

Filozofická fakulta Univerzity Palackého

Katedra anglistiky a amerikanistiky

Voicing assimilation in English spoken by Czech and Slovak learners

(bakalárska práca)

Autor: Zuzana Kanioková

(Angličtina se zaměřením na aplikovanou ekonomii)

Vedúci práce: Mgr. Václav Jonáš Podlipský, PhD.

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Prehlasujem, že som túto bakalársku prácu vypracovala samostatne a uviedla úplný zoznam citovanej a použitej literatúry.

V Olomouci dňa

.....

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1 Introduction

The term Second Language Acquisition (SLA) refers to “the process of learning another language after the native language has been learned” (Gass and Selinker, 2008, 7). While the term suggests there is a ‘second’ language (L2 or Target Language – TL), in fact it applies to any number of languages acquired after the native language (NL or L1). The issue of L1 influencing the acquisition of an L2 (or what we now call ‘language transfer’) is one of the more discussed issues in the field of SLA and the views on the concept of language transfer have undergone a revolution over the years. While earlier hypotheses (like the Contrastive Analysis Hypothesis – CAH and Error Analysis) put transfer into the very centre of the SLA and cited L1 influence as the single source for learners’ difficulty during acquisition, later research concentrated on the *quality* of NL influence and took into account other factors affecting SLA, mainly of developmental origin (Gass and Selinker, 2008, 137). Although in some areas such as syntax, the mere presence of L1 transfer has been challenged (Burt and Dulay, 1984), it has been suggested that in phonology, L1 influence may be in fact stronger than in other areas (Richards, 1970, 2).

The aim of this thesis is to examine in what ways and just how much does L1 transfer affect the speech production of learners acquiring English, resulting from the differences in voicing assimilation. In order to find out the extent of L1 transfer, we examine two groups of learners with different NL’s – Czech and Slovak.

Although the CAH has come under some criticism in the past and is now considered somewhat superseded (as discussed in further detail in 1.4), we believe that its predicates will suffice as the basis for our research and we chose to apply the method of a contrastive analysis as the stepping stone for this thesis. The contrastive analysis focuses on the differences in voicing assimilation structures of the three languages (Czech, Slovak and English).

The first part of the thesis describes the voicing assimilation systems of English, Czech and Slovak, focusing on the differences between the three languages. Later in the chapter, a general introduction needed to the field of SLA is presented. Based on the predictions of the contrastive analysis, thesis’ hypotheses are drawn. The following three chapters are devoted to the practical research itself, including a description of the methodology, results of the study

and finally the interpretation of the results, which addresses the hypotheses stated in the first chapter.

1.1 Allophonic changes of voicing in English

1.1.1 English consonant inventory

Before we look at the effects of voicing coarticulation in English, let us look at the nature of English obstruents in terms of their voicing. As we see in Table 1 we can divide all English obstruents into two groups according to their phonological voicing. Each obstruent forms a pair with an obstruent of the group with the opposite voicing class, while they share a common place of articulation. The only obstruent in English, which does not have this pair is the voiceless glottal fricative /h/, however in certain environments it can be realized as a voiced [ɦ]. Also the voiced fricative sound /v/ is sometimes realized without any friction and is thus more close to an approximant sound [ʋ]. In

Table 2 we can view the sonorant sounds of English. They are not paired and are all voiced.

Table 1: Obstruent sounds in English

	stops			fricatives					affricates	
Voiceless	p	k	t	s	f	ʃ	θ	h	ts	tʃ
Voiced	b	g	d	z	v	ʒ	ð		dz	dʒ

Table 2: Sonorant sounds in English

Voiceless							
Voiced	m	n	ŋ	l	ɹ	j	w

1.1.2 Phonetic voicing in English obstruents

Although we categorize English obstruents as either phonologically voiced or phonologically voiceless, we should note, that as Shockey (2003, 30) observes, there exists a tendency in English to “avoid voicing in obstruents when possible”, phonologically voiced stops are rarely actually voiced on the phonetic level and even if some voicing is going on, it is rarely maintained throughout the whole articulation (Ibid.). Phonologically voiced fricatives in English are however phonetically voiced in more cases (Ibid.). This subchapter presents a closer look on the issue of phonetic voicing in obstruents classified as voiced.

When utterance final, all phonologically voiced obstruents in English have very little phonetic voicing (1) (Ladefoged, 2001, 57).

- | | | |
|-----|----------------------|----------|
| (1) | <i>bad</i> /bæd/ | [b̥æd̚] |
| | <i>lose</i> /lu:z/ | [lu:z̚] |
| | <i>bridge</i> /bɪdʒ/ | [b̥ɪdʒ̚] |

Phonologically voiced stops and affricates in syllable onset are phonetically voiceless also in the syllable onset (2) (Ladefoged, 2001, 57). However, phonologically voiced fricatives in the initial position are not subject to utterance-initial devoicing (Jansen, 2007, 272) (3).

- | | | |
|-----|-------------------------------|----------------|
| (2) | <i>be good</i> /bi gud/ | [b̥i gud̚] |
| | <i>Georgetown</i> /dʒɔdʒtaun/ | [d̥ʒɔd̥ʒtaun̚] |
| (3) | <i>zoo</i> /zu/ | [zu] |
| | <i>thing</i> /θɪŋ/ | [θɪŋ] |

Phonologically voiced stops and affricates also remain phonetically voiceless when preceded or followed by a voiceless sound (4). Phonologically voiced fricatives remain voiced even when preceded by a voiceless sound when in onset (5). However, these fricatives remain voiceless in the final position when followed by a voiceless sound (6).

- | | | |
|-----|--------------------------------------|------------------------------|
| (4) | <i>outbid</i> /aʊt ^h bɪd/ | [aʊt ^h b̥ɪd̚] |
| | <i>bad times</i> /bæd taɪmz/ | [b̥æd̚ t ^h aɪmz̚] |
| (5) | <i>nice voice</i> /naɪs vɔɪs/ | [naɪs vɔɪs] |
| (6) | <i>newspaper</i> /nju:zpeɪpə/ | [nju:zpeɪpə̚] |

The only time a phonologically voiced stop (and affricate) is fully voiced is when both preceded and followed by a voiced sound (Ladefoged, 2001, 53) (7) (8). Phonologically voiced fricatives retain phonetic voicing also when surrounded by voiced sounds (9) in addition to when in onset (3).

- | | | |
|-----|-------------------|---------|
| (7) | <i>good</i> /gʊd/ | [g̚ʊd̚] |
|-----|-------------------|---------|

	<i>be good</i> /bi gud/	[b̥i gud]
(8)	<i>bad</i> /bæd/	[b̥æd]
	<i>bad act</i> /bæd ækt/	[b̥æd ækt̚]
	<i>bad night</i> /bæd naɪt/	[b̥æd naɪt]
(9)	<i>bad voice</i> /bæd vɔɪs/	[b̥æd vɔɪs]

Even when a phonologically voiced obstruent is devoid of phonetic voicing, the listener is able to discern the voicing class of the obstruent. This is because although the role of the presence of voicing during the closure of a consonant has some cue value, it is less significant than other cues like preceding vowel duration (Raphael, 1971, 1301) or aspiration (Roach, 1991, 32–33).

1.1.3 Voicing contrast in English

Even though phonetically voiced obstruents in English actually frequently lack phonetic voicing as we have discussed in the previous chapter 1.1.2, they remain discernable from voiceless obstruents, as they keep their other lenis characteristics. These include (expressed in comparison to phonologically voiceless obstruents):

- Longer preceding vowel duration (Raphael, 1971, 1301; Broersma, 2008, 1942)
- Shorter duration of the obstruent (Myers, 2010, 168)
- Higher intensity of the burst (stops, if released) or of the friction (fricatives and affricates) (Hayward, 2000, 196).

Also, in the stressed initial position, English stops classified as voiceless are distinguishable from stops, which are phonologically voiced, because stressed initial voiceless stops in English acquire aspiration (Roach, 1991, 32–33) (10).

(10)	<i>bin</i> /bɪn/	[b̥ɪn]
	<i>pin</i> /pɪn/	[p ^h ɪn]

1.1.4 *Progressive voicing assimilation*

The morphemes {/z/ ~ plural}, or {/z/ ~ possessive case}, or {/z/ ~ 3rd person singular} and the morpheme {/d/ ~ past tense} undergo progressive devoicing on the phonemic level. The morpheme {/z/} has the allomorphs /z/, which occurs after a voiced speech sound (except sibilants), /ɪz/ after a sibilant and /s/ after a voiceless consonant (11) (Volín, 2003, 55). The morpheme {/d/ ~ past tense} is realized as /d/ after a voiced consonant or a vowel, as /ɪd/ after alveolar plosives and /t/ after a voiceless consonant (12) [examples taken from Volín (2003, 57)].

(11) {/z/ ~ plural}, {/z/ ~ possessive case}, {/z/ ~ 3rd person singular}

/z/ *Pam's* /pæmz/, *eyes* /aɪz/

/s/ *hits* /hɪts/

/ɪz/ *buses* /bʌsɪz/

(12) {/d/ ~ past tense}

/t/ *stopped* /stɒpt/ AmE.

/d/ *robbed* /rɒbd/ AmE., *played* /pleɪd/

/ɪd/ *seated* /si:tɪd/

1.1.5 *Regressive voicing assimilation*

Voicing assimilation in English is mainly active in the regressive direction. We should note that English is not a language in which the contrast between voiced and voiceless obstruents is regularly neutralized through voicing assimilation (which is the case for Czech and Slovak). Still, some laryngeal coarticulation in consonant clusters is present in English (Myers, 2010, 164–165).

One of the most recent works taking a closer look on the regressive voicing assimilation as it functions in English is Myers' (2010) experimental phonological study. It focuses on the effects of regressive voicing assimilation on English fricatives and analyses how the voicing cues of word-final fricatives are affected by the voicing class of the following segment. Each

test word with a word final phonologically voiceless or a phonologically voiced fricative was put in a context before a vowel, a nasal, a voiced plosive and a voiceless plosive. Then the final fricative was measured for three voicing cues: the voiced and voiceless intervals within the fricatives, the duration of the fricative and the duration of the preceding vowel (p.167). Myers found out, that the effect of the following segment on the voicing interval of the phonologically voiceless fricatives was not significant (p. 169); however for phonologically voiced fricatives, this interval was affected when the following segment was a voiceless obstruent, in that the voicing interval was significantly shorter in comparison to that of a voiced fricative followed by other segments (Ibid.). Myers (p.170.) also observes, that the remaining voicing cues (preceding vowel duration and fricative duration affected) were not significantly affected by the voicing class of any of the following segments in neither the voiced fricatives nor the voiceless fricatives.

Complete (not partial) anticipatory devoicing can be found in some instances in English, however this occurs only in the most common phrases and otherwise is not natural (Volín, 2003, 67), also it only ever affects fricatives (Torres, 2001, 29) (13).

- (13) *of course* /ɔf 'kɔs/ [əʊ 'kɔs] or [əf 'kɔs]
have to /'hæv tə/ ['hæʊ tə] or ['hæf tə]
cf. leave cords /liv kɔdz/ [*lif kɔdz]

We should also mention, that in some dialects of English, especially in American, Australian and Irish English, we sometimes see an alveolar tap (or a ‘flap’ as it is sometimes called). The tap has been described by Shockey (2003, 29) as “a single gesture of ‘throwing’ the tongue towards the alveolar ridge, then letting it drop back.” While in Australian and Irish English, the use of tapping is limited to replacing the voiceless alveolar stop /t/ when between a stressed and an unstressed syllables respectively (Ladefoged, 2001, 51), in American English, the alveolar tap often occurs in place of both voiceless and voiced alveolar stops (Ibid.). The voiceless alveolar stop /t/ in words such as “bidder” and “bitter” are then both frequently realized as [ɾ] in American English. However as Braver (2011, 39) demonstrates, such tapping in American English leads to incomplete neutralization, at least for some speakers. As Braver explains, “[the] study found an effect of underlying voicing status on pre-flap vowel duration, suggesting that whether a given flap token originated as a /t/ or a /d/ had an impact on the

duration of the preceding vowel,” the effect of the underlying voicing is such that that the /t/-taps have longer preceding vowel duration than the /d/-taps (p. 36).

1.2 Allophonic changes of voicing in Czech

1.2.1 Czech consonant inventory

A feature, which cuts across the whole Czech phonological system, is the issue of voicing. Czech obstruents form pairs of voiceless and voiced obstruent counterparts, which undergo voicing assimilation. In an assimilatory position, a sound change occurs and the obstruent changes into an obstruent of the opposite voicing value.

Czech obstruent phonemes and their orthographic forms can be viewed in Table 4 and Table 3 respectively, their allophonic variations are given in Table 6. We see in Table 3, that all obstruent phonemes given are paired, except for the phonemes $\widehat{ts}/$ and $/\text{ɾ}/$, which do not form a pair with a phoneme of the opposing voicing value; however they still can be realized as allophones of the opposing voicing value in an assimilatory position. The voiceless fricative pair $/x/$ and $/h/$ can be realized as three allophones – $[x]$, $[\text{ɦ}]$ and $[\text{ɣ}]$, their distribution is determined by the environment. Also, the voiced labiodental fricative $/v/$ can in some cases be realized with no friction and become closer to a voiced labiodental approximant $[v]$.

Czech sonorants, given Table 6 and Table 7, are “unique” – they do not have a corresponding counterpart with the opposing voicing value. The liquid phonemes $/l, r/$ can be syllabic in Czech, they can act as the nucleus in a syllable.

Table 3: Obstruent sounds in Czech, orthographic forms

	stops			fricatives					affricates		trill
Voiceless	p	k	t	tʰ	s	f	š	ch	c	č	
Voiced	b	g	d	dʰ	z	v	ž	h		dž	ř

Table 4: Obstruent phonemes in Czech

	stops			fricatives					affricates		trill
Voiceless	p	k	t	c	s	f	ʃ	x	\widehat{ts}	$\widehat{tʃ}$	
Voiced	b	g	d	ɟ	z	v	ʒ	ɦ		$\widehat{dʒ}$	ɾ

Table 5: Obstruent sounds in English, phonetic transcription

	stops			fricatives						affricates		trill	
Voiceless	p	k	t	c	s	f	ʃ	x	ts	tʃ	ɾ		
Voiced	b	g	d	ʒ	z	v	ʋ	ʒ	ɦ	ɣ	dʒ	dʒ	ɾ

Table 6: Sonorant sounds in Czech, orthographic forms

Voiceless						
Voiced	m	n	ň	l	r	j

Table 7: Sonorant sounds in Czech, phonetic transcription

Voiceless						
Voiced	m	n	ɲ	l	r	j

Originally, both [d̥z̥, d̥ʒ̥] sounds were not a part of the Czech phonemic system, some older materials such as Palková (1994, 238) list them just as allophones to phonemes /t̥s/ and /t̥ʃ/. However, in modern Czech, we can definitely consider the voiced palato-alveolar affricate /d̥ʒ̥/ as a meaning-distinguishing phoneme. It found its way into the Czech phonemic system through borrowings from foreign expressions, most of which are now frequently used Czech words (14). Krčmová (2008, chapter 8.1.4.) views the former lack of voiced oppositions to /t̥ʃ/ as one of the reasons why has /d̥ʒ̥/ adapted into the Czech phonemic system so successfully.

- (14) *džem* /d̥ʒ̥ɛm/ [d̥ʒ̥ɛm] jam
džíny /d̥ʒ̥i:ni/ [d̥ʒ̥i:ni] jeans

Originally however, the [d̥z̥] and [d̥ʒ̥] sounds were mostly results of assimilatory processes. These are frequently obligatory as cases of voicing assimilation (15) (Palková, 1994, 213).

- (15) *lecko* /lets̥kdo/ [lets̥z̥gdo] whoever
oč běží /ot̥ʃ̥ bjezi:/ [od̥ʒ̥ bjezi:] what's going on

1.2.2 Contrast neutralization in Czech

Unlike in English, voicing assimilation can lead to complete contrast neutralization in Czech. The concept of contrast neutralization is connected with the Prague School of linguists and can be applied to Czech as follows. Czech phonemes can either be contrastive or non-contrastive, depending on their environment. For example, alveolar stops /t/ and /d/ are meaning distinguishing (contrastive) in Czech the initial position (16). This would be called a “position of relevance” (Lass, 1984, 41). However when /t, d/ occur in the final position in Czech, the /t/ - /d/ contrast is neutralized (17). In this case, the position is called “a position of neutralization” (Ibid.).

- (16) *dát* /da:t/ [da:t] to give
tát /ta:t/ [ta:t] to melt
- (17) *led* /lɛd/ [lɛt] ice
let /lɛt/ [lɛt] flight

As Lass (1984, 41) explains, in Trubetzkoy’s view, neither of the two opposing phonemes actually appears in the position of neutralization, rather an underlying archiphoneme, which shares properties common to both phonemes occurs. An archiphoneme for phonemes /t, d/ would then be an alveolar stop /T/ (18).

- (18) *led, let* /lɛT/

There has been some debate recently about whether the neutralization of contrast in Czech really is incomplete rather than complete. A recent study by Podlipský and Chládková (2007) suggests, that the preceding vowel duration in Czech indeed is affected by the voicing of an obstruent in the coda, in that “it is the shortest when the following consonant is voiceless, longer when the consonant is devoiced, and still longer when the consonant is voiced” (Ibid.). However, this study failed to prove that vowel duration serves as a cue for the perception of the phonological voicing class of the obstruent (Ibid.).

Further research into this matter by Sehnalíková (2010, 60) showed, that the vowel duration production of the Czech native subjects was not significantly affected by the voicing in coda. The study also found out, that the Czech native subjects failed to perform above chance when asked to categorize voicing in final consonants, leading to the assumption, that “without the

necessary context, final voicing simply cannot be perceived accurately in Czech since there might be no relevant cues to it” (p. 61).

1.2.3 Final devoicing

In Czech, voiced obstruents in coda undergo final devoicing (Palková, 1994, 329) and minimal pairs such as the ones in the example (19) become homophonous, as mentioned in the section 1.2.2.

(19)	<i>let</i> /let/	[let]	flight
	<i>led</i> /lɛd/	[let]	ice
	<i>les</i> /les/	[les]	forest
	<i>lez</i> /lez/	[les]	climb (v., imperative)

1.2.4 Regressive voicing assimilation

Czech is a language in which regressive voicing assimilation results in complete contrast neutralization and thus laryngeally mixed obstruent clusters do not occur in Czech – all obstruents in an obstruent clusters have to match in voicing value in Czech (Hall, 2003, 96; Myers, 2010, 163).

As Palková (1994, 328–329) shows, regressive voicing assimilation figures both in making phonologically voiceless obstruents acquiring the [+voiced] feature (20) and in making phonologically voiced obstruents lose voicing (21). Regressive voicing assimilation acts both within words and across word-boundaries (when there is no articulatory pause between the words).

(20)	<i>pět bodů</i> /pjɛt bodu:/	[pjɛd bodu:]	five points
	<i>naš dům</i> /naːʃ du:m/	[naːʒ du:m]	our house
	<i>kdo</i> /kdo/	[gdo]	who
	<i>sbor</i> /sbor/	[zbor]	a choir
(21)	<i>lov ptáků</i> /lov pta:ku:/	[lof pta:ku:]	bird hunting

<i>než půjde</i> /neʒ pu:jdɛ/	[neʃ pu:jdɛ]	till it goes
<i>odpor</i> /odpor/	[otpor]	resistance
<i>nůžky</i> /nu:ʒki/	[nu:ʃki]	scissors

Palková (1994, 328) adds, that sonorants (with some exceptions) do not trigger voicing assimilation in Czech (22). In Common Czech a sonorant can however follow a non-devoiced final voiced obstruent, but only in the case of the sonorant being preceded by a one-syllabic (stressed) preposition (23).

(22)	<i>sleva</i> /sleva/	[sleva]	discount
	<i>zleva</i> /zleva/	[zleva]	from the left
(23)	<i>nad lesem</i> /nad lesem/	[nad lesem]	above the forest
	<i>od rána</i> /od ra:na/	[od ra:na]	since morning

Sonorants triggering assimilation are frequent in some Czech dialects, most commonly Moravian Czech (24) (Palková, 1994, 329). This study will however mainly focus on the more widely spread Common Czech, partly because there is a greater contrast between the voicing assimilation systems of Slovak and Common Czech than between Slovak and Moravian Czech.

(24)	<i>lov ryb</i> /lov rɪb/	fishing
	[lof rɪp]	in Common Czech
	[lov rɪp]	in Moravian Czech
	<i>než najde</i> /neʒ najdɛ/	till he finds (it)
	[neʃ najdɛ]	in Common Czech
	[neʒ najdɛ]	in Moravian Czech

As Palková (1994, 325–326) observes when speaking about Common Czech, vowel-initial glottalization is required after non-syllabic prepositions and this glottal stop triggers devoicing

(25).¹ Omission of the glottal stop after non-syllabic prepositions is considered non-standard and sloppy in Czech (p. 326). In other situations (between two words, inside words) glottal stop omission is accepted (26). The preceding obstruent however stays voiceless even if the glottal stop is not actually present (27).

- (25) *z okna* /z okna/ [s ʔokna] from the window
- (26) *pod oknem* /pod oknem/ [potʔoknem] under the window
- bezodkladně* /bezodkladně/ [besʔotkladně] with no delay
- lev usnul* /lev usnul/ [lef ʔusnul] a lion fell asleep
- (27) *lev usnul* /lev usnul/ [lef usnul]

In the dialects of Moravia, glottal stop omission after non-syllabic prepositions is more common and may result in regressive voicing of the obstruent (28) (Palková, 1994, 327). Between words and inside words in Moravian dialects, the absence of a glottal stop does trigger regressive assimilation (29).

- (28) *k oknu* /k oknu/ [goknu] in Moravian Czech
- to the window
- (29) *bezodkladně* /bezodkladně/ [bezotkladně]
- pod oknem* /pod oknem/ [podoknem]

As mentioned in section 1.2.1, phonemes /fi/ and /x/ are not truly “paired” in that they can both be additionally realized as the voiced velar fricative [ɣ] in certain environments. The phoneme /fi/ is realized as [x] when subject to regressive voicing assimilation (i.e. when followed by a voiceless obstruent) or final devoicing (30). When the /x/ or /fi/ phonemes are

¹ In frequently used /o/-initial words in Common Czech, we sometimes see epenthetic /v/, as in [k voknu] (Volín, 2010, 54).

word-final and are followed by a voiced obstruent or a vowel, they are realized as [ɣ] or [ɦ], the former being the preferred articulation (Volín, 2010, 51) (31).

(30) *roh stolu* /roɦ stolu/ [rox stolu] the corner of the table

jih /jiɦ/ [jix] south

(31) *abych byl* /abix byl/ so that I would be

[abix] → [abɣ byl]

or [abɣɦ byl]

práh dveří /pra:ɦ dveři:/ treshold

[pra:x] → [pra:ɣ dveři:]

or [pra:ɦ dveři:]

The behaviour of /v/ is complicated not only in Czech, but also in other languages. Its double face has been documented in Slovak, Hungarian and Russian (Kiss and Bárkányi, 2006, 195). In Czech it behaves like a sonorant in that it does not trigger regressive voicing (32), however it undergoes regressive devoicing and final devoicing (33) which makes it obstruent-like as well (Palková, 1994, 330).

(32) *tvůj* /tvu:j/ [tvu:j] your

k vode /k voʝɛ/ [k voʝɛ] to the water

(33) *vtip* /fciɸ/ [fciɸ] a joke

kov /kof/ [kof] metal

1.2.5 Progressive voicing assimilation

The (lowered) alveolar fricative trill /ɾ/, a sound so typical for Czech phonology (because so unique among the languages of the world), has two phonetic representations and can undergo both regressive and progressive assimilation (Palková, 1994, 231, 330). It is realized as a voiced [ɾ] when in the beginning of the word, when preceded by a voiced consonant in an

onset CC cluster or when intervocalic (34). The phoneme /r̥/ is realized as a devoiced [r̥] when in a consonant cluster with voiceless obstruents (both when preceded or followed by a voiceless obstruent) or when word-final (35) (Ibid.).

(34)	<i>řeka</i> /r̥ɛka/	[r̥ɛka]	a river
	<i>mřenka</i> /m̥rɛŋka/	[m̥rɛŋka]	a loach
	<i>pořád</i> /poɾa:t/	[poɾa:t]	still
(35)	<i>tři</i> /t̥ɾi/	[t̥ɾi]	three
	<i>hořký</i> /hoɾki:/	[hoɾki:]	hot
	<i>keř</i> /keɾ/	[keɾ̥]	a bush

If an /f/ phoneme follows an /s/ phoneme in an onset CC cluster in Common Czech, the /f/ phoneme assimilates in voicing with /s/, i.e. it is realized as the voiceless [x]. This is an instance of progressive assimilation of voicing (with the first C in the CC cluster as the source of the spreading feature). However, in Moravia, regressive assimilation (with the second C of the cluster as the source of the spreading feature) is more typical (Palková, 1994, 331) (36).

(36)	<i>na shledanou</i> /na sɦledanou/	good-bye
	[na sxɦledanou]	in Common Czech
	[na zɦledanou]	in Moravia

1.3 Allophonic changes of voicing in Slovak

1.3.1 Slovak consonant inventory

A feature, which cuts across the whole Slovak phonological system, is the issue of voicing. Slovak obstruents form pairs of voiceless and voiced obstruent counterparts, which undergo voicing assimilation. In an assimilatory position, a sound change occurs and the obstruent changes into an obstruent of the opposite voicing value.

Slovak obstruent phonemes and their orthographic forms can be viewed in Table 9 and Table 8 respectively, their allophonic variations are given in Table 10. In Table 10 we see that the phoneme /v/ has four positional allophones [f], [v], [v̥], [v̥̥] and the voiceless fricative /h/, which has three – [x], [ħ] and [χ]. Compared to the consonant system of Czech, Slovak lacks the phoneme /r̥/, but the phonemes /d͡z/ and /d͡ʒ/ are more native to Slovak and are used more frequently.

Slovak sonorants, given Table 11 and Table 12, are “unique” – they do not have a corresponding counterpart with the opposing voicing value. Compared to Czech, Slovak has additional sonorants, which include the liquids /l̥/, /l̥̥/ and /r̥/. Liquid phonemes /l, l̥, r, r̥/ can be syllabic in Slovak, they can act as a nucleus in a syllable.

Table 8: Obstruent sounds in Slovak, orthographic forms

	stops			fricatives					affricates	
Voiceless	p	k	t	tʰ	s	f	š	ch	c	č
Voiced	b	g	d	dʰ	z	v	ž	h	dz	dž

Table 9: Obstruent phonemes in Slovak

	stops			fricatives					affricates	
Voiceless	p	k	t	c	s	f	ʃ	x	ts̥	tʃ̥
Voiced	b	g	d	ʒ	z	v	ʒ	ħ	d͡z̥	d͡ʒ̥

Table 10: Obstruent sounds in English, phonetic transcription

	stops			fricatives							affricates		
Voiceless	p	k	t	c	s	f			ʃ	x	ts̥	tʃ̥	
Voiced	b	g	d	ʒ	z	v	v̥	v̥̥	ʒ	y	ħ	d͡z̥	d͡ʒ̥

Table 11: Sonorants in Slovak, orthographical forms

Voiceless									
Voiced	m	n	ň	l	ʀ	ĺ	r	ř	j

Table 12: Sonorants in Slovak, phonetic transcription

Voiceless									
Voiced	m	n	ɲ	l	ʎ	l:	r	r:	j

1.3.2 Final devoicing

Like in Czech also in Slovak, are voiced obstruents at the end of a word subject to final devoicing, which can lead to neutralization of contrast (Hanulíková and Hamman, 2010, 376) (37). For more discussion on contrast neutralization as it functions in both Czech and Slovak, see section 1.2.2.

- (37) *plot* /plot/ [plot] a fence
plod /plod/ [plot] fruit
prah /prah/ [prax] threshold
prach /prax/ [prax] dust

1.3.3 Regressive Voicing Assimilation

Slovak obstruents are also affected by regressive voicing assimilation, which can result in voicing or devoicing of the obstruent (Hall, 2003, 106). Unlike in Common Czech though, the ability to trigger the assimilatory change is not limited solely to obstruents, as sonorants can also act as triggers of voicing assimilation (p. 107) (38). In this way, the Moravian dialects are closer to the Slovak assimilation system, because in it, sonorants frequently trigger regressive voicing assimilation as well (39) (Volín, 2010, 51). Sonorants however do not spread regressive voicing assimilation in every situation, there is no spreading of the [+voiced] value when not on a morphological boundary (40).

- (38) Slovak: *s mužom* /s muʒom/ [z muʒom]
with a man
Common Czech: *s mužem* /s muʒɛm/ [s muʒɛm]
with a man
(39) Moravia: *s mužem* /s muʒɛm/ [z muʒɛm]

			with a man
(40)	<i>tmavý</i> /tmavi:/	[tmavi:]	dark

Devoicing of a phonologically voiced obstruent can occur when an obstruent is followed by a voiceless consonant, whether inside the word (41) or across a word boundary (42) (Kráľ, 1984, 113–115).

(41)	<i>bezťak</i> /beztak/	[bestak]	anyhow
	<i>hĺbka</i> /ɦl̩:bka/	[ɦl̩:pka]	depth
	<i>nadpis</i> /nadpis/	[natpis]	heading
(42)	<i>keď sa dozvedel</i> /keɟ sa dozveɟel/	[keɟ sa dozveɟel]	
			when he found out
	<i>z Prešova</i> /z preɟova/	[s preɟova]	
			from Prešov

Regressive voicing assimilation also works the other way around, as voicing can spread from a voiced consonant onto a preceding voiceless obstruent. Kráľ (1984, 113–115) observes that this type of assimilation occurs when a voiceless obstruent is followed by a voiced sound (a voiced obstruent, a vowel or a sonorant) when there is no pause in the pronunciation and it occurs inside the words (43) or between them (44).

(43)	<i>prosba</i> /prosba/	[prozba]	a plea
	<i>viacročný</i> /viatsrɔtʃni:/	[viadzrɔtʃni:]	several years old
	<i>hocako</i> /ɦɔtsako/	[ɦɔdʒako]	by any means
(44)	<i>pec hreje</i> /peɟs ɦreɟe/	[peɟz ɦreɟe]	the oven is warm
	<i>most opravili</i> /most opravili/	[mozd opravili]	
			they repaired the bridge
	<i>vlak mešká</i> /vlak meɟka:/	[vlag meɟka:]	the train is late

While in Czech the insertion of a glottal stop prevocally is very common, even mandatory and thus is a trigger to regressive devoicing, in Slovak it is far less frequent, as Slovak speech is characteristically connected (Král', 1984, 101; Rendár, 2009, 620).

When a glottal stop is inserted prevocally after a consonant in Slovak, it does cause regressive devoicing of the consonant. When such articulation is used inside words or between two words however, it is considered an orthoepic mistake in Slovak (45) (Král', 1984, 101), the correct pronunciation is one using linked speech (46). Glottalization in Slovak may sometimes be used vowel-initially in the first word of a sentence after an articulatory pause or in affected speech (47).

- | | | |
|------|--|----------------------------|
| (45) | <i>bezodkladne</i> /bezodkladɲe/ | [*bɛsʔotkladɲe] |
| | | with no delay |
| | <i>vlak už odišiel</i> /vlak uʒ odiʃiɛl/ | [*vlak ʔuʃ ʔodiʃiɛl] |
| | | the train has left already |
| (46) | <i>bezodkladne</i> /bezodkladɲe/ | [bɛzotkladɲe] |
| | <i>vlak už odišiel</i> /vlak uʒ odiʃiɛl/ | [vlag uʒ odiʃiɛl] |
| (47) | <i>ani nepovedala</i> /ɲi nɛpovɛdala/ | [ʔɲi nɛpovɛdala] |
| | | she did not even say |
| | <i>ej!</i> /ɛi/ | [ʔɛi] |
| | | hey! (interjection) |

The realization of the /f/ and /x/ phonemes is quite similar in Slovak to their realization in Czech, in that they can both be realized as a voiced velar fricative [ɣ] under certain conditions (Král', 1984, 124–125). When the /f/ phoneme is followed by a voiceless sound or when before a pause, it gets devoiced and is realized as the voiceless velar fricative [x] (48). If the /x/ or /f/ phonemes are followed by a voiced sound, they can be realized as [ɣ] or [f], the former being more common (49).

- (48) *juh* /juɦ/ [jux] south
roh stola /roɦ stola/ [rox stola] corner of a table
- (49) *nech ide* /nɛx idɛ/ [nɛɣ idɛ] let him/her go
 [nɛɦ idɛ]
- druh vína* /druɦ vi:na/[druɣ] → [druɣ vi:na] wine type
 [druɦ vi:na]

As mentioned in section 1.2.4, the behavior of the phoneme /v/ is complicated not just in Slovak, but in other Slavic languages as well. While in some context it behaves like a voiced fricative, with the voiceless counterpart being the voiceless fricative /f/; in other contexts, it behaves like a sonorant (for an extensive discussion on the phoneme /v/ and its categorization see Tabačeková [1981, 179–181]).

In coda, /v/ behaves in a sonorant-like fashion as it does not devoice when word final. Instead, it is realized as [ɤ] (in older literature sometimes also transcribed as [w]) or as the voiced approximant [v] (50) (Hanulíková and Hamann, 2010, 374). Notice this happens also when preceded by syllabic [l] or [r] which act as a vowel in this situation (51).

- (50) *stav* /stav/ [staɤ] or [stav] state (a condition)
- (51) *krv* /krv/ [krɤ] or [krv] blood

The phoneme /v/ is also realized as [ɤ] or [v] in syllable coda whenever followed by a voiced or a voiceless consonant (52) (Hall, 2003, 107). The [f] realization in this context is considered a grave orthoepic mistake in Slovak (Kráľ, 1984, 121) and a czechism, but may be heard in some local dialects.

- (52) *lávka* /la:vka/ [la:ɤka] or [la:vka] a footbridge
 [*la:fka]
- stávka* /sta:vka/ [sta:ɤka] or [sta:vka] a bet

pravda /pravda/ [praʊ̯da] or [prauda] truth

In the syllable onset, /v/ is subject to regressive devoicing, in which it copies the behavior of other obstruents in Slovak. The distribution of allophones of /v/ in syllable onset, taken from Hanulíková and Hamann (2010, 374, 376), is as follows.

In the onset before a voiced obstruent, the /v/ phoneme is realized as a voiced fricative [v] (53).

(53) *vzrast* /vzrast/ [vzrast] increase

When followed by a vowel or a liquid, the /v/ phoneme is realized as a voiced approximant [v] (54).

(54) *krvavý* /krvavi:/ [kr̥vavi:] bloody

vrah /vrafi/ [v̥rax] murderer

When a voiceless obstruent follows, the /v/ phoneme is realized as a voiceless fricative [f] (55).

(55) *včela* /vt̥ʃɛla/ [ft̥ʃɛla] a bee

v celi /v tsɛli/ [f tsɛli] in a cell

The phoneme /v/ does not trigger regressive voicing assimilation, except for across word boundaries (56). In this way it copies the behavior of sonorants as triggers of voicing assimilation.

(56) *tvár* /tva:r/ [tva:r] face

brat vám povie (my/your) brother will tell you

/brat va:m povje/ [brad va:m povje]

When looking at the behavior of the /v/ phoneme as a trigger of voicing assimilation in Czech, we see that in Common Czech, /v/ acts like a sonorant in that it does not trigger regressive

voicing assimilation (32). However in Slovak [much like in Moravian dialects (24)], sonorants do trigger voicing assimilation (38) and so does /v/ (57).

(57) *k vode* /k voʝɛ/ [g voʝɛ] to the water

1.4 Second language acquisition perspective

Before we inspect and compare the three languages and draw our hypotheses, let us consider the theoretical background of how does native language knowledge influence the learning of a foreign language.

1.4.1 The contrastive analysis hypothesis

The emergence of the field of SLA is tightly connected to the psychological schools of behaviorism and structuralism, which were highly prevalent during the inception of SLA. Many of the basic notions of both behaviorism and structuralism like the notions of habits, cumulative learning and transfer found their way into the early concepts of SLA (Gass and Selinker, 2008, 89–94). From this behaviorist and structuralist framework emerged the Contrastive Analysis Hypothesis (CAH), which dominated the field of SLA during the 1960s. The CAH, as proposed by Lado's influential 1957 work *Linguistics across cultures*, positioned the notion of language transfer to its very centre and claims, that all errors that learners of a L2 make are attributable to the NL, because learners tend to transfer the NL forms and meanings during the process of the acquisition (p. 89). In order to determine where the potential errors caused by the interference of the NL will occur according to the CAH, one is to do a contrastive analysis of the NL and the TL (p. 96). This entails comparing the two languages, one linguistic level at a time.

The CAH operates under the assumption, that the dissimilarity of two languages generates difficulty and thus causes errors in the learner's output and also, that the deeper the differences between the languages are, the more difficulty and errors are to be expected (Gass and Selinker, 2008, 97). This would be a case of negative transfer or interference. However, when the NL and the TL prove to be similar in some aspects, the transfer of the NL forms and structures benefits the learner and is considered positive transfer. In order to successfully acquire a TL according to the CAH, one has to learn the differences between the TL and the NL and for everything else use previous knowledge from the NL (Ibid.).

The notion of difficulty in the CAH started a discussion among fellow linguists working within the framework of the CAH, as the simple notion: the more different – the more difficult proved to be too simplistic (Gass and Selinker, 2008, 100). The Hierarchy of Phonological Difficulty (as seen in Table 13) by Stockwell and Bowen (1965) extended the CAH by acknowledging there may be various *degrees* of difficulty a learner is expected to encounter, depending on whether a given phonological categories is “optional”, “obligatory” or “null” in L1 and L2 (Eckman, 2004, 516). As we can observe, the situation deemed to be the most difficult occurs when the construction is not present in the NL, but is obligatory in the TL.

Table 13: The Hierarchy of Phonological Difficulty

NL	TL	
0	Obligatory	↑ difficult
0	Optional	
Optional	Obligatory	
Obligatory	Optional	
Obligatory	0	↓ easy
Optional	0	
Optional	Optional	
Obligatory	Obligatory	

Source 1: Stockwell and Bowen (1965), as cited in Gass and Selinker (2008, 179)

For example, when a learner whose NL does not keep a contrast between a voiced stop and a voiceless stop in the final position (like Czech) tries to learn a TL, in which this contrast is mandatory (like English), the learner will experience difficulty. However if an English native speaker tries to acquire a language, which also keeps the final contrast in voicing, the Hierarchy of Phonological Difficulty predicts, that no grave difficulties are to be encountered.

1.4.2 Addressing the criticism of CAH

Since the inception of the CAH, it has been very influential, but also a target of much criticism. While we chose to use the method of contrastive analysis as the basis of this thesis, we have not done so without considering and addressing some of its potential shortcomings.

Although the fact that the NL indeed affects SLA has never been too controversial, the scope of NL influence has been debated in some linguistic fields such as syntax. The influential

child acquisition morpheme study by Burt and Dulay (1984) seriously challenged the validity of CAH. Their study focuses on syntactic errors made by Spanish native speakers (ages 5–8) learning English and the study found that only 4.7% of the total number of mistakes analyzed could be attributed to the Spanish NL interference (p. 132). The remaining errors were recognized as having mostly developmental origins (87.1%).

Still, in terms of phonological research, the concepts of CAH have not encountered as much critique and even those who are skeptical of the prediction ability of CAH, acknowledge its importance in phonology (Eckman, 2004, 515). Richards (1970, 2) notes, that “contrastive analysis may be most predictive at the level of phonology, and least predictive at the syntactic level.”

Nevertheless, the undisputable weaknesses of the CAH remain its uncompromising claim, that *all* errors learners make when learning an L2 are attributable to language transfer and the CAH’s failure to consider other factors, such as “innate principles of language, attitude, motivation, aptitude, age, other languages known and so forth” (Gass and Selinker, 2008, 100). However, we should note that although the CAH as a complex hypothesis was largely disputed, contrastive analysis as a method of predicting errors in SLA has not and for the purposes of our phonological study, it will suffice.

1.5 Contrastive analysis of voicing systems of English, Czech and Slovak

As we have established in the previous section 1.4, we have chosen the method of contrastive analysis as the basis for our predictions in this thesis. In order to draw the hypotheses predicting the errors of Slovak and Czech speakers will likely produce when speaking an L2 – English, which are caused by voicing assimilation, we first need to compare the English, the Slovak and the Czech assimilation systems. This section focuses on the areas where the three languages differ from each other and are thus expected to be subject to negative transfer.

1.5.1 Realization of phonologically voiced obstruents

We have previously noted, that phonologically voiced stop and affricate sounds in English are produced as phonetically voiceless during closure, unless both preceded and followed by a voiced sound (Ladefoged, 2001, 53). Phonologically voiced fricatives in the initial position however retain their voicing (Jansen, 2007, 272) (more discussion in section 1.1.2). In Czech and Slovak, phonologically voiced obstruents (including stops and affricates) in the initial position are realized as phonetically voiced. Because of this, both Czech and Slovak speakers

are expected to realize English initial obstruents as voiced. This is a case of negative transfer in realization of phonologically voiced stops and affricates (when not both preceded and followed by voiced sounds) but a case of positive transfer in the realization of phonologically voiced fricatives and phonologically voiced stops and affricates when surrounded by vowels or sonorants.

1.5.2 Neutralization of contrast

As discussed in segments 1.2.1 and 1.3.2, the process of voicing assimilation in both Czech and Slovak can result in neutralization of contrast, which causes sound change, i.e. two phonemes, which contrast on the phonological level, become identical on the phonetic level. We call this process ‘complete contrast neutralization’.

However in English, complete contrast neutralization usually does not occur (see section 1.1.5) and although coarticulation causes some voicing assimilation, contrast neutralization is incomplete. English has adopted other acoustic cues, which help to keep voicing contrast in final position discernable, these cues include: duration of the obstruent preceding a vowel (Raphael, 1971, 1301) and aspiration of voiceless stressed onset obstruents (Roach, 1991, 32–33). While it has been observed, that the tendency of the preceding vowel duration being longer before a voiced obstruent is somewhat of a universal tendency (Podlipský and Chládková, 2007), still this rule has been phonologized in English and the effect has been deemed “relatively large” (Ibid.) in English.

This partial contrast neutralization (or partial devoicing) in English may pose some challenge for Slovak and Czech speakers, as they may pronounce English obstruents as though they underwent complete contrast neutralization, when it is required that the contrast is present in English.

1.5.3 Regressive voicing assimilation

In both Czech and Slovak, regressive assimilation causes, that voiceless obstruents frequently become voiced in an assimilation position [see (20) and (43)]. However in English, voiceless

obstruents mostly do not become voiced as result of voicing assimilation², partly because English avoids voicing in obstruents much more intensely than Czech and Slovak. Thus, it is to be expected, that both Czech and Slovak learners of English will incorrectly change an underlyingly voiceless obstruent in English into a voiced one, wanting to apply the principles of regressive voicing assimilation in a place, where an English speaker would realize the phonologically voiceless obstruent with no voicing and would keep the phonetically voiced obstruent (at least partially) devoiced.

It also should be noted, that in some cases, a glottal stop may be inserted in front of an initial vowel. This feature, sometimes called a “hard onset” is particularly characteristic for the Czech language. A glottal stop behaves like a voiceless obstruent in that it triggers devoicing or prevents a phonologically voiced obstruent from being revoiced.

Regressive voicing assimilation in Czech and Slovak also causes phonologically voiced obstruents to change into voiceless ones if followed by voiceless sounds [as demonstrated in (21) and (41),(42)]. However in English, this situation does not result in complete devoicing of the obstruent (more in section 1.1.2). This may be a source of difficulty for Czechs and Slovaks speaking English.

1.5.4 Sonorants as triggers of voicing assimilation

While in Slovak, sonorants trigger (regressive) voicing assimilation [as demonstrated in (38)], in Common Czech they do not (22). In English, phonetically voiced obstruents do maintain phonetic voicing when in intervocalic or intersonorant position (as discussed in section 1.1.2). Slovak speakers are expected to transfer sonorants triggering voicing assimilation into their production of English, which may be a case of positive transfer if the obstruent is underlyingly voiced, however, it may be a case of negative transfer if the obstruent is underlyingly voiceless.

² We could consider ‘tapping’ an exception to this rule. We discuss the issue of tapping in section 1.1.5 in more detail.

1.5.5 Behavior of the /v/ phoneme

As noted in the earlier sections 1.2.4 and 1.3.3, the phoneme /v/ acts differently in Czech than it does in Slovak, especially in the final position, as in Slovak it can be realized as a vowel-like sound [v̥]. It is expected that Czech speakers will pronounce the devoiced /v/ sound as a voiceless fricative sound [f], while Slovak speakers will prefer the [v̥] realization.

1.5.6 Table predicting L1 interference

Our predictions, based on the contrastive analysis of the voicing assimilation systems of English, Czech and Slovak are given in Table 14. They predict possible results of language transfer – both positive and negative – on the production of the L2 (English). Areas of difficulty (interference) are highlighted in yellow.

Table 14: Predicted language transfer in voicing assimilation observed in speech of Czech, Slovak learners of English. The target segments studied are stops or affricates in four different contexts (the obstruent in question is followed by a vowel, a phonologically voiced obstruent sound, a nasal or a phonologically voiceless obstruent sound)

Context	Target segment: voiceless obstruent				Target segment: voiced obstruent			
	V	+ O	N	- O	V	+ O	N	- O
English	-	- *	-	-	+	+	+	dev
Slovak	+	+	+	-	+	+	+	-
Czech	- ?	+	-	-	- ?	+	-	-

Areas of the predicted L1 interference (negative transfer caused by the L1) are highlighted in yellow.

Context (the sound immediately following the target segment):

“V” – vowel; “+O” – phonologically voiced obstruent sound; “N” – nasal; “- O” – phonologically voiceless obstruent sound

* stops/affricates in context (sounds following the target segment) are expected to be devoiced in this position if non-homorganic

Predicted voicing values of the target segments:

“+” indicates our expectation that the sound in the given context will be realized as voiced; “-” sound will be realized as voiceless; “dev” sound will be realized as voiceless during closure, but still discernable from its voiceless counterpart; “?” – a glottal stop

1.5.7 Statement of hypotheses

Based on the contrastive analysis of the three languages, areas of predicted L1 transfer were determined and summarized in the Table 14. In accordance with these findings following hypotheses determining L1 transfer were raised:

H1: Slovak speakers will produce phonologically voiceless and phonologically voiced obstruents as voiced when followed by a vowel, if the following vowel is not glottalized. Czech speakers are expected to glottalize the initial vowel, which stops the spreading of the voiced value and thus Czech speakers will produce phonologically voiceless and phonologically voiced obstruents as voiceless, followed by a glottalized vowel.

H2: Both Czech and Slovak speakers will produce phonologically voiceless obstruents as voiced when followed by a voiced obstruent sound.

H3: Both Czech and Slovak speakers will produce phonologically voiced obstruents as voiceless when followed by a voiceless obstruent sound.

H4: Slovak speakers are expected to have sonorants triggering voicing assimilation in their production of English, which may be the case of negative transfer when the underlyingly voiceless obstruent is followed by a sonorant. However, Czech speakers are expected not to have sonorants triggering voicing assimilation in their production of English, which may be the case of negative transfer when the underlyingly voiced obstruent is followed by a sonorant.

H5: Slovak speakers are expected to realize the voiced fricative /v/ as an [ɤ] sound in a position of assimilation.

H6: Both Czech and Slovak speakers will produce phonologically voiced stops and affricates as phonetically voiced even when not both preceded and followed by vowels or sonorants.

2 Methodology

The goal of this thesis is to find out whether Slovak and Czech speakers transfer some of the voicing assimilation systems from their native languages to their production of an L2 language – English. In order to find this out, we have presented a detailed look into the voicing assimilation systems of English, Czech and Slovak and drew hypotheses predicting areas, which will be subject to negative language transfer. In this chapter, methods used in the practical research are introduced.

2.1 Participants

Participants used in the study were divided into three groups: a group of Slovak speakers, a group of Czech speakers and a control group of native English speakers. The criterion for the

Czech group was, that the speakers had to come from Bohemia and speak what is considered Common Czech. The reason for this specification is that the Moravian dialect is very close to Slovak in some aspects of voicing assimilation, most noticeably the role of sonorants as triggers of voicing assimilation, as we have discussed in this thesis in examples (24), (39). Both the Czech and the Slovak group included 3 learners of English, their proficiency level ranging from upper-intermediate to advanced. A more extensive overview of the subjects is included in Appendix 2 (section 6.2).

2.2 Materials

The elicitation instrument consisted of a set of 88 test sentences printed on a sheet of paper. Subjects were asked to read the utterances out loud while being recorded with a Sanako HSL-07 headset microphone. The program used for recording was Praat (vers. 5.2.22, Boersma and Weenink, 2011). Sentences were presented to the subjects in a randomized order.

In the test utterances, there were 10 minimal pairs differing only in the voicing of the final obstruent used (58) and two non-paired words, which both had a final voiceless affricate /ts/ (59). The minimal pairs were previously used in studies by Myers (2010, 176; November 22, 2010, e-mail message to author).

- (58) proof – prove
- leaf – leave
- belief – believe
- neat – need
- seat – seed
- feet – feed
- leak – league
- rich – ridge
- Bruce – bruise
- ice – eyes
- (59) let’s – cats

The minimal pairs were pretested for the purposes of this thesis by the total number of 35 respondents. The pretesting subjects did not participate in the actual study. The goal of the pretesting was to exclude pairs of words, which non-native speakers would not recognize as contrasting, as they were not able to transcribe the given words at the success rate required. Minimal pairs, whose error rate was higher than 50% were excluded. We found that subjects had trouble especially with identifying pairs which ended in alveolar fricatives /s/ - /z/. However, we decided to include two such pairs even though they did not meet our error rate requirement in the pretesting, but to treat them differently from other pairs, which successfully passed.

The 22 test words were then each set in these four contexts:

1. The obstruent followed by a vowel
2. The obstruent followed by a nasal
3. The obstruent followed by a voiced obstruent
4. The obstruent followed by a voiceless obstruent

The sentences were constructed so that the speaker would be discouraged from inserting an articulatory pause in between the obstruent and the two observed sounds in that the main stress was on the first word (the minimal pair word). It was important to encourage a fluency in speech, which is necessary to observe the effects of assimilation. Some of the sentences used in the testing were already used in Myers' studies (2010; November 22, 2010, e-mail message from author). For a full list of all the test sentences, refer to Appendix 1 (section 6.1).

2.3 Analysis methodology

The data obtained from speakers were first analyzed in an impressionistic matter in combination with an acoustic analysis done using Praat (vers. 5.2.22, Boersma and Weenink, 2011) and were later submitted to a number of statistical analyses. The studied tokens were marked and segmented in Praat according to the rules proposed by Machač and Skarnitzl (2009, 27–55).

Individual tokens were analyzed for the presence of voicing, that is both for phonetic voicing and phonological voicing. It is assumed, that it is possible to identify a phonologically voiced obstruent which has been devoiced, as it still retains some of the characteristics of a voiced obstruent as was mentioned in section 1.1.2, such as longer preceding vowel duration

(Raphael, 1971, 1301; Broersma, 2008, 1942), shorter duration of the obstruent (Myers, 2010, 168) and higher intensity of the burst (stops, if released) or of the friction (fricatives and affricates) (Hayward, 2000, 196) when compared to phonologically voiceless obstruents. However, as we have pointed out (see section 1.2.2), preceding vowel duration in Czech does not significantly affect the voicing of an obstruent in the coda (Sehnalíková, 2010, 60). Because of this, the preceding vowel duration cannot be treated as a cue for voicing in the Czech and presumably neither it can in the Slovak group. In our analysis, we decided not to use the preceding vowel duration as a cue for determining the phonetic voicing of obstruents. Other cues like the duration of the obstruent and the intensity of the burst or the friction however have been employed in addition to the impressionistic evaluation.

2.4 ANOVA

The data were submitted to repeated measures analysis of variance (ANOVA). The dependant variable was the voicing status of the studied obstruent. After the obstruents were analyzed for the presence of voicing, they were classified into four categories: “voiced”, “voiceless”, “devoiced”, “deleted”. For the purposes of the statistical analysis, obstruents classified as “voiced” or “devoiced” were merged into one category named *voiced*, obstruents classified as “deleted” were ignored and not counted in the statistical analysis, obstruents classified as “voiceless” were put into a category named *voiceless*. In the ANOVA, the voicing value of all obstruents was expressed on a scale of 0–1.00; 1.00 meaning that all the counted obstruents were voiceless; 0.80 meaning that 80% of the counted obstruents were voiceless and 20% were voiced or devoiced. This value is called “Proportion of voicelessness” for short.

The between-subject independent variable was the native language, called “L1” for short (possible values: Slovak, Czech, English). There were two within-speaker independent variables: target segment phonological voicing value, called “Target /voicing/” for short (possible values: voiced, voiceless) and “Context” – the target segment following the token sound (5 possible values: vowel, voiced fricative, voiced stop/affricate, nasal, voiceless). In order for the variable to be deemed as having a significant effect, the alpha level was set to be $p=0.05$.

In addition to ANOVA, the raw data were also searched and analyzed in direct connection to the hypotheses that have been drawn. The findings were put into concise tables and are discussed in the Discussion section of the thesis.

3 Results

3.1 ANOVA results

The data were submitted to a number of statistical analyses to find out which variables were significant and which were not. Not surprisingly the Target /voicing/ variable (the underlying voicing value of the given obstruent) proved to have a significant effect on the proportion of voicelessness: $F(1,5)=73.300$, $p=.00036$, which means that phonologically voiced obstruents were indeed realized as phonetically voiced significantly more often than phonologically voiceless obstruents.

The effect of the “Context” variable on the proportion of voicelessness proved to be strongly significant: $F(4,20)=14.202$, $p=.00001$, which means that the following sound has a significant effect on the phonetic voicing of the preceding obstruent for all L1 groups.

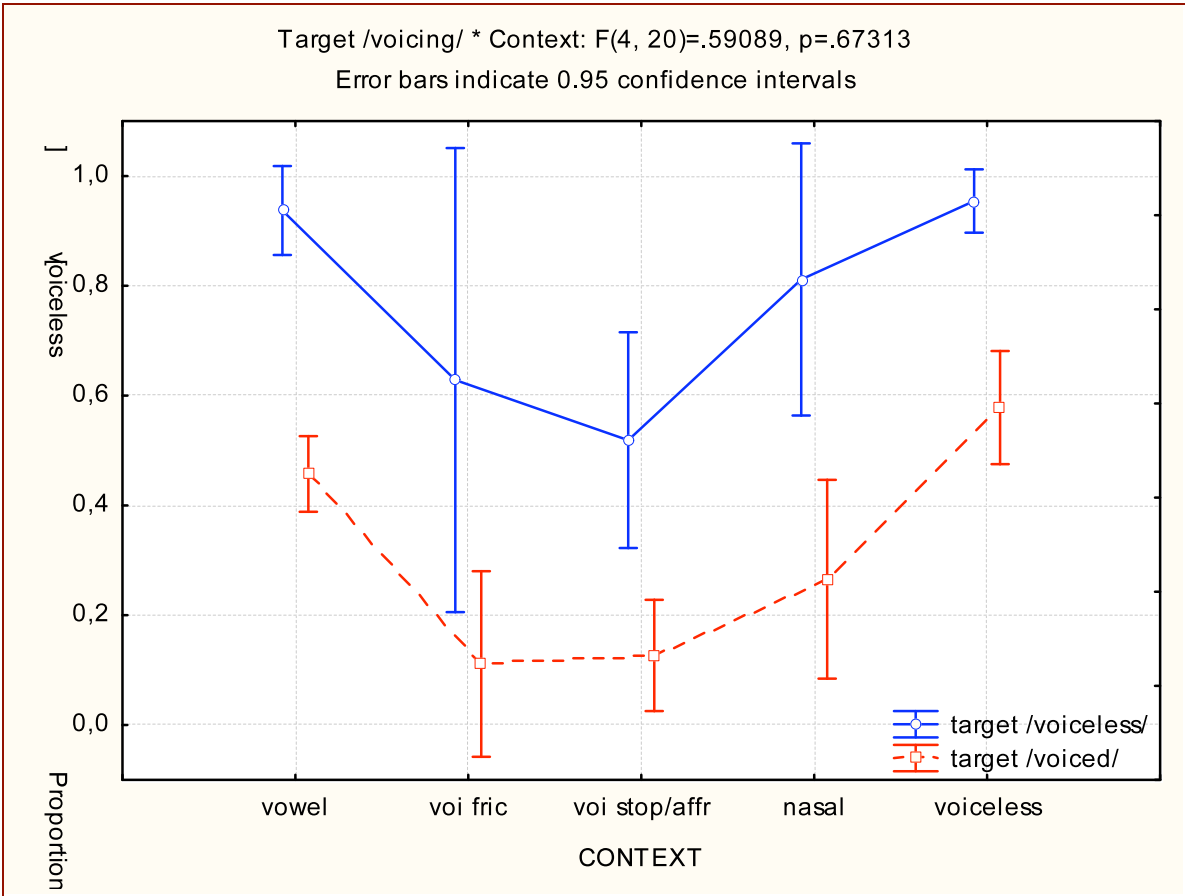
When we inspect the effect of the context further and take into consideration the effect of the phonological voicing of the obstruent as well, as we can observe in Figure 1, we can see that the phonological realization of the “target /voiceless/” obstruents and the “target /voiced/” obstruents (i.e. phonologically voiced obstruents) does indeed depend on the following segment. The obstruents tested tend to be phonetically voiced more frequently when followed by a voiced fricative and a voiced stop or an affricate, this applies both for “target /voiceless/” and “target /voiced/” obstruents. This tendency is observed, even though to a lesser extent, when the obstruent is followed by a nasal.

In a voiceless context, phonologically voiceless obstruents are realized almost exclusively as phonetically voiceless. Phonologically voiced obstruents tend to be realized as voiceless just short of 60% of the time in a voiceless context.

However there is quite a high proportion of voiceless realizations in the “vowel” context. Even though a vowel, being a voiced sound should theoretically trigger (re)voicing of obstruents, in our data this is mostly not the case, as almost all phonologically voiceless obstruent are realized as voiceless in the vowel context, while phonologically voiced obstruents retain phonetic voicing in about half of the times.

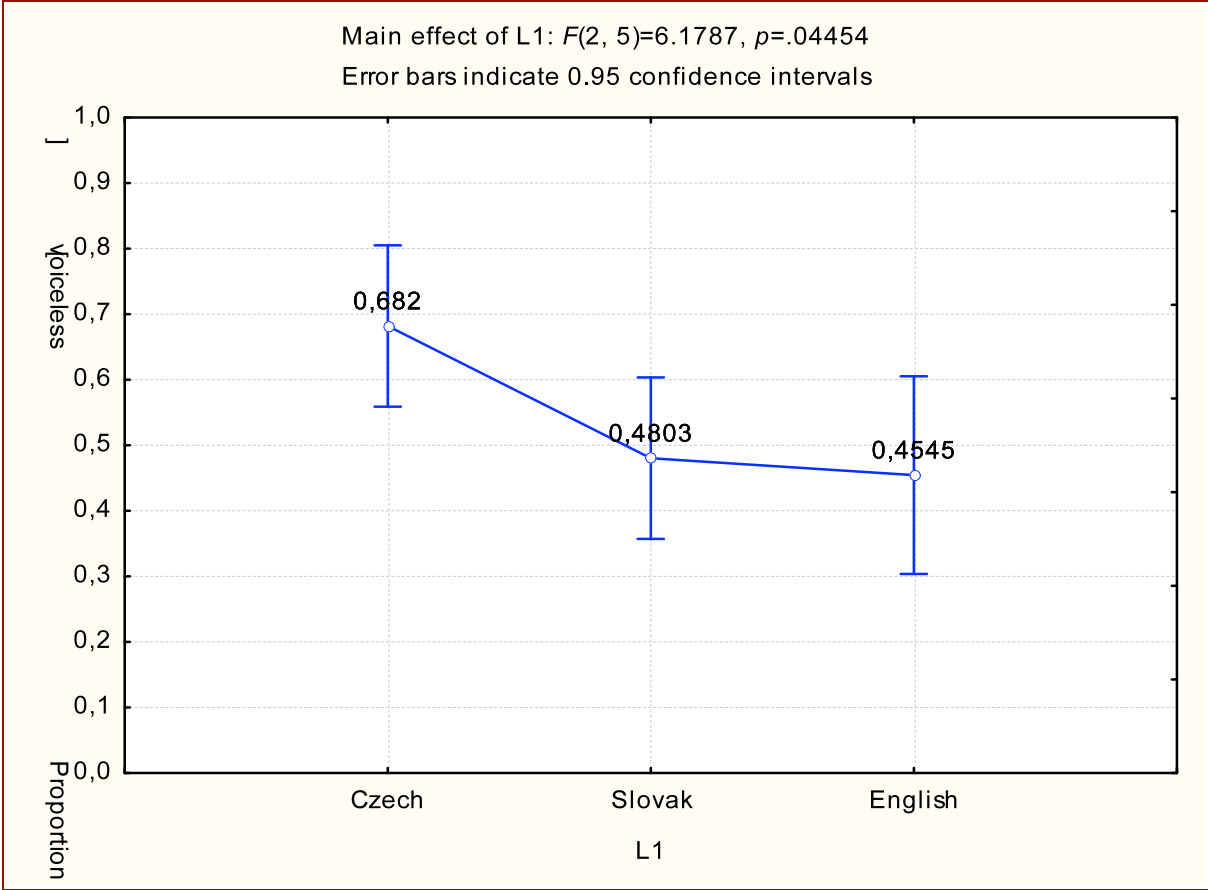
Figure 1: The proportion of voiceless realizations of phonologically voiceless and phonologically voiced tested obstruents, with “Context” and “Target /voicing/” as the variables

Context: Obstruent followed by a vowel, a phonologically voiced fricative, a phonologically voiced stop/affricate, a nasal, a voiceless obstruent



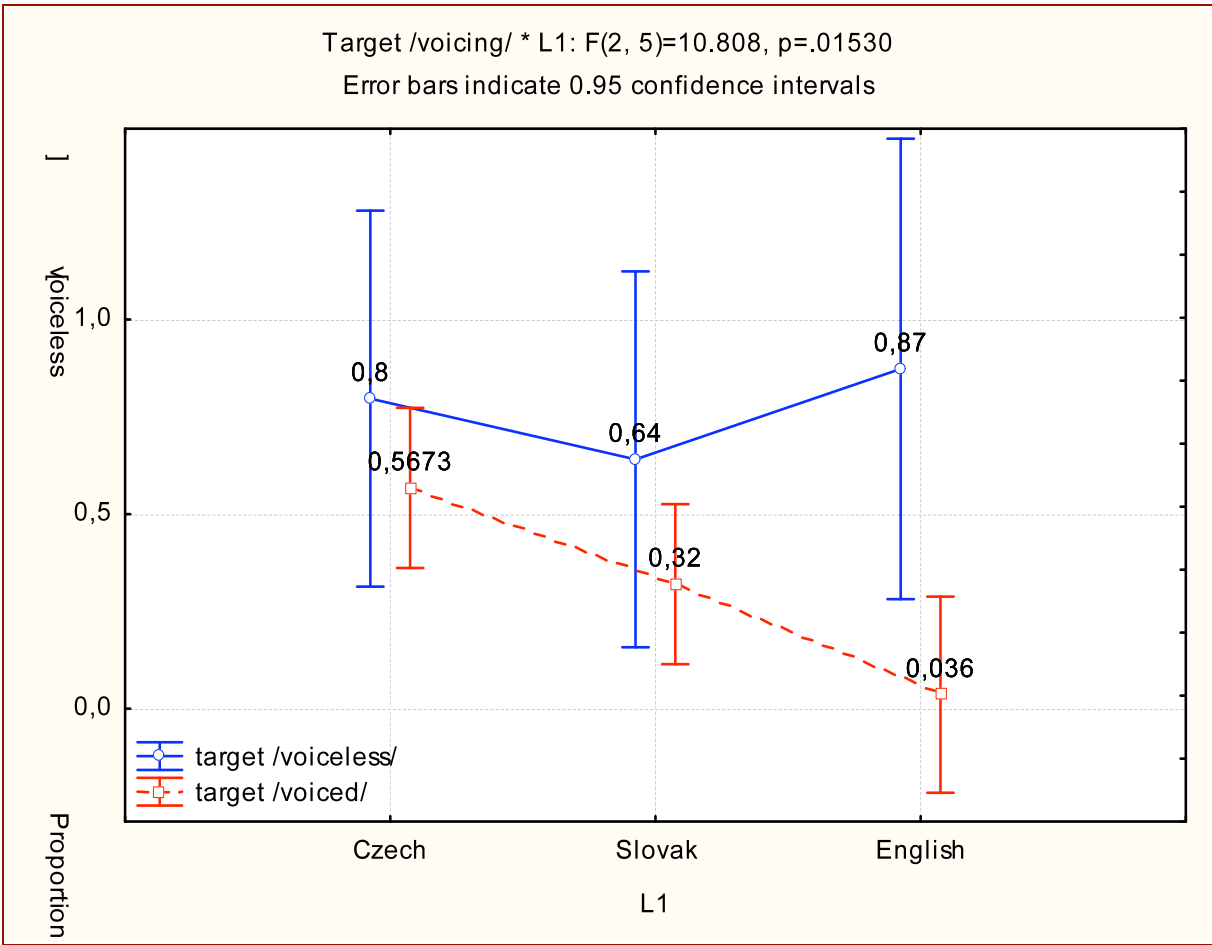
When we take into consideration the native language (the “L1” variable) on the proportion of voiceless realizations, we discover that the effects of the L1 variable are considered significant by a small margin: $F(2,5)=6.1787$, $p=.04454$ (see Figure 2). While Czech speakers’ obstruents tested were voiceless 68.2% of the time, for the Slovak and English speakers the proportion of voicelessness was 48.03% and 45.45% respectively.

Figure 2: The proportion of voiceless realizations of tested obstruents, with “L1” as the variable



The effects of “L1” and “Target /voicing/” variables on the proportion of voiceless realizations can be seen in Figure 3 and proved to be of significance: $F(2,5)=10.808$, $p=.01530$. Note, that in English speakers responses, the target phonologically voiced obstruents tend to retain their voicing much more frequently than they do in the Czech or Slovak group (in the native English group, 3.6% of target /voiced/ obstruents became voiceless, as opposed to 32% and 56.73% of the Slovak and Czech group respectively). Both Czech and Slovak speakers tended to realize phonologically voiced obstruents as voiceless in the position of assimilation much more frequently than native English speakers.

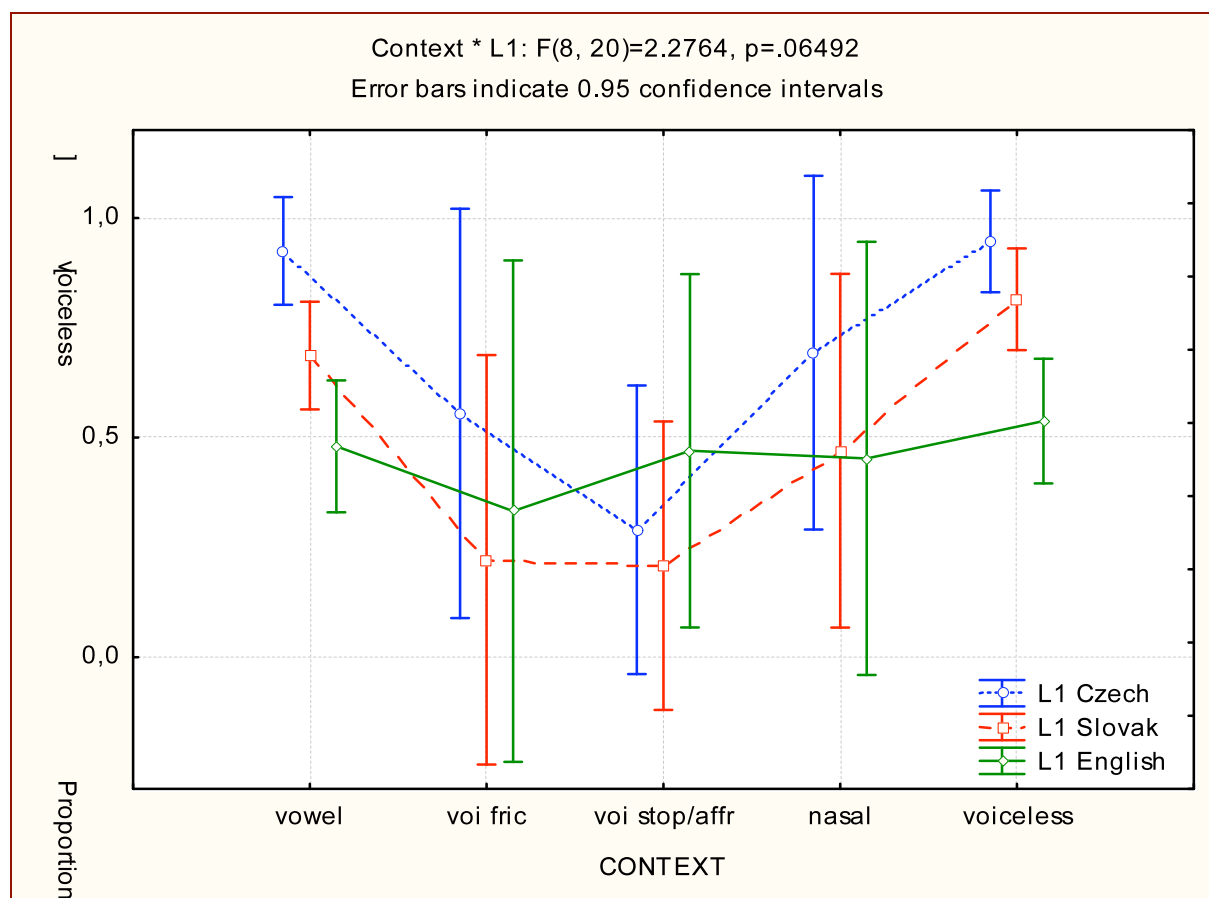
Figure 3: The proportion of voiceless realizations of phonologically voiceless and phonologically voiced obstruents, with “L1” and “Target /voicing/” as the variables



In Figure 4 we see a rather detailed chart correlating the variables “Context” and “L1”. Their effect comes close to significance $F(8,20)=2.2764$, $p=.06492$. Also, while the Slovak and Czech L1 lines copy each other in shape and are rather affected by the following context, the English L1 line is not as affected by the context and is only slightly shifted towards more voiced realizations when followed by a voiced sound context.

Figure 4: The proportion of voiceless realizations of phonologically voiceless and phonologically voiced obstruents, with “L1” and “Context” as the variables

Context: Obstruent followed by a vowel, a phonologically voiced fricative, a phonologically voiced stop/affricate, a nasal, a voiceless obstruent



3.2 H1: Realization of obstruents when followed by a vowel

In Table 15 and Table 16 we see the realization of the phonologically voiceless and phonologically voiced obstruents when followed by a vowel. For underlyingly voiceless obstruents, there is a strong tendency in all L1 groups to realize these obstruents as phonetically voiceless. For underlyingly voiced obstruents, this tendency is observed only in the Czech group, Slovak speakers are likely to realize these obstruents as devoiced, English native speakers tend to realize them as voiced or devoiced. We also include the percentages of the glottalized realization of the following vowel, which are high for all groups.

Table 15: Voicing in the phonologically *voiceless* obstruents followed by a vowel and the presence of glottalization of the vowel

[voicing] of the obstruent	Groups		
	Czech	Slovak	English
Voiced	0%	3%	8%
Devoiced	0%	6%	0%
Voiceless	100%	91%	88%
Deleted	0%	0%	4%
Following glottalized vowel	63%	74%	61%

Table 16: Voicing in the phonologically *voiced* obstruents followed by a vowel and the presence of glottalization of the vowel

[voicing] of the obstruent	Groups		
	Czech	Slovak	English
Voiced	3%	10%	40%
Devoiced	14%	43%	55%
Voiceless	83%	47%	5%
Deleted	0%	0%	0%
Following glottalized vowel	62%	60%	19%

3.3 H2: Realization of phonologically voiceless obstruents when followed by a phonologically voiced obstruent

In Table 17 the account of the realization of the phonologically voiceless obstruents when followed by a phonologically voiced obstruent sound can be seen. For English speakers, there is a strong tendency to realize these obstruents as phonetically voiceless. The final obstruents for Czech and Slovak speakers are not as prevalently voiceless, as in both the Slovak and the Czech group, around 60% percent of obstruents are phonetically voiced or devoiced.

Table 17: Voicing in the phonologically voiceless obstruents followed by a phonologically voiced obstruent

[voicing] of the obstruent	Groups		
	Czech	Slovak	English
Voiced	36%	29%	4%
Devoiced	25%	31%	8%
Voiceless	39%	40%	79%
Deleted	0%	0%	8%

3.4 H3: Realization of phonologically voiced obstruents when followed by a phonologically voiceless obstruent

In Table 18 the account of the realization of the phonologically voiced obstruents when followed by a phonologically voiceless obstruent sound is given. In the English group, there is a strong tendency to realize these obstruents as partially devoiced. For both the Czech group and the Slovak group however, the realization of the final obstruents tends to be predominantly voiceless.

Table 18: Voicing in the phonologically voiceless obstruents followed by a phonologically voiceless obstruent

		Groups		
		Czech	Slovak	English
Final obstruent	Voiced	3%	14%	0%
	Devoiced	6%	14%	75%
	Voiceless	88%	69%	10%
	Deleted	3%	3%	15%

3.5 H4: Realization of obstruents when followed by a sonorant

In Table 19 we see the presence of phonetic voicing in the realization of the phonologically voiceless and phonologically voiced obstruents when followed by sonorants. In all groups a preference to realize final phonologically voiceless obstruents as voiceless when followed by a sonorant can be observed, however for the Slovak group this tendency is somewhat weaker. In the Slovak group, almost 40% of the final phonologically voiceless obstruents are realized as having some phonetic voicing. For phonologically voiced obstruents, we see a tendency in English speakers not to maintain voicing when in a sonorant context and to realize them as devoiced. In both the Czech and the Slovak group more voiceless realizations of the phonologically voiced obstruents are produced when compared to the English group.

Table 19: Voicing in phonologically voiceless and phonologically voiced obstruents when followed by sonorants

	[voicing] of the obstruent	Groups				[voicing] of the obstruent	Groups		
		Czech	Slovak	Eng.			Czech	Slovak	Eng.
Phonologically voiceless obstruent	Voiced	3%	26%	4%	Phonologically voiced obstruent	Voiced	36%	28%	20%
	Devoiced	6%	11%	4%		Devoiced	14%	38%	80%
	Voiceless	89%	63%	88%		Voiceless	46%	34%	0%
	Deleted	3%	0%	4%		Deleted	4%	0%	0%

3.6 H5: The [v̥] realization of the /v/ phoneme

Addressing the realization of the Slovak allophone of the phonologically voiced fricative /v/, we have found out, that out of all the subjects of the Slovak group, the [v̥] sound is produced 3 times out of all /f-v/ realizations, which represents 4% of all realizations of /f-v/ pair of fricatives in the Slovak group. All occurred in the speech of a single speaker.

3.7 H6: Phonetic voicing in the following phonologically voiced stops and affricates

In Table 20, we see the presence of voicing in phonologically voiced stops and affricates in Czech, Slovak and English subjects when preceded by phonologically voiceless obstruents. The English group displayed a very pronounced tendency to devoice the studied stops and affricates. The Czech, and to a lesser degree the Slovak speakers, however tended to produce these stops and affricates as voiced.

Table 20: Voicing in the phonologically voiced obstruents when preceded by a phonologically voiceless obstruent

[voicing] of stops or affricates	Groups		
	Czech	Slovak	English
Voiced	73%	52%	0%
Devoiced	27%	48%	100%
Voiceless	0%	0%	0%
Deleted	0	0	0

In Table 21, we see the presence of voicing in phonologically voiced stops and affricates in Czech, Slovak and English subjects when preceded by phonologically voiced obstruents. The English group displays a very pronounced tendency to devoice the stops and affricates. The Czech and to a lesser degree the Slovak speakers however, tend to produce the stops and affricates as voiced.

Table 21: Voicing in the Phonologically Voiced Obstruents when Preceded by a Phonologically Voiced Obstruent

Voicing of stops or affricates	Groups		
	Czech	Slovak	English
Voiced	58%	42%	0%
Devoiced	38%	58%	100%
Voiceless	4%	0%	0%
Deleted	0%	0%	0%

4 Discussion

In this section the results of the testing and the subsequent validation or refusal of the presented hypotheses are discussed and interpreted.

4.1 ANOVA results

The ANOVA results indeed proved, that the variables of target phonological voicing, context (the following sound) and speaker's native language significantly affected the phonetic voicing of the tested obstruents of our subjects. These findings are not surprising, as it is to be expected, that for instance phonologically voiced obstruents will be realized as phonetically voiced more often than phonologically voiceless obstruents. The significant effect of the following segment suggests, there is indeed some regressive voicing assimilation going on in the speech of the subjects influencing the surface form of the obstruents. The effect of the L1 variable, which was deemed significant (even though by a small margin) suggests, that there are some differences in the speech of individual L1 groups.

It was also found, that according to the ANOVA analysis, in the speech of the native English group, phonologically voiced obstruents tend to retain voicing more frequently than in the speech of the Czech and Slovak group. Keep in mind, that the "voiced" category includes realizations, which are not necessarily fully voiced but are discernable from phonologically voiceless obstruents (in other words are 'devoiced'). Our findings are in line with a suggestion we have previously discussed (section 1.5.2), that in English, voicing assimilation does not really cause complete contrast neutralization (as it does in Slovak and Czech), but rather the voicing contrast is eliminated only partially and it is still possible to determine the phonological value of the obstruent after it has been a subject to voicing assimilation in English.

If we study the influence of the variable of context and phonological voicing, disregarding the aspect of the L1, we clearly see the effects of regressive voicing assimilation in work. Obstruents do tend to be voiced more frequently when followed by a voiced fricative or a voiced stop or a voiced affricate. This tendency is a bit less obvious in other voiced contexts – like when followed by a nasal. What is perhaps most surprising is the effect of a following vowel. Although we have predicted (in section 1.5.1) the vowel should (re)voice the preceding obstruent (at least in Slovak), the results did not support this suggestion, as almost

all phonologically voiceless obstruents remained phonetically voiceless and not even a half of phonologically voiced obstruents remained voiced.

If we look closer on the results of individual L1 groups (Figure 4), we quickly find out, that there are differences in the way context influences the tested obstruents. First of all, the English obstruent production tends not to be as affected by voicing of the context as the Czech and Slovak production. While there are some slight shifts in voicelessness depending on the following sound, these shifts are much more visible in the production of Czech and Slovak. This would seem to make English obstruents less susceptible to the effects of voicing assimilation when compared to Czech and Slovak.

It would seem that both Czech and Slovak production of obstruents is affected by the following sounds. When the obstruent is followed by a voiced fricative or a voiced stop or affricate, the tested obstruents are voiced more frequently. This tendency is also present, although to a lesser extent, with nasals. Also, nasals seem to trigger the spreading of the [+voice] value in Slovak more than in Czech. The effects of nasals are further discussed in section 4.5. The influence of the following vowels seems not to trigger voicing assimilation as frequently as we have expected, the effects of a following vowel on the voicing value of the preceding obstruent are discussed in detail in section 4.2.

4.2 H1: Realization of obstruents when followed by a vowel

We have predicted in H1, that Slovak speakers in our tests will produce phonologically voiceless obstruents as voiced when followed by a vowel granted the vowel is not glottalized. In the test results, all groups, including the Slovak one, have been observed as having a tendency to realize the obstruents as voiceless, which may be caused by the high amount of glottalization occurring before a vowel. Although occurring frequently in both English (discussed in some detail by Bortlík, 2009) and Czech (section 1.2.4), it is a bit surprising to see this tendency in the Slovak group, as pre-vocalic glottalization is far less frequent in Slovak connected speech (section 1.3.3). We can only speculate as to why this occurred, it may be a case of subjects putting more emphasis on the vowels than they would, when not in a test environment.

4.3 H2: Realization of phonologically voiceless obstruents when followed by a phonologically voiced obstruent

We have predicted in H2, that Czech and Slovak speakers will produce phonologically voiceless obstruents as voiced when followed a voiced obstruent sound. This prediction is partly supported by the test data. While the English subjects mostly kept the phonologically voiceless obstruents phonetically voiceless, the Czech subjects produced as much as 36% of the obstruents as voiced, the Slovak speakers produced 29% of the obstruents as voiced.

4.4 H3: Realization of phonologically voiced obstruents when followed by a phonologically voiceless obstruent

In H3 it has been predicted, that the Czech and Slovak speakers will tend to produce the phonologically voiced obstruents as voiceless when followed by a phonologically voiceless obstruent sound, while the English speakers will tend to pronounce the obstruents as devoiced. This prediction is supported by the test data, as there was a strong preference found (as high as 88% in Czech and 69% in Slovak speakers) to realize the phonologically voiced obstruents as voiceless. This is in contrast to the production of the English speakers, who devoiced 75% of the obstruents.

4.5 H4: Realization of obstruents when followed by a sonorant

We have noted than in the three languages, sonorants differ in their ability to trigger voicing assimilation. As discussed in section 1.5.4, in Slovak, sonorants do trigger regressive voicing assimilation, in Common Czech they do not. In English sonorants can help to maintain voicing in phonetically voiced obstruents, as phonologically voiced obstruents can retain voicing when both preceded and followed by vowels or sonorants.

The H4 predicted, that Slovak speakers will transfer sonorants triggering voicing assimilation into their production of English, which would be a case of positive transfer in the underlying form of the English obstruent is voiced, but may is negative transfer if the underlying form is voiceless. The H4 also predicted sonorants would not trigger regressive voicing assimilation for the Czech speakers.

While the production of the Slovak speakers displayed some proof of sonorants triggering regressive voicing assimilation when following a phonologically voiceless obstruent, still a majority of the realizations were voiceless (63% in total). The voiceless realizations were less

rare for phonologically voiced obstruents, however, the amount of phonologically voiced obstruents realized as voiced was still quite low (26%). As for the Czech speakers, they also displayed a similar tendency, as the half of the realizations of the phonologically voiced obstruents had some voicing.

Also, our predictions of sonorants helping to maintain the voicing in phonologically voiced obstruents in English was not strongly supported, as only 20% of the tested phonologically voiced obstruents we realized as phonetically voiced, remaining 80% staying non-revoiced (devoiced).

So although there is some evidence, that there exists a tendency for Slovak speakers to use sonorants as triggers for regressive voicing assimilation in their English production, this tendency is not as pronounced as our predictions have indicated. Also, the fact, that for Czech speakers, a tendency to realize phonologically voiced obstruents as voiced was also displayed, does not support the H4 hypothesis.

4.6 H5: The [ɥ] realization of the /v/ phoneme

We have previously described the behavior of the /v/ phoneme and noted, that in Slovak, in addition to the [v],[f] and [ʋ] realizations, it can also be realized as a vowel-like [ɥ] allophone, which is a “devoiced” variant of the /v/ phoneme (for more discussion on its role in Slovak, see section 1.3.3). It has been suggested by the H5, that Slovak speakers would realize the voiced fricative /v/ as an [ɥ] sound in place of in a position of assimilation.

The test results showed the [ɥ] allophone was produced in only 4% of the /f-v/ realizations to which the prediction applied and they were all limited to a single speaker. Although this result confirms, that some Slovak speakers can indeed realize transfer the [ɥ] allophone into their production of English fricative /v/, this rate is low and we have expected to see allophone occurring in more cases.

4.7 H6: Phonetic voicing in phonologically voiced stops and affricates

We have predicted in H6, that the phonetic realization of English initial phonologically voiced stops and affricates by the Czech and the Slovak group will be affected by negative transfer, in that Slovak and Czech subjects will tend to maintain the stops’ and affricates’ voicing even

when not both preceded and followed by vowel or sonorant sounds. This hypothesis is supported by the test data as both Czech and (in lesser degree) Slovak speakers displayed a tendency to keep voicing in the phonologically voiced stops or affricates both when preceded by a phonologically voiceless sound and a phonologically voiced sound, as opposed to the group of English speakers, which exclusively realized the obstruents as devoiced. Thus, we can conclude that in this case, H6 was indeed supported by the data.

5 Conclusion

In this thesis, several questions about the presence and the nature of NL transfer on the acquisition of the voicing assimilation system of English have been raised. A number of our hypotheses have been validated, some strongly, some less decisively.

The analysis of the data obtained during the practical part of the thesis showed, there really is some interference from the native languages in the production of English of Czechs and Slovaks. This interference is rooted in the differences between the voicing assimilation systems of the three languages. Perhaps the most important finding of the thesis is that as suspected, the context affected the Czech and Slovak realizations of English obstruents more intensely than it did in case of the native English speakers realizations. This perhaps proves, that the Czech and Slovak subjects tend to apply the principles of regressive assimilation of voicing from their native tongue to their production of English.

The areas in which our hypotheses of negative transfer were supported, include the Czech and Slovak obstruent production being subject to regressive voicing assimilation, which often caused a change of the underlying form of the tested obstruent. This is considered non-standard for the native English production. Also, both Czechs and Slovaks tended to realize phonologically voiced obstruents as phonetically voiced much more frequently than native English speakers did, which again would be considered a divergence from the native English production.

On the other hand, one of the hypothesis not directly confirmed in the thesis, is that both Czech and Slovak speakers would tend to apply the principles of regressive voicing assimilation of the production of phonologically voiced obstruents followed by vowels and would realize such voiced obstruents as voiced. Both groups actually tended to realize these obstruents as voiceless. This may have been caused by the high amount of glottalization of the

following vowels and we speculated that this may have occurred because speakers tended to emphasize the vowels more than they would if not in a test environment.

As for the differences between the two native languages – Slovak and Czech, the tendencies we described in hypotheses were found, but did not prevail as strongly as predicted. The hypothesis claiming there would be transfer of sonorants acting as triggers of voicing assimilation for the Slovak speakers and not acting as triggers for the Czech speakers, has been somewhat mildly supported. The hypothesis about Slovak subjects producing the voiced fricative /v/ as the [v̥] sound has been validated in that some occurrences of the [v̥] allophone have been observed. Still, according to the hypothesis this was to be seen much more frequently. These however may be the faults of the study set-up and these areas would benefit from further study.

Because this study was administered with a limited number of subjects, it should not be viewed as a definitive research into the subject of voicing assimilation in Slovak, Czech and English, but rather as a test-study of the subject of language transfer.

6 Appendices

6.1 *Elicitation instrument*

1) prove – proof

He has nothing left to **prove** in this race.
It's not something you can **prove** by yourself.
That is what we will proceed to **prove** now.
He has to **prove** to them that he is right.
That is the conclusive **proof** in the case.
The tent was put to the **proof** by this storm.
The police believe they have the **proof** now.
He showed the **proof** to the defense lawyer.

2) leave – leaf

Our friends are going to **leave** on Tuesday.
They should be ready to **leave** by next month.
The young children should really want to **leave** now.
The visitors wanted to **leave** tonight.
There's just one remaining **leaf** on the planet.
He must rake up every **leaf** by next week.
I can see the fine veins of the **leaf** now.
I couldn't find a single **leaf** tonight.

3) believe – belief

Some children don't **believe** in Santa Claus.
He was taught what to **believe** by his dad.
I don't even know what to **believe** now.
This is just what I **believe** to be true.
That man has a strong **belief** in himself.
She showed her heartfelt **belief** by her acts.
That is not a widely-held **belief** now.
She expressed her **belief** to her sister.

4) need – neat

You sure look like you **need** another drink.
The Conservatives still **need** John Major.
I **need** my pen, I must have lost it though.
Sorry, we will **need** to get going soon.
Joe is always very **neat** and organized.
Marianne always keeps a **neat** garden.
She always keeps her papers in **neat** piles.
Stroud has always been a **neat** market town.

5) feed – feet

We are able to **feed** about ten people.
If it's shedding its skin, **feed** sparingly.

It's enough to **feed** their curiosity.
Mom used to **feed** me a lot of veggies.
Jenny's **feet** and toes hurt after the walk.
If your **feet** keep hurting, take your shoes off.
If your **feet** get tired, sit down and relax.
I though his **feet** never touched the ground

6) seed - seat

Jeremy has planted a **seed** in my mind.
This **seed** grew and flourished into a tree.
The **seed** company has ended that line.
The **seed** merchant didn't pay the insurance.
The pupils should get a **seat** in the back.
Where do you **seat** visitors?
The new Peugeot can **seat** five people in total.
My **seat** never declines the way I want it to.

7) leak – league

The source started to **leak** various documents.
The **leak** in the roof got worse in the winter.
The ship started to **leak** from the deck.
The **leak** may have been caused by an explosion.
The players are truly in a **league** of their own.
The major **league** suffers one scandal after another.
Have a Major **League** vacation!
He didn't want to play **league** no mater what the money was.

8) ridge – rich

We crossed the **ridge** of the mountain today.
We always made it to the **ridge** top.
So where did the mysterious **ridge** go?
The **ridge** moved a meter last year.
I have one poor aunt and one **rich** aunt.
Their cuisine is famous for their **rich** soups.
Goblins dwell in mines and point out **rich** veins of silver and gold.
The neighborhood is full of **rich** men and ladies who lunch.

9) cats

Those **cats** are incredibly cute.
Dogs bark and **cats** meow.
Cats do whatever they please.
There's no knowing what the **cats** picked.

10) let's

Let's all get a grip, people!
Soon everybody was singing, "**Let's** go to the mall."
Come on everybody, **let's** move on.
Let's try to see who does the best.

12) Bruce – bruise

His boss hasn't seen **Bruce** in quite a while.
They are all going to see **Bruce** tonight.
He really got **Bruce** going about that.
She says she's going to vote for **Bruce** now.
She got that **bruise** going up for a shot.
Peter got another bad **bruise** tonight.
We should put something on that big **bruise** now.
That's going to cause a **bruise** in his face.

13) eyes – ice

Can you get **ice** and coke?
Her expression was **ice** cold.
The way she laughed was like **ice** down my back.
The **ice** needs to be in the freezer all the time.
My **eyes** are tired after the whole day.
She looked sad, her **eyes** fixed on that single line.
What the **eyes** don't see, the heart doesn't feel.
His lovely **eyes** move quickly.

6.2 *Participants information*

Group	Czech
Name	Milan
Age	20
Area	Děčín
Languages spoken (0% – no knowledge, 100% – native speaker-like proficiency)	German – 60 %
Time spent in an English speaking country	1 month, London

Group	Czech
Name	Šimon
Age	21
Area	Chotěboř
Languages spoken (0% – no knowledge, 100% – native speaker-like proficiency)	Spanish – 15%
Time spent in an English speaking country	2 weeks, London

Group	Czech
Name	Eva N.
Age	24
Area	Hradec Králové
Languages spoken (0% – no knowledge, 100% – native speaker-like proficiency)	French – 70%
Time spent in an English speaking country	none

Group	Slovak
Name	Tomáš
Age	22
Area	Žilina
Languages spoken (0% – no knowledge, 100% – native speaker-like proficiency)	German – 40%
Time spent in an English speaking country	2 weeks, London

Group	Slovak
Name	Eva B.
Age	22
Area	Žilina
Languages spoken (0% – no knowledge, 100% – native speaker-like proficiency)	French – 10%
Time spent in an English speaking country	1 week, London

Group	English
Name	Chris
Age	41
Area	Hastings
Languages spoken (0% – no knowledge, 100% – native speaker-like proficiency)	French – 15%

Group	English
Name	Tyra
Age	29
Area	New York City
Languages spoken (0% – no knowledge, 100% – native speaker-like proficiency)	

7 Zhrnutie

Obor akvizície druhého jazyka sa zaoberá spôsobmi, akými náš prvý (materinský) jazyk vplýva na osvojovanie si iného, cudzieho jazyka. Podľa hypotéz ako teória kontrastnej analýzy, materinský jazyk nepriaznivo vplýva na takúto akvizíciu vtedy, keď sa jednotlivé aspekty materinského jazyka líšia od aspektov cudzieho jazyka. Takéto negatívne ovplyvňovanie tiež nazývame interferencia, alebo negatívny jazykový transfer. Predmetom tejto bakalárskej práce je zistiť, akým spôsobom náš materinský jazyk (slovenský alebo český) vplýva na osvojovanie si iného, cudzieho jazyka (angličtiny). Práca sa konkrétne zameriava na systém znelostnej asimilácie.

Jadrom teoretickej časti práce je kontrastná analýza, teda porovnanie systémov znelostnej asimilácie v jednotlivých jazykoch, pričom sa sústreďujeme na oblasti, ktoré sa medzi jazykmi líšia. Na základe kontrastnej analýzy vyvodzujeme hypotézy, ktoré predpokladajú ťažkosti a teda chybovanie práve v týchto oblastiach. Aj keď metóda kontrastnej analýzy sa často považuje za prekonanú a v minulosti bola pomerne často kritizovaná [napr. štúdiá Burt and Dulay (1984), ktorá sa zaoberala jazykovým transferom v oblasti syntaxe], a túto kritiku sme zobrali do úvahy, prišli sme ale k názoru, že pre oblasť fonológie je táto metóda stále relevantná a pre naše potreby teda dostačujúca.

Medzi jednotlivé hypotézy, ktoré boli vyvedené pomocou kontrastnej analýzy patria nasledujúce predpoklady:

H1: Pre slovenskú skupinu platí, že budú respondenti realizovať obštruenty ako foneticky znelé, ak bude nasledovať samohláska, ktorá nezačína rázom. U Čechov sa predpokladá realizácia samohlásky s rázom, ktorý svojou glotálnou charakteristikou zamedzuje šíreniu znelosti, preto predpokladáme, že bude česká skupina obštruenty realizovať ako neznelé.

H2: U českej aj slovenskej skupiny predpokladáme, že budú realizovať fonologicky neznelé obštruenty ako znelé, keď bude nasledovať znelý obštruent.

H3: U českej aj slovenskej skupiny predpokladáme, že budú realizovať fonologicky znelé obštruenty ako neznelé, keď bude nasledovať neznelý obštruent.

H4: Keďže v slovenskom jazyku sonoranty šíria znelostnú asimiláciu, predpokladá sa, že Slováci túto vlastnosť prenesú aj do svojej produkcie angličtiny, čo je ukážkou negatívneho transferu v prípade, že je fonologicky neznelý obštruent nasledovaný sonorantom.

V českom jazyku ale sonoranty znelostnú asimiláciu nešíria, čo môže byť negatívnym transferom v prípade, že je fonologicky znelý obštruent nasledovaný sonorantom.

H5: Predpokladáme, že v slovenskej skupine sa vyskytne hláska [ʋ], ktorá v slovenčine predstavuje alofónu znejšej frikatívy /v/, vyskytujúcu sa v miestach asimilácie.

H6: Predpokladáme, že slovenská aj česká skupina bude mať tendenciu vyslovovať fonologicky znelé explozívny a afrikáty na fonetickej úrovni ako znelé, aj ak neplatí, že sú obklopené samohláskami alebo sonorantami.

Bakalárska práca je doplnená praktickým výskumom. Podieľali sa na ňom tri skupiny respondentov – skupina Slovákov (3 osoby), skupina Čechov výlučne z Čiech (3 osoby) a kontrolná skupina anglicky hovoriacich subjektov (2 osoby). Respondenti boli požiadaní, aby nahlas prečítali predom pripravený materiál, pričom boli nahrávaní. Nahrávky boli spracované a analyzované v programe Praat (vers. 5.2.22, Boersma and Weenink, 2011). Predmetom analýzy bolo pozorovať prítomnosť znelosti v testovaných obštruentoch.

Dáta boli neskôr podrobené štatistickej analýze rozptylu (ANOVA), pričom bola skúmaná štatistická významnosť jednotlivých faktorov. Závislá premenná vyjadrovala fonetickú znelosť študovaného obštruentu. Nezávislými premennými bol faktor rodného jazyka a fonetický kontext – hláska, ktorá bezprostredne nasledovala skúmaný obštruent. Ako štatisticky významné sa ukázali faktory fonetického kontextu, faktor rodného jazyka aj faktor fonologickej znelosti obštruentov, čo znamená, že tieto faktory majú dôrazný vplyv na fonetickú realizáciu testovaných obštruentov. Účinky faktorov rodného jazyka a fonologickej znelosti prinášajú zistenie, že v anglickej skupine si fonologicky znelé obštruenty uchovali fonetickú znelosť omnoho častejšie ako v slovenskej a českej skupine. Pri pozorovaní vplyvu faktorov fonetického kontextu a rodného jazyka si môžeme všimnúť, že obštruenty pozorované v produkciách Čechov a Slovákov sú ovplyvnené fonetickým kontextom vo väčšej miere, ako je to pozorované v produkciách rodených Angličanov.

Pri analýze jednotlivých hypotéz sme zistili, že niektoré boli podporené získanými dátami, iné boli podporené iba čiastočne. Medzi hypotézy, ktoré boli podporené patrí fakt, že Česi aj Slováci realizovali fonologicky znelé obštruenty ako foneticky znelé, aj v prípade, že neboli obklopené znelými hláskami, čo je známkou nenatívnej produkcie. Ďalším faktom je, že u Slovákov a Čechov nastáva z dôvodu znelostnej asimilácie zmena obštruentu nielen na

fonetickom ale aj fonologickom levele (nastáva neutralizácia kontrastu znelosti). Táto úplná neutralizácia kontrastu ale nenastáva v produkcii rodených Angličanov.

Na druhej strane, predikcia, ktorá nebola priamo overená v práci sa týka nášho predpokladu, že o samohlásky rozširujú znelosť v obštruentoch Čechov a Slovákov. Keďže ale obe skupiny realizovali obštruenty pred samohláskami ako neznelé, nebola hypotéza dokázaná. Môžeme iba špekulovať, prečo táto hypotéza nebola potvrdená. Predpokladáme, to zapríčinila vysoké percento samohlások, ktoré boli vyslovené s rázom, čo mohlo byť spôsobené väčším dôrazom subjektov na hlásky v textovom kontexte.

Čo sa týka rozdielov medzi dvoma materskými jazykmi – slovenčinou a češtinou, hypotéza, ktorá predpokladala transfer správania sa sonorantov v asimilačnom kontexte sa potvrdila iba čiastočne. Aj keď bola dokázaná tendencia Slovákov do určitej miery rozširovať pomocou sonorantov znelostnú asimiláciu, táto tendencia nebola veľmi silná a bola tiež pozorovaná v skupine Čechov. Hypotéza, ktorá predpokladala, že Slováci budú frikatívu /v/ vyslovovať ako [ʋ] sa tiež potvrdila iba čiastočne, keďže výskyt tejto realizácie bol veľmi nízky a bol nájdený iba u jedného respondenta.

8 Annotation

Faculty, department: Philosophical Faculty, Department of English and American Studies

Title: Voicing assimilation in English spoken by Czech and Slovak learners

Supervisor: Mgr. Václav Jonáš Podlipský, PhD.

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Keywords: voicing assimilation, neutralization of voicing contrast, speech production, second language acquisition, contrastive analysis

Description: The concept of language transfer has been is one of the most discussed issues in the field of Second Language Acquisition. It studied the way our native language influences all other languages we try to acquire further along in life. According to the claims of the Contrastive Analysis Hypothesis, the aspects of the second language, which are different from our native languages are those, which cause difficulty and thus will cause erroneous production. This BA thesis analyses and compares the voicing assimilation systems of Czech, Slovak and English language, concentrating on the differences between the languages. On the basis of the literature review, hypotheses are drawn, which are concerned with the ways of how do the concepts of voicing assimilation learned in a native language (Slovak or Czech) affect the acquisition of a second language (English). The thesis' findings are supported by a practical research.

Anotácia:

Autor: Zuzana Kanioková

Názov fakulty a katedry: Filozofická fakulta Univerzity Palackého, Katedra anglistiky a amerikanistiky

Názov bakalárskej práce: Znelostná asimilácia v anglickom jazyku produkovaná českými a slovenskými žiakmi

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Charakteristika práce: Koncept jazykového transferu je dlho jedným z najzaujímavejších tém odboru zaoberajúcim sa procesom osvojovania si cudzieho jazyka. Zaoberá sa spôsobmi, ktorými náš materský jazyk ovplyvňuje akvizíciu cudzích jazykov, ktoré sa snažíme osvojiť si neskôr v živote. Podľa tvrdení teórie kontrastnej analýzy, práve aspekty jazyka, ktoré sú odlišné od nášho materského jazyka sú tie, ktoré budú spôsobovať ťažkosti a tým aj chyby pri produkciách. Táto bakalárska práca sa zaoberá komparáciou systémov znelostnej asimilácie v českom, slovenskom a anglickom jazyku. Na základe teoretických poznatkov je vytvorená téza, ktorá zisťuje, akým spôsobom vplývajú koncepty znelostnej asimilácie naučené z východzieho jazyka (čestiny alebo slovenčiny) na akvizíciu cieľového jazyka (angličtina). Práca je podporená praktickým prieskumom.

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