). Kenworthy (1987, 18) refers to

several experiments where it was discovered that native English speakers expect specific word stress patterns. When the foreigners placed the word stress wrongly, they often misheard the word (even if the sounds of the word were pronounced correctly). One of the examples in the book is the wrong placement of the word stress in the word 'comfortable'. "It was pronounced with the stress on 'com-' and on '-ta-'. The listener heard this as 'come for a table'" (Ibid 1987, 18). The experiments led to a significant finding that the native hearer focused more on the word stress than the sounds themselves (Ibid 1987, 19). With the word comfortable, stress is expected to be only on the first syllable. When the foreign speaker also stresses the third syllable '-ta-', the English speaker supposes it is the beginning of a different word.

John Field (2005, 400) explains another term closely related to intelligibility which is comprehensibility. According to him, some authors consider both terms as synonyms; on the other hand, some distinguish their meanings. Munro and Derwing in Field (2005, 400) judge intelligibility by the listener's capability to recognize and transcribe the individual words of the discourse and comprehensibility by how smoothly the listener can understand the message. Field adds his definition of intelligibility, saying, "it refers to the extent to which the acoustic-phonetic content of the message is recognizable by a listener." (2005, 401)

Lexical stress is often an indicator for the native speaker's ear to identify the word based on their mental lexicon (Field 2005, 418). From the Field's findings, shifting stress to the wrong syllable can mislead the native speaker in identifying words in the utterance of a non-native speaker. The author gives an example of the misplacement of stress in the word "follow". When a non-native speaker stresses the normally unstressed second syllable (e.g., follów), it confuses the native speakers. It leads them to search for words with a stressed

syllable of the same pronunciation, such as "low" or "local". As a result, the wrong stress placement impairs the EFL speaker's intelligibility. (Field 2005, 418)

1.6.1 English as a lingua franca

Many kinds of research have been done on the intelligibility of a non-native speaker with a foreign accent to native speakers of English (Walker 2010, 26). However, it is also valid to investigate the issue from the point of view of English as a Lingua Franca (ELF). It is more than probable that learners of English will not use the English language just for communication with native speakers. It is common to use English in international business meetings between non-English speaking countries or when traveling tourists and locals use English as a common language. At that moment, English serves as a lingua franca, thus "common language for speakers whose mother tongues are different (Walker 2010, 6)."

Robin Walker (2010) elaborates on Jennifer Jenkins' findings on communication between non-native speakers. Jenkins focused on instances when pronunciation errors caused a communication breakdown (Walker 2010, 28). Her findings also included stress placement where the nuclear stress placement belongs to the *Lingua Franca Core*, thus a feature that significantly influences ELF speakers' intelligibility. (Walker 2010, 28) Interestingly, according to Jenkins, word stress, stress-timing, or vowel reduction are considered non-core features in ELF (Walker 2010, 38).

Her findings suggest that pronunciation goals might differ for EFL learners and learners of ELF (Ibid 2010, 38). In other words, English teachers should reconsider if the aim of their students is to be intelligible to a native speaker and thus to learn English as a foreign language; alternatively, if their goal is instead to learn English as a lingua franca, thus for communication between the non-native speakers of English. According to Jenkins, teachers

of ELF should emphasize The Lingua Franca Core items, which she established. (Walker 2010, 5, 28)

1.6.1.1 Nuclear stress placement as a Lingua Franca Core item

According to Jenkins, the wrong placement of nuclear stress is one of the features that disrupt intelligibility in a conversation between non-native speakers. (Walker 2010, 36-37). Walker (2010, 36) explains that when one is speaking English, the words are divided into 'thought groups', or as he calls them, 'word groups'. The speaker usually makes a small pause in between the word groups dividing the message into meaningful units and providing the listener with time to process new information. Moreover, one syllable in the word group is the most prominent, carrying nuclear stress.

Walker (2010, 36) mentions that inappropriate distribution of pauses can cause difficulties in communication; nevertheless, he explains that proper positioning of nuclear stress is crucial for intelligibility in ELF. Jenkins in Walker describes two types of nuclear stresses. Firstly, it is the 'unmarked stress,' which falls "on the last content word in the word group." Secondly, it is the 'contrastive stress' where the speaker moves the nuclear stress to a different word to draw attention to that part of a phrase or sentence (2010, 37). According to Jenkins, making salient a wrong part of the word group confuses the listener and causes breakdowns in intelligibility between non-native speakers (Ibid 2010, 37).

1.6.1.2 Non-core features in ELF

Walker describes several non-core features that, according to Jenkins, are less important for ELF intelligibility. However, only the ones related to stress will be mentioned in this thesis. Firstly, shifting the word stress seldom causes misunderstandings among non-native speakers. Secondly, teaching stress-timing patterns is not relevant for

intelligibility in ELF classrooms. Thirdly, omitting the vowel reduction and weak forms of the words is not considered a problem in communication between non-native speakers if the nuclear stress is placed correctly. (Walker 2010, 39-42) It is important to mention that the vowel reduction and weak forms are not crucial for speakers of ELF to dominate as a productive skill; however, it is reasonable to introduce these features of English to students, so they are able to understand native speakers or very advanced non-native speakers, thus to practice their receptive skills of these instances. (Walker 2010, 42)

1.7 Summary of the literature review

To sum up the main differences between Czech and English stress patterns Table 1 is provided.

	CZECH	**ENGLISH**
Type of word stress	Invariable stress (on the first syllable)	Variable stress (on any syllable - it is lexically designated)
Unstressed syllable qualities	No vowel reduction	Very often, a vowel reduction occurs
The function of word stress	Indicates the beginning of the word	Distinctive function
Differences between stressed and unstressed syllables	Stressed and unstressed syllables do not significantly differ in acoustic properties. (Stressed syllables tend to have a lower pitch, and a slight post-stress rise in pitch occurs.)	Stressed syllables are usually higher in pitch and intensity, moreover, longer in duration.
The function of the stress groups (feet) in sentence stress	Semantic units	Rhythmical units

Table 1: Comparison of Czech and English stress patterns

According to several researchers (Skarnitzl and Rumlová 2019, Andrews in Odlin 1989, Volín and Weingartová 2014), foreign speakers of English may transfer stress patterns from their mother tongue. Thus, when Czech speakers misplace the lexical stress, it is often placed on the first syllable. (Volín and Weingartová 2014, 178) Additionally, it is expected that language transfer occurs when the foreign speaker finds the word or phrase unfamiliar and, consequently, challenging. (Odlin 1989, 134)

Kenworthy (1987, 18) explains that native English speakers anticipate particular word stress patterns in the utterances of other English speakers. This suggests that when a non-native speaker misplaces stress, it may disrupt his intelligibility because the improper stress placement confuses the native speakers. However, according to Jenkins' findings in Walker (2010, 38), wrong word stress placement is not crucial in communication between two non-native speakers; thus, it plays a minor role in intelligibility when using English as a Lingua Franca.

2 Practical part

2.1 The aims of the practical part and the research questions

The aims of the practical part of the thesis are, firstly, to determine whether students acquired correct stress patterns for words that are stressed on other than the first syllable at different stages of their language learning. Secondly, the aim is to find out if Czech pupils and students transfer their mother tongue stress patterns, e.g., when they misplace the lexical stress in words under analysis if they tend to place it on the first syllable. Furthermore, it is examined how the error rate changes according to the age and language proficiency of the respondents. Lastly, it is investigated which types of multisyllabic English words are the most problematic for Czech speakers.

The research questions for this thesis are:

1. Does the number of errors vary with the age and language proficiency of the respondents?

2. Do Czech pupils and students tend to transfer the stress patterns from their mother tongue when reading in English?

3. Which words were found problematic in the auditory analysis?

4. Which acoustic parameters (or a combination of which parameters) serve as the most probable acoustic cue of stressed syllables in English for Czech auditors?

2.2 Methodology

The practical part of the thesis mainly focuses on analyzing the voice recordings of three different age groups. Ten respondents were recorded in each age group. Firstly, ten third graders in primary school; secondly, ten ninth graders in primary school; and lastly, ten university students of English in education in the third year of their undergraduate studies. These three age groups were chosen to cover the absolute beginners of English (level A1 according to the CEFR), intermediates (between levels A2 and B1 according to the CEFR), and advanced speakers that are studying to be English teachers (level C1 according to the CEFR). The research was anonymous, and all ethical questions were settled.

Each respondent was asked to read words in isolation, and respondents from two older age groups additionally read prepared sentences. The sentences were made artificially, and only predetermined words with desired stress patterns were further analyzed. Words are chosen according to each age group's English level (teacher's materials and textbooks were used to select vocabulary that the pupils and students should be familiar with). In addition, a vocabulary of a higher level is included so that respondents do not know the correct stress patterns of all the words. Therefore, in some cases, they have to attempt to make an intelligent guess. The words under analysis have lexical stress on any syllable other than the first one. Respondents are unaware of what feature of their pronunciation is examined and do not know which word from the sentences will be analyzed.

All the audio recordings are recorded on an audio voice recorder on a mobile phone. Since it is recorded in a school environment, it was complicated to find a quiet location; thus, in some cases, the speakers are interrupted by the surrounding sounds. However, this reality does not affect the perceptual analysis of the recordings. For the acoustic analysis of the recordings in Praat, only recordings of higher quality are used.

The analysis of the recordings is done in two stages. Firstly, two Czech auditors do an auditory analysis to decide if the primary stress was placed correctly. For the validation of the results, a shorter version of the verbal protocol is completed by a native speaker of English. Subsequently, the results of the quantitative research are presented. In the second stage of the research, with a certain number of problematic words, acoustic analysis is done in Praat, measuring the pitch, intensity, and duration of stressed syllables.

2.2.1 Verbal protocols

In the first stage of the research, the analysis of the placement of the primary stress in words in isolation and chosen words in the sentences is done. All the recordings are examined by two auditors; the author of the thesis and an English teacher with fifteen years of experience in the field. Each auditor completes verbal protocols while listening to the recordings. When completing the verbal protocol, auditors have three options - 1. Yes - correct primary stress placement, 2. No - primary stress placed on the wrong syllable, 3. I don't know (I am not sure which syllable is primarily stressed by the speaker). Additionally, a native speaker, not experienced in linguistics, completes one protocol analyzing the recordings of two university students with the highest percentage of correct stress placement to validate the results of nonnative auditors, where it is expected that the results of the protocols will match, with a 2-3% margin of errors. The samples of the protocols and the lists of words/sentences for analysis can be found in the appendices.[1]

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[1] The word *television* was excluded from the research and is not included in the results because, according to Cambridge Dictionary online (2023), the primary stress in this word can also occur on the first syllable. Therefore, it is not valid for the investigation since only the words with primary stress on other than the first syllable are analyzed.

2.2.2 Praat analysis

The recordings are examined in the software program for speech analysis called Praat (version 6.3.09, 2023), created by Paul Boersma and David Weenink. According to the theory, it is expected that the stressed syllable in English will be higher in pitch and intensity than the unstressed syllables and longer than the average length of the syllable in a chosen word. (Brinton, Brinton 2010, 64). The pitch is measured in Hertz (Hz), intensity in Decibels (dB), and the length of the syllables in seconds (s).

The Maximum measures of pitch and intensity for the word under analysis are compared to the maximum measures for the syllable under analysis. Additionally, the length of the syllable under analysis is compared to the average length of the syllable. Based on the comparison of previously described variables, it is decided if the syllable under analysis can be perceived as stressed or which acoustic features made the auditor determine the syllable as stressed. If the maximum measures of pitch and intensity for the syllable under analysis equal the maximum measures of pitch or intensity for the word under analysis, in theory, the syllable should be perceived as stressed. Moreover, if the length of the syllable under analysis is longer than the average syllable's length for the word, it suggests that the length of the syllable serves as an indicator of stress.

2.3 Analysis of verbal protocols

2.3.1 Results according to the respondent's age

Age Group 1

Firstly the recordings of ten third graders from a Czech primary school are examined. According to the RVP ZV (2021), English language teaching is compulsory from the third grade in Czech primary schools; thus, the expected language proficiency is the very first level of CEFR, level A1. This age group is chosen to see if the absolute beginners of English had already acquired the correct stress patterns of the words and to see how much they rely on their mother tongue when reading in English. Pupils from this age group were asked to read ten words in isolation with the word stress on other than the first syllable. Some words were chosen directly from the teacher's materials, such as *giraffe* and *eraser*; thus, only a few words that would not have their lexical stress on the first syllable were present. The rest of the words were chosen because they are widespread, and according to Cambridge Dictionary online (2023), they belong to the basic levels of CEFR (A1, A2). The list of the words for the third graders contains: *computer, television, hotel, banana, fantastic, today, apartment, giraffe, eraser, afternoon*. As mentioned in Chapter 2.2.1, the word television must be excluded from the analyses.

The following tables show the results of both auditors for this age group:

Auditor 1	Yes	No	I don't know
Speaker 1	11,11%	66,67%	22,22%
Speaker 2	66,67%	11,11%	22,22%
Speaker 3	66,67%	0,00%	33,33%
Speaker 4	66,67%	0,00%	33,33%
Speaker 5	44,44%	33,33%	22,22%
Speaker 6	66,67%	11,11%	22,22%
Speaker 7	44,44%	22,22%	33,33%
Speaker 8	55,56%	11,11%	33,33%
Speaker 9	55,56%	22,22%	22,22%
Speaker 10	66,67%	11,11%	22,22%

Auditor 2	Yes	No	I don't know
Speaker 1	22,22%	33,33%	44,44%
Speaker 2	66,67%	11,11%	22,22%
Speaker 3	66,67%	0,00%	33,33%
Speaker 4	66,67%	11,11%	22,22%
Speaker 5	66,67%	11,11%	22,22%
Speaker 6	88,89%	0,00%	11,11%
Speaker 7	66,67%	11,11%	22,22%
Speaker 8	55,56%	22,22%	22,22%
Speaker 9	44,44%	33,33%	22,22%
Speaker 10	55,56%	33,33%	11,11%

Table 2: Results of verbal protocol 1 (3.A)   *Table 3: Results of verbal protocol 2 (3.A)*

As shown in Tables 2 and 3, the results of the two auditors differ significantly. Only the percentages for Speaker 2 and Speaker 3 are identical. According to both auditors, speaker 1 had the lowest percentage of correct stress placement. When listening again to the recording of Speaker 1, the respondent reads the English words with the Czech pronunciation. Therefore, cross-linguistic influences are evident. The most significant difference between the results of both auditors is seen in Speaker 5, Speaker 6, and Speaker 7. The reason for such a deviation is partly because the list of the words under analysis is very short (only nine words).

Additionally, in some cases, it was difficult to decide where the primary stress was placed because several respondents tended to rise in pitch at the end of the word. This reality could have two different reasons. Firstly, the speakers were uncertain in their pronunciation, and a rise in pitch could indicate the uncertainty (almost the same pattern as when asking a question). Secondly, it could be because when enumerating a list of items, some people are tempted to raise the pitch at the end of every word to separate the words from each other, almost as if they were trying to suggest a presence of a comma in between the words.

Another phenomenon that recurs in the recordings of respondents with a higher percentage of incorrect stress placement or a higher rate of undecided words (marked as 'I don't know) is that pupils read every syllable with the same emphasis. This usually happens when Czech children learn to read. The same thing happened for some English beginners, reading the words syllable by syllable.

For the latter comparison of the age groups, the final average percentage of every group was made. Firstly, the average of both auditors was made, and subsequently, an average percentage of answers indicated as 'correct', 'incorrect', and 'I don't know' was counted.

	Yes	No	I don't know
Speaker 1	16,67%	50,00%	33,33%
Speaker 2	66,67%	11,11%	22,22%
Speaker 3	66,67%	0,00%	33,33%
Speaker 4	66,67%	5,56%	27,78%
Speaker 5	55,56%	22,22%	22,22%
Speaker 6	77,78%	5,56%	16,67%
Speaker 7	55,56%	16,67%	27,78%
Speaker 8	55,56%	16,67%	27,78%
Speaker 9	50,00%	27,78%	22,22%
Speaker 10	61,11%	22,22%	16,67%

Final results for the 1. age group:	
Yes	57,22%
No	17,78%
I don't know	25,00%

Table 4: Average percentage of both auditors (3.A)   *Table 5: Final results for Age Group 1*

Age Group 2

The ninth graders from a Czech primary school are chosen as a second age group. This age group is selected to investigate to which extent the pupils acquired correct stress patterns at the end of primary education, where the level of proficiency is expected somewhere between levels A2 and B1, according to the CEFR. Ten pupils from this age group were asked to read twenty words in isolation with the word stress on other than the first syllable. The first ten words are the same as for the previous age group (third graders), and ten new words are added. The words in isolation designated for this age group are: *computer, television, hotel, banana, fantastic, today, apartment, giraffe, eraser, afternoon, behavior, permission, important, contestant, electricity, interpretation, unfortunately, produce, communicate, addiction.* The word television is excluded from the experiment.

Subsequently, they continued with reading five artificially made sentences containing eleven words with the word stress on other than the first syllable. Words from the sentences that are analyzed are: *decide, engineer, police, politicians, international, independent, musicians, respect, society, intelligent, proposal.* Respondents did not know that the focus of the study was the correct stress placement, nor did they know which words from the sentences would be examined.

The sentences for the 9th graders (only the underlined words are analyzed):
1. I cannot <u>decide</u> if I want to become an <u>engineer</u> or a <u>police</u> officer.

2. Politicians take part in a lot of international meetings.

3. Independent musicians do not earn much money.

4. It is necessary to respect everyone in our society.

5. You must be intelligent to come up with such a proposal.

The following tables show the results of both auditors for this age group:

Auditor 1	Yes	No	I don't know
Speaker 1	76,67%	16,67%	6,67%
Speaker 2	40,00%	30,00%	30,00%
Speaker 3	80,00%	13,33%	6,67%
Speaker 4	80,00%	13,33%	6,67%
Speaker 5	76,67%	10,00%	13,33%
Speaker 6	43,33%	33,33%	23,33%
Speaker 7	60,00%	23,33%	16,67%
Speaker 8	23,33%	26,67%	50,00%
Speaker 9	36,67%	43,33%	20,00%
Speaker 10	43,33%	30,00%	26,67%

Auditor 2	Yes	No	I don't know
Speaker 1	73,33%	23,33%	3,33%
Speaker 2	40,00%	36,67%	23,33%
Speaker 3	70,00%	26,67%	3,33%
Speaker 4	73,33%	20,00%	6,67%
Speaker 5	76,67%	16,67%	6,67%
Speaker 6	50,00%	33,33%	16,67%
Speaker 7	60,00%	26,67%	13,33%
Speaker 8	26,67%	33,33%	40,00%
Speaker 9	26,67%	46,67%	26,67%
Speaker 10	50,00%	33,33%	16,67%

Table 6: Results of verbal protocol 1 (9.A)   Table 7: Results of verbal protocol 2 (9.A)

The results of this age group of both auditors differ slightly less than in the previous group. The difference is always at most ten percent. The lowest percentage of correct stress placement was received by Speaker 8; at the same time, this speaker has by far the highest rate of the answers marked as 'I don't know' for both auditors. When listening to the recording, this respondent does not know the correct pronunciation of most of the words under analysis. Sometimes, a wrong guess of English pronunciation is made. In other cases, the words are read with Czech pronunciation. Therefore, it was challenging to assess the correct stress placement of this respondent.

	Yes	No	I don't know
Speaker 1	75,00%	20,00%	5,00%
Speaker 2	40,00%	33,33%	26,67%
Speaker 3	75,00%	20,00%	5,00%
Speaker 4	76,67%	16,67%	6,67%
Speaker 5	76,67%	13,33%	10,00%
Speaker 6	46,67%	33,33%	20,00%
Speaker 7	60,00%	25,00%	15,00%
Speaker 8	25,00%	30,00%	45,00%
Speaker 9	31,67%	45,00%	23,33%
Speaker 10	46,67%	31,67%	21,67%

Final results for the 2. age group:	
Yes	55,33%
No	26,83%
I don't know	17,83%

Table 8: average percentage of both auditors (9.A)   Table 9: final results for Age Group 2

Age Group 3

For the last age group, students in the third year of undergraduate studies of English in education are chosen, where their level of English is expected to be at least on level C1 according to CEFR. Ten university students were asked to read twenty words in isolation, five words from each of the previous groups and ten new words: *computer, hotel, giraffe, banana, eraser, electricity, communicate, produce, contestant, interpretation, inexpressible, empathetic, communicative, meteoric, convincingly, benevolent, complicit, questionnaire, incoherent, abnormality.*

Subsequently, each of the students from this age group continued with reading ten artificially made sentences containing twenty-one words with the word stress on other than the first syllable, where eleven of them are identical as for the second age group. Analyzed words from the sentences designated for the oldest age group are: *decide, engineer, police, politicians, international, independent, musicians, respect, society, intelligent, proposal, opportunity, conservatory, development, satisfactory, phonological, transcription, accessibility, available, exports, contaminants.* Respondents did not know that the focus of the study was the correct stress placement, nor did they know which words from the sentences would be examined.

The sentences for the university students (only the underlined words are analyzed):

1. I cannot <u>decide</u> if I want to become an <u>engineer</u> or a <u>police</u> officer.
2. <u>Politicians</u> take part in a lot of <u>international</u> meetings.
3. <u>Independent</u> <u>musicians</u> do not earn much money.
4. It is necessary to <u>respect</u> everyone in our <u>society</u>.
5. You must be <u>intelligent</u> to come up with such a <u>proposal</u>.
6. It's a pity you didn't take the <u>opportunity</u> to study at the <u>conservatory</u>.
7. The <u>development</u> of the factory is <u>satisfactory</u>.
8. Please write the <u>phonological</u> <u>transcription</u>.
9. The <u>accessibility</u> of this document is <u>available</u>.
10. Our country <u>exports</u> only a few products containing chemical <u>contaminants</u>.

The following tables show the results of both auditors for this age group:

Auditor 1	Yes	No	I don't know
Speaker 1	73,17%	26,83%	0,00%
Speaker 2	56,10%	39,02%	4,88%
Speaker 3	97,56%	2,44%	0,00%
Speaker 4	63,41%	24,39%	12,20%
Speaker 5	58,54%	29,27%	12,20%
Speaker 6	56,10%	26,83%	17,07%
Speaker 7	68,29%	24,39%	7,32%
Speaker 8	78,05%	17,07%	4,88%
Speaker 9	63,41%	17,07%	19,51%
Speaker 10	92,68%	7,32%	0,00%

Auditor 2	Yes	No	I don't know
Speaker 1	68,29%	26,83%	4,88%
Speaker 2	60,98%	39,02%	0,00%
Speaker 3	97,56%	2,44%	0,00%
Speaker 4	53,66%	36,59%	9,76%
Speaker 5	65,85%	26,83%	7,32%
Speaker 6	63,41%	31,71%	4,88%
Speaker 7	68,29%	21,95%	9,76%
Speaker 8	75,61%	21,95%	2,44%
Speaker 9	58,54%	36,59%	4,88%
Speaker 10	95,12%	2,44%	2,44%

Table 10: Results of verbal protocol 1 (Uni)   *Table 11: Results of verbal protocol 2 (Uni)*

When comparing the results of both auditors for this age group, the differences between the percentages are slightly less significant than in previous groups. The reason could be that university students were, in most cases, able to guess the pronunciation of segments of the speech correctly, even though they didn't know the word (meaning they did not read the words with Czech pronunciation as it often happened in the previous groups); thus the decision of correctness of the stress placement was facilitated.

	Yes	No	I don't know
Speaker 1	70,73%	26,83%	2,44%
Speaker 2	58,54%	39,02%	2,44%
Speaker 3	97,56%	2,44%	0,00%
Speaker 4	58,54%	30,49%	10,98%
Speaker 5	62,20%	28,05%	9,76%
Speaker 6	59,76%	29,27%	10,98%
Speaker 7	68,29%	23,17%	8,54%
Speaker 8	76,83%	19,51%	3,66%
Speaker 9	60,98%	26,83%	12,20%
Speaker 10	93,90%	4,88%	1,22%

Final results for the 3. age group:	
Yes	70,73%
No	23,05%
I don't know	6,22%

Table 12: Average percentage of both auditors (Uni)   *Table 13: Final results for Age Group 3*

2.3.1.1 Validation of the non-native speakers' protocols

Speaker 3 and Speaker 10 had the highest percentage of correct stress placement, according to both auditors. Recordings of these two speakers were used to validate the results of non-native auditors. A native speaker of English listened to those recordings and completed a shorter version of the original verbal protocol. As shown in Table 14, the results of all three auditors are very similar, noting that the results of correct stress placement match with 2-3% margin of errors. This verification suggests that the results of the protocols of non-native auditors are valid.

Auditor 1	Yes	No	I don't know
Speaker 3	97,56%	2,44%	0,00%
Speaker 10	95,12%	2,44%	2,44%
Auditor 2	Yes	No	I don't know
Speaker 3	97,56%	2,44%	0,00%
Speaker 10	92,68%	7,32%	0,00%
Auditor 3	Yes	No	I don't know
Speaker 3	97,56%	2,44%	0,00%
Speaker 10	95,12%	4,88%	0,00%

Table 14: Validation of the results (Auditor 1 and Auditor 2 are non-native speakers of English, Auditor 3 is a native speaker of English)

2.3.1.2 Comparing the final average results of three age groups
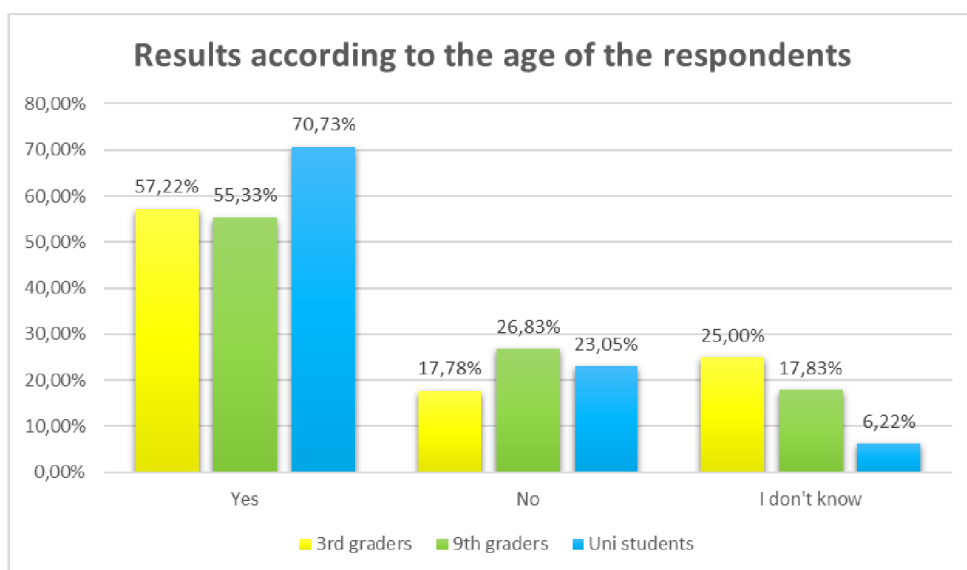
Graph 1: Final results of the verbal protocols

As shown in Graph 1, the oldest age group received the highest percentage of correct stress placement. The rate of proper stress placement in the two younger groups is very similar; interestingly, it is slightly higher in the youngest age group.

The highest percentage of instances perceived as a wrong stress placement is shown in the second group (ninth graders). However, the most significant finding is that the youngest and second youngest groups received a far higher percentage in the instances marked as 'I don't know' than the oldest age group. It is assumed that it is because the younger respondents relied more on language transfer in reading the words and sentences; thus, it made it more problematic to determine the correct stress placement.

From the average results of both auditors, it is evident that the respondents with the highest language proficiency have better results in the correct stress placement than the two younger age groups. It is difficult to determine which age group made the most mistakes because it is unknown why the auditors were not sure about the stress placement of words labeled as 'I don't know'. It could be for various reasons: Firstly, it could be because it was difficult for the auditor to see the difference between the stressed and unstressed syllables from the auditory point of view. Secondly, the decision may have been complicated because the respondent did not recognize the word and tried to read it syllable by syllable, which makes the stress placement questionable. Many other reasons could make the auditor uncertain about the stress placement in words under analysis.

2.3.2 Results according to the words under analysis

2.3.2.1 Incorrectly stressed words in at least two age groups

Firstly, five words that all of the respondents read in isolation are examined. These included: *computer, giraffe, hotel, banana, and eraser*. From the results of both auditors, it is evident that the word *hotel* was the most problematic. It has the lowest percentage of cases perceived as correct and, simultaneously, the highest rate of cases perceived as incorrect.

Interestingly, the identical written form of the word *hotel* exists in Czech, but it is stressed on the first syllable, whereas in English, the second one is stressed. When listening to the recordings again, it was found that speakers from the youngest age group shifted the stress to the first syllable. However, in the older age groups, when speakers stressed the word *hotel* incorrectly, they also tended to reduce the vowel in the second syllable, which made the word even more unintelligible for native speakers of English.

Auditor 1	Yes	No	I don't know
computer	83,33%	6,67%	10,00%
giraffe	90,00%	10,00%	0,00%
hotel	50,00%	43,33%	6,67%
banana	80,00%	20,00%	0,00%
eraser	73,33%	13,33%	13,33%

Auditor 2	Yes	No	I don't know
computer	86,67%	13,33%	0,00%
giraffe	93,33%	6,67%	0,00%
hotel	50,00%	46,67%	3,33%
banana	83,33%	16,67%	0,00%
eraser	73,33%	13,33%	13,33%

Table 15: Words in isolation destined for all age groups (Auditor 1)

Table 16: Words in isolation destined for all age groups (Auditor 2)

Secondly, five words read in isolation by two older age groups were analyzed, i.e., *electricity, communicate, contestant, and interpretation*. As shown in the tables, the lowest percentage of correct stress placement and the highest error rate has the word *communicate*.

Auditor 1	Yes	No	I don't know
electricity	80,00%	0,00%	20,00%
communicate	45,00%	55,00%	0,00%
produce	80,00%	10,00%	10,00%
contestant	60,00%	15,00%	25,00%
interpretation	70,00%	5,00%	25,00%

Auditor 2	Yes	No	I don't know
electricity	75,00%	5,00%	20,00%
communicate	50,00%	50,00%	0,00%
produce	90,00%	5,00%	5,00%
contestant	65,00%	25,00%	10,00%
interpretation	75,00%	10,00%	15,00%

Table 17: Words in isolation destined for two older age groups (Auditor 1)

Table 18: Words in isolation destined for two older age groups (Auditor 2)

Lastly, ten words from the sentence were common for both older age groups; thus, the percentage of correct stress placement of these words can be counted from both of these groups. These words are: *decide, engineer, police, politicians, international, independent, musicians, respect, society, intelligent, proposal.* When comparing the results of both auditors, it seems that the word *respect* is the most problematic for the respondents, where the stress placement was marked in only 40 % of cases as correct, 55 % as incorrect, and 5 % as uncertain, for both auditors. Moreover, the words *engineer* and *international* were often perceived as incorrectly stressed.

Auditor 1	Yes	No	I don't know
decide	85,00%	5,00%	10,00%
engineer	25,00%	50,00%	25,00%
police	50,00%	35,00%	15,00%
politicians	65,00%	20,00%	15,00%
international	40,00%	40,00%	20,00%
independent	65,00%	10,00%	25,00%
musicians	60,00%	35,00%	5,00%
respect	40,00%	55,00%	5,00%
society	70,00%	0,00%	30,00%
intelligent	75,00%	15,00%	10,00%
proposal	75,00%	0,00%	25,00%

Table 19: Words from the sentences destined for two older age groups (Auditor 1)

Auditor 2	Yes	No	I don't know
decide	85,00%	5,00%	10,00%
engineer	45,00%	45,00%	10,00%
police	85,00%	15,00%	0,00%
politicians	55,00%	25,00%	20,00%
international	40,00%	45,00%	15,00%
independent	45,00%	40,00%	15,00%
musicians	60,00%	25,00%	15,00%
respect	40,00%	55,00%	5,00%
society	75,00%	0,00%	25,00%
intelligent	55,00%	35,00%	10,00%
proposal	70,00%	5,00%	25,00%

Table 20: Words from the sentences destined for two older age groups (Auditor 2)

To summarize, both auditors agreed that respondents from all age groups made the most stress placement errors in the word *hotel*. Auditor 1 indicated 43,33 % of cases; Auditor 2 indicated 46,67 %. On average, auditors perceived the word **hotel** as incorrectly stressed in **45 %** of the cases, counted from the results of all respondents from all age groups.

From the words destined for two older age groups, auditors concur that the most incorrectly stressed word was *communicate*. Auditor's 1 results show 55 %, and Auditor 2 shows 50 %. On average, auditors perceived the word ***communicate*** as incorrectly stressed in **52,5 %** of cases, counted from the results of all respondents from two older age groups.

In the sentences destined for two older age groups, there are three words under analysis with a high percentage perceived as incorrectly stressed by both auditors. Firstly, the

word *respect*, where the auditors think it was incorrectly stressed in **55 %** of cases; secondly, the word *engineer* with an average result of **47, 5 %** and lastly, the word *international* with **42,5 %**.

2.3.2.2 Incorrectly stressed words in individual groups

Apart from making an average error rate of the common words for at least two age groups, words destined just for one specific group were examined. From the results of the verbal protocols, the most problematic stress placement for the group of ninth graders, in addition to the words from the previous chapter (Chap. 2.3.2.1), showed the words: *afternoon* with an average error rate of **55 %,** and *permission* with the error rate of **45 %**, counted from the results of all respondents from the group of ninth graders.

The most problematic words for the group of university students, in addition to the words from the previous chapter (Chap. 2.3.2.1), were the words: *conservatory*, with an average error rate of both auditors of **70 %,** *complicit* with an average error rate of **65 %**, *development* with an average error rate of **60 %**, *phonological* with an average error rate of **60 %**, and *meteoric* with an average error rate of **60 %,** counted from the results of all respondents from the group of university students.

2.4 Analysis of problematic words in Praat

The analysis in Praat is divided into two main chapters, wherein the first one (Chap. 2.4.1), words indicated by both auditors as incorrectly stressed are examined. In the second chapter (Chap. 2.4.2), the words in which the auditors disagreed on the stress placement are examined.

2.4.1 Words indicated by both auditors as incorrectly stressed

One of the research objectives is to determine whether Czech pupils and students tend to transfer stress patterns from their mother tongue when reading in English. Only words with the highest rate of instances perceived as incorrect are examined for this matter. These words, previously bolded in chapter 2.3.2.1, are: *hotel, communicate, engineer, international, respect.* Additionally, the word *musicians* was added to the sample of examined words in this chapter because it also has quite a high percentage of answers marked as incorrectly stressed.

The word *hotel* was found problematic for all three age groups. The rest of the words were problematic for the ninth graders and the university students. For each word, it was counted how many instances of incorrect stress placement were present (only the instances where both auditors marked it as incorrect). It is for *hotel* (12 instances out of a total of 30), for *communicate* (11 instances out of a total of 20), for *engineer* (7 instances out of a total of 20), for *international* (7 instances out of a total of 20), for *respect* (9 instances out of a total of 20), and for *musicians* (5 instances out of a total of 20).

In total, 51 instances marked as incorrect by both auditors were examined one more time by Auditor 1, deciding if the stress was incorrectly placed on the first syllable or another incorrect syllable was stressed. Auditor 1 had three options when completing the verbal protocol: 1. Stress was incorrectly put on the first syllable, 2. Stress was incorrectly put on other than the first syllable, 3. I cannot decide which syllable was stressed just by auditory analysis. In the cases where the auditor was not able to indicate the most prominent syllable, acoustic analysis is performed.

|	First Syllable	Other syllable	I cannot decide
hotel	83,33%	0,00%	16,67%
communicate	0,00%	72,73%	27,27%
engineer	85,71%	0,00%	14,29%
international	85,71%	14,29%	0,00%
musicians	60,00%	0,00%	40,00%
respect	44,44%	0,00%	55,56%
final average:	59,87%	14,50%	25,63%

Table 21: Results of perceptual analysis of incorrectly stressed words

As shown in Table 21, most of the words were perceived as stressed on the first syllable, even though it is not the correct stress placement for these English words. The results suggest that the words *hotel, engineer, international,* and *musicians* show language transfer of Czech stress patterns because respondents tended to stress the first syllable. In total, in 59,87 % of cases, stress was incorrectly shifted onto the first syllable. Words *communicate* and *respect* deviate from the rest of the results significantly; for that reason, they are further analyzed later in this chapter.

COMMUNICATE

The word *communicate* has the highest percentage where the primary stress was placed incorrectly but not on the first syllable. In most cases, it was perceived as stressed on the last syllable ('cate'), where secondary stress occurs, according to Cambridge Dictionary online (2023). One of the cases (Speaker 2, from the group of university students) is worth the examination because when listening to the word's pronunciation again, it sounds like it was stressed on the second syllable (where it is correct) but also on the last syllable ('cate'). It is further analyzed in Praat to see why both auditors marked it as an incorrect stressed placement.

1. **Speaker 2, from the group of university students.** (Both auditors marked it as incorrectly stressed)
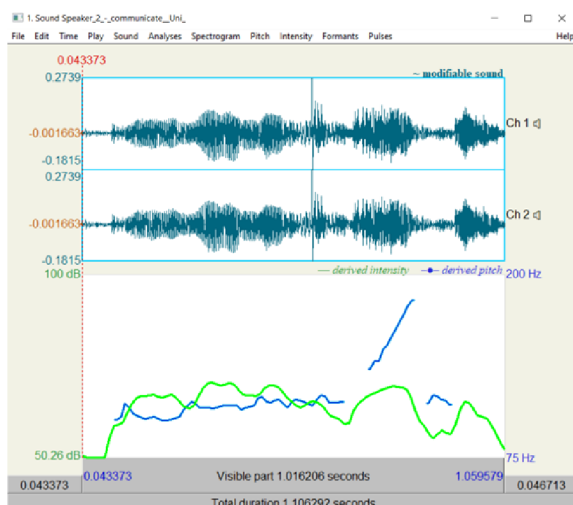
Picture 1: Speaker 2 (Uni) – The Acoustic protocol of the word communicate

	Maximum measure for the second syllable /mju:/	The Maximum measure for the word under analysis
Pitch (Hz)	113.0813	182.3570
Intensity (dB)	70.5911	70.5911
	Length of the syllable under analysis	The average length of the syllable for the word under analysis
Length (s)	0,287132	0,2540515

Table 22: Speaker 2 (Uni) – syllable /mju:/

	Maximum measure for fourth syllable /keɪt/	The Maximum measure for the word under analysis
Pitch (Hz)	182.3570	182.3570
Intensity (dB)	69.4739	70.5911
	Length of the syllable under analysis	The average length of the syllable for the word under analysis
Length (s)	0,476103	0,2540515

Table 23: Speaker 2 (Uni) – syllable /keɪt/

From the acoustic analysis of Speaker 2, from the group of university students, it can be seen that the most intensity was put on the second syllable. However, on the last (fourth) syllable, there is a significant rise in pitch, and it is almost twice as much longer than the average length of the syllable for the word. Based on the results, it can be stated that the auditors decided the word was incorrectly stressed because the last syllable showed two out of three acoustic features of stress, thus the change of pitch and longer duration of the syllable. Interestingly, the most intensity was put on the second syllable, which normally carries the primary stress of this word.
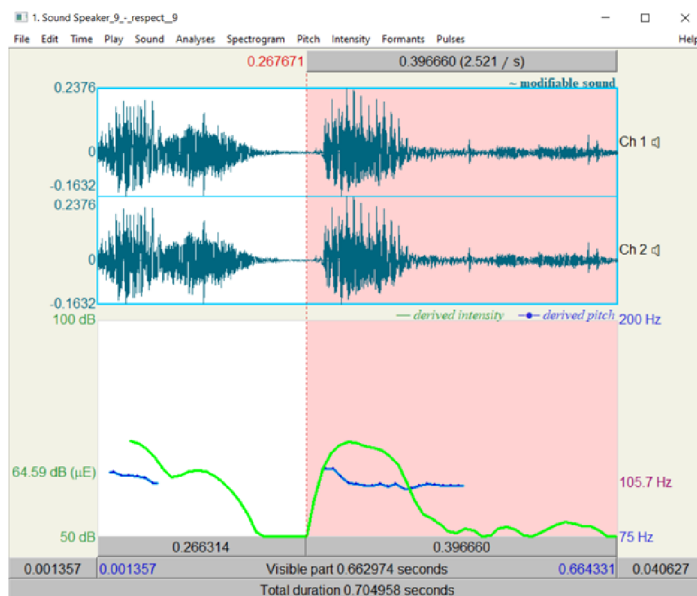
RESPECT

In the word *respect*, there is a high percentage of cases where it is difficult for Auditor 1 to decide where the stress was placed (shown in Table 21). One of the reasons could be that the speakers do not make a significant difference in the realization of stressed

and unstressed syllables. According to Skarnizl and Eriksson's research (2017, 3224), unstressed syllables in Czech do not show noticeably higher values in acoustic features than stressed ones. Three cases of acoustic implementation of the word *respect* are analyzed to see if Czech speakers make a prominent difference between the syllables or if the language transfer of Czech acoustic features of stress occurs.

Since the word *respect* has only two syllables, the higher maximum measure of the pitch and intensity for the syllable indicates the maximum measures for the word. Same for the duration, the longer syllable in a disyllabic word indicates the above-average length of the syllable for the word under analysis.

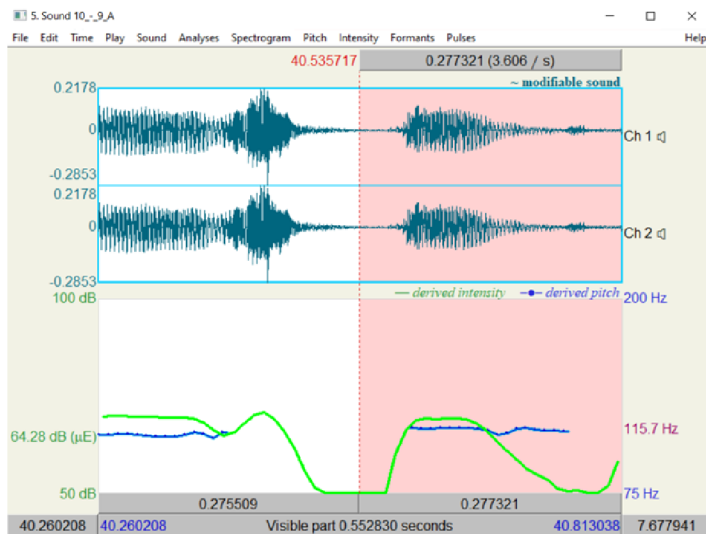## 1. Speaker 9 from the group of ninth graders

Picture 2: Speaker 9 (9.A) – The Acoustic protocol of the word respect

Speaker 9 – 9th grade		
	RES	PECT
Max. M. in pitch (Hz)	112,0289	114,0087
Max. M. in intensity (dB)	72,01488	71,8985
Duration of the syllable (s)	0,266314	0,396660

Table 24: Speaker 9 (9.A) – respect
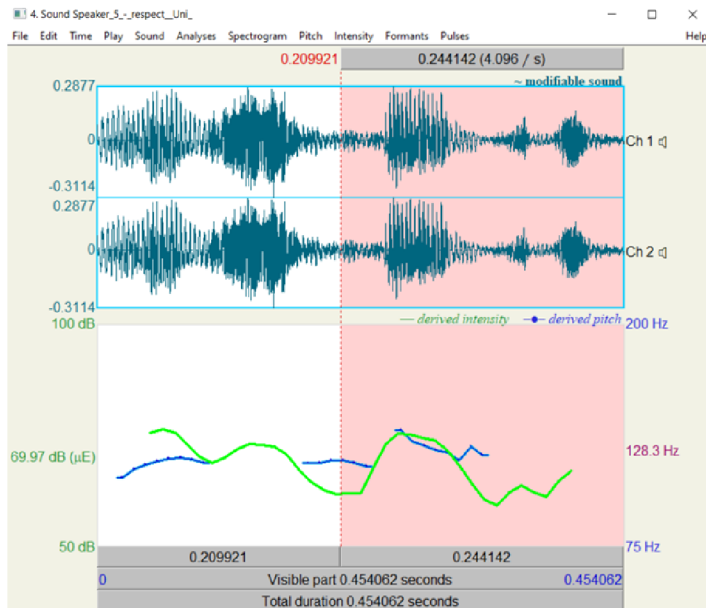
2. Speaker 10 from the group of ninth graders

Picture 3: Speaker 10 (9.A) – The Acoustic protocol of the word respect

Speaker 10 – 9th grade		
	RES	PECT
Max. M. in pitch (Hz)	113,94	117,125
Max. M. in intensity (dB)	70,749	69,211
Duration of the syllable (ms)	0,275509	0,277321

Table 25: Speaker 10 (9.A) - respect

3. Speaker 5 from the group of university students

Picture 4: Speaker 5 (Uni) – The Acoustic protocol of the word respect

| Speaker 5 – Uni student		
	RES	PECT
Max. M. in pitch (Hz)	125,0163	140,3773
Max. M. in intensity (dB)	76,3930	75,6257
Duration of the syllable (s)	0,209921	0,244142

Table 26: Speaker 5 (Uni) – respect

In all three cases, in which it was difficult for Auditor 1 to decide which syllable was the most prominent in the word *respect,* more intensity was put on the first syllable, and the second syllable was higher in pitch and longer than the first one. As shown in Pictures 2,3 and 4 from Praat and Tables 24, 25 and 26, the differences between the stressed and unstressed syllables are mostly insignificant.

Comparison with the native speakers:

For the matter of comparison, two cases of acoustic implementation of the word *respect* by native speakers are analyzed.
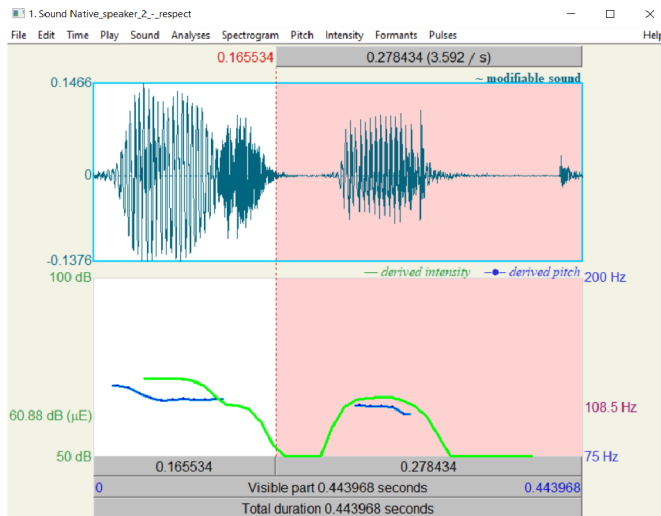
1. **Native speaker 1**
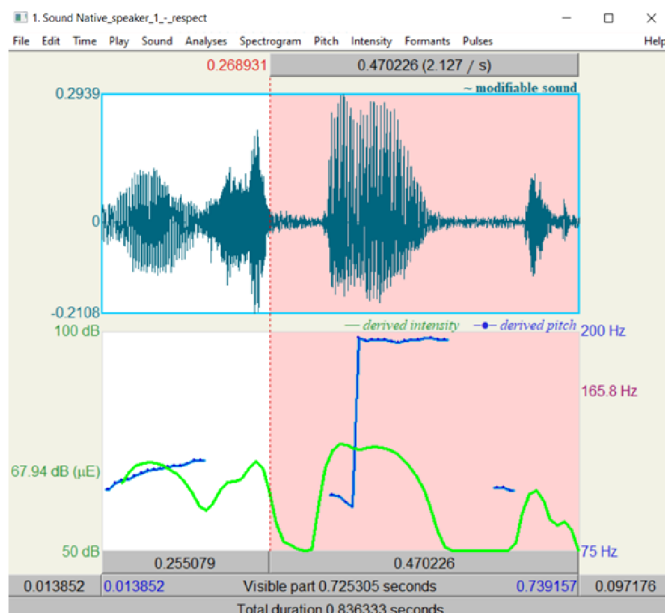
Picture 5: Native speaker 1 - The Acoustic protocol of the word respect

Native speaker 1		
	RES	PECT
Max. M. in pitch (Hz)	126,6518	207,8733
Max. M. in intensity (dB)	70,3982	74,4630
Duration of the syllable (s)	0,255079	0,470226

Table 27: Native speaker 1 – respect

2. Native speaker 2

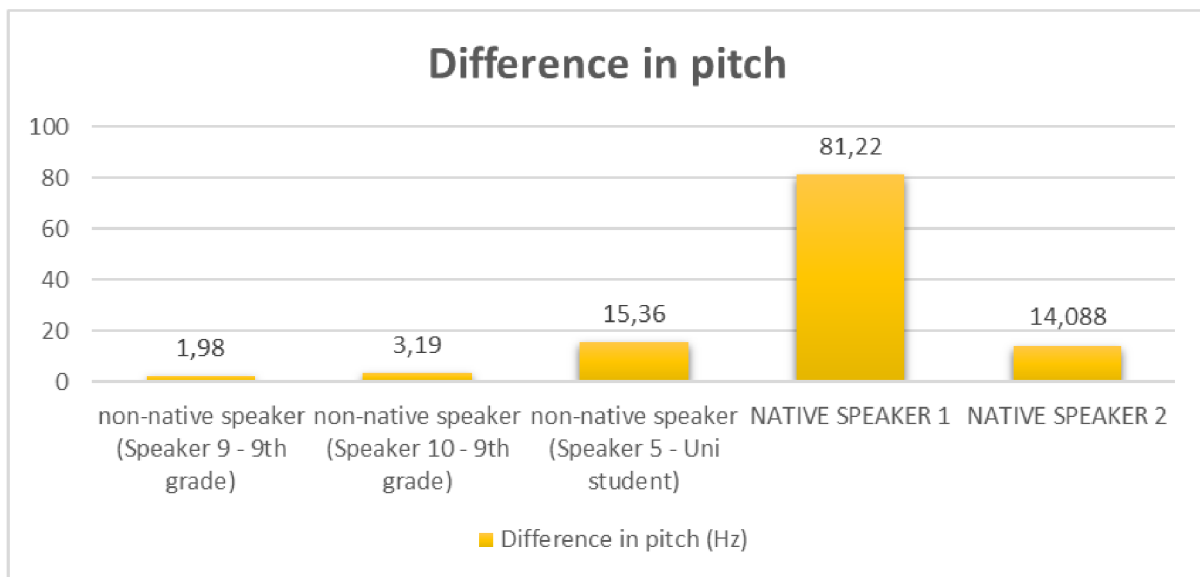*Picture 6: Native speaker 2 - The Acoustic protocol of the word respect*

Native speaker 2		
	RES	PECT
Max. M. in pitch (Hz)	124,3785	110,2905
Max. M. in intensity (dB)	71,6601	66,4489
Duration of the syllable (s)	0,166664	0,253001

Table 28: Native speaker 2 – respect

As shown in Table 28, Native speaker 2 did not make the second syllable more prominent in terms of pitch and intensity in connected speech. The syllable prescribed as primarily stressed was only made longer. As shown in Table 26, Native speaker 1 made the second syllable more prominent in pitch, intensity, and duration.

For the matter of seeing the difference between the two maximum measures of each syllable, it was ignored which syllable was stressed because, except for Native speaker 1, it

cannot be clearly indicated for any other speaker. Instead, it is only examined how much difference there is between the maximum measure of the first syllable and the maximum measure of the second syllable in pitch and intensity. In addition, the difference in the length of the syllable is counted. The following graphs show the differences in pitch, intensity, and duration of both non-native and native speakers.

Difference in pitch

	Difference in pitch (Hz)
non-native speaker (Speaker 9 - 9th grade)	1,98
non-native speaker (Speaker 10 - 9th grade)	3,19
non-native speaker (Speaker 5 - Uni student)	15,36
NATIVE SPEAKER 1	81,22
NATIVE SPEAKER 2	14,088

Graph 2: Difference between the two maximum measures of pitch (for the word 'respect')

Difference in intensity

	Difference in intensity (dB)
non-native speaker (Speaker 9 - 9th grade)	0,12
non-native speaker (Speaker 10 - 9th grade)	1,54
non-native speaker (Speaker 5 - Uni student)	0,77
NATIVE SPEAKER 1	4,06
NATIVE SPEAKER 2	5,21
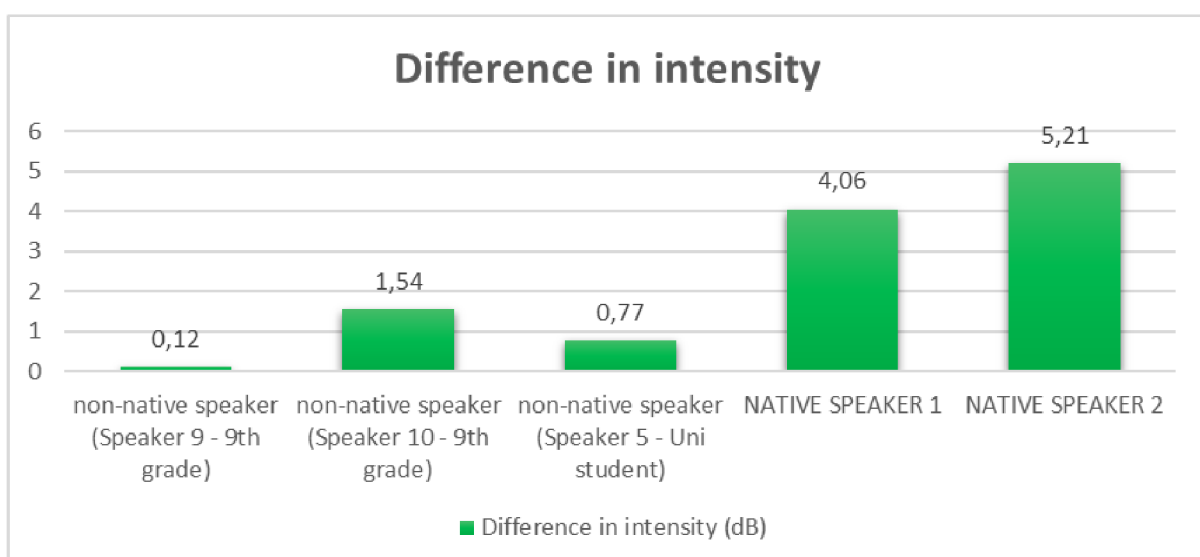
Graph 3: Difference between the two maximum measures of intensity (for the word 'respect')
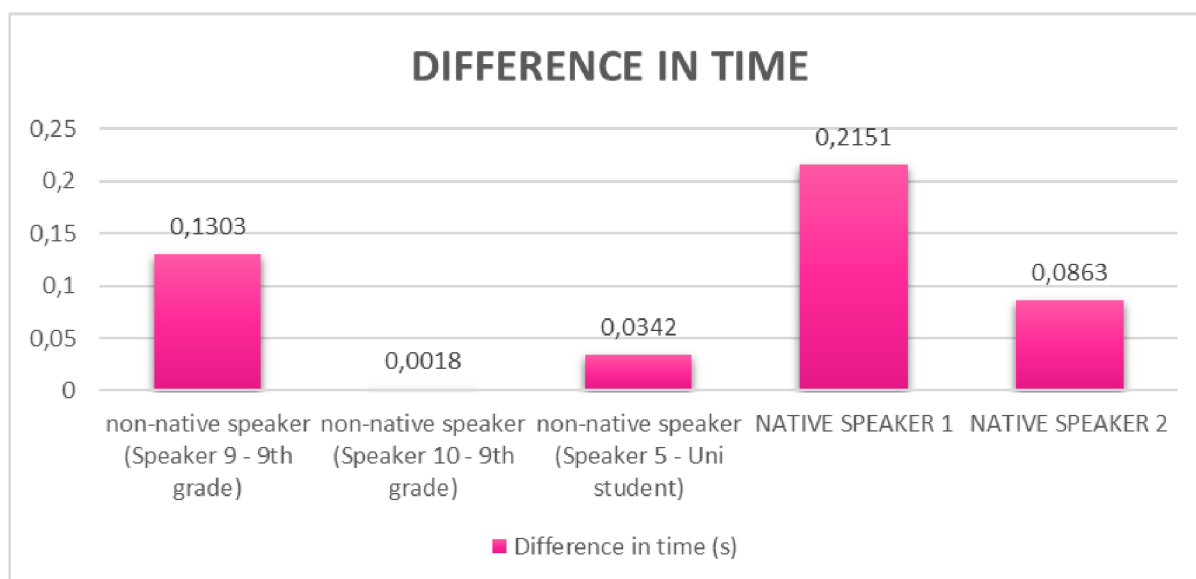
Graph 4: Difference between the duration of the syllables (for the word 'respect')

As shown in Graphs 2, 3 and 4, Native speaker 1 made a more significant difference in all three acoustic features under analysis than all the non-native speakers. Native speaker 2 showed the highest distinction in intensity among all five speakers analyzed in the graphs. A visible difference between native and non-native speakers is displayed in intensity. For both native speakers, the difference between the maximum intensity measures of two syllables is higher than for the non-native speakers. The average difference in intensity for the native speakers is 4,635 dB, and for the non-native speakers, it is only 0,81 dB. The average difference in pitch for the native speakers is 47.654 Hz, and for the non-natives, it is 6.843 Hz. The average difference in time for the native speakers is 0.151 s, and for the non-native speakers, it is 0.055 s.

From the average differences, it is evident that native speakers of English make more significant differences in the acoustic features of the first and second syllables (in the word *respect)* than Czech speakers of English. However, from this sample of analyzed words, it cannot be stated that the Czech speakers of English make less difference between the stressed and unstressed syllables than the native speakers of English because, in many instances, it is not evident which syllable was stressed.

## 2.4.2 Words in which the auditors disagreed on the stress placement

As seen in Tables 19 and 20, for the words *police, independent,* and *intelligent,* a more significant deviation is shown when comparing the percentages of Auditor 1 and Auditor 2. The word *police* will be further analyzed in Praat to investigate by which of the acoustic features each auditor judged the syllable as stressed or unstressed.

POLICE

The correct stress placement in the word *police* was found questionable because the following word is *officer*. When looking at the stress pattern of those two words, theoretically, two primary stresses stand next to each other if the words are seen as independent units. In that case, according to Giegerich (1992, 277), 'stress reversal' should occur to avoid two stressed syllables standing side by side. Meaning that the first syllable of the word *police* would be stressed, and the first syllable of the *office* would be stressed. However, according to Cambridge Dictionary online (2023), the phrase is pronounced as /pəˈliːs ˌɒf.ɪ.sər/. Meaning that only the word *police* carries the primary stress on the second syllable, and the word *officer* carries the secondary stress.

Two recordings of native speakers were examined to see how native speakers stressed this phrase when reading the sentence (I cannot decide if I want to become an engineer or a police officer.), thus if the primary stress was put on the second syllable in the word *police*.
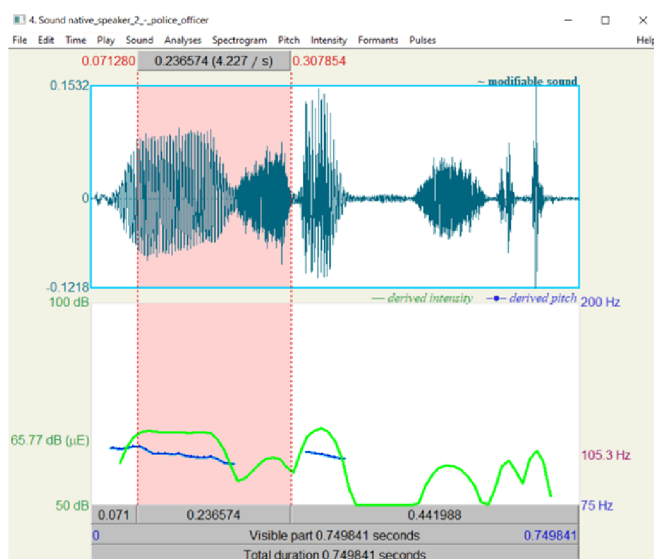
1. Native speaker 1
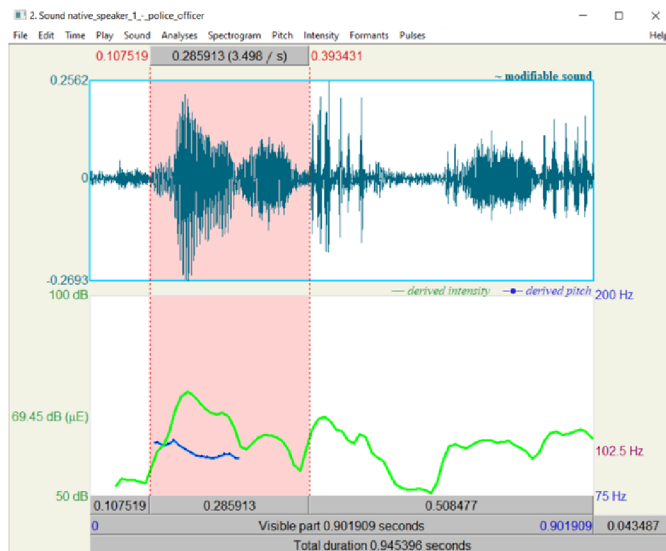
Picture 7: Native speaker 1 – The Acoustic protocol of the phrase police officer

	The maximum measure for the syllable under analysis	The Maximum measure for the phrase under analysis
Pitch	109.5862	109.5862
Intensity	75.9997	75.9997
	Length of the syllable under analysis	The average length of the syllable for the phrase under analysis[2]
Length	0.285913	0.1803818

Table 29: Native speaker 1 - syllable /ˈliːs/

2. Native speaker 2

Picture 8: Native speaker 2 – The Acoustic protocol of the phrase police officer

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[2] Total length of the phrase divided by the number of syllables.

|	The maximum measure for the syllable under analysis	The Maximum measure for the phrase under analysis
Pitch	111.1803	11.1803
Intensity	68.2796	68.9191
	Length of the syllable under analysis	The average length of the syllable for the phrase under analysis
Length	0.236574	0.1499682

Table 30: Native speaker 2 – syllable /ˈliːs/

For both native speakers, it can be said that they made the second syllable in the word *police* the most prominent of the whole phrase. Native speaker 1 shows the highest numbers for all three acoustic features. Native speaker 2 made the syllable longer than the average and showed the maximum measure for pitch; the only exception is the measure of intensity, where the highest measure of intensity for Native speaker 2 was shown on the first syllable of the word *officer*. It was proven that native speakers stress the second syllable in the word police in a given context; thus, the 'stress reversal' does not occur.

From the acoustic analysis of native speakers shown in Picture 7 and Picture 8, it is supposed that the correct stress placement in the word police (in the context of the sentences under analysis) is on the second syllable. In the verbal protocols, there are cases where Auditor 1 and Auditor 2 perceived the stress in the word *police* exactly the opposite (one of them marked it as correct and one of them as incorrect). This situation has occurred four times in total, and all of them are examined in Praat to see by which acoustic parameters both auditors judged the stress placement of the word.

Since the word *police* has only two syllables, the higher maximum measure of pitch and intensity for the syllable indicates the maximum measures for the word. Same for the duration, the longer syllable in a disyllabic word indicates the above-average length of the syllable for the word under analysis.

1. **Speaker 6 from the group of ninth graders** (Auditor 1 thinks the stress was placed incorrectly, Auditor 2 thinks the word is stressed correctly)
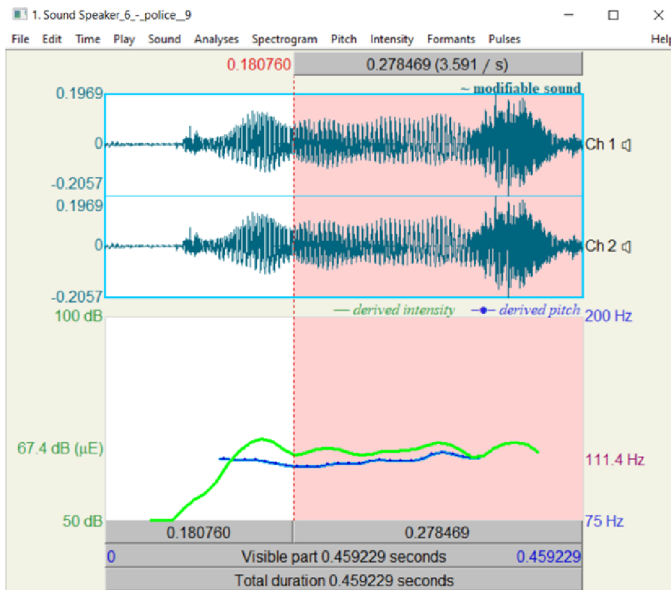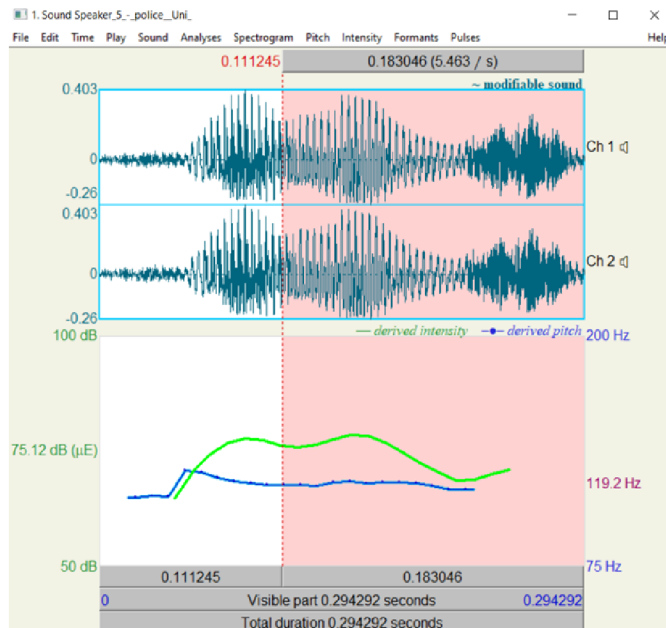

Picture 9: Speaker 6 (9.A) – The Acoustic protocol of the word police

Speaker 6 – 9th grade		
	PO	LICE
Max. M. in pitch (Hz)	112.4968	116.3230
Max. M. in intensity (dB)	69.8343	69.1235
Duration of the syllable (s)	0,180760	0,278469

Table 31: Speaker 6 (9.A) – police

Speaker 6, from the group of ninth graders, put the most intensity on the first syllable; however, the difference in intensity between the two syllables is minimal. The second syllable is longer and higher in pitch. Just by the auditory analysis, it was decided by Auditor 1 that the first syllable was stressed. According to the acoustic analysis, Auditor 1 judged the correctness of stress placement by intensity. On the other hand, Auditor 2 judged by the duration of the syllable and the rise in pitch, marking the word as correctly stressed in the verbal protocol.

2. **Speaker 5 from the group of university students.** (Auditor 1 thinks the stress was placed incorrectly, Auditor 2 thinks the word is stressed correctly)

Picture 10: Speaker 5 (Uni) - The Acoustic protocol of the word police

Speaker 5 – Uni student		
	PO	LICE
Max. M. in pitch (Hz)	128.3724	121.0316
Max. M. in intensity (dB)	77.8361	78.5615
Duration of the syllable (s)	0,111245	0,183046

Table 32: Speaker 5 (Uni) – police

Speaker 5, from the group of university students, put the most intensity on the second syllable and made it longer. The first syllable is higher in pitch. From the acoustic analysis, it can be stated that Auditor 1 judged by the raise of pitch (marking the stress placement as incorrect), and Auditor 2 judged by the intensity and the duration of the syllable, marking that the second syllable received the primary stress.

3. **Speaker 7 from the group of university students.** (Auditor 1 thinks the stress was placed incorrectly, Auditor 2 thinks the word is stressed correctly)
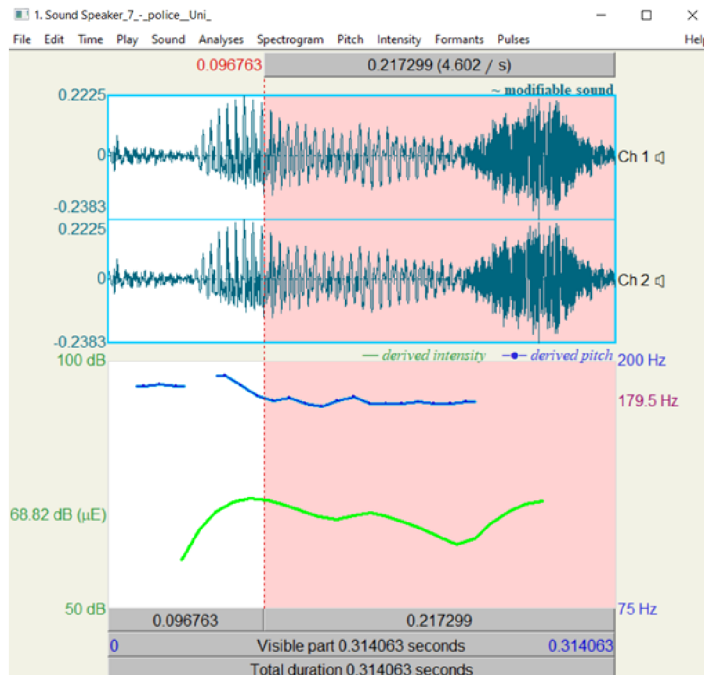

Picture 11: Speaker 7 (Uni) - The Acoustic protocol of the word police

Speaker 7 – Uni student		
	PO	LICE
Max. M. in pitch (Hz)	192.7066	182.1771
Max. M. in intensity (dB)	72.3058	71.9624
Duration of the syllable (s)	0,096763	0,217299

Table 33: Speaker 7 (Uni) – police

Speaker 7, from the group of university students, put the most intensity on the first syllable, and the highest pitch measure was measured for the same syllable. The second syllable was made longer. It seems like higher intensity and higher pitch in the first syllable made Auditor 1 decide the word was stressed incorrectly. Auditor 2, judging just by the syllable's duration, marked the stress placement as correct.

4. **Speaker 8 from the group of university students** (Auditor 1 thinks the stress was placed incorrectly, Auditor 2 thinks the word is stressed correctly)
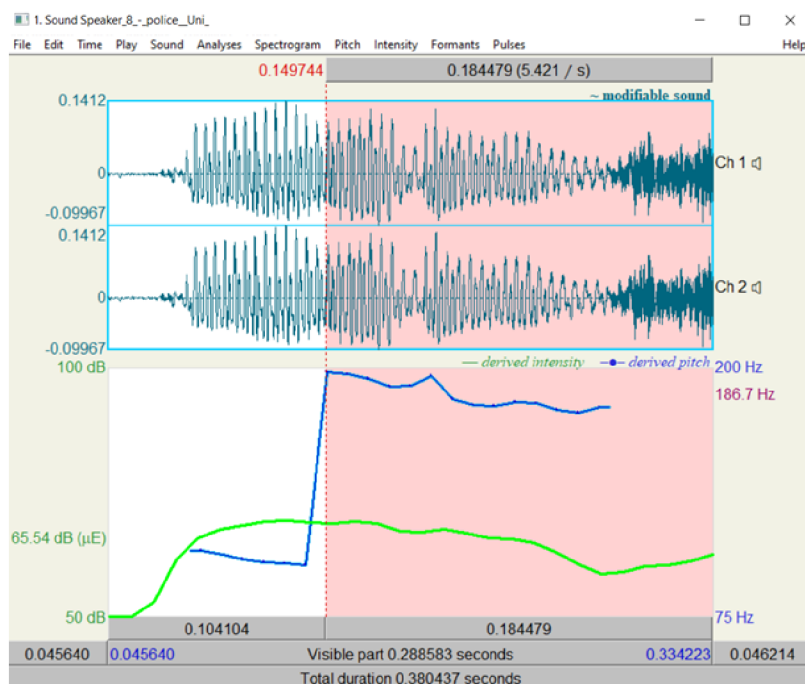

Picture 12: Speaker 8 (Uni) - The Acoustic protocol of the word police

Speaker 8 – Uni student		
	PO	LICE
Max. M. in pitch (Hz)	196.2081	209.8785
Max. M. in intensity (dB)	69.4285	69.1567
Duration of the syllable (s)	0,104104	0,184479

Table 34: Speaker 8 (Uni) – police

Speaker 8, from the group of university students, put more intensity on the first syllable; however, the difference in intensity between the syllables is insignificant. The second syllable is longer and higher in pitch. Auditor 1, judging by the intensity, marked the word as incorrectly stressed. Auditor 2, judging by the duration and rise in pitch, believed the word was stressed correctly on the second syllable.

As shown in Pictures 9, 10, 11 and 12, and Tables 31, 32, 33 and 34, in these four cases of pronunciation of the word *police*, the second syllable that should be stressed according to the rules never included all three expected acoustic features. Meaning it was

never higher in pitch, in intensity, and at the same time longer than the unstressed syllable. That could be the reason why the auditors did not agree on the stress placement in these cases. Each of them probably judged by different acoustic cues. It seems like Auditor 1 judged mainly by the intensity, except for the second case (Speaker 5 from the group of university students). On the other hand, according to the results, Auditor 2 judged mainly by the duration of the syllable and, in some cases, by the rise in pitch.

2.5 Discussion

The discussion part of the thesis deals with answering all the research questions set at the beginning of the practical part of the thesis.

The first research question aims to find out how the number of errors varies with the age and language proficiency of the respondents. The youngest age group of pupils in the third grade (between 7 and 8 years old) is expected to have the lowest language proficiency; thus, as absolute beginners, their level of English is A1, according to the CEFR. The second youngest age group of pupils in the ninth graders (between 15 and 16 years old) is expected to have higher language proficiency as they are learning English for a minimum of 7 years during their primary school studies. It is anticipated that their level of English is between A2 and B1, according to the CEFR. The oldest age group of university students in the third year of undergraduate studies (between 21 and 23 years old) is expected to have the highest language proficiency, reaching at least the C1 level, according to the CEFR.

According to the final average results from the verbal protocols of both auditors (as shown in Graph 1), it is evident that the oldest age group of university students has the highest rate of correct stress placement, in total 70,73 % of the cases marked as correctly stressed. The two younger age groups have very similar average rates of correct stress

placement; the youngest group, with 57,22 %, has even a slightly higher percentage than the middle age group, with 55,33 %.

It cannot be clearly determined which group made the most mistakes in placing the lexical stress because auditors had another option to choose from, indicating 'I don't know'. There could be several reasons leading the auditors to choose this option; for example, they could not decide which syllable was stressed just by the auditory analysis, or the respondent did not read the word properly; thus, it made it impossible to identify the primary stressed syllable. When not considering this fact, the highest rate of incorrect stress placement shows the second age group (pupils from the ninth grade) with 26,83 %. The error rate for university students totals 23,05 %, and for the third graders, it is 17,78 %.

Lastly, the youngest age group shows the highest rate of answers marked as 'I don't know', with 25,00 % of cases. The group of ninth graders shows 17,83 %, and the group of university students shows 6,22 %. It was found that two younger age groups have a significantly higher percentage of cases where auditors could not decide which syllable was stressed in English because the younger respondents relied more on the language transfer of Czech pronunciation. In addition, it often happened that an unfamiliar word was read syllable by syllable, which made it challenging to indicate which syllable carries the primary stress. On the other hand, university students have a low rate of cases where auditors could not decide, probably because they were able to guess the pronunciation of the sounds in English and did not read the words with Czech pronunciation.

The second research question aims to verify whether Czech pupils and students tend to transfer the stress patterns from their mother tongue when reading in English. For this matter, an auditory analysis of words that received the highest rate of incorrect stress placement was performed to determine if the stress was placed on the first syllable, as it is natural for Czech speakers, or if another syllable was wrongly stressed. For the possibility of

comparison, only the words common to at least two age groups were examined, which are: *hotel, communicate, engineer, international, musicians*, and *respect*. It was found that in 59,87 % of the wrongly stressed instances, the stress was shifted on the first syllable. In 14,50 %, the stress was wrongly shifted on another syllable than the first one, and in 25,63 %, it was difficult for the auditor to decide just from the perceptual point of view which syllable is the most prominent. These results, shown in Table 21, suggest that Czech pupils and students tend to shift the stress onto the first syllable when they do not know the correct placement of stress in an English word.

The third research question asks which words were found problematic in the auditory analysis. This question can be answered from two different points of view. Firstly, which words were the most problematic for the respondents, thus having a high percentage of incorrect stress placement? Secondly, which words were found problematic for the auditors to determine the most prominent syllable? The words with the highest rate of wrong stress placement, common to at least two age groups, as previously mentioned, were: *hotel, communicate, engineer, international, musicians,* and *respect*. Additionally, words found challenging by the ninth graders regarding stress placement were *afternoon* and *permission*. The university students had the most problem correctly stressing the following words: *conservatory, complicit, development, phonological, and meteoric*.

The listed words may have been troublesome in terms of stress placement for a variety of reasons. For the vocabulary which is somewhat similar to the Czech translation of the word, whether, in orthography or pronunciation (e.g., hotel = hotel, engineer = inženýr, respect = respektovat), the reason could be that the respondents transferred the Czech stress patterns as the words were familiar to them from their mother tongue. Another reason could be that the speakers have never heard the word's pronunciation or did not know the word; thus, they focused more on the segments of the language than on the suprasegmental features,

such as stress. However, any specific pattern of problematic words for Czech pupils and students was not found. Hence further research is needed with a longer list of analyzed words to discover certain types of words which do not have predictable stress patterns for the Czech speakers and why.

From the second point of view, there were words in which it was complicated for the auditor to determine which syllable carries the primary stress just from the auditory analysis. One of the possible explanations is that the Czech speakers did not make any syllable the most prominent in all three expected acoustic features. As shown in Table 26, it was difficult for the auditor to decide which of the syllables is the most prominent because the respondent made one syllable the most prominent in intensity. However, at the same time, another syllable was pronounced much longer and higher in pitch. Another possible explanation is that Czech speakers did not make an evident acoustic difference between the stressed and unstressed syllables in multisyllabic words. As shown in Tables 22 and 23, the respondent made an insignificant difference in intensity between the two syllables, only 0,12 dB.

The last research question asks which acoustic parameters (or a combination of which parameters) serve as the most probable acoustic cue of stressed syllables in English for Czech auditors. From the acoustic analysis of the chosen words in this thesis (i.e., *communicate, respect, police*), it cannot be clearly stated which acoustic parameters served as a cue for both Czech auditors. The results indicate that not all parameters are equally important in perceiving the syllable as stressed. Auditor 1 relied more on the intensity factor of the syllables; on the other hand, Auditor 2 concentrated more on the syllables' duration and the rise in pitch. To conclude, the auditors' judgment was very subjective in words where it was not apparent which syllable was primarily stressed, and each considered different acoustic factors to be more influential.

Conclusions

To conclude, the key takeaways from the present research are that the placement of stress in multisyllabic words, with lexically designated stress on other than the first syllable, is somewhat problematic for Czech speakers of English. According to the findings, when a wrong shift of stress occurred, it was in 59,87 % of cases placed on the first syllable. Thus, in more than half of the incorrectly stressed words under analysis, a language transfer of Czech stress patterns occurred (as Czech, as a rule, has initial stress placement). Another significant finding is that Czech speakers make less difference in acoustic features of the syllables when speaking English than native speakers do. For this reason, in some cases, it was difficult to recognize the stressed syllable by the Czech speaker just from the perceptual point of view.

From the findings of acoustic analysis, Czech speakers usually do not make the stressed syllable more prominent by all three acoustic features, as is expected in English. Thus they do not put more intensity, raise in pitch, and simultaneously make the syllable longer. This fact sometimes made it more challenging for non-native auditors to designate the primary stress. It would be interesting to further research how native speakers judge the placement of the stress of Czech speakers and which acoustic parameters would serve them as a cue. Although one native speaker did the acoustic analysis of two respondents in this paper, it was only for validation. Moreover, the English auditor analyzed recordings of two speakers with high language proficiency and a very low error rate in stress placement.

The research results suggest that the stress placement of English words is not entirely predictable; thus, it is best to learn it with the new vocabulary. Moreover, it is advisable to put more emphasis on this pronunciation feature of English in Czech classrooms. According to Kenworthy (1987, 18), wrong stress placement confuses the English speaker; thus, acquiring the correct stress pattern when using English as a foreign language is important. However, it

must also be mentioned that according to Jenkins' findings (Walker 2010, 39), shifting the lexical stress does not cause breakdowns in the communication of speakers of English as Lingua Franca. Furthermore, when teaching English, it should be decided if the goal of pronunciation is to be intelligible to a native speaker of English or if the learner will use English just for communication with other non-native speakers.

The list of problematic words is enclosed in the appendices; however, the findings are limited to a very small amount of vocabulary under analysis. Suggestions for further investigation would be performing extensive research with more respondents and more words under analysis with the lexical stress on other than the first syllable to identify patterns of problematic words for Czech speakers of English. Creating a list of problematic words divided into different types of stress patterns could be very useful for teachers of English in Czech EFL classrooms; thus, they could focus on teaching the general rules for these groups of words and make the stress placement more predictable for the Czech pupils and students. Moreover, the list of exceptions that could not be classified could be assembled. Both lists would facilitate the question of which rules of stress placement should be taught in Czech EFL classrooms and for which words it is best to learn stress placement individually as exceptions to the rules.

References

1. Brinton, Laurel J. and Brinton, Donna M. 2010. *The linguistic structure of modern English*. Rev. ed. Philadelphia: John Benjamins Pub. Co.

2. Collins, Beverley and Mees, Inger M. 2013. *Practical phonetics and phonology: a resource book for students*. 3rd ed. Routledge English language introductions. London: Routledge.

3. Dalton, Christiane and Seidlhofer, Barbara. 1994. *Pronunciation*. Language teaching: a scheme for teacher education. Oxford: Oxford University Press.

4. Dictionary, 2023. Cambridge English Dictionary. [online] Available at: https://dictionary.cambridge.org/dictionary/english [Accessed 5.4. 2023].

5. Eriksson, Anders and Heldner, Mattias. 2015. "The acoustics of word stress in English as a function of stress level and speaking style." Interspeech (2015).

6. Field, John. 2005. "Intelligibility and the Listener: The Role of Lexical Stress". *TESOL Quarterly* 39 (3). Available at: https://doi.org/10.2307/3588487.

7. Giegerich, Heinz J. 1992. *English phonology: an introduction*. Cambridge: Cambridge University Press.

8. Grepl, Miroslav, et al. 1995. *Příruční mluvnice češtiny*. Praha: Nakladatelství Lidové noviny.

9. Hůrková, Jiřina. 1995. *Česká výslovnostní norma*. Praha: Scientia.

10. Jarvis, Scott and Pavlenko, Aneta. 2008. *Crosslinguistic Influence in Language and Cognition*. New York: Routledge.

11. Kenworthy, Joanne. 1987. *Teaching English pronunciation*. Longman handbooks for language teachers. London: Longman.

12. Krčmová, Marie. 2009. *Fonetika a fonologie* [online]. 3rd ed. Brno: Masarykova univerzita. Elportál. Available at: https://is.muni.cz/elportal/?id=852835 [Accessed 3.3. 2023]

13. Odlin, Terence. 1989. *Language transfer: cross-linguistic influence in language learning*. Cambridge: Cambridge University Press.

14. Palková, Zdena. 1997. *Fonetika a fonologie češtiny s obecným úvodem do problematiky oboru*. Praha: Karolinum.

15. Roach, Peter. 2009. *English phonetics and phonology: a practical course*. 4th ed. Cambridge: Cambridge University Press.

16. Skaličková, Alena. 1979. *Srovnávací fonetika češtiny a angličtiny*. Praha: Státní pedagogické nakladatelství. 1st ed.

17. Skaličková, Alena. 1982. *Fonetika současné angličtiny*. 1st ed. Učebnice pro vys. školy. Praha: SPN.

18. Skarnitzl, Radek and Eriksson, Anders. 2017. "The Acoustics of Word Stress in Czech as a Function of Speaking Style." Proc. Interspeech 2017, 3221-3225, doi: 10.21437/Interspeech.2017-417

19. Skarnitzl, Radek and Rumlová, Jana. 2019. "Phonetic aspects of strongly-accented Czech speakers of English: The Role of Lexical Stress". *AUC PHILOLOGICA* 2019 (2): 109-128. Available at: https://doi.org/10.14712/24646830.2019.21.

20. Volín, Jan and Skarnitzl, Radek. 2018. *Segmentální plán češtiny*. Praha: Filozofická fakulta Univerzity Karlovy.

21. Volín, Jan and Skarnitzl, Radek. 2020. "Accent-Groups vs. stress groups in Czech Clear and Conversational Speech". Proc. 10th International Conference on Speech Prosody 2020, 695-699, DOI: 10.21437/SpeechProsody.2020-142

22. Volín, Jan and Weingartová, Lenka. 2014. "Acoustic Correlates of Word Stress as a Cue to Accent Strength". *Research in Language* 12 (2): 175-183. Available at: https://doi.org/10.2478/rela-2014-0008.

23. Walker, Robin. 2010. *Teaching the pronunciation of English as a lingua franca*. Oxford: Oxford University Press. Oxford handbooks for language teachers.

24. Yavaş, Mehmet. 2020. *Applied English phonology*. Hoboken, NJ: Wiley Blackwell.

List of Appendices

Appendix A: Recommendation for teachers of English in Czech schools

Appendix B: List of the words and sentences under analysis

Appendix C: Sample of Verbal Protocol 1 (Czech Auditor 1)

Appendix D: Sample of Verbal Protocol 2 (Czech Auditor 2)

Appendix E: Verbal Protocol 3 (Native speaker of English – Auditor 3)

Appendix A

Recommendation for teachers of English in Czech schools

List of words found problematic in placing the word stress for Czech pupils and students:

1. For all age groups:

   Hotel

2. For both 9th graders and University students:

   Communicate, (to) Respect, Engineer, **International**, *Musicians, Police,*

   Independent, Intelligent

3. For 9th graders (apart from previous words in sections 1 and 2):

   Permission, Afternoon

4. For university students (apart from previous words in sections 1 and 2):

   Meteoric, Complicit, Conservatory, Development, Phonological

Appendix B

List of the words and sentences under analysis

Words in isolation destined for the third graders:

1. Computer
2. Television
3. Hotel
4. Banana
5. Fantastic
6. Today
7. Apartment
8. Giraffe
9. Eraser
10. Afternoon

Words in isolation and sentences destined for the ninth graders:

1. Computer
2. Television
3. Hotel
4. Banana
5. Fantastic
6. Today
7. Apartment
8. Giraffe
9. Eraser
10. Afternoon
11. Behavior
12. Permission
13. Important
14. Contestant
15. Electricity
16. Interpretation
17. Unfortunately
18. Produce
19. Communicate
20. Addiction

1) I cannot decide if I want to become an engineer or a police officer.
2) Politicians take part in a lot of international meetings.
3) Independent musicians do not earn much money.
4) It is necessary to respect everyone in our society.
5) You must be intelligent to come up with such a proposal.

Words in isolation and sentences destined for the ninth graders:

1. Computer
2. Hotel
3. Giraffe
4. Banana
5. Eraser
6. Electricity
7. Communicate
8. Produce
9. Contestant
10. Interpretation
11. Inexpressible
12. Empathetic
13. Communicative
14. Meteoric
15. Convincingly
16. Benevolent
17. Complicit
18. Questionnaire
19. Incoherent
20. Abnormality

1) I cannot decide if I want to become an engineer or a police officer.
2) Politicians take part in a lot of international meetings.
3) Independent musicians do not earn much money.
4) It is necessary to respect everyone in our society.
5) You must be intelligent to come up with such a proposal.
6) It's a pity you didn't take the opportunity to study at the conservatory.
7) The development of the factory is satisfactory.
8) Please write the phonological transcription.
9) The accessibility of this document is available.
10) Our country exports only a few products containing chemical contaminants.

If you think the primary stress was placed correctly, write **YES**; if you think the primary stress was put on a wrong syllable, write **NO**; if you are not sure, write **I DO NOT KNOW** or the symbol (–):

Appendix C

Sample of Verbal Protocol 1 (Czech Auditor 1)

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Word (Correct stress placement)	Decide (decíde)	Engineer (enginéer)	Police (políce)	Politicians (politícians)	International (internátional)	Independent (indepéndent)	Musicians (musícians)	Respect (verb) (respéct)	Society (socíety)	Intelligent (intélligent)	Proposal (propósal)
Speaker 1	YES	NO	YES	NO	NO	YES	YES	YES	YES	YES	YES
Speaker 2	YES	NO	NO	YES	NO	NO	NO	YES	YES	YES	YES
Speaker 3	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Speaker 4	YES	YES	NO	YES	YES	YES	YES	YES	YES	YES	YES
Speaker 5	YES	NO	NO	NO	YES	NO	YES	NO	YES	YES	YES
Speaker 6	YES	YES	—	YES	YES	—	YES	NO	YES	YES	YES
Speaker 7	YES	—	NO	YES	NO	YES	NO	YES	YES	YES	YES
Speaker 8	YES	NO	NO	YES	YES	—	YES	YES	YES	YES	YES
Speaker 9	YES	YES	YES	YES	NO	YES	YES	—	YES	YES	YES
Speaker 10	YES	YES	YES	YES	YES	YES	YES	NO	YES	YES	YES

If you think the primary stress was placed correctly, write **YES**; if you think the primary stress was put on a wrong syllable, write **NO**; if you are not sure, write **I DO NOT KNOW** or the symbol (–):

Word (Correct stress placement)	Decide (decíde)	Engineer (enginéer)	Police (políce)	Politicians (politícians)	International (internátional)	Independent (indepéndent)	Musicians (musícian)	Respect (verb) (respéct)	Society (socíety)	Intelligent (intélligent)	Proposal (propósal)
Speaker 1	YES	NO	YES	YES	NO	NO	YES	YES	YES	YES	YES
Speaker 2	YES	NO	YES	NO	—	—	NO	NO	YES	NO	—
Speaker 3	YES	NO	YES	NO	—	YES	YES	YES	YES	NO	YES
Speaker 4	YES	NO	YES	YES	YES	NO	YES	NO	—	—	YES
Speaker 5	YES	NO	YES	YES	YES	YES	YES	NO	YES	NO	YES
Speaker 6	YES	YES	YES	—	NO	YES	NO	YES	—	NO	—
Speaker 7	YES	YES	YES	—	NO	NO	—	NO	—	NO	—
Speaker 8	—	—	YES	YES	—	—	—	NO	—	NO	—
Speaker 9	NO	NO	NO	—	NO	—	YES	NO	YES	—	NO
Speaker 10	—	NO	YES	NO	NO	NO	NO	NO	—	NO	—

Appendix D

Sample of Verbal Protocol 2 (Czech Auditor 2)

Appendix E

Verbal Protocol 3 (Native speaker of English - Auditor 3)

If you think the primary stress was placed correctly, write **YES**; if you think the primary stress was put on a wrong syllable, write **NO**; if you are not sure, write **I DO NOT KNOW** or the symbol (−):

Word (Correct stress placement)	Computer (compúter)	Hotel (hotél)	Giraffe (giráffe)	Banana (banána)	Eraser (eráser)	Electricity (electrícity)	Communicate (commúnicate)	Produce (prodúce)	Contestant (contéstant)	Interpretation (interpretátion)
Speaker 3	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Speaker 10	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

	Inexpressible (inexpréssible)	Empathetic (empathétic)	Communicative (commúnicative)	Meteoric (meteóric)	Convincingly (convíncingly)	Benevolent (benévolent)	Complicit (complícit)	Questionnaire (questionnáire)	Incoherent (incohérent)	Abnormality (abnormálity)
Sp. 3	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sp. 10	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes

	Decide (decide)	Engineer (enginéer)	Police (políce)	Politicians (politícians)	International (internátional)	Independent (indepéndent)	Musicians (musícians)	Respect (verb) (respéct)	Society (socíety)	Intelligent (intélligent)	Proposal (propósal)
Speaker 3	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Speaker 10	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

	Opportunity (opportúnity)	Conservatory (consérvatory)	Development (devélopment)	Satisfactory (satisfáctory)	Phonological (phonológical)	Transcription (transcríption)	Accessibility (accessibílity)	Available (aváilable)	Exports (verb) (expórts)	Contaminants (contáminants)
Sp. 3	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sp. 10	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes