THE REALIZATION OF THE GLOTTAL STOP IN UTTERANCES READ BY STUDENTS OF CZECH AS A SECOND LANGUAGE

MICHAELA KOPEČKOVÁ

REALIZACE RÁZU VE ČTENÉM PROJEVU STUDENTŮ ČEŠTINY JAKO CIZÍHO JAZYKA
V příspěvku jsou prezentovány výsledky výzkumu, jenž je zaměřen na realizaci rázu ve čteném projevu mluvčích-cizinců, kteří studují češtinu jako cizí jazyk. Ráz slouží v češtině primárně jako delimitační signál a je Čechy zpravidla přirozeně realizován před vokály na začátku slova po pauze či na začátku slovního základu po prefixu.

Cílem zde prezentované analýzy je zjistit, zda u cizinců obecně dochází k redukci rázu, jaký typ odchylek u nich lze detekovat a ve kterých slovech / slovních kombinacích chybují nejčastěji. Dílčím cílem studie je upozornit na nutnost zařadit ráz do výuky výslovnosti v rámci češtiny pro cizince již od úrovně A1.

Klíčová slova: ráz; fonetika; ortoepie; čeština pro cizince; jazyková úroveň; jazyková rodina

INTRODUCTION

The glottal stop [ʔ] is one of the phenomena from the language sound plane which in spoken utterances serves particularly to delimitate words or morphemes starting with a vowel. It is classified as a consonant and recently has frequently been called a glottal plosive. Based on the regular or less regular vibration of the vocal cords, it is possible to differentiate more precisely between the glottal plosive and the creaky or breathy voice (Palková 2004). The realization of the glottal stop preceding vowels after a pause is commonly natural

for native speakers of the Czech language and its possible reduction does not result in incomprehension, given that the context is known.

According to orthoepic rules, glottal stop should be used particularly with non-syllabic prepositions *v* "in", *k* "to", *z* "from", *s* "with", for instance *z Ostravy* "from Ostrava" [s ʔostravɪ], not [z ostravɪ] or [s ostravɪ] (Hůrková 1995).[1]

Due to the specifics in its realization and utilization in spoken language, the glottal stop has recently been the subject of numerous studies. One can point out for instance studies and recent monographs delimiting the term *ráz*, its possible variants and utilization (Machač and Skarnitzl 2009; Palková 2016), or statistical studies investigating the occurrence of the glottal stop in read and spoken utterances (Volín 2012; Kopečková 2022b). The glottal stop is frequently part of research into the spoken language of professional speakers in the context of the orthoepic norm of Czech (Kopečková 2022a; Štěpánová 2019). Among other things, the studies have demonstrated that the correct realization of the glottal stop significantly contributes to the overall quality of a spoken utterance and that speakers who regularly reduce glottal stops are viewed as lower-quality speakers.

As already mentioned above, while the absence or partial reduction of the glottal stop may result in slight deviations, these usually do not prevent comprehension and a usual recipient does not even notice them, especially in shorter utterances or utterance segments. It is also for this reason that this element of language is frequently marginalized while teaching Czech as a second language, although, as documented in the studies published in the Czech Republic as well as abroad (e. g. Balas 2011; Bissiri, Lecumberri, Cooke and Volín 2011; Veroňková and Shadrina 2016), the glottal stop is an important part of spoken utterances, in Czech primarily due to the signalling of boundaries of individual words or expressions.

1 The tendency to link a non-syllabic preposition with the following word is, according to native speakers, more typical for Moravians and Silesians (available from: https://www.czechency.org/slovnik/RÁZ).

While typical educational materials focused on all language skills always include sections on pronunciation, these serve for practising of speech sounds and common phenomena that might be difficult for non-native speakers[2], such as the difference between the speech sounds [ɦ] × [x]; [d], [t], [n] × [ɟ], [c], [ɲ]; sibilants, sometimes also voice assimilation. Concerning suprasegmental features, they place emphasis on word accent. At this point, it needs to be noted that these exercises are usually not complex, and are very brief compared to the amount of grammar, reading and comprehension, listening, etc. a non-native speaker needs to manage while studying (e.g. Holá 2016; Švarcová and Wenzel 2020). Complex practical materials including the glottal stop as a separate element of language are usually provided in topic-specific guidebooks (or sections in other study materials) focused on practising pronunciation for non-native speakers studying Czech as a second language (for instance Kopečková 2017; Palková and Veroňková 2022; Veroňková 2022).

Due to insufficient education focusing on the glottal stop, this phenomenon may more frequently be linked to pronunciation habits derived from the non-native student's mother tongue. It is likely, for example, that a speaker whose mother tongue is French, Slovak, Ukrainian or English will tend to "link" expressions with prepositions/prefixes or combinations of two words (e.g. *na ulici* "in the street", *poobědval* "he had lunch", *znám Alenu* "I know Alena") – i.e. the person will not realize the glottal stop before the word-initial vowel – [na ulɪʦɪ], [poobjɛdval], [znaːm alɛnu] (Skarnitzl, Šturm and Volín 2016; Duběda 2005; Zborovská 2023; Poláchová 2023). Individual units might therefore be linked, which results in incomprehensibility, more frequently on the part of recipients who also learn Czech as their L2. In contrast, in the case of speakers whose mother tongue is German, the realization of glottal

2 Non-native = L2 Czech.

stop is expected, since this element is part of German phonology (O'Brien and Fagan 2016).[3]

In a similar way in which the realization of the glottal stop is affected by the speaker's mother tongue, it may also be influenced by the level of language competence and speaking practice of the speaker. The glottal stop is likely to occur more frequently in the utterances of beginners with insufficient vocabulary, since they tend to separate individual lexemes with a pause [/] and therefore naturally realize the glottal stop before a word-initial vowel.[4] Speakers with a higher level of language competence and greater speaking practice may speak more fluently (and naturally); on the contrary, they link the words incorrectly due to the negative transfer form their L1 (see above) or sloppy L2 pronunciation, especially in common expressions and phrases.

What may be especially problematic for non-native speakers are combinations with non-syllabic prepositions (*k*, *s*, *v*, *z*), for instance *v Opavě* "in Opava", *z Islandu* "from Iceland". Here, as mentioned in the initial part of the text, two deviations may occur that are realized by Czech native speakers as well – i.e. pronunciation without a glottal stop and voice assimilation [v opavjɛ], [z ɪslandu], or with voice assimilation [f opavjɛ], [s ɪslandu]. In contrast, a more significant deviation, that does not occur with Czech native speakers, is the separation of prepositions and words with a pause while maintain-

3 In German, as in the Czech language, realization of the glottal stop increases the quality of speech (Skarnitzl, Šturm and Volín 2016).

4 A more significant, even excessive, separation of words is clearly expected with beginners, but it needs to be noted that while a distinctive break between two content words does not necessarily seem unnatural to the recipient, in combinations with prepositions, such as *na ulici* [na / ʔulɪʦɪ], the situation differs. Based on orthoepic rules concerning word stress in Czech, in such word combinations only the preposition shall bear the stress, while the following word is part of the so-called stress group. While this pronunciation occurs even with Czech native speakers – the preposition does not bear stress and the first syllable of the following word is stressed, or stress is positioned on the preposition as well as the first syllable (Kopečková 2022a) – an average recipient in an average conversation is not likely to perceive them, since the speaker does not make the pause. It is therefore recommended that non-native speakers should be made aware of the rules of word stress in Czech as soon as possible, so that they do not develop an incorrect habit.

ing the pronunciation of the preposition based on its written form, i.e. [v / ʔopavjɛ], [z / ʔɪslandu].[5] Such a manner of realization is very distinctive particularly for the recipients, especially Czech native speakers, and the speaker's utterance is perceived as generally unnatural.

A similar situation may be found in combinations with syllabic prepositions (or words) ending with a consonant, for instance *pod oknem* "under the window", úsměv *Aleny* "Alena's smile". There might occur deviations with the absence of the glottal stop, i.e. [pod oknɛm], [uːsmɲɛv alɛnɪ], [pot oknɛm], [uːsmɲɛf alɛnɪ], and also incorrect and unnatural pronunciation caused by realization of a pause, i.e. [pod / ʔoknɛm], [uːsmɲɛv / ʔalɛnɪ].

The above listed deviations, where the glottal stop is reduced or entirely omitted, may be expected in case of non-native speakers with a higher language competence or less precise speaking, and speakers applying habits from their mother tongue.[6] In contrast, the occurrence of the mistake involving the realization of a pause and the maintained pronunciation in accordance with the written form of the preposition is most likely with beginners. It may, however, also appear in case of speakers with greater speaking practice but with insufficient awareness of the rules concerning the pronunciation of the individual speech sounds, their clusters, or word accent in

5 The glottal stop, as well as consonant pairs (with the exception of the phoneme v), contribute to voice assimilation. Students often do not know the rules of assimilation, but naturally obtain an understanding of the phenomenon during their speaking practice, since the pronunciation is easier to articulate, for instance zpívat [spiːvat]. An important role is played by lecturers whose pronunciation non-native speakers imitate. However, the combination of non-syllabic preposition and a following word should be pointed out, because in this case assimilation is not entirely natural to them and they sometimes tend to individually develop a habit (such as separation of prepositions and words with a pause) that may be subsequently rather hard to eliminate. Voice assimilation in Czech is therefore one of the phenomena that should receive greater attention while practising pronunciation with non-native speakers of Czech.

6 Based on the recent research focusing on Czech TV news presenters (L1 speakers), the tendency to link the words appears more frequently in the speeches with higher tempo (around 6 syllables per second) and sloppy pronunciation (Kopečková 2022a, 96–99). Thus, speech tempo can be another feature influencing realization of glottal stop by non-native speakers.

Czech.[7] Apart from possible incomprehension, the speech production also results in the speaker's uncertainty, which may in extreme cases even lead to a non-native speaker's reluctance to speak Czech in the Czech environment.

A pilot research project conducted as part of this study is focused on an analysis of read utterances delivered by speakers studying Czech as L2. It takes into account various word combinations, where the realization of the glottal stop may be expected, the mother tongue and Czech-language competence of individual participants. Its main aim is to identify possible tendencies and deviations in the realization of the glottal stop in the speech of non-native speakers, and determine whether the assumptions outlined above may be confirmed or disproved based on a comparison of selected speakers with regard to their mother tongue and level of their Czech-language competence. An equally important aim is to determine which combinations are difficult for the speakers with regard to the realization of the glottal stop and therefore cannot be omitted when practising pronunciation with beginners as well as with more advanced students.

1 METHODOLOGY AND DATA PROCESSING

RESEARCH PARTICIPANTS

The first phase of the research involved a total of 61 students, particularly participants of the Summer School of Slavonic Studies that took place in Olomouc in summer 2022. Recordings of their reading were obtained over a period of three weeks, beginning in the second week of the summer school (particularly due to 'acclimatization' of students with regard to the timetable of the summer school,

7 The observation of these typical deviations and the features expected to influence realization of the glottal stop is based on the author□s eight year teaching experience, especially in the lessons of corrective pronunciation at the Summer School of Slavonic Studies in Olomouc.

etc.). Each participant came for his/her reading session individually within the course that lasted one moth.

The participants' language competence varied (from beginners to level C1). Some of them also stated a range of levels, for instance A1 – A2. Such cases were included twice while processing the data for comparison based on language competence level, i.e. both in group A1 and group A2. In particular, the recording involved 14 A1-level students (or A1 – A2), 22 A2-level students (or A1 – A2; A2 – B1), 28 B1-level students (or A2 – B1; B1 – B2), 4 B2-level students (or B1 – B2; B2 – C1), and 3 C1-level students (or B2 – C1).

The research included students who not only reached various language competence levels, but also spoke different mother tongues. Concerning the aspect of mother tongue, participants were compared even with regard to the language family into which the particular languages belong. The language families compared were the following: Germanic (13), Romance (13), Slavic (29), Sino-Tibetan (5), Altaian (2), and Finno-Ugric (1). Mother tongues of the students were the following: German (GER, 7), English (ENG, 3), French (FRE, 5), Spanish (ESP, 6), Romanian (ROM, 1), Italian (ITA, 1), Ukrainian (UKR, 28), Russian (RUS, 9), Polish (POL, 4), Slovak (SVK, 1), Bosnian (BOS, 1), Japanese (JAP, 2), Chinese and Taiwanese (CHIN/TAIW, 5), Finnish (FIN, 1), Norwegian (NOR, 1), Dutch (DUT, 1), and Danish (DAN, 1).

In view of the disproportion between the participants regarding individual levels of language competence, individual language families and particularly mother tongues, average values were calculated for all resulting data. The comparison in figures provided below reflects especially mother tongues (and language families) represented by multiple participants. A commentary is provided, however, even for those represented by only one or two students.

MATERIAL

The material used for analysis was a text prepared in advance with a length of one standard page (A4) consisting of four sections (for

greater detail, see Table 1). The first section included 18 isolated content words starting with a vowel (a monophthong or a diphthong). The second section consisted of 54 word combinations including primary prepositions (syllabic and non-syllabic) as well as secondary prepositions. The third section contained 30 combinations of two content words. Half of the first words from these combinations ended with a vowel and the other half ended with a consonant, and the second words always started with a vowel. The fourth section included eight simple or complex sentences selected in such a way that each contained two situations where pronunciation with glottal stop is expected. The total number of these situations in the fourth section therefore equalled 16.

Section	Position Observed	Abbreviation	Number	Example
1	Isolated word	W	18	Evropa, ouškama, ukázat
2	Non-syllabic preposition	NP	12	z Anglie, k Ostravě
	Syllabic preposition – open	SPO	18	za Aničkou, pro Emila
	Syllabic preposition – closed	SPC	12	nad Anglií, bez úkolu
	Multi-syllable preposition	MSP	12	vedle Umy, místo Evy
3	Two words – first ending with a vowel, the same as or different from the initial vowel of the second word	VV/VdV	15	doba akátů, rada Evropy
	Two words – the first ending with a consonant	CV	15	oběd Erika, výlet Amálky
4	Simple or complex sentences (combination with glottal stop)	S	8 (16)	Mají akci v obchodě.

Table 1: An overview of the sections of the text including all the observed positions and their numbers in the particular section, abbreviations for the individual positions used in the figures below, and examples of expressions / sentences

The text contained elementary as well as more advanced lexicon[8] and consisted primarily of two- and three-syllable words, with the exceptions of prepositions and four four-syllable words (*restauraci* "restaurant", *poobědval* "he had lunch", *euforie* "euphoria", *informace* "information"). Apart from general nouns, the text also included proper nouns[9] in order to facilitate reading, particularly for beginners. It may be presumed, however, that reading such a long text might be in itself rather difficult for some of the participantsand that it could affect the realization of the glottal stop.

THE ANALYSIS PROCESS

The participants were asked to read all four sections at their own speech tempo. Prior to reading, they were informed about the focus of the research and the fact that the reading would be recorded.[10] They were also instructed to read naturally and without thinking about the correct realization, if possible. They were also aware that, given the focus of the research, they did not need to be afraid of making mistakes in pronunciation, but they could correct themselves if they wished.[11]

The analysis of the speeches delivered by the participants was conducted primarily through perception; if the auditory perception needed to be verified, the Praat software[12] and visualization of oscillograms were used. In particular, possible errors listed in Table 2 below were observed.

8 The occurrences of advanced lexicon (e. g. *akátů*, *euforie*) were marginal and therefore it did not affect individual speeches.

9 Proper nouns may be easier even for beginners, since they might know them as equivalents to proper nouns from their own language.

10 All students signed their consent with the recording. The document included, among other things, a more detailed description of the aim of the research, and it stated that all data would be presented anonymously. The students also filled in information on the length of their study of Czech and the level of their competence, their mother tongue, places of residence, etc.

11 This option was used by only a few participants, most of them did not correct themselves.

12 Available from: https://www.fon.hum.uva.nl/praat/.

Position	Deviation	Abbreviation	Example
NP	Glottal stop deletion without voice assimilation	NP – WOA	z Anglie [zaŋglɪjɛ]
	Glottal stop deletion with voice assimilation	NP – WA	z Anglie [saŋglɪjɛ]
	Realization of pause and speech sound according to the grapheme	NP – RP (G)[14]	z Anglie [z / ʔaŋglɪjɛ]
SPO	Glottal stop deletion (2 identical vowels)	SPO – VV	pro Oldu [prooldu]
	Glottal stop deletion (2 different vowels)	SPO –VdV	pro Evu [proɛvu]
VPC	Glottal stop deletion without voice assimilation	SPC – WOA	nad Anglií [nadaŋglɪji:]
	Glottal stop deletion with voice assimilation	SPC – WA	nad Anglií [nataŋglɪji:]
	Realization of pause and speech sound according to the grapheme	SPC – RP (G)	nad Anglií [nad / ʔaŋglɪji:]
MSP	Glottal stop deletion (2 different vowels)	MSP – VdV	vedle Umy [vɛdlɛumɪ]
VV	Glottal stop deletion (2 identical vowels)	VV	známe Emila [zna:mɛɛmɪla]
VdV	Glottal stop deletion (2 different vowels)	VdV	peče oplatky [pɛʧɛoplatkɪ]
CV	Glottal stop without voice assimilation	CV – BA	oběd Erika [ʔobjɛdɛrɪka]
PR[15]	Glottal stop deletion after prefix (2 vowels)	PR – VV	doopravdy [do:pravdɪ]
OM[16]	Other mistake – inserted [j] preceding *e*	OM – JE	v Evropě [vjɛvropjɛ]

Table 2: Expected deviations in utterances read by research participants; the table includes the positions (see Table 1), deviations expected in these positions, abbreviations of positions with deviations (used in figures below) and examples

13 G = written grapheme.

14 This situation only occurred on one instance in a sentence.

15 Other mistakes, such as insertion of a speech sound [j] in front of words beginning with the vowel e in case of Slavic speakers – Eva [jɛ:va], or incorrect realization of diphthongs, e. g. native speakers of English – euro [juro], were expected in all sections, particularly section 1 (W).

The analysis of the recordings and subsequent data processing were conducted using the statistical method, particularly determination of the error rate in the read utterances, i.e. the method always reflected all positions and combinations where a recipient might expect the realization of the glottal stop, and the percentage proportion of deviations emerging in the particular expressions was counted.

The resulting data, i.e. the error rate, were subsequently compared with regard to all speakers, and a comparison was elaborated concerning the individual attributes: language family, mother tongue, and the level of Czech-language competence. As already mentioned above, due to the disproportion of speakers in the individual groups under observation, the average values were always reflected.[16]

With regard to all speakers, it was also determined which section (1–4) was the most demanding for them and which position posed the greatest trouble (W, NP, MSP, etc.). A more detailed comparison of the individual positions within the individual sections was subsequently done for all the speakers (cf. Table 2). In a similar way, a comparison based on the above-listed attributes was done, i.e. a comparison of the speakers themselves (e.g. according to the language family), then with regard to the individual sections, and to the individual positions (or the expected deviations in these positions).

For the purpose of comparison,[17] based on the expected mistake in the positions, a less complex model was chosen compared to the model outlined in Table 2, concerning only four basic deviations (see Table 3).

16 The analysis also reflected the standard deviation, which is not included in the presentation of the data. It is, however, necessary to mention that in the vast majority of cases, it was high, i. e. some speakers within a group under observation, whether based on mother tongue, language family, or level of Czech, made significantly more mistakes, while others made few or none.

17 Particularly according to attributes: language family, mother tongue, and the level of language competence in Czech.

Deviation	Abbreviation	Example
Glottal stop deletion after a consonant without assimilation	GD – WOA	z Anglie [zaŋglɪjɛ], nad Anglií [nadaŋglɪji:]
Glottal stop deletion after a consonant with assimilation	GD – WA	nad Anglií [nataŋglɪji:], oběd Erika [ʔobjɛtɛrɪka]
Realization of glottal stop after a consonant – realization of pause and speech sound according to the grapheme	GR – RP (G)	z Anglie [z / ʔaŋglɪjɛ], oběd Erika [ʔobjɛd / ʔɛrɪka]
Glottal stop deletion (2 vowels)	VV – VdV	pro Oldu [prooldu], peče oplatky [pɛʧɛoplatkɪ]

Table 3: A simplified model of expected deviations emerging in the read utterances of the research participants; the table provides the expected deviations in the individual positions, abbreviations of the positions containing the deviations (used in the figures below), and examples

All results were subsequently presented in the form of column figures accompanied with commentaries on the individual comparisons. As already stated, the analysis primarily took into account the groups with three and more speakers, but some of the tendencies are even reflected in the less represented groups.

2 FINDINGS

The following part of the treatise presents the research results. Figure 1 shows the ratio of error rate in speeches delivered by all speakers according to the individual sections (Sect). Figures 2 and 3 provide deviations of all the research participants compared based on a simplified model (see Table 2), and based on all possible deviations within the individual sections (see Table 3).

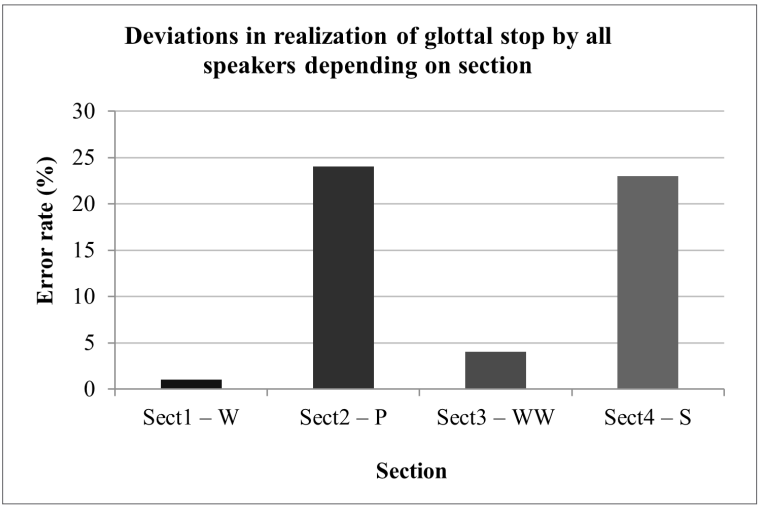

Figure 1: The error rate (in %) in realization of the glottal stop for all the speakers in sections 1–4; the legend also includes abbreviations of observed positions occurring in the individual[18]

Considering all speakers (61) and situations where the glottal stop should be realized (118), the overall error rate may be evaluated in very positive terms, since its value is only 15.4 %.[19] Certain differences may, however, be observed already from these data.

As it is apparent from the figure, the most problematic sections in general were sections 2 and 4. This result is not surprising. In section 1, it was not expected that any greater trouble would appear concerning realization of the glottal stop.[20] If a deviation emerged, it was OM – JE, particularly with Slavic speakers. In section 3, containing combinations of two content words, the number of mistakes was also small, mostly linking of two vowels, which also happens with Czech native speakers. What was also expected is that combinations with prepositions would pose another problem since there might oc-

18 W = one word; P = prepositions; WW = two words; S = sentence.

19 There was, however, a great difference among speakers: there was a speaker who made mistakes in almost 50 % of cases, as well as a speaker who made almost no mistakes.

20 Partial deletion (such as creaky voice) was not evaluated as a mistake.

cur three or four mistakes (according to the ending of the preposition). Section 4, as mentioned above, includes all possible variants of observed positions in complete sentences. The participants therefore needed to concentrate more while reading, and the tendency to make mistakes was higher. It is, however, important to mention that there were also participants (mostly with the language competence level B1 or higher) who made mistakes in isolated combinations, for instance *z Anglie* [z / ʔaŋglɪjɛ], but had no trouble reading the expression *v obchodě* in a sentence correctly, i. e. [f ʔopxoɟɛ]. This fact documents that these students had learned correct pronunciation of a familiar expression in practice, but they were not sure about correct pronunciation in isolated word combinations (or they tried to make pronunciation more precise).

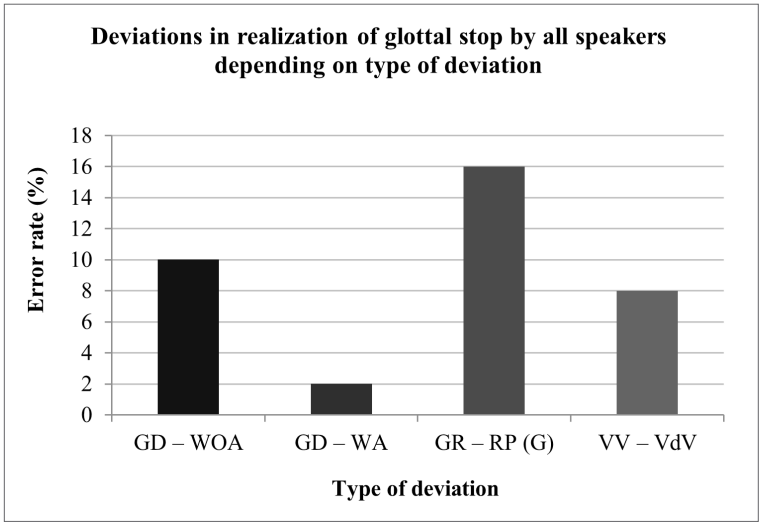

Figure 2: The error rate (in %) in realization of the glottal stop for all speakers according to the simplified model of expected deviations in individual sections

Figure 2 also shows differences related to the type of deviation. Concerning the position where a consonant – vowel combination occurs, the most frequent deviation was GR – RP (G), less frequently

also GD – WOA, while the value of GD – WA was almost negligible. A similar error rate, as with deviation GD – WOA was detected for the vowel – vowel combination (VV – VdV). Although the values were generally not high, it should to be noted that while deviations GD – WOA, GD – WA, and VV – VdV occur even with Czech native speakers, and therefore are not perceived as disturbing in most cases, in the case of GR – RP (G) there might occur excessive segmentation of the utterance and the fluency of speech might be disrupted, which may be perceived as marked by the recipient.

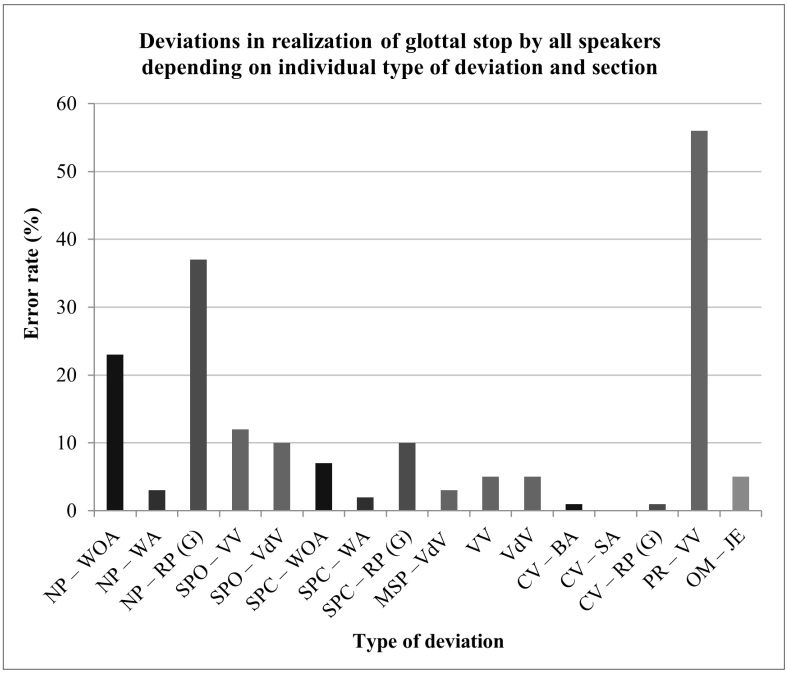

Figure 3: The error rate (in %) in realization of glottal stop for all speakers concerning all expected deviations in individual sections (1–4)

Figure 3 presents, as already stated, deviations in relation to particular combinations in the individual sections. It provides a more detailed view of the positions where realization of the glottal stop was more or less problematic for students. As expected, there was a higher error rate in combinations with a non-syllabic preposition for deviations GD – WOA and GD – RP (G), particularly an almost 40 % error rate for GD – RP (G). A considerably smaller number of deviations were detected after closed syllabic prepositions; in combinations of two content words, the error rate was almost zero. For combinations V – VdV, deviations emerged in all observed sections (with the exception of section 1); a slightly higher error rate occurred after open syllabic prepositions. There was, however, a significant error rate concerning the position of a vowel after a prefix (PR – VV), which reached the value of approximately 55 %. The result cannot be generalized here, since this situation appeared only once in the entire text. It is, however, important to point out that the omission of the glottal stop in this case occurred even with those participants who made a minimum of mistakes in their speech as a whole. It is therefore possible that, even if this combination appeared more frequently in the text, the error rate would remain very similar.

The following Figures 4 to 6 present a comparison of error rate for speakers based on the language family into which their mother tongues belong (Figure 4), deviations according to the simplified model (Figure 5), and deviations by section (Figure 6).

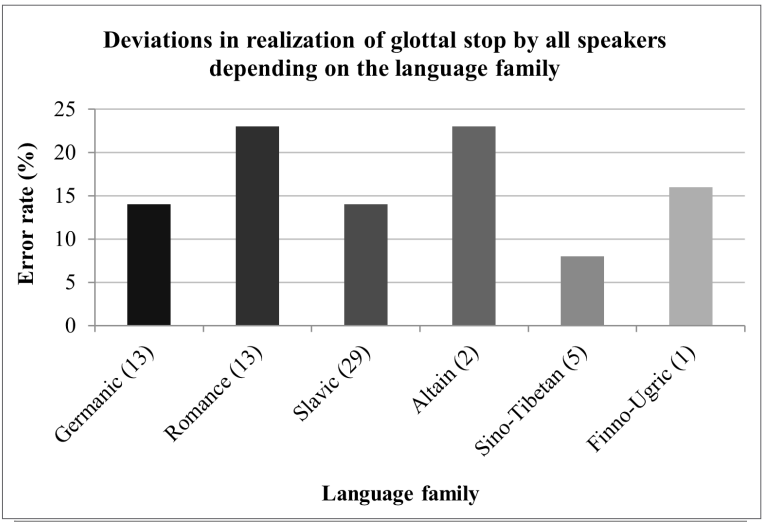

Figure 4: The error rate (in %) in realization of the glottal stop for all speakers according to the language family of their mother tongue. Information on the number of participants in the particular language family is provided in the legend (in brackets)

Taking into account individual language families represented by five or more speakers, it is obvious that the greatest error rate (23 %) was reached by participants of the Romance language family (particular languages are presented in Figures 7–9). The error rate of students of the Germanic and Slavic language families was 14 %. The lowest error rate was reached by speakers from the Sino-Tibetan language (8 %). As to Romance languages, especially French, a typical feature is linking of words, so the greater error rate was expected here (more detail in Figure 7).

The Altaian language family was only represented by two students, whose mother tongue was Japanese; both of them had a lower level of Czech-language competence (A2). The error rate is therefore not surprising. As shown in Figure 5, the most frequently occurring deviation was GR – RP (G).

A similar result was obtained for the single representative of the Finno-Ugric language family whose mother tongue was Finnish. This

student's language competence level was B1 and in general, the student did not manifest any problems with pronunciation. The occurrence of error GR – RP (G) may therefore in all likelihood be explained with insufficient knowledge of realization of the glottal stop and voice assimilation.[21]

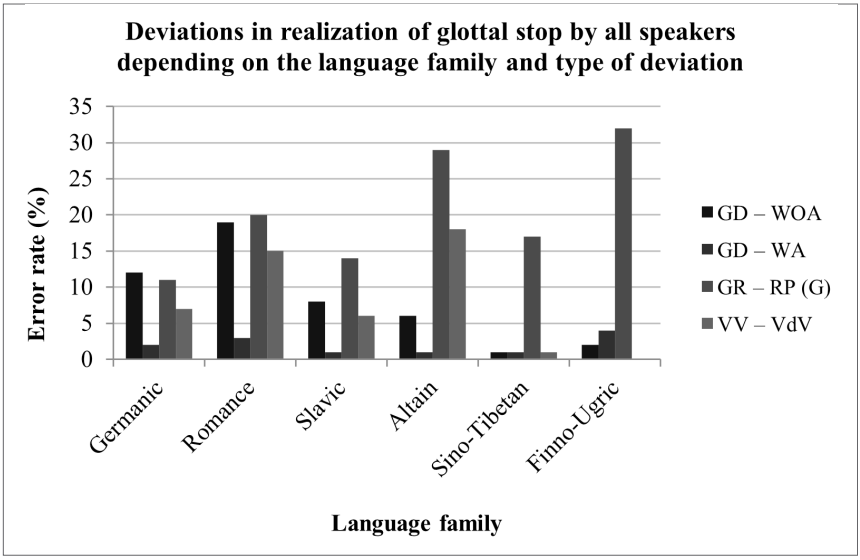

Figure 5: The error rate (in %) in realization of the glottal stop for all speakers according to language family based on the simplified model of expected deviations in individual sections

The figure shows that the most frequent deviation, with the exception of the Germanic language family, was GR – RP (G), which was clearly the prevailing mistake for Altaian, Sino-Tibetan, and Finno-Ugric language families; the same was also valid for the Slavic language family. The Altaian and Finno-Ugric language families were commented on previously. As concerns the Sino-Tibetan family, the vast majority of errors concerned one single deviation (with

21 It also must be pointed out, that the student was really nervous. According to my own experience with another Finnish student, there were almost no mistakes in his speech (including realization of the glottal stop) detected.

several exceptions). For the Slavic language family, even deviations GD – WOA and VV – VdV were observed with a similar error rate of approximately 7 %.

When comparing the deviations, the Germanic and Romance language families show similar tendencies; in the Germanic family, the prevailing error is GD – WOA by 1 % over GR – RP (G); in the Romance family, the results were reversed. A slightly lower error rate was detected for VV – VdV.

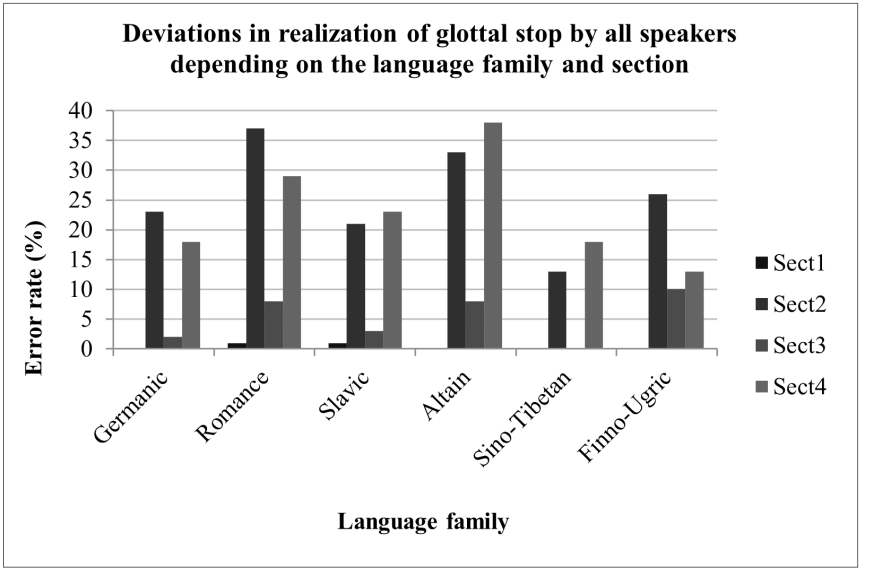

Figure 6: The error rate (in %) in realization of the glottal stop for all speakers according to language family with regard to all expected deviations in individual sections

Concerning individual sections, half of the speakers had greatest difficulties reading section 2, i. e. combinations with non-syllabic prepositions (Germanic, Romance, and Finno-Ugric language families), while for the other half the most difficult part was section 4, i.e. simple and complex sentences (Slavic, Altaian, and Sino-Tibetan language families). The result in the Altaian language family is not

surprising; as already mentioned, the speakers' language competence was lower and shorter combinations are certainly less difficult for them compared to entire sentences. Similarly, a significant number of students – beginners were represented in the group of Slavic native speakers, which certainly affected the results.

As concerns speakers of the Romance, Altaian, and Finno-Ugric families, one can observe a slightly higher error rate in section 3 compared to other language families. In case of the Altaian family, the errors may probably be caused by insufficient practice in reading. Concerning the Romance language family, the result was undoubtedly influenced by students with a higher level of Czech-language competence whose mother tongue was French. These speakers had a tendency to link the words. The speaker whose mother tongue was Finnish made mistakes particularly in combinations of consonant – vowel with the deviation GR – RP (G).

The following Figures 7–9[22] present a comparison of the error rate of individual speakers based on their mother tongue (Figure 7), deviations according to the simplified model (Figure 8), and deviations in individual sections (Figure 9).

22 As mentioned above, languages with less than three participants are not included. Yet, these speakers' results are also commented if needed.

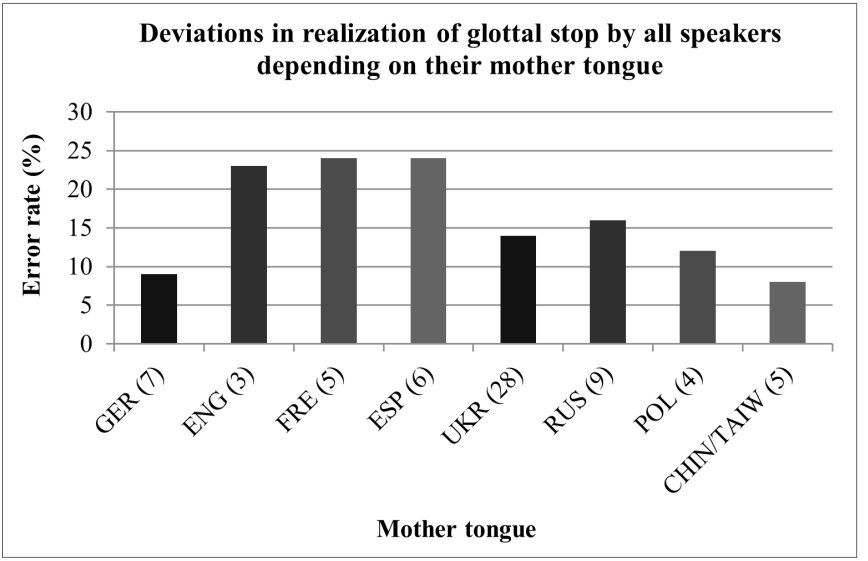

Figure 7: The error rate (in %) in realization the of glottal stop for all speakers according to the language family of their mother tongue; information on the number of participants with the particular mother tongue is provided in the legend (in brackets)

Figure 7 presents equally interesting findings. The group of Germanic languages manifests differences in the error rate: it is obvious that speakers whose mother tongue is German or Danish (1)[23] manifested a much lower propensity for deviations in glottal stop realization, in some cases even more than 50 %, compared to native speakers of English, Norwegian (1), and Dutch (1).[24] In contrast, concerning the Slavic language family (with the exception of a student whose mother tongue was Bosnian (1) and had B1 level in Czech) and the Romance language family (with the exception of a student whose mother tongue was Italian (1) and had B2 level in Czech), the

23 Number of participants.

24 It seems there is a positive interference from the mother tongue by participants with German and Danish mother tongue.

error rate of the individual speakers having different mother tongues was similar or almost identical.

Compared to other Slavic languages, the highest error rate was detected for a student who was a native speaker of Slovak (1)[25] and whose Czech-language competence was C1. In particular, this participant manifested multiple cases of deviation DR – WOA, i.e. absence of the glottal stop without assimilation – concerning Czechs, this pronunciation is typical for Moravian and Silesian speakers of Czech.[26] In addition, he also manifested a smaller number of cases of deviation VV – VdV.

Other languages (Finnish, Japanese, Chinese/Taiwanese) were the only representatives of the language families commented on above.

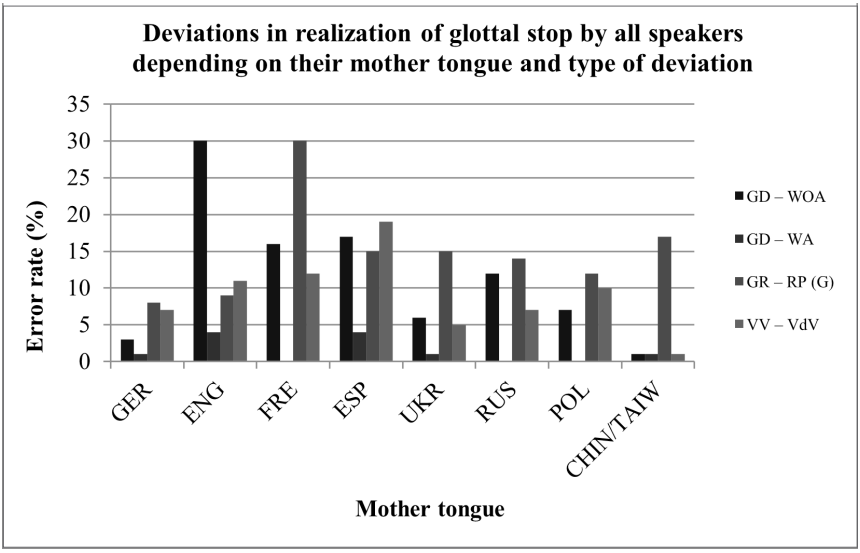

Figure 8: The error rate (in %) in realization of the glottal stop for all speakers according to mother tongue based on the simplified model of expected deviations in individual sections

25 A similar tendency occurred with the Bosnian native speaker (B1 level).

26 Available from: https://www.czechency.org/slovnik/RÁZ.

As concerns languages in the Germanic language family, particularly German and English, it is possible to observe differences especially in the error rate of deviation GD – WOA. German-speaking students (and similarly Danish-speaking one) manifested a lower, even negligible, error rate of this deviation; the prevailing mistake within this group, with an almost identical error rate, were GR – RP (G) and VV – VdV. For English native speakers, mistake GD – WOA clearly prevailed, reaching the value of up to 30 %.

The group of Romance languages also manifested differences. French native speakers, especially those with a lower level of Czech-language competence, manifested prevalently mistake GR – RP (G) with the error rate of 30 %, almost 50 % more compared to GD – WOA and over 50 % more compared to combination VV – VdV.[27] As to Spanish native speakers, the error rate was comparable (15–19 %) for all types of deviations with the exception of GD – WA. It is also worth pointing out the results of the Italian native speaker (1), who only manifested deviation GD – WOA in 34 % of cases.

Concerning speakers of Slavic languages, for Ukrainian, Russian, and Polish native speakers the prevailing deviation was GR – RP (G); Ukrainian students manifested the highest error rate for this deviation, which was also more significant compared to GD – WOA and VV – VdV. This group contained the greatest proportion of beginners, who did not yet possess sufficient education regarding pronunciation, and also clearly applied habits from their mother tongue where combinations with non-syllabic prepositions are realized according to the graphical form of the consonant. Russian native speakers also showed a greater proportion of GD – WOA; Polish native speakers manifested a greater error rate for combination VV – VdV.

27 The opposite was true for the Romanian native speaker, i.e. error GD – WOA prevailed in the same way.

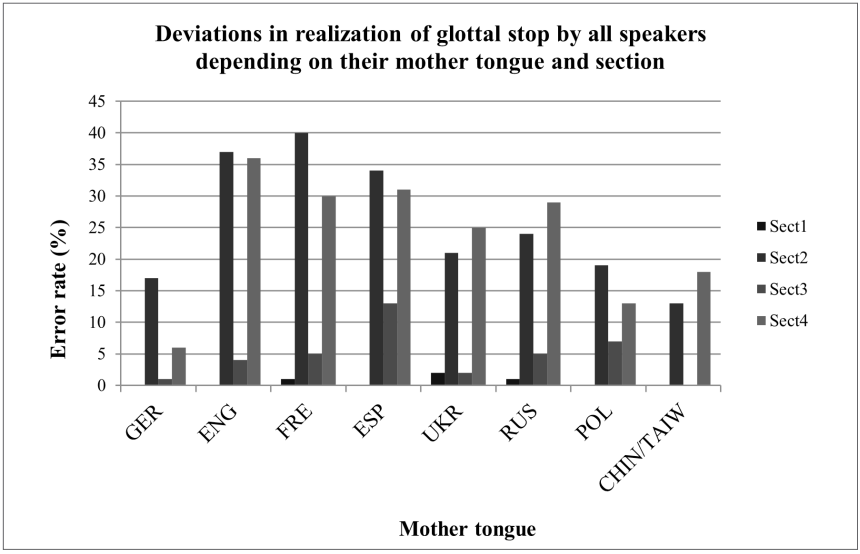

Figure 9: The error rate (in %) in realization of the glottal stop for all speakers according to mother tongue with regard to all expected deviations in individual sections

The figure clearly illustrates that section 1 was not problematic for any group of speakers; there were several cases of deviation made by speakers of Russian, Ukrainian, in one case also French. In particular, it was OM – JE. Section 3 already contained slightly more deviations, although in many cases the error rate was negligible. A moderately higher value was reached by Spanish native speakers – their error rate equalled 13 %. In conclusion, with regard to the mother tongue, all speakers encountered the greatest difficulties in sections 2 and 4, which corresponds to the overall result presented in Figure 1.

For speakers with mother tongues belonging to the Germanic family, the difficulty of sections 2 and 4 was almost equal, with the only exception of German native speakers: in a comparison of these two sections, their error rate was higher in section 2 by almost two thirds.

Native speakers of Spanish, French, and Romanian (1) showed a slightly higher error rate in section 2: for French, the difference was 10 %, for Spanish it was only 3 %, and for Romanian it reached

27 %. Contrarily, the student whose mother tongue was Italian (1) showed higher error rate in section 4, but only by 3 %.

Concerning participants of the Slavic language family, certain differences can be observed. Native speakers of Russian and Ukrainian made slightly more mistakes in section 4; however, the difference equalled 3 % (UKR) and 5 % (RUS), which may be considered a negligible difference. In contrast, speakers of Polish and Slovak (1) encountered greater difficulties in section 2: for Polish the difference was 6 %, while for Slovak it reached 29 %.[28] The student whose mother tongue was Bosnian (1) only made mistakes in section 2.

Figures 10–12 below present a comparison of the speakers' error rate based on their level of Czech-language competence (Figure 10), deviations according to the simplified model (Figure 11), and mistakes in individual sections (Figure 12).

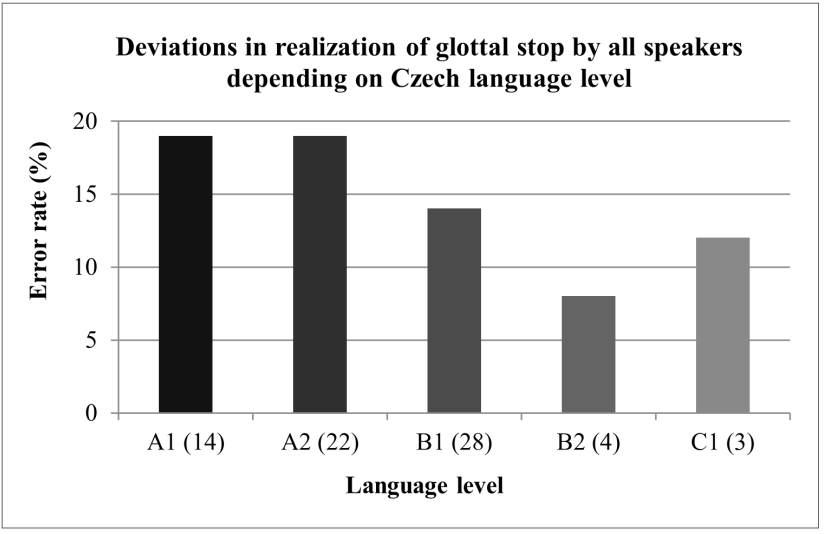

Figure 10: The error rate (in %) in realization of the glottal stop for all speakers according to their Czech-language competence; provided in the legend (in brackets) is information on the number of participants with language competence level[29]

28 Some differences may be found between West and East Slavic languages, but considering quite small amount of speakers it is difficult to generalize the data.

While the comparison of speakers based on the level of their Czech-language competence expectedly showed the greatest error rate in groups with levels A1 and A2, the figure illustrates that deviations emerged even with speakers at higher levels and the difference is not very high (with the exception of level B2).[30]

The pronunciation of speakers in individual groups is obviously more or less affected by their mother tongue. There are, however, other factors that might play a role in their pronunciation deviations. Concerning levels A1 and A2 we may expect the influence of insufficient practice, while with speakers of level B1 or higher, the cause of deviations (especially GR – RP (G)) may be, among other things, insufficient educational focus on the rules of pronunciation in expressions with glottal stop[31] and also more frequent cases of sloppy speaking resulting from insufficient speaking practice.

29 If students stated their language competence level as a range (e. g. A1 – A2), they were included in the comparison according to language level twice, i. e. both in group A1 and A2 (see Methodology – Research Participants).

30 The result is obviously also influenced by the number of students at individual levels, since higher levels are represented by a significantly lower numbers of students compared to levels A1 – B1.

31 Students might develop an undesirable habit that is difficult to eliminate later.

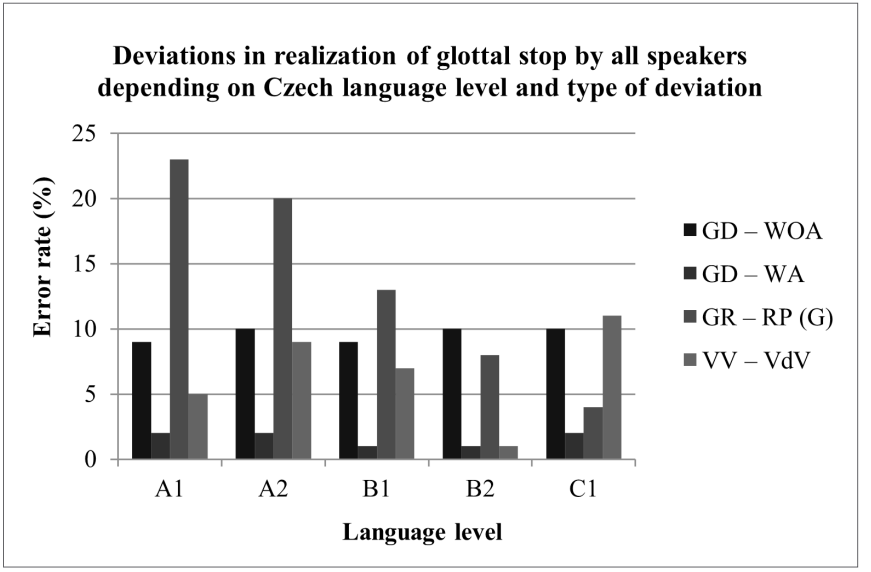

Figure 11: The error rate (in %) in realization of the glottal stop for all speakers according to their Czech-language competence based on the simplified model of expected deviations in individual sections

A comparison of occurrence of deviations in relation to the level of participant's language competence brings interesting results. A positive aspect is the decreasing error rate for deviation GR – RP (G) with the increasing students' language competence. The reasons might be more extensive speaking practice, as well as knowledge in the area of the Czech phonetics.

In contrast, it is obvious that deviation GD – WOA occurred almost identically at all language competence levels. The reason may be the influence of the participants' mother tongue and their speaking habits. As to levels B2 and C1, it should be noted that they were represented by a smaller number of participants, which distorts the results. As already mentioned above, particularly the speaker whose mother tongue was Slovak manifested most frequently deviation GD – WOA and therefore contributed significantly to the result.

Deviation VV – VdV occurred most frequently with C1-level speakers, while the lowest error rate for the combination vowel-vowel was detected in the group of participants with B2-level competence. Apart from this group (B2), the differences concerning this case among individual language levels were negligible.

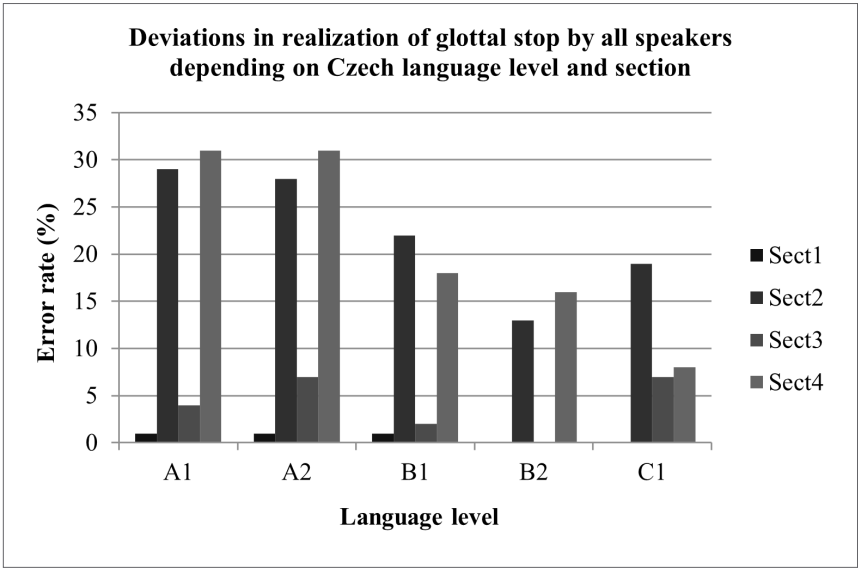

Figure 12: The error rate (in %) in realization of the glottal stop for all speakers according to their Czech-language competence concerning all expected deviations in individual sections

The resulting data concerning individual sections correspond to the overall results (Figure 1), particularly with regard to levels A1 – B2. The most problematic parts appeared to be sections 2 and 4; with students of levels A1 and A2, the error rate for both sections was around 30 % with slightly higher values for section 4. A similar trend may be observed for level B2, although the error rate is approximately 50 % lower. Participants with the language competence level A1 – A2 obviously struggled to read entire sentences: they showed greater uncertainty and were therefore more prone to making mistakes.

Contrarily, the prevalence of mistakes with speakers of levels B1 and C1 occurred in section 2: for level B1, the difference was only 4 %, for students of C1 level, the difference was slightly higher, equalling 11 %.

Deviations in section 3 occurred more frequently with speakers of levels C1 and A2. While with C1 speakers it may be presumed that there is, among other things, the factor of more sloppy speaking, with A2 students the deviations are expected to result from insufficient practice. Speakers in both groups were undoubtedly also influenced by their mother tongue.

CONCLUSION

The present pilot research aimed to determine the propensity for deviations in realization of the glottal stop in utterances read by speakers studying Czech as a second language[32] and to point out, among other things, the need for regular practising of expressions containing the glottal stop within lessons of Czech language for non-native speakers. A secondary aim was a comparison regarding types of deviations and individual text sections. The comparison involved the participants' general error rate and the error rate for selected attributes: language family, mother tongue, and the level of Czech-language competence.

Based on the obtained data, the following may be concluded: concerning all speakers, deviations occurred particularly in word combinations with prepositions and in entire simple or complex sentences. In contrast, the error rate was lower for isolated words and combinations of two content words; in case of isolated words, it was almost negligible.

32 Particularly students of the one-month workshop within the Summer School of Slavonic Studies taking place in Olomouc in summer 2022.

The most frequently detected deviation was in general the realization of a pause and pronunciation of a speech sound in accordance with the particular grapheme in combinations with prepositions (especially non-syllabic) and between two content words where the first one ended with a consonant (GR – RP /G/), e. g. [z / ʔaŋglɪjɛ]. Unlike other deviations observed, this one is unnatural for Czech native speakers, and therefore disturbing during reception. In addition, there was a relatively regular occurrence of deletion of glottal stop, which is common even for Czech speakers, for instance [zaŋglɪjɛ], [prooldu], etc.[33] The lowest error rate occurred in the deletion of glottal stop with preserved voice assimilation, i.e. [saŋglɪjɛ].

The comparison of speakers based on the language family of their mother tongue showed that the highest error rate emerges with speakers belonging to the Romance language family, as well as the Altaian language family (which was represented by only two students). Contrarily, the fewest mistakes occurred within the Sino-Tibetan language family.

With regard to a comparison based on the mother tongue, it was possible to observe certain differences. While languages belonging to the Romance language family and Slavic language family manifested no significant differences in the error rate (in fact only exceptionally, in individual cases), with students whose mother tongues belonged to the Germanic family it was proven that the greatest proportion of deviations came from English-speaking participants, while the fewest deviations came from German native speakers. These results confirmed that the non-native speakers' pronunciation is positively/negatively influenced by, among other things, interference from their mother tongue.

Interesting results were obtained from a comparison based on the speakers' level of Czech-language competence. Although the greatest error rate was expectedly detected in the group of students of

33 For more details see Kopečková (2022b); Kopečková (2023).

levels A1 and A2, the difference compared to higher levels was not substantial. The fewest mistakes were made by B2-level speakers. As to level C1, incorrect realization of expressions containing the glottal stop may be affected, among other things, by the speaker's mother tongue, as well as a tendency towards rather lax speaking.

A positive result in relation to the language level was the decreasing error rate for the most problematic deviation, i.e. GR – RP (G). The number of deviations, that may be perceived as marked by the recipient, proportionately decreased with the increasing language level.

On the basis of the obtained data, it may be stated that instructing non-native speakers that glottal stop is an important part of the Czech phonetics while practising pronunciation is substantial. It is particularly important to point out its role in word combinations with prepositions – both syllabic and non-syllabic, where the so-called voice assimilation may occur. One cannot rely on the students' ability to adopt correct pronunciation based on listening to a teacher's speech. The research has also shown that while in simple and complex sentences the speakers with higher command of Czech had no trouble concerning realization of the glottal stop and assimilation, in isolated expressions they were uncertain about the correct pronunciation. In view of this, following a short theoretical explanation, it is important to include regular practice of these and other combinations, so that incorrect pronunciation habits are eliminated from the start. As stated above, concerning the pronunciation, a higher level of language competence does not automatically mean lower error rate.

Speakers of mother tongues where glottal stop does not serve as a delimitation signal (or doesn't have another function) and where linking of words occurs (such as French) need to receive particular attention, since the absence of glottal stop in a longer utterance may result in the recipient's perception of the speech as sloppy.

While a possible deviation usually does not result in incomprehension, correct realization glottal stop increases the quality of speech

(in particular, it contributes to its cultivated nature), and with non-native speakers it also increases the overall quality of pronunciation of Czech speech sounds and their combinations. Equally importantis that it prevents them from feeling uncertain and unwilling to practise speaking in the Czech environment.

Mgr. Michaela Kopečková, Ph.D.
Dept. of Czech Studies
Faculty of Arts, Palacký University
Křížkovského 512/10
771 80 Olomouc
michaela.kopeckova@upol.cz

Zpracování studie bylo umožněno díky finanční podpoře Filozofické fakulty Univerzity Palackého v Olomouci v letech 2022–2024 z Fondu pro podporu vědecké činnosti (FPVC2022/09).

LITERATURE

Balas, Anna. 2011. "Glottal stops produced by polish native speakers in polish and in English." www.internationalphoneticassociation.org, https://www.internationalphoneticassociation.org/icphs-proceedings/ICPhS2011/Online-Proceedings/RegularSession/Balas/Balas.pdf (access 15. 11. 2023).

Bissiri, Maria Paola, Lecumberri, Maria Luisa, Cooke, Martin and Volín, Jan. 2011. "The Role of Word-Initial Glottal Stops in Recognizing English Words." www.osca-speech.org, https://www.isca-speech.org/archive/pdfs/interspeech_2011/bissiri11_interspeech.pdf (access 15. 11. 2023).

Duběda, Tomáš. 2005. *Jazyky a jejich zvuky: univerzálie a typologie ve fonetice a fonologii*. Praha: Karolinum.

Holá, Lída. 2016. *Česky krok za krokem 1 / Czech step by step 1: A1-A2*. Praha: Akropolis.

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

Kopečková, Michaela. 2022a. *Mluvní vzory v hlavním televizním zpravodajství (Analýza zvukové roviny v projevu vybraných moderátorů*. Olomouc: Vydavatelství Univerzity Palackého v Olomouci.

Kopečková, Michaela. 2022b. "Deletion of glottal stop by professional speakers." *Bohemica Olomoucensia* 14(2), pp. 90–107.

Kopečková, Michaela. 2023. "Use of glottal stop and voicing assimilation in Czech regional TV news." *Conference paper. 18th Annual Meeting of the Slavic Linguistics Society*, Bratislava (25. 8. 2023).

Ladefoged, Peter. 2003. *Phonetic Data Analysis: An Introduction to Fieldwork and Instrumental Techniques*. Malden, MA: John Wiley and Sons Ltd.

Machač, Pavel and Skarnitzl, Radek. 2009. *Fonetická segmentace hlásek*. Praha: Epocha.

O'Brian, Mary Grantham a Fagan, Sarah M. B. 2016. *German phonetics and phonology: theory and practice*. New Haven: Yale University Press.

Palková, Zdena and Veroňková, Jitka. 2022. *Výslovnost spisovné češtiny (cvičení pro cizince)*. Praha: Filozofická fakulta Univerzity Karlovy.

Palková, Zdena et al. 2004. "Stabilizace některých termínů pro fonetický popis češtiny v závislosti na nových výsledcích výzkumu." *Sborník z Konference česko-slovenské pobočky ISPhS*. Ed. Tomáš Duběda. Praha: FF UK, pp. 65–74.

Palková, Zdena. 1994. *Fonetika a fonologie češtiny*. Praha: Karolinum.

Palková, Zdena. 2016. "Hlasivkový ráz ve výzkumu zvukové stavby češtiny." In *Sandhi w językach słowiańskich II*. Anna Cychnerska, Irena Sawicka. Toruń: Wydawnictwo Naukowe Uniwersytetu Mikołaja Kopernika, pp. 143–158.

Poláchová, Pavla. 2023. *Chyby ve výslovnosti češtiny u frankofonních studentů*. Dissertation thesis. Olomouc: Filozofická fakulta Univerzity Palackého v Olomouci.

Skarnitzl, Radek, Šturm, Pavel and Volín, Jan. 2016. *Zvuková báze řečové komunikace: fonetický a fonologický popis řeči*. Praha: Karolinum.

Štěpánová, Veronika. 2019. *Vývoj kodifikace české výslovnosti*. Praha: Academia.

Švarcová, Tereza and Wenzel, Jakub. 2020. *Czech it up! 1 (učebnice): čeština pro cizince: úroveň A1*. Olomouc: Vydavatelství Univerzity Palackého v Olomouci.

Veroňková, Jitka and Shadrina, Yana. 2016. "Vowel-related glottalization in Czech read speech: Russian vs. native speakers." *Studie z aplikované lingvistiky* (7), pp. 93–108.

Veroňková, Jitka. 2022. *Souhrnná a tematická cvičení (k nácviku výslovnosti a mluvené češtiny pro cizince)*. Praha: Filozofická fakulta Univerzity Karlovy.

Volín, Jan. 2012. "Jak se v Čechách 'rázuje'?" *Naše řeč* 95(1), pp. 51–54.

Zborovská, Karolína. 2023. *Problematické jevy ve výslovnosti českých hlásek a hláskových spojení u nerodilých mluvčích s mateřským jazykem ukrajinštinou*. Master's thesis. Olomouc: Filozofická fakulta Univerzity Palackého v Olomouci.