

Filozofická fakulta Univerzity Palackého

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**The influence of native language on production of second language
during interpreting**

(bakalářská práce)

Autor: Anna Gaurová (Angličtina se zaměřením na aplikovanou ekonomii)

Vedoucí práce: Mgr. Šimáčková Šárka, Ph.D.

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Prohlašuji, že jsem tuto bakalářskou práci vypracovala samostatně a uvedla úplný seznam citované a použité literatury.

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1 INTRODUCTION

Acquisition of a second language (L2) is a process affected by many factors. Learner's first language is certainly one of them. Foreign accent is considered to be the obvious evidence for the existence of this influence (Ellis 1985, 19). This thesis explores the influence of L1 on L2 pronunciation in situations typical for interpreters. The aim is to find out whether the degree of the L1 influence throughout the process of interpreting changes. The study asks if immediate increases in foreign accentedness can be traced in the situation when an interpreter continues to listen to messages in their L1 and produces them immediately in L2.

Not all researchers in the field of phonetics agree whether people when learning a second language are able to separate their L1 and L2 into two systems. Some propose that languages of bilinguals are two separate systems that bilinguals have to switch between during production and perception of speech (e.g., Escudero 2004, 2007), others maintain that the L1 and L2 phonetic categories share the same phonological space in the bilingual's mind (Flege 1995). In any case the interaction between the two systems occurs (Olson 2013, 408).

L1 transfer can be described as the influence of L1 that exerts during the acquisition of L2. It is frequently believed that L1 influence is negative - features of L1 are transferred into L2, resulting in mistakes made by speaker in L2. This interaction is called L1 interference or negative transfer. In pronunciation, typical features of L1 phonological system are found in the production of L2. It should be noted that transfer can be positive as well. In some cases L1 can facilitate L2 acquisition with help of the rules that are similar in L1 and L2 and this process is called positive transfer or facilitation (Ellis 1985, 19).

People with the same L1 often have different degrees of foreign accent in their L2. In the process of determining the reasons of different degrees of foreign accents in case of the speakers of the same L1, various factors contributing to foreign accentedness have been explored. Age of onset of L2 learning, length of residence in an L2-speaking environment, gender, formal instruction, motivation, language learning aptitude and amount L1/L2 use belong among the ones explored most often in the previous literature (Piske et al. 2001). However, studies vary significantly in the choice of subjects, methods, learner's first and second languages; thus, with the exception of the age of onset, it is difficult to draw conclusions about the relative importance of these factors.

This thesis focuses on the factor referred to in literature as L1 use. Effects of the amount of L1 use on L2 pronunciation have been examined in several studies before (e.g., Guion et al., 2000; Piske et al., 2001; Flege, Frieda, & Nozawa, 1997). For example, Guion et al. (2000) in her study investigates the interaction between two language systems (L1 and L2) in bilinguals. The focus of the study is on the effect of L1 use frequency on production of L2. According to its findings the influence between L1 and L2 is unidirectional and the L1 use affects production of L2 only. Guion et al. and other researchers (Flege, 1997; Piske et al., 2001) focused their papers on the amount of L1 use in everyday life and therefore on the influence of the L1 during the learners' lifetime. This paper asks if any short-term effects of L1 use on L2 can be found. The questions we address are (1) can the interference from L1 increase as a result of the use of L1 immediately before L2 production during interpreting situations and (2) does the impact of intensive immediate L1 use vary according to the length of experience with interpreting.

The thesis consists of four parts. In the first part I present the theoretical background, existing opinions concerning the interaction between L1 and L2 as one or two separate systems, the influence of L1 on L2 and recent research studies with similar objectives as the one of my thesis. The second part provides the description of methods used in the study. It is divided into three sections: subjects, procedure and analyses. The study is based on the analysis of recordings of 2 experienced interpreters and 2 students of Translation and Interpreting. Two phonetic features which differ in Czech and English language, VOT and final devoicing are analyzed. In the third part, Results, the findings of the study are reported. In the last part – the Discussion - the interpretation of the results can be found and suggestions for further research are presented. I assume that speakers' interpretation in English will show more Czech-like features at the end than at the beginning of interpreting. This pattern is expected to be more evident in the speech of less experienced speakers and interpreters – students.

2 LITERATURE REVIEW

2.1 The role of the L1

The opinions on the importance of the first language during acquisition of the second language have been changing since the second half of the twentieth century when researchers started to consider the L1 as one of the possible factors influencing the L2.

For example, according to Marton, who referred to the L2 acquisition in the classroom, “there is never a peaceful coexistence between two language systems in the learner” (Ellis 1985, 19). On the other hand, Felix writing about naturalistic SLA suggested that the notion of interference being considered as natural and inevitable in L2 acquisition should be abandoned (1980b, 107).

The behaviorist learning theory was the first to pay a great attention to the role of the L1 in learning process. The terms habits, imitation and reinforcement were considered to be of great importance. According to this theory, learners create habits in the L2 by means of imitation and reinforcement. In this way the formation of habits explained why L2 learners make errors. It was claimed by behaviorists that “old habits get in the way of new habits” (Ellis 1985, 19). Applied to SLA it can be described as the notion of interference. The possibility that the L1 interferes with the L2 makes it uneasy to learn the L2. Two types of transfer are presented within this theory. On one hand, if there is a difference in expressing one phenomenon in two languages than the transfer from L1 to L2 occurs and it is the source of errors. This is called negative transfer. On the other hand, positive transfer occurs when habits in the L1 and L2 are the same, therefore the habits from L1 can help to learn L2.

Later on the Contrastive Analysis was presented and used to predict possible errors. In the psychological aspect there were two forms of this theory: the strong form and the weak form. The strong form claimed that the main cause of difficulty in L2 is interference of L1. In case of the weak form L1 was considered to have less powerful role as not all errors are the result of interference. Contrastive Analyses mostly compared phonological systems and it led to the conclusion that it is the influence of the L1 that is responsible for foreign accent. Further development of Contrastive Analysis Hypothesis brought some changes. It was observed that sometimes learners have a tendency to avoid phenomenon instead of making errors. Another new observation was concerning interference which now seemed more likely to occur when there was a similarity between L1 and L2 items than when there was a total difference. The changed transfer theory proposed that there is little interference when learning a language that is different (Lee 1968).

The criticism of Contrastive Analysis hypothesis followed in early 1970s. There were some doubts if it can really predict errors because only sometime was the L1 revealed as the cause of the errors in the L2. Dulay and Burt (1973) suggested that interference may be a major factor only in phonology. According to their findings,

children do not rely on L1 when learning L2 but they construct L2 as a separate system. The main problem criticized was the fact that Contrastive Analysis Hypothesis together with habit-formation theory cannot provide explanation of Second Language Acquisition. Therefore the central claim that linguistic difference between L1 and L2 leads to errors was called into question. The conclusion was made that it is important to state conditions under which interference took place and the type of learner's L1 knowledge. Interference was accepted as an important factor at least in phonology. It can be concluded that L1 influence is likely to be most evident in L2 phonology.

The fact that interference interacts with many other factors became also crucial. Researchers such as Gass claim that interference is a relevant factor if its operation is related to that of other non-interference factors (Ellis 1985, 36). L1 interference was also newly considered as a learner strategy. It was explained as the process when the learner was relying on prior knowledge to facilitate new learning.

One influential theory of L2 phonetics and phonology is Flege's Speech Learning Model (1995). Central to the SLM is the concept of equivalence classification (Flege 1987). The concept presents the prediction that the more dissimilar the L2 sound is, the simpler it will be for the L2 speaker to produce the L2 sound. If the L1 sound is similar to the L2 sound, it is more difficult for the L2 speaker to realize the difference, and therefore produce it without the influence of the L1.

According to Thomson (1991, 200) high L1 proficiency may be responsible for more foreign-accented speech. This suggestion was supported by other studies that examined the effects of the amount of L1 use on degree of foreign accent (Flege et al., 1995; Flege et al., 1997; Flege et al., 1999b; Guion et al., 1999, 2000).

The first study to have assessed the effect of amount of L1 use on performance in an L2 was the one of Flege (1997). In this study he found out, the native Italian subjects who continued to speak their L1 quite often had significantly stronger foreign accent in English than did the subjects who seldom spoke Italian. Both groups were found to have a detectable foreign accent, although there were individuals who began learning English in their childhood.

Guion et al. (2000) observed in her research that the amount of L1 use affected the L2 but not L1 speech of Quichuan-Spanish bilinguals who use their L1 frequently. The bilinguals explored in this study lived in a bilingual society where both L1 and L2 were used frequently. Use of L1 is one of the most recent variables introduced to the

literature and researchers so far have focused mainly on early bilinguals. Guion et al. suggests that further research should focus more on late bilinguals.

If the L1 is not used frequently then the disuse can lead to the loss or attenuation of L1 (Grosjean, 1982; Romaine, 1995). This can also result in the reduction of the degree of perceived foreign accent in an L2. Dunkel (1948) claimed that the less L1 there is in the speakers' mind, the smaller will be its influence on the L2. In this paper I turn the problem around and suggest that the more L1 is used, the greater its influence on the L2 will be.

2.2 Other factors influencing foreign accent in an L2

Age of L2 learning was found to be the most important predictor of degree of foreign accent by Piske et al. (2001). In their experiment they examined the influence of Italian-English bilinguals' age of L2 learning, length of residence in an L2 speaking country (in this case Canada), gender, the amount of continued L1 (Italian) use and self-estimated ability on degree of L2 foreign accent. The literature review and results showed that age of learning and amount of continued L1 use affect the degree of foreign accent. Other factors were not found to have a significant independent effect on L2 pronunciation accuracy.

One of the most influential factors already mentioned is age of L2 learning. This factor is connected with Critical Period Hypothesis which says that complete mastery of an L2 is no longer possible if learning begins at the end of the Critical Period (Patkowski 1980, 1990). The earlier one begins to learn the second language, the higher probability the one will pronounce it accurately (e.g., Purcell & Suter, 1980; Tahta, Wood & Lowenthal, 1981; Thompson, 1991; Flege & Fletcher, 1992; Flege et al., 1995). Therefore, the more fully developed the L1 phonetic system is at the time L2 learning begins, the more foreign-accented the pronunciation of the L2 will be. The main question remains when the Critical Period ends. There were a few suggestions that it might end at the age of 6, 12 or 15. It is not supported by unequivocal evidence yet because there were always some exceptions.

Length of residence (LOR) in a country where L2 is a predominant language is another factor. Some studies showed that this factor is significant (Purcell & Suter, 1980; Flege et al., 1995) and other studies showed that it is not a significant factor (Oyama, 1976; Flege, 1988; Moyer, 1999). Length of residence is definitely less

important than age of learning when speaking about factors affecting foreign accent of the L2.

Regarding gender, as LOR increases the gender differences vanish. Generally women get higher ratings in the experiments (Tahta et al., 1981; Thomson, 1991) but most studies have not identified gender as a significant predictor of degree of L2 foreign accent (Suter, 1976; Flege & Fletcher, 1992; Elliott, 1995).

The problem with the next factor - formal instruction - is that only little attention in the classroom is given to L2 pronunciation, thus it has only little effect on degree of L2 foreign accent. It has larger effect if subjects received a special training in pronunciation of an L2.

Factors like professional motivation or strong concern for L2 pronunciation accuracy do not automatically lead to L2 speech without accent. Motivation is difficult to quantify and that is why it was not quantified precisely in previous studies.

In addition, the degree of perceived foreign accent can be affected for example by speaking style. An interesting observation was reported in study by Oyama (1976) and Thomson (1991). Read speech was more strongly foreign-accented than spontaneous unprepared speech. It may be because subjects may avoid difficult L1 sounds or words when asked to speak freely.

Language use was first examined as a factor influencing foreign accent of the L2 by Suter (1976) and Purcell & Suter (1980). It was based on the self-estimation of the amount of subjects' L2 use. L2 use was not found to be a significant predictor because of its correlation with length of residence and L1 background. Other studies also showed no significant effect of L2 use (Flege & Fletcher, 1992; Elliott, 1995; Thomson, 1991).

2.3 L1 and L2 in bilinguals' mind

It is a frequently asked question whether the brain of a bilingual functions in the same way as the brain of a monolingual, in other words if there are differences in the organization of two languages in the brain of a monolingual and bilingual. Usually in the case of right-handed adults the left hemisphere of the brain dominates in language processing. There is some evidence that the right hemisphere is used more, especially in the adult second language acquisition than in the first language acquisition. As the second language proficiency grows the involvement of the right hemisphere decreases and involvement of the left hemisphere increases. Nevertheless, existing data show that

the left hemisphere is strongly dominant for both cases – for monolinguals and bilinguals. Differences between them are exceptions rather than rules (Li Wei 2000).

What is more important for my thesis is the related issue of a mental representation of bilingual's languages and processing resulting from such a representation. It can be concluded based on evidence that language store for every bilingual's language exists separately and that there is also shared storage of the two languages. There are strong interconnections that depend on many individual factors (e. g., proficiency level or acquisition stage). Other important issues that are connected with the way languages are represented in a bilinguals mind are language use and switching between the bilinguals languages. For bilinguals with higher proficiency in the two languages it is no problem to switch instantly from the L1 to L2 and vice versa. Nonetheless, bilinguals whose L2 is weaker tend to use their L1 as a mediator between concept and the target. Weinreich (1953) was the first researcher who suggested that the mutual influence of a bilingual's L1 and L2 on one another exists and that it is inevitable to occur.

It is a popularly held belief that bilinguals code-switch when they cannot express themselves sufficiently in one language. It is true only to some extent that bilinguals code-switch only in those cases because code-switching is very common for bilinguals and it is being practiced in many forms. "Interpreters and translators, for example, switch between languages as a routine part of their job" (Li Wei 2000, 15). It is true for interpreters and translators as well as for other bilinguals that one language is used more actively and therefore used with more ease by them. They are trained to translate and interpret from their "passive" (L2) to "active" (L1) language because it is more natural for them (Li Wei 2000). In this paper subjects will interpret from their L1 to L2 so that the influence of L1 on L2 can be observed.

There are three models of what the actual relationship between languages in bilinguals' mind could be (presented in Figure 2):

- Separation model
- Interconnection model
- Integration model

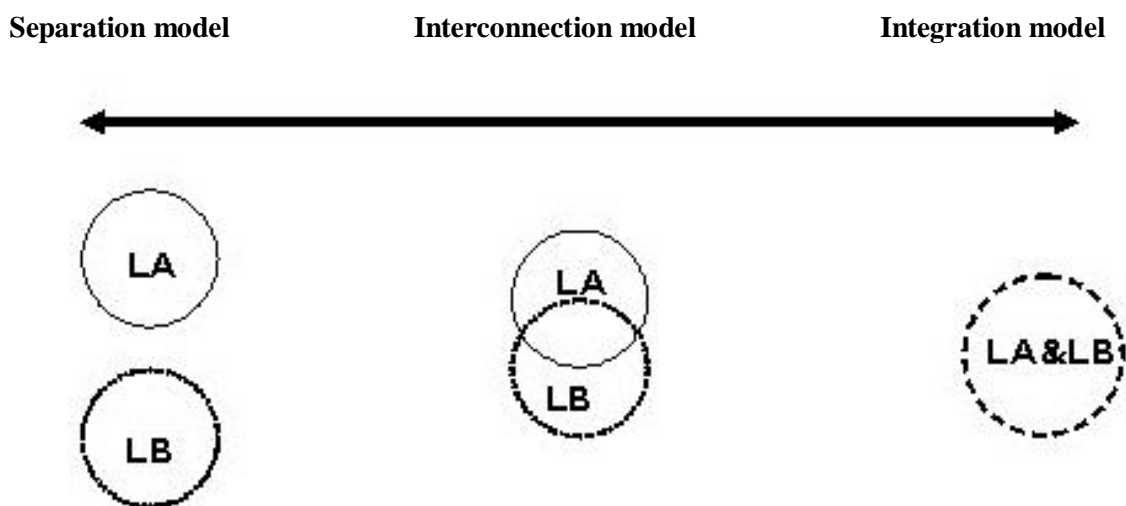


Figure 2: Integration continuum, (LA = L1 and LB = L2).

The first one, separation model, presents the idea that L2 user either speaks one language or the other but there is no connection between the two languages in the mind. It refers to the idea of coordinate bilingualism associated with Weinreich (1953). In the early SLA research in separation model L2 interlanguage was claimed to be developed without drawing on the L1 to any great extent (Dulay & Burt 1980). It influenced much language teaching methodology that hopes students will create new language system without links to the first so this methodology does not support use of L1 in the classroom.

The opposite possibility is that the two languages create one system. This view is called integration model. In case of vocabulary it is claimed by some people that there are two separate mental lexicons and bilingual has one lexicon where words from one language are stored alongside the words of the other language (Caramazza & Brones 1980). According to some researchers in case of phonology L2 users have a single merged system for producing speech (Williams 1977). This model says that L2 users can still choose which language they want to use in a particular context.

Integration and separation are not real. These two models are only two extremes on the integration continuum (Cook 2002a). Separation is not possible because the two language systems exist in one mind and integration is not possible because bilingual can choose to speak in one of the languages.

The interconnection model has been assumed by studies of language “transfer” or “influence”. It was based on observing the development of interlanguage when L2 element was influenced by the element of the first language (Cook 2003). The links,

however, work in both directions. The strength of the links between L1 and L2 depend on the direction and stage of acquisition (Kroll & Tokowicz 2001).

A similar view is called partial integration. Cook (2002a) implied that this model could be an alternative wording of the same idea as interconnection. This model represents the idea of partial overlapping of two language systems in the same mind. It does not distinguish between languages presented in the areas that overlap. The focus is on the difference of the single system from monolingual versions of languages.

The direction of movement on the continuum may vary. Some people may start with separation and move towards integration but it can also happen in the opposite direction. Another possibility is that the languages may stay separate. This continuum also does not concern all individuals in the same way. It can also vary from moment to moment according to individual's perception of language mode (Grosjean 2001). It can also influence different areas of language system in different ways. For example, a person's lexicon might be integrated in contrast with their phonology which might be separate (Cook 2002a).

Grosjean (1985) questioned the traditional view of a bilingual as two monolinguals in one person. There are many interconnections between the two languages of a bilingual and bilinguals' languages are permanently changing the state of activation they are in. In addition, Grosjean (1982, in press) concluded that bilinguals' two language systems are always activated to some extent. Bilingual speakers can switch between the languages according to the specific conditions they are provided with. In their everyday lives bilinguals find themselves in different situations that require different language modes. There is a situational continuum that represents possible language modes. At one end of the continuum, there is the completely monolingual language mode in that they use only one language in that moment. At the opposite end the bilingual mode occurs when a bilingual communicates with another bilingual that shares the same language so code-switching is a natural practice in these situations.

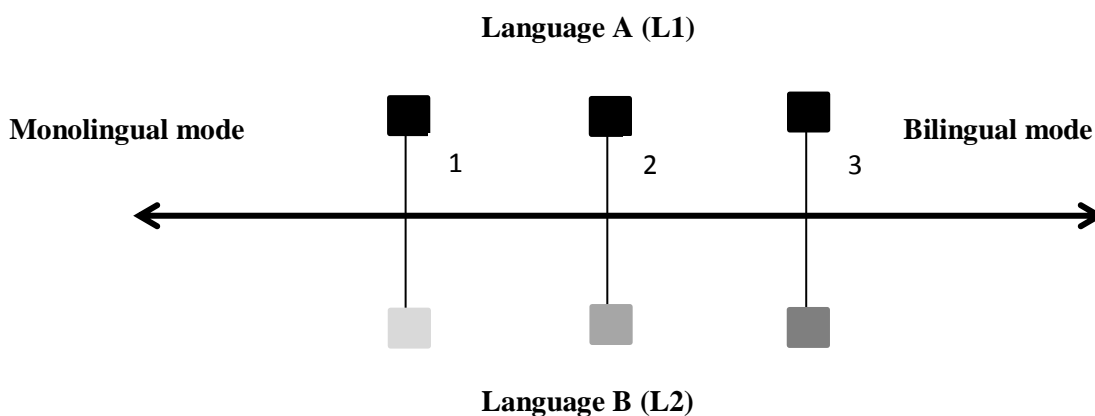


Figure 1: Visual representation of the language mode continuum. Figure adapted from Grosjean (2000).

As was explained in section 2.1, interference is use of features characteristic for one language while speaking (or writing) another. Weinreich (1966) writes that when speaking in the bilingual mode there are hardly any limits to interferences. It is clear that every bilingual has to decide, usually unconsciously, which language to use and the degree of the other language that is needed. The activation of the languages depends on this decision and the stage of activation of the languages is called language mode. In the monolingual speech mode, one language is deactivated but it is impossible to deactivate it fully. In the bilingual speech mode, one language is chosen and the other is used from time to time. There are also intermediate modes that were presented in Grosjean’s study (1989). Later on the expression speech mode was replaced by language mode (Grosjean 1994) so that it would include not only spoken language but also written language. Treffers-Daller (1998) suggested that the concept of language mode continuum can be important for further studies concerning code-switch patterns because it can help predict the frequency and type of switching that takes place. Grosjean (2000) claims, that taking language modes into account provides many advantages to bilingualism research. For example, it shows how bilingual’s two languages are processed separately and together. Language mode also occurs constantly in bilingual research as an independent variable, a control variable or a confounding variable.

A different view from that of Grosjean is the one presented by Flege in his work “Second language speech learning: Theory, findings, and problems.” where he presented Speech Learning Model (1995). It proposes that bilinguals have only one phonological system where the two languages are situated. One of the postulates of this model is that bilinguals strive to keep the contrast between L1 and L2 phonetic

categories, which exist in a common phonological space. When a sound is produced, the properties presented in a particular phonetic category correspond with the production of that sound. According to Flege's Speech Learning Model, adults are capable of forming phonetic categories for specific L2 vowels and consonants. SLM also proposes that when the phonetic category of an L2 consonant is formed, it can be pronounced accurately if the new category is based on the same features as in the case of monolingual speakers of the particular L2 and if it is not different from the nearest L1 consonant only to preserve the contrast within a common L1-L2 phonological space.

2.4 Recent findings

Not many people who begin to learn their L2 as adults are able to speak without a foreign-accent (Flege, Munro & MacKay 1995b). It is not certain what reasons there are for the occurrence of foreign accent. It might result from slowing, deterioration or complete loss of some basic speech learning mechanisms etc. It may also occur because it is quite a difficult to prevent the L1 and L2 phonological systems from interacting with one another. The evidence exists that vowels which do not exist in L2 can be obtained by L2 adult learners, whereas vowels that are similar but not identical in the L1 and L2 cannot be managed (Flege 1995).

“Individuals who learn a second language often identify phones in an L2 with phonic elements (position-sensitive allophones, perhaps phonemes) of the L1. This process called interlingual identification, occurs even when the L2 and L1 phones differ acoustically and articulatorily, and when the difference between them can be detected auditorily.” (Flege 1995)

Interlingual identification mentioned above is considered to be the trigger of the replacement of L2 phones by L1 phones in speech production (Flege 1987).

On the basis of one of the SLM hypotheses it can be concluded that position-sensitive allophones in the L1 and L2 are related to each other in terms of perception. It means that, for example, speakers of an L1 without word-final consonants are expected to produce word-final stops in English accurately. However, inexperienced late learners of English have been observed to have a tendency to devoice /b d g/, delete word-final stops or to add an epenthetic vowel to CVC words (Flege and Davidian, 1984; Weinberger, 1987). Findings of the study carried out by Flege, Munro, and Skelton (1992) suggest that closure voicing is easier to learn than other features connected with

the /t/ – /d/ distinction (Kluender et al. 1988) but it does not ensure that NE listeners will identify this as native-like pronunciation.

Recent studies dealing with the L1 effect vary in many aspects. However, researchers mostly focus on the influence of L1 throughout the subjects' lives, not only on the moments before the speech. In this paper the main focus is on the interpreting that takes place after the speaker hears his/her L1 (Czech) and interprets it into L2 (English).

On one hand, if the L1 and L2 interact inevitably (Weinrich, 1953; Grosjean, 1982) then the amount of recent L1 use may not be as important as bilingual's overall competence in the L1 or the use of L1 during the whole lifetime. On the other hand, if the L1 and L2 subsystems can be activated and deactivated (Paradis 1993) then the recent L1 use may be more important than the overall lifetime use of the L1.

The first study that assessed the effect of the amount of L1 use on performance in L2 was the one performed by Flege et al. (1997). Flege et al. suggested that the degree of "activation" of a particular language affects L2 production accuracy. This view is in agreement with "a single system hypothesis". It proposes that bilinguals have only one phonological system where the two languages are situated. Therefore bilinguals are unable to isolate their languages fully and phonic elements of one language subsystem inevitably influence the phonic elements of the other language subsystem. This principle works in both directions. The previous studies have shown that amount and circumstances of L1 and L2 use belong among important factors affecting strength of the L1 influence.

In the study carried out by Flege, Frieda & Nozawa (1997) the effect of variation in the amount of self-reported use of the L1 on L2 production was investigated. The more the subjects used their L1 (Italian), the stronger the foreign accent was in L2 (English). It could not be due to the practice effect because they had experience of at least 18 years in Canada.

Piske & MacKay (1999) had the same results for early bilinguals as for the late bilinguals. This finding was important because it shows that other factors than neurological maturation at the time of L2 learning are in play, such as L1 use, and it has influence on L2 production capabilities. Interaction between L1 and L2 can influence production of L2 and affect the success of the speaker in pronouncing the L2 accurately.

As it was already mentioned in section 2.1, Guion (2000) investigated interaction of L1 and L2 systems in bilinguals who used their L1 on a regular basis so

its influence was expected to occur in the results. The main difference between three groups investigated in this research was the amount of L1 use. The asymmetry was observed in how two systems of a bilingual may influence each other. As expected, L1 use had an effect on the L2. The more frequent the L1 (Quichua) use was, the stronger the foreign accent ratings were for the L2 (Spanish). However, the L1 use did not influence the degree of foreign accent in L2. The results replicated the study by Flege et al. (1997).

Interaction and separation of two bilingual's languages has received less attention at phonetic level (Fabiano-Smith & Barlow 2010) than at lexical level (Green 1998). There are a few proposals for the cognitive mechanisms that could be responsible for language separation at lexical level. One of them is The Inhibitory Model presented by Green (1998). It was established that bilinguals maintain and produce separate phonetic categories in their two languages (MacLeod & Stoel-Gammon 2010). Another view is called Unitary System Model (Vihman 1985) and it proposes that dual systems emerge as the result of one single system that divides into two autonomous systems. Different view is the one that says that the dual systems emerge as two dually developing systems and it is presented as Dual Systems Model. Nevertheless, the researchers agree that even from a young age bilinguals separate their phonetic categories systems. There is also general agreement that the L2 learners are capable of establishing separate phonetic systems for their L1 and L2. Those two systems are not completely autonomous. There is the influence of L1 on L2 (Caramazza 1973) or the influence of L2 on L1 (Flege, Mackay, & Piske 2002). In overall findings, no phonetic interaction has been found in the study carried out by Grosjean & Miller (1994). Transfer can occur in one direction (unidirectional transfer) or in both directions (bidirectional). Bidirectional transfer was observed for example by Bullock & Toribio (2009). Antoniou et al. (2011) observed L1 to L2 influence in his study.

Olson (2013) decided to focus on code-switching between two languages with elimination of the influence of connected speech. In the findings he discovered a unique asymmetrical L2 to L1 transfer. It highlighted the influence of connected discourse on phonetic interaction.

It can be concluded based on the results of previous studies that amount of L1 use affects L2 production. Stronger foreign accent was observed for speakers that used their L1 more frequently. It means there is an interaction on phonetic level. Together with chronological age at the time of the beginning of L2 learning, L1 use (thus L1

activation) is considered to be an important factor. L1 and L2 use affect the extent to which the L1 sound system influences the L2 pronunciation, whereas it does not affect the way the L2 sound system influences pronunciation of the L1. This tendency is called asymmetrical transfer (Guion 2000).

2.5 Selected phonetic features

2.5.1 Voice Onset Time

One of the features examined in this study is Voice Onset Time. VOT is the lag between the release of a stop consonant and the onset of vocal folds vibration (Lisker & Abramson 1964). There are differences from one language to another. English language has typically long-lag voiceless stops with VOT of 30-120ms in initial positions. One typical phonetic property of the English stop categories is connected with VOT. The feature is called aspiration and it can be described as strong burst of air that accompanies either release or the closure of some obstruents in case of preaspiration. Voiceless stops can be aspirated or unaspirated. Aspiration takes place before vowels and it is stronger in stressed syllables than in unstressed syllables. It varies with place of articulation. The strongest aspiration occurs in case of /k/, the second strongest aspiration is usually for /t/ and the least conspicuous aspiration is typical for /p/ (Melen 2010).

Flege and Eefting (1987b) discovered that the experienced French native speakers produced voiceless stops in English with shorter VOT values, which is more French-like characteristic, than did the English monolinguals. Nevertheless, experienced native French speakers of English produced longer, more English-like VOT values than French monolinguals (Flege and Eefting 1987b). In compliance with the SLM, a prediction can be made that early bilinguals will produce voiceless stops more accurately than the late bilinguals. It was confirmed in a study by Flege (1991b) where two groups of native Spanish speakers were examined. One group involved speakers who learned English as adults and the other group involved speakers that learned English as children. Native Spanish late learners produced /p t k/ with more Spanish-like values, whereas the early learners produced these stops with the same values as native speakers of English. It was interpreted in the way that early bilinguals had formed phonetic categories for English /p t k/.

Grosjean & Miller (1994) found no differences of VOT in English and French. VOTs were similar to monolinguals in both cases of non-switched and code-switched

English productions. However, Bullock et al. (2006) and Bullock & Toribio (2009) found significant interactions in VOTs of Spanish-English bilinguals where Spanish was the dominant language. Both early and late bilinguals were included. Direction of switch influenced the VOT values. In the case of Spanish to English code-switched tokens shorter, more Spanish-like VOTs occurred. English to Spanish code-switched tokens were longer, more English-like only in the case of early bilinguals.

2.5.2 Final obstruent devoicing

The second feature which is examined in this paper is voicing of the final stops. For Czech language devoicing of final obstruents depends on the environment they are in, whereas in English there is no final-obstruent devoicing that would neutralize phonemic contrasts. However, voiced obstruents are devoiced to some extent when they occur in final position in English, mainly when it is the end of a phrase or when followed by a voiceless consonant. It means obstruents are only partially devoiced in English. In Czech, obstruents are voiceless when immediately preceding voiceless sound or when they are final in some domain, usually a word. Details differ from language to language. This phonological constraint called final obstruent devoicing is also found in languages such as Dutch, German, Maltese, Polish, Russian.

Juli Cebrian (2000) focused his study on the interference of L1 rules in the acquisition of a voicing contrast in English word-final obstruents by native speakers of Catalan. The results are explained by the transfer and universal tendencies which means there was more limited influence of the L1 voicing rules.

The interference from the native language is supported by the Contrastive Analysis Hypothesis (Lado 1957). It can predict areas of difficulty by comparing L1 and L2 and it explains interlanguage errors as transfer of L1 structures. Not all interlanguage errors can be explained by transfer alone. Other factors that shape L2 phonology gained importance in the studies concerning acquisition of L2 (Eckman 1977). Linguistic universals such markedness are relevant factors in the formation of L2 system.

A new approach occurred called the Markedness Differential Hypothesis and it claims that areas that are both different from the L1 and more marked are those that will be difficult (Eckman 1977). For example, final voiced obstruents are marked because they are less frequent than their voiceless counterparts cross-linguistically. Catalan language has rules of regressive voicing and final devoicing that Catalan native speaker

has to overcome when learning L2 in comparison with languages such as English that do not have the same rules.

In the study by Major & Faudree (1996) it was confirmed that the final voicing contrast in the study of the acquisition of English has a marked status. It has been proved by many studies that final obstruent devoicing (FOD) in an interlanguage cannot be always explained by the characteristics of the L1 (Weinberger, 1987; Edge, 1991). For example, Mandarin language has no final obstruents but still Mandarin subjects produced two-thirds of their English word-final obstruents as devoiced.

Importance of phonological environment of the target obstruent as another factor affecting the production of the target was pointed out by Edge (1991). Non-native subjects produced voiced final obstruents in English more successfully when the target was followed by a voiced sound. She also found out that there is final devoicing in native English speakers' production before a pause or before a voiceless sound but almost never before a voiced consonant or a vowel. FOD prevails in many interlanguages regardless of L1 characteristics and even when the L1 has final voiced obstruents. It is a developmental process found in the acquisition of L1 and to some extent even in the adult speech in English (Edge 1991).

In the study by Juli Cebrian (2000) the L1 rules were expected to interfere with the production of target obstruents because the same input and the same environment for the L1 rules are found in the L2, therefore it is necessary for transfer to take place (Rubach 1984). The result of the study by Juli Cebrian show higher scores of FOD compared with other studies. This pattern of high number FOD responses can be possibly explained by the nature of the task which was designed to avoid orthographic interference. High rates of FOD also point to joint effect of L1 interference and universal or markedness tendencies. Higher number of correct voiced responses occurred before a voiced consonant or before a vowel initial word. More evidence for marked nature of final voiced obstruents and the unmarked nature of FOD was presented in this study.

The production of word-final English stops was examined by Flege (1995b) on 240 native Italian speakers who had spoken English for 30 years on average. The native Italian subjects whose AOL was from 3 to 21 years produced /p t k/ accurately. The NI speakers who began learning English by the age of 15 years pronounced /b d g/ accurately but approximately 40% of those subjects whose age of learning was between 15 and 21 pronounced /b d g/ as devoiced.

Both voicing and devoicing cause interference but the difference is in the extent to which it is transferred. In the case when the L1 rules can be characterized as unmarked transfer is considered to be the predominant source of L2 errors.

2.6 Hypothesis and research question

Based on previous research it can be assumed that long-term L1 use influences L2 production (Guion, 2000; Flege, 1997; Piske et al., 2001). As mentioned above, Guion (2000) examined how the frequency of L1 use has an effect on the L2 production of Quichuan-Spanish bilinguals. It was found out that the amount of L1 use affects the L2 but not the L1 speech. In case of Quichua-Spanish bilinguals who spoke their L1 more frequently, the stronger foreign accent ratings for their L2 (Spanish) were obtained than in case of bilinguals who spoke their L1 more rarely. Flege et al. (1997) has come to similar findings in his study.

Hypothesis of this thesis is derived from the point of view on when the transfer of phonetic features from L1 to L2 occurs. If Flege (1995) and his theory of equivalence classification are right, the transfer occurs in case of similarity of two languages. Phoneme /k/ is a similar phoneme in both languages examined in this thesis as well as phoneme /b/ is similar in English and Czech. They only differ in their phonetic features – Voice onset time in case of /k/ and voicing in final position in case of /b/.

I assume that the L1 influences L2 production even in the case when it is immediately preceding L2 production. It can be also presumed that the influence will increase with time and the amount of L1 heard. The more L1 is heard, the more influence of L1 on L2 will occur. Voice Onset Time in English is generally longer than VOT in Czech. This tendency is expected to be transferred from Czech to English in my experiment. VOT in subjects' L2 (English) is expected to be influenced by L1 (Czech), and therefore VOT shall be shorter, more Czech-like. Transfer from L1 to L2 may also occur in case of Final Obstruent Devoicing, which is typical for Czech language in environments immediately preceding voiceless sound or at the end of a phrase. In English there is only partial devoicing.

I expect the transfer tendency to increase as the interpreting process from Czech into English progresses. The more of L1 the interpreter hears, the more influence on his/her L2 production it will have. I therefore assume that speakers' interpretation in English will show more Czech-like features at the end than at the beginning of

interpreting. It can be assumed that the interpretation of less experienced interpreters will show signs of stronger L1 influence on L2.

3 METHOD

3.1 Subjects

Four people participated in my research, two of them were students of English for Translators and Interpreters study programme (ETI) and the other two were interpreters, translators and teachers of English at the same time. All participants had really high L1 and L2 proficiency. The subjects were asked to fill in a questionnaire after the study. The age of these participants ranged from 22-27. Two of the subjects were male and two of them were female.

Both students have studied English for more than 14 years. The students spoke English (their L2) approximately 2 hours a day but they have never been exposed to their second language for a longer time in an English speaking country (i.e., they have never lived in English speaking country for a month or more). The average time of their L2 acquisition was 9 (i.e., 8 for the female student and 10 for the male student). The students had experience with interpreting because of the mandatory interpreting courses that are part of their study programme, which they studied for the third year. Outside of the school the female student had experience of approximately 25 hours of interpreting and for the male student it was 40 hours of experience in interpreting outside of the school. They interpreted more from Czech to English. Both students had theoretical background in English phonetics from attending phonetic seminars during their study.

The two interpreters spoke English approximately 4 hours a day (ranging from 3-7 hours a day). The average time of their L2 acquisition was 14 (i.e., 13 for the female interpreter and 15 for the male interpreter). The frequency of them interpreting from Czech into English and from English into Czech was the same on average. The female interpreter had about 9 years of English education and she had been living in an English speaking country for 11 months (in 2006). She has experience of 8 years of interpreting. She attended two courses in English phonetics and phonology during her study at Mendel University in Brno. The male interpreter had 6 years of English education and he had been living in an English speaking country for 3 months (in 2009). The male interpreter has no theoretical background in English phonetics. He has

experience of two years of interpreting but recently he has been more devoted to teaching English.

3.2 Procedure

After choosing the appropriate target words (i.e., cubes and people) which would contain relevant phonemes (i.e., /k/, /p/ and /b/), I found a few short Czech texts including these target words and created a text about the history of sugar cubes and Rubik's cube (see Appendix 7.2). There were 117 sentences in the text. This text was recorded by a Czech native speaker who studied Czech philology. The recording of the text was divided into sentences in the Audacity programme (version 2.0.5). Then I prepared three questions in English (see Appendix 7.1) that the subjects were asked to answer in English. This part was designed to gain samples of the subjects' spontaneous speech in English which would not be preceded by their L1. Therefore, the instructions in the experiment and the three questions were recorded in English by an American native speaker. After these preparations, a slideshow in PowerPoint 2010 consisting of two parts was created (the slideshow is enclosed on the CD). In the first part the participants were asked to answer three English questions mentioned above. These recordings were obtained to measure the length of the subject's VOT in their spontaneous speech and also to find out if the subjects tend to devoice completely in case of final obstruents even in the spontaneous speech. In the second part, the fifteen minute read text in Czech was divided with 1 to 2 sentences per slide. The subjects' task was to interpret these sentences from Czech into English. After hearing each sentence or sentences, the subjects had time to interpret it. The subjects themselves decided when they want to move to the next sentence or sentences by clicking on the slide. Then I submitted the questionnaires with relevant questions to the research (see Appendix 7.3). The male subjects were asked to say a few sentences about the history of a sugar cube and Rubik's cube in Czech. The recordings of these sentences were used for analysis of the phonetic features in the subjects' Czech spontaneous speech. This part was not carried out with the female subjects because it was designed after the female subjects had already undergone the study. All subjects, except the female interpreter, were recorded in a special recording room which was soundproof. In the case of female interpreter, the study was carried out in her apartment, therefore I had to count with disturbance caused by neighbors. I was always present in the room where the study took place but I was there only as a support and did not speak or influence the experiment in

any other way. For all the recordings a special device for recording was used (Zoom H4n).

3.3 Analyses

In many studies of foreign accented speech a group of raters is recruited which evaluates the degree of subjects' foreign accent. In my study I did not have a group of raters. I focused on the particular measurable phonetic features that are different in subjects' L1 (Czech) and L2 (English). The recordings were divided into smaller parts in the Audacity programme (version 2.0.5). The recordings were then annotated in the Praat programme (version 5.3.51). I focus on the shift of the VOT and change of final obstruent devoicing towards more Czech-like characteristic. Therefore, I measured VOT for /k/ in *cube*, /p/ in *people* and time of devoicing for /b/ in *cube*. Unfortunately, during measuring of final obstruent devoicing, I found out that the subjects in this study completely devoice /b/ in most final positions already from the beginning of the interpreting. Word-final devoicing is typical for the Czech language. Since no change could be observed in the case of final obstruent devoicing, I decided to focus only on VOT. In annotation I marked tone units (the target word or target word with a few words that surrounded it). I also marked if a particular word was pronounced as stressed and accented (Sa), stressed (S) or unstressed (U) so that I could see how the stress influences the length of the VOT. Later the unstressed syllables were excluded. For the analysis I chose the first 15 realizations of the word *cube* in stressed or accented positions in the recording and the last 15 realizations of the same word, again in stressed or accented positions in the recording. Then I calculated the average length of a phoneme for each subject by dividing the measured time of the marked word/words by a number of phonemes in that phrase. This helped me to see how the speed of speech differentiated between the speakers and made it easier to compare them. I divided VOT values by the time of a phoneme for each target word at the beginning of interpreting and then I did the same with the last 15 target words and the time of a phoneme for each target word at the end of the interpreting. It showed what portion of an average phoneme a VOT value of a [κH] represents. VOT was measured also for /k/'s that occurred in the spontaneous answers to the questions in English and for the /k/'s in Czech read sentences in case of the male subjects. The Czech words containing initial /k/ were used for verbal comparison and were not analyzed further. Then the target words *people* from the interpreted text, the words including /p/ in the question part and

also the words with /p/ in the Czech sentences were analyzed in the same way as I did with the words containing /k/. The target words *people* were later excluded from the analysis because of the small number of them in the interpretations of the subjects. Afterwards the data were submitted to statistical programmes and they were compared on basis of t-tests, post-hoc Tukey tests and repeated measures ANOVA.

4 RESULTS

Before the data are presented separately for each speaker, a general comparison of all the speakers is presented. Then the results for each subject are reported separately. In the last part of this section VOT for the realizations of word *people* is analyzed.

Using the data for the first 15 and the last 15 target words from interpreting for each speaker, graphs presenting a general comparison between the subjects as to difference in overall Tp, absolute VOT and relative VOT were created. It showed that the speakers' average duration of a phoneme varied from 86.3ms/phoneme to 108.6ms/phoneme at the beginning and from 97.9ms/phoneme to 112.1ms/phoneme at the end of the interpreting (see Figure 3). The male student spoke the fastest. Tp values for both phases were the lowest for this subject. The other subjects' speech rate was relatively similar. The average time per phoneme values of female student at the beginning of interpreting were 6.1ms longer than the average time per phoneme values of the female interpreter. The difference in the same phase between female interpreter and male interpreter was even smaller (2.9ms). At the end of interpreting the difference in time per phoneme values between female student and female interpreter was 0.3ms and between female and male interpreter it was only 0.1ms.

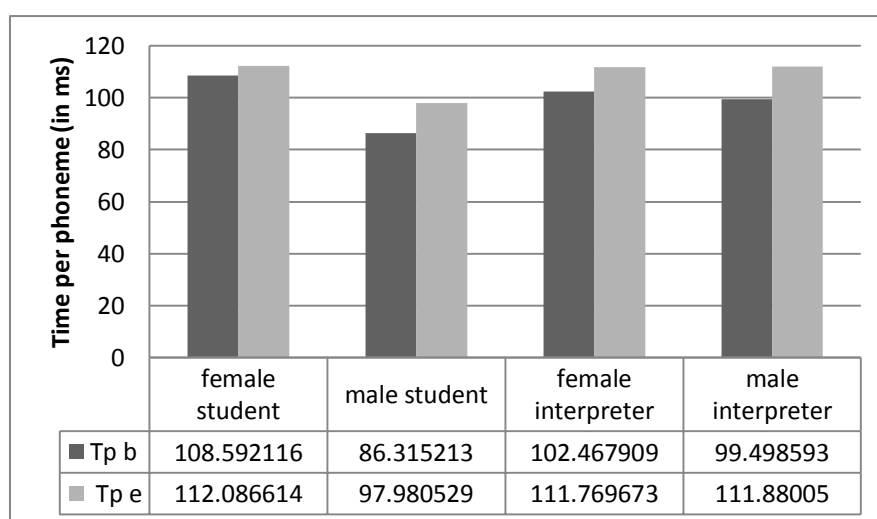


Figure 3: Comparison of mean Tp values at the beginning and at the end of interpreting (in ms).

The mean values for absolute VOT varied from 63.6ms to 105.4ms at the beginning and from 58.9ms to 106.1ms at the end of interpreting (see Figure 4). Both female subjects had longer VOT at the end than at the beginning. The difference between the phases was 7.3ms for female student and 25.3ms for female interpreter. For both male subjects the opposite tendency was observed of having shorter VOT at the end. The difference between the phases was 7.7ms for male student and 17.7ms for male interpreter. Therefore, the student subjects had smaller differences in VOT between the phases than the interpreter subjects.

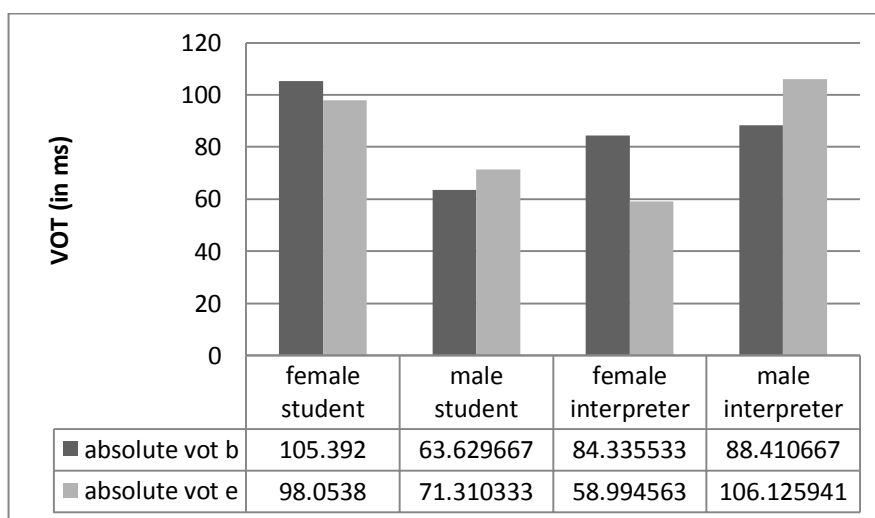


Figure 4: Comparison of mean absolute VOT values at the beginning and at the end of interpreting (in ms).

When the factor of speech rate was normalized, the graph (see Figure 5) revealed that the female student had the longest relative VOT values of all the subjects at the beginning of interpreting. The third longest relative VOT values were measured for the same subject at the end of her interpreting. Only male interpreter had longer relative VOT values at the end of his interpreting. This graph also confirmed the tendencies of shift towards shorter VOT at the end for the female subjects and shift toward longer VOT at the end for the male subjects. The tendency of less significant difference in relative VOT values between the phases was also observed for the student subjects than for the interpreter subjects.

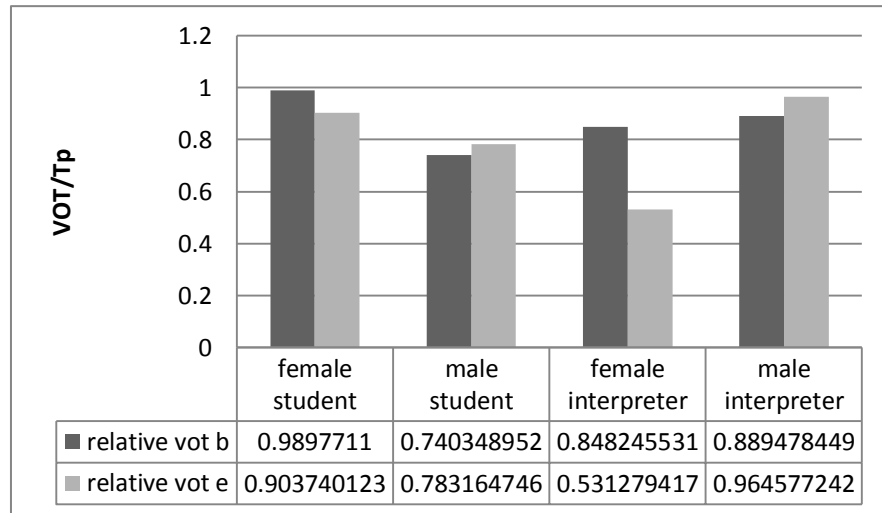


Figure 5: Comparison of mean relative VOT values at the beginning and at the end of interpreting.

The variables analyzed were absolute VOT (without normalization of speech rate), relative VOT (VOT/Time per phoneme), an average duration of a phoneme (Time per phoneme, Tp). The data were submitted to t-tests as dependent variables. The effect of phases was analyzed (beginning – b, end – e). T-tests were also run for the analysis of stress effect on three variables mentioned above. We also run one-way ANOVA and then repeated measures ANOVA which compared the effect of the phases *b*, *e* and *q* (*q*-questions) on the same variables as in the t-tests.

4.1 Female student

At the beginning of interpreting the mean absolute VOT for the female student was 105.4ms and at the end of interpreting the mean value was 98.1ms. In case of target phonemes in question phase the mean VOT was 52.4ms. The data collected for female student for *b* and *e* phase were submitted to t-tests. The T-tests revealed the tendency of shifting the VOT towards shorter, more Czech-like VOT but the difference between the phases *b* and *e* was not found significant for relative VOT ($p > 0.2$). For the absolute VOT, the VOT was also shorter at the end and the difference was also not found significant ($p > 0.3$). The t-tests showed that the speech rate did not change during interpreting in a significant way ($p > 0.7$). The correlation between duration of a phoneme and VOT was found significant ($r = 0.386992$). We also run t-tests on the VOT values from all phases with the same dependent variables as in previous t-tests and with stress as independent factor (accented and unaccented syllables containing /k/). T-tests found a significant effect of stress on relative VOT ($F[1, 32] = 5.3189$, $p = 0.02772$) and

absolute VOT ($F[1,32]=11.882$, $p=0.00161$). The VOTs in accented syllables were longer than the VOTs in unaccented syllables. The factor of stress was not found to have a significant effect on time per phoneme ($p>0.2$). The data for *b*, *e* and *q* phase were submitted to one-way ANOVA and repeated measures ANOVA with absolute VOT, relative VOT and average time per phoneme as the dependent variables. One-way ANOVA found a significant main effect of phase on absolute VOT ($F[2, 31]=12.495$, $p=0.001$) and also on relative VOT ($F[2, 31]=9.1080$, $p=0.0001$). In case of the relative VOT, Post-hoc Tukey test showed that the difference was significant only between the phases *b* and *q* ($p=0.000597$), *e* and *q* ($p=0.004451$). The difference between the phases *b* and *e* was not found significant ($p>0.4$). It should be noted that there were only four cases of /k/ found in *q* phase for this speaker. Female student had the shortest VOTs for the question phase. The longest VOTs were at the beginning of interpreting. One-way ANOVA did not find significant main effect of average duration of a phoneme. It means the female student spoke with the same speech rate during the interpreting and answering the questions. Repeated measures ANOVA found a significant effect of phase on relative VOT ($F[2, 6]=7.2931$, $p=0.02476$) and also on absolute VOT ($F[2, 6]=10.176$, $p=0.01180$). The difference was again significant only between phases *b* and *q*, *e* and *q*. The effect of phase on time per phoneme was not found significant ($p>0.6$)

4.2 Male student

Values of VOT in Czech spontaneous speech of this subject were gained for the purpose of comparison. The mean absolute VOT was 41ms, at the beginning of interpreting the mean absolute VOT was 63.6ms and at the end of interpreting the mean value was 71.3ms. In case of target phonemes in question phase the mean VOT was 47ms. The data collected for male student in *b* and *e* phases were submitted to t-tests with absolute VOT, relative VOT and average time per phoneme as the dependent variables. The data for question phase were excluded. The VOT was shorter at the beginning than at the end of interpreting. The male student had relatively long VOT and it was even longer at the end of interpreting (see Figure 3). However, the difference was not found significant ($p>0.6$). The speech rate of this speaker increased during interpreting so the average duration of a phoneme was longer in *e* phase than in the *b* phase. This difference was also not found significant ($p>0.1$).

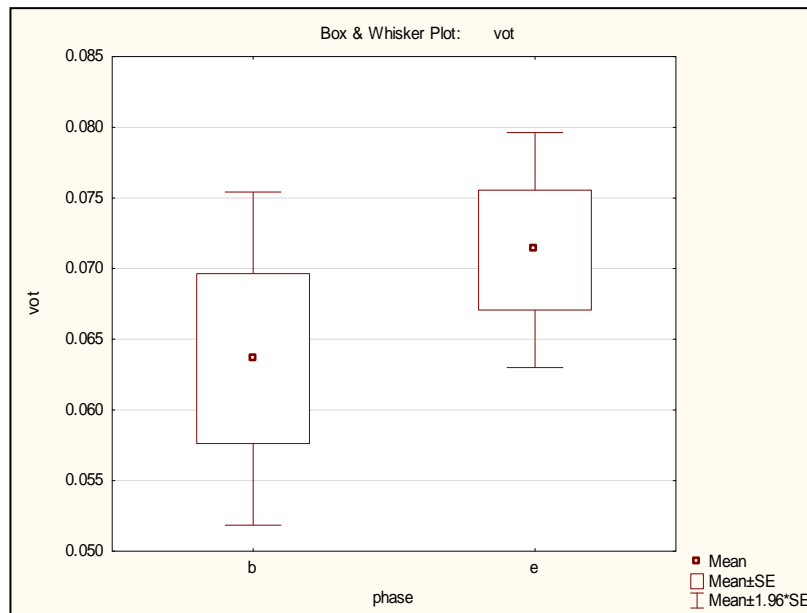


Figure 6: Box and Whisker Plot showing the mean VOT at the beginning and the end of interpreting.

The correlation between variables VOT and time per phoneme was found significant ($r=0,376065$). We also run t-tests on the VOT values from all phases with stress as independent variable (only accented and unaccented). The effect of stress (accentedness or unaccentedness) did not influence significantly the speech rate ($p>0.8$) nor relative VOT ($p>0.6$). The data collected for *b*, *e* and *q* phase were submitted to one-way ANOVA and repeated measures ANOVA. One-way ANOVA supported the results from t-tests. One-way ANOVA found that there was no significant effect of phase on relative VOT ($p>0.3$). The effect of time per phoneme was also found as not significant ($p>0.3$). The male student had shorter VOT in the phase *b* than in the phase *e*. The shortest VOT was in phase *q*. This speaker spoke faster at the beginning than at the end of interpreting. These differences were not found to be significant. One-way ANOVA found a significant main effect of phase on absolute VOT ($p=0.029$) but the difference between phase *b* and *e* was not significant. Repeated measures ANOVA did not found a significant effect of phase on relative VOT ($p>0.3$). The effect of phase on absolute VOT was approaching significance ($F[2, 28]=2.9761, p=0.06731$). The difference in VOT between phases *b* and *e* was even smaller when the variable of speech rate was normalized (relative VOT). The effect of phase on time per phoneme was not found significant ($p>0.3$)

4.3 Female interpreter

The mean absolute VOT for the female interpreter at the beginning of interpreting was 84.3ms and at the end of interpreting the mean value was 58.9ms. In case of target phonemes in question phase the mean absolute VOT was 26.5ms. The data collected for female interpreter for phases *b* and *e* were submitted to t-tests. The data for question phase were excluded. T-tests found significant differences between phases *b* and *e* ($p=0.002145$). The difference between phases for absolute VOT was 25ms. The difference with normalization of speech rate was even higher (relative VOT, $p=0.000071$). T-tests did not find a significant difference in average duration of a phoneme for phases *b* and *e* ($p>0.3$). Therefore, it can be stated that female interpreter spoke with the same speech rate during the phases *b* and *e*. No correlation between time per phoneme and VOT was found for this speaker. We also run t-tests on the VOT values from all phases with stress as independent variable (only accented and unaccented). The effect of stress on relative VOT (VOT/ T_p) approached significance ($p>0.7$). However, t-tests found a significant effect of stress on absolute VOT ($F[1, 39]=5.3700$ $p=0.02582$). When the syllable containing target /k/ was accented, the VOT was longer than VOT for target /k/'s in unaccented syllables (see Figure 5).

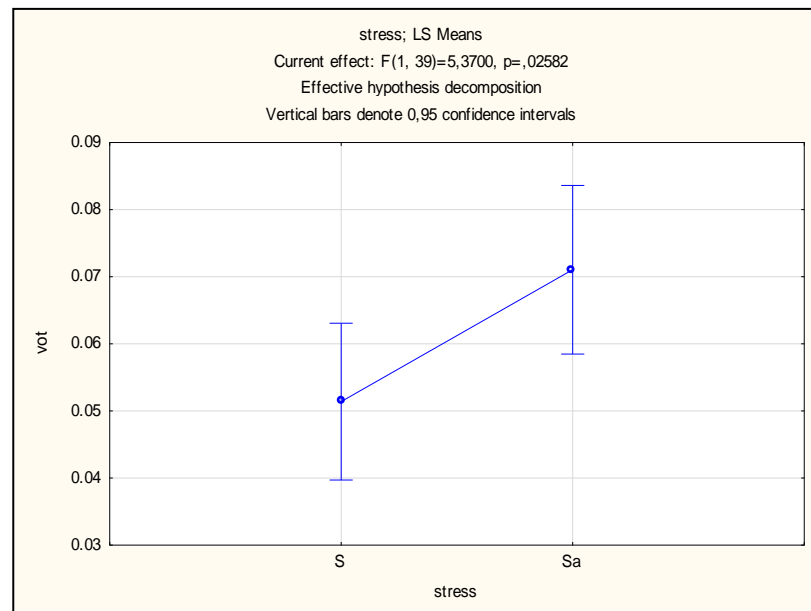


Figure 8: The post-hoc Tukey test showing the interaction between stress and absolute VOT.

T-tests did not find a significant effect of stress on average duration of a phoneme ($p>0.9$). The data collected for all phases were submitted to one-way ANOVA and repeated measures ANOVA with absolute VOT, relative VOT and average time per

phoneme as the dependent variables. The results from one-way ANOVA supported the results from t-tests. One-way ANOVA found a significant main effect of phase on relative VOT ($F[2, 38]=34.988, p=0.00000$). A post-hoc Tukey test found significant differences between all the phases: the beginning, the end, questions ($p>0.05$). Similar results were found for the effect of phase on absolute VOT. The effect was found significant ($F[2, 38]=28.948, p=0.00000$) and post-hoc Tukey test found significant differences between all the phases ($p>0.05$). This study is interested in the shift towards more Czech-like VOT during interpreting. These results show the expected shift of VOT towards shorter more Czech-like VOT (see Figure 4). The VOT was longer at the beginning and shorter at the end of interpreting. The shortest VOT was measured for the question phase. One-way ANOVA did not find a significant effect of phase on duration of a phoneme ($p>0.05$). It means the differences in average duration of a phoneme were not significant but there was a decreasing tendency. The subject spoke the fastest at the beginning of interpreting, more slowly at the end and even more slowly in spontaneous speech.

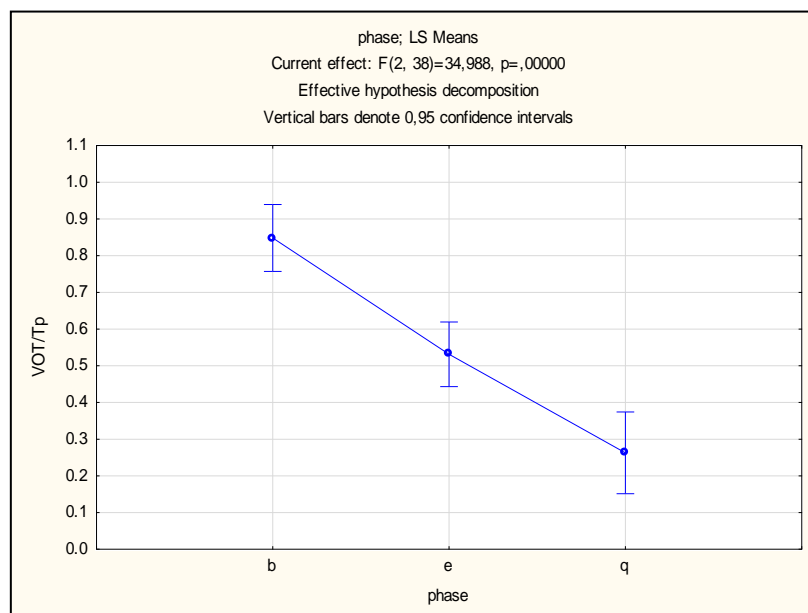


Figure 7: The post-hoc Tukey test showing the interaction between the phases and relative VOT.

Repeated measures ANOVA also found a significant effect of phase on absolute VOT ($F[2, 18]=24.557, p=0.00001$) and also on relative VOT ($F[2, 18]=21.964, p=0.00001$). The difference was again significant between all the phases. The effect of phase on time per phoneme was not found significant ($p>0.3$)

4.4 Male interpreter

Values of VOT in Czech spontaneous speech of this subject were gained for the purpose of comparison. In the Czech speech the mean absolute VOT was 36.1ms, at the beginning of interpreting the mean absolute VOT was 88.4ms and at the end of interpreting the mean value was 106.1ms. In case of target phonemes in question phase the mean VOT was 74.1ms. The data collected for male interpreter in *b* and *e* phases were submitted to t-tests. The t-tests showed tendency of shift towards longer VOT at the end of interpreting. The difference was not found significant (relative VOT: $p>0.5$, absolute VOT: $p>0.1$). The significant difference was found in case of the variable T_p ($p=0.038019$, see Figure 6). Therefore the speaker spoke more slowly in the *e* phase than in *b* phase.

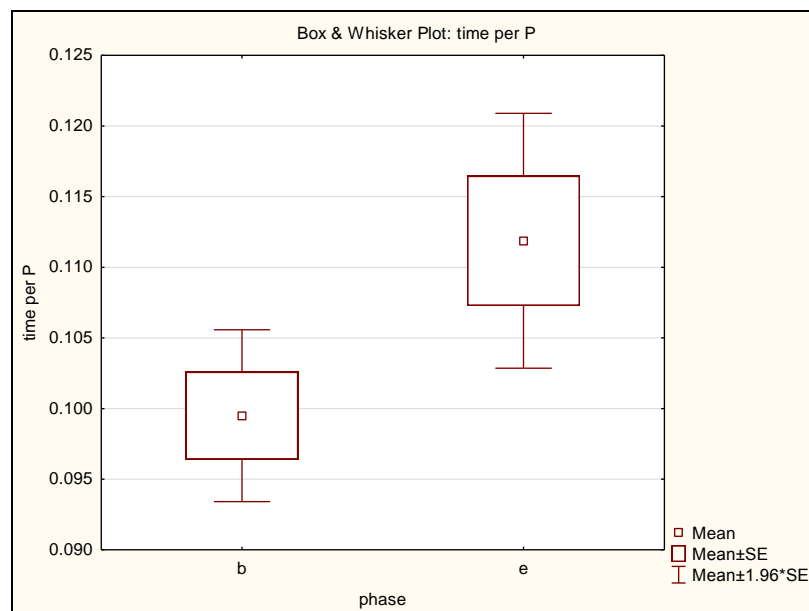


Figure 9: T-test showing interaction between phase (*b* and *e*) and T_p .

No significant correlation was found between T_p and VOT. T-tests were also run on the absolute VOT, relative VOT and T_p values from all phases with stress as independent variable (only accented and unaccented syllables). T-tests found significant main effect of accentedness or unaccentedness on absolute VOT ($F[1, 41]=10.275$, $p=0.00261$) and relative VOT ($F[1, 41]=6.5516$, $p=0.01426$; see Figure 7). However, t-tests did not found significant effect of stress on T_p ($p>0.9$).

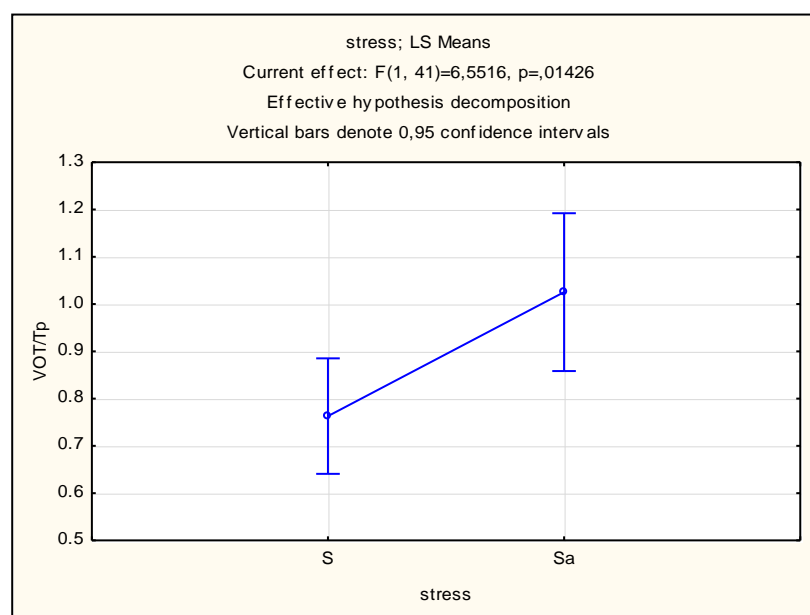


Figure 10: Post-hoc Tukey test showing the interaction between stress and relative VOT.

The data collected for all phases were submitted to one-way ANOVA and repeated measures ANOVA in the same way as for the previous subjects. One-way ANOVA found a significant main effect of phase on relative VOT ($F[2, 40]=3.6217, p=0.036$) but not on absolute VOT ($p>0.2$). In case of relative VOT, post-hoc Tukey test showed that the only significant difference is the one between phase *e* and phase *q* ($p=0.031039$). One-way ANOVA found the significant main effect of phase on the time per phoneme for the male interpreter ($F[2, 40]=8.2381, p=0.00101$). It was found that the time per a phoneme in *q* phase differs significantly from both the *b* phase ($p=0.000906$) and *e* phase ($p=0.013063$). The male interpreter spoke faster at the beginning than at the end and had the longest VOT at the end but these differences were not significant. The longest time per phoneme was measured in the *q* phase but the VOT was not the longest in *q* phase. Repeated measures ANOVA did not found a significant effect of phase on absolute VOT ($p>0.1$) nor on relative VOT ($p>0.6$). The effect of phase on time per phoneme was found significant ($F[2, 20]=5.0366, p=0.01692$).

4.5 VOT in the realizations of word *people*

The correlation between order and absolute VOT was analyzed for all the speakers. In case of increasing influence of the L1 (Czech) on the L2 (English) the correlation would be negative. However, absolute VOT for /p/'s was not significantly changing during interpreting in case of female student ($r=0.05560$) and male interpreter ($r=0.25127$). Moreover, the correlation was significantly positive for male student (0.417472) and female interpreter ($r=0.548455$). It means the length of VOT for /p/'s was increasing

with the time of interpreting for the male student and female interpreter. These results did not show the expected influence of L1 on L2.

5 DISCUSSION

The purpose of this thesis was to determine whether the L1 influences the pronunciation of L2 during interpreting. The first question addressed in this study was whether the interference from L1 can increase as a result of the use of L1 immediately preceding L2 production during interpreting situations. It was assumed that the L1 influences L2 production even when it is immediately preceding L2 production and that this influence will increase with the time and the amount of L1 heard. Therefore, the more L1 the speaker hears, the more the L1 influences his pronunciation of the L2.

The results varied for each subject. The post-hoc Tukey test revealed that the expected shift of VOT towards shorter, Czech-like VOT was present during interpreting of the two female subjects. The VOT of female interpreter was shorter at the end than at the beginning and the difference was found significant. The mean VOT at the beginning and the end differed by 25ms. It was not influenced by speech rate because it was determined that she spoke with the same speed throughout the process of interpreting. The same tendency was found for the female student but the change was not significant. The male subjects shifted the VOT in an unexpected direction towards longer VOT but in both cases the difference was not significant. The factor of speech rate could be responsible for this tendency in the interpretation of the male subjects because they spoke faster at the beginning than at the end. Post-hoc Tukey test did not find the difference in average duration of a phoneme as significant. The reason in case of the male interpreter could be that he did not attend any course in English phonetics or phonology, therefore was not familiar with the phonetic characteristics of English language.

Interestingly, the VOT in English spontaneous speech of all the subjects was shorter than during the interpreting. The factor of speech rate might explain the shorter VOT in English spontaneous speech in case of the male student. The female student spoke more slowly at the end but post-hoc Tukey test revealed that this tendency was not significant and that therefore she spoke with approximately the same speed during the interpreting. The results for male and female interpreter were different. They had also the shortest VOTs in the spontaneous speech but did not have the lowest values for

average duration of a phoneme. Moreover, they spoke with the slowest speech rate in that phase.

Based on the data collected in the research, we cannot explicitly claim that the L1 influence is always noticeable. Moreover, we cannot claim that the research did not find any influence of the L1 perception on L2 production. There are several probable reasons why the research did not reveal noticeable influence of L1 perception on L2 production during the interpreting situations.

It should be noted, that interpreting is a process demanding a lot of effort. The focus of the interpreter is usually on the message interpreted and not on the monitoring of the pronunciation. Therefore, the shift from longer to shorter VOT might be due to increasing effort connected with the interpreting process. Another reason could be the subjects' weariness that was probably increasing during the interpreting. The weariness could lead to less attention paid to L2 pronunciation, and therefore it could lead to production of longer VOTs at the end of interpreting.

As was claimed by Li Wei (2000), interpreters have to switch between two languages as a routine part of their jobs. They use one language more actively and this language is used with more ease. They are trained more to translate and interpret from their "passive" (L2) to "active" (L1) language because it is more natural for them. The two student subjects of this study had more experience with interpreting from Czech into English. The other two subjects (interpreters) stated that they interpreted from Czech into English and from English into Czech with the same frequency on average. The fact that the subjects are native speakers of Czech might make it more difficult for the subjects to interpret into their L2. Therefore, the focus on the transfer of the message from the L1 to the L2 might be even more intensive. Furthermore, the sentences interpreted were too long for the subjects to remember and their mind was fully occupied with memory processes. In further studies the length of interpreted sentences should be shorter and with less factual information to remember so that the subject can produce the L2 with more ease.

Another reason for the influence of L1 perception not being noticeable might be the fact that the two languages of a bilingual are situated in one common phonological space (for more information on one common phonological space and single system hypothesis, see section 2.3). The bilinguals are unable to isolate their languages fully and the phonic elements of the two languages influence each other. As stated in SLM model, the more similar the L2 sound is to the L1 sound, the more difficult it is for the

L2 speaker to acquire and produce this sound. The voiceless velar stop /k/ is the same phoneme in both subjects' languages (English and Czech). However, there is a difference in phonetic feature called aspiration which is connected with the length of VOT for the initial voiceless stop. It can be difficult for non-native speakers to notice the difference, and therefore control the production of their L2.

The second research question of this thesis was whether the influence of L1 will vary according to the length of experience with interpreting. The subjects' age varied from 22-27 years. The interpreters were relatively young and they had experience of 2-8 years of interpreting. The students had experience with interpreting at school and also outside the school. Therefore, the differences in experience with interpreting were not sufficiently large to find more English-like results for more experienced interpreters than for students of interpreting. I suggest further studies should be performed with more experienced interpreters.

In conclusion, the specific research questions cannot be answered in a conclusive way. Based on the results from the research the L2 production varies with each subjects. The L1 influence was found in the results of female subjects but the findings were significant only in case of the female interpreter. Further studies should be carried out, in order to determine the influence of L1 on the production of L2 with larger group of subjects and with more experienced interpreters.

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7 APPENDIX

7.1 Part 1 – English questions

- 1) What was your first job?
(Where was it? What did you do? How was this experience beneficial for you?)
- 2) Could you please describe how has your idea of a dream job changed from your childhood until now?
- 3) What was your best vacation? Please, describe what you liked about it.

7.2 Part 2 - interpreted text

Kdo vytvořil **kostku** cukru?

Kostka cukru nebo, chcete-li, cukr v **kostkách** – tak to je jedna z mnoha drobností, kterou dnes považujeme za samozřejmost a která poprvé spatřila světlo světa právě na území dnešní České republiky v Dačicích.

Pro naši **kostku** cukru je důležitý rok 1840, kdy na jaře do dačické cukerné rafinérie přichází z Vídně nový ředitel Jakub Kryštof Rad, rodák ze Švýcarska.

Pod jeho vedením dochází k modernizaci podniku, roku 1842 zavádí první parní stroj ve městě a je i vynálezcem **kostky** cukru.

V roce 1700 **lidé** v Evropě kupovali cukr ve tvaru hnědých šišek, které se musely rozsekat, rozdrtit a rozmlátit na menší kousky.

„**Lidé** jednoduše přijali, že aby mohli používat cukr, tak musí podstoupit všechnu tu fyzickou námahu,“ říká Elizabeth Abbott, autorka knihy „Cukr: hořkosladká historie.“

„Velkým překvapením je, že **kostka** cukru nebyla vynalezena mnohem dříve.“

Během roku 1800 obchody prodávaly cukr již rozbitý na kousky různé velikosti. Ale tyto kusy mohly být nevhodné na čajové dýchánky.

Lidé je často museli namáčet jako koblihy, protože by se nevlezly do šálku s čajem. Když se čaj dopil, zůstal vám ulepený kus cukru, který se musel nechat vyschnout pro další použití.

V roce 1840 zrovna probíhala průmyslová revoluce.

Její následky byly obzvláště zřejmé na panstvích, které řídili šlechtici s dobrým vzděláním.

Karl Anton Dalberg, vlastník dačického panství, byl jedním z těchto **lidí**.

Byl člověkem, který podporoval nové projekty a obklopoval se schopnými **lidmi**.

Jedním z těchto schopných **lidí** byl švýcarský občan Jakub Kryštof Rad. Ten přijel do Dačic z Vídně, aby se stal ředitelem místní cukerní rafinerie.

Ptáte se, kde se vlastně vzal ten nápad na cukr v **kostkách**?

Inspirace na největší změnu, kterou v rafinerii Rad provedl, přišla z neočekávaného zdroje.

Radova žena Juliana, stejně jako další ženy v domácnosti po celém světě, zápasila s nevyhovujícím tvarem, do kterého byl cukr zpracováván – obvykle do tvaru kuželů nebo klobouků.

Pro praktické použití v domácnosti musely být tyto šišky cukru rozřezány na menší kusy pomocí řezáku.

Zranění nebyla vzácná a výkřiky bolesti vycházející z kuchyně nebyly ničím neobvyklým.

Něco podobného se jednoho dne v létě 1841 roku přihodilo, když našťvaná Juliana přišla ke svému muži s obvazem na ruce. „Podívej se, co se mi stalo. Ty zatracené šišky cukru!

Příště si může má dcera nebo já uříznout celý prst. Nebylo by možné vynaleznout něco menšího? **Lidé** by určitě uvítali, kdyby se cukr vyráběl v menších a praktičtějších kusech“

Paní Juliana se už dále o tuto nehodu nestarala a brzy zapomněla i na tento rozhovor.

Avšak zaujalo to pozornost jejího muže. Začal uvažovat, jaké kousky cukru by měl vyrábět. A tudíž vynalezl lis na výrobu **kostek** cukru.

Přibližně o tři měsíce později přišel za svou ženou a řekl: „Juliano, mám pro tebe dárek. Něco co sis přála již dlouho dobu.“

Ukázal jí malou krabičku s asi 350 **kostkami** cukru. „To je báječné,“ zaradovala se Juliana. „Slazení s takovými malými kousky bude jedna radost.“

Jakub Kryštof Rad si byl vědom potenciálu, který **kostky** cukru představovaly, a proto pracoval na sériové výrobě **kostek** cukru v nadcházejících měsících.

Nejdřív získal říšské výsadní právo na svojí proceduru, potom patent a na podzim 1843 roku začala dačická rafinerie vyrábět **kostky** cukru pro trh.

Z Dačic se **kostky** cukru dodávaly také do Vídně, kde se **lidem** prodávaly pod názvem "čajový cukr." Balíček o 250 **kostkách** připomínal bedničku s čínským čajem.

Malé **kostky** se šířily do světa a slavily velký úspěch. Po tom, co byly přivítány ve Vídni, licenci na výrobu **kostek** cukru začaly kupovat i jiné země jako Prusko, Sasko, Švýcarsko, Anglie.

Jak tehdy **kostka** cukru vypadala? Jak vlastně byla velká?

"Tehdy se dokonce vyráběly dva druhy **kostek**. Jedna kostka byla větší, měla hranu asi 1,5 cm. A ta menší měla hranu asi 1,2 cm.

Ta se možná přibližovala dnešní **kostce**, i když po pravdě řečeno, dnešní **kostky** ani **kostkami** nejsou, je to spíše hranolek."

A tajemství Radova vynálezu? Cukrová moučka se naplnila do otvorů mosazné desky, která měla 400 čtvercových děr a byla usazena na spodní měděnou desku.

Obě desky se potom posunuly pod lis, ve kterém se cukr stlačil na polovinu svého původního objemu.

Nakonec se **kostky** vytlačily na dřevěnou podložku a na ní se asi 12 hodin sušily. Pak už se **kostky** cukru mohly balit.

Výroba **kostkového** cukru se v Dačicích dlouho neudržela.

Už od poloviny 40. let se hospodářská situace rafinérie začala zhoršovat. A dokonce ani výroba **kostkového** cukru, do které Jakub Kryštof Rad vkládal velké naděje, očekávané zlepšení nepřinesla.

V roce 1846 Rad rezignoval a odešel zpět do Vídně.

O několik let později je tedy rafinérie definitivně uzavřena - byla totiž příliš daleko od hlavních řepářských oblastí a náklady na dopravu cukrové řepy se zvyšovaly.

Kostka cukru je pro **lidi** v dnešní době naprostou samozřejmostí. O to překvapivější je fakt, že Radův vynález byl lidmi brzy zapomenut.

*Potom se také přisuzoval jiným osobám. Až ve 30. letech 20. století se zase obnovilo bádání a bylo dokázáno, že Rad je první, kdo s výrobou **kostky** cukru přišel.*

Na památku této události vynalezení **kostky** cukru **lidé** postavili žulový pomník na jednom z náměstí v Dačicích v roce 1983.

A v létě roku 2003 toto město také odhalilo pamětní desku jako projev uznání svému čestnému občanovi.

Manžele Radovi možná jsou Pierre a Marie Curie v slazení nápojů, ale trvalo to několik desetiletí, než se **kostka** cukru rozšířila po celé Evropě.

A teď něco o zcela odlišné **kostce** – Rubikové **kostce**.

Rubikova **kostka** je neuvěřitelný hlavolam, který okouzлил **lidi** doslova na celém světě. Dosud se prodalo více než dvě stě milionů **kostek**.

Po útlumu koncem 80. a počátkem let 90. se Rubikova **kostka** znovu vrací na pulty prodejen.

Každý vynález má své oficiální „datum narození“. Pro Rubikovu **kostku** to je rok 1974, kdy byl maďarským vynálezcem Erno Rubikem zhotoven první prototyp.

Vynálezcovovo jméno je dnes všeobecně známý pojem. Tenkrát byl pan Rubik lektorem na Umělecko-průmyslové akademii v Budapešti.

Během své výuky Erno Rubik používal k interpretaci svých nápadů skutečné modely zhotovené z papíru, lepenky, dřeva nebo plastických hmot pro nácvik prostorové orientace studentů.

Později tato jeho činnost vedla k vytvoření proslulé **kostky**.

Zhotovení **kostky** však nebylo zrovna jednoduchou záležitostí. Inspiraci našel jednoho letního dne, když se procházel po břehu Dunaje.

Všiml si říčního šterku, jehož původně ostré hrany byly působením vodního toku zaobleny. Přišel na to, že vnitřek jednotlivých **kostiček** musí být zakulacen.

Když byla **kostka** zkonstruována, Erno Rubik ji představil **lidem** ve svém okolí, aby ji vyzkoušeli. Efekt se dostavil okamžitě.

Jakmile **lidé** vzali **kostku** do ruky, těžko se jí zbavovali.

Překvapivý zájem **lidí** o tuto **kostku** přinutil jejího stvořitele přemýšlet o možnosti průmyslové výroby.

Zásluhu na uvedení **kostky** do výroby měli **lidé** v čele hračkářské firmy „Politechnika“.

Ale protože se při výrobě **kostky** využívalo značné množství ruční práce, trvalo celé tři roky, než se první **kostky** objevily na policích budapeštských obchodů.

Během roku 1978 si **kostka** i bez mediální podpory či reklamy pozvolna razila cestu mezi **lidi** a v roce 1979 se **kostkou** „kroutilo“ doslova po celém Maďarsku.

Díky tehdejší železné oponě se stále rostoucí obliba **kostky** jen stěží dostávala do povědomí **lidí** v západních zemích.

Rozšíření Rubikovy **kostky** na západní trhy se posléze podařilo dvěma občanům maďarského původu – Tom Kremer a Tibor Laczi.

Tito dva muži se rozhodli, že prosadí Rubikovu **kostku** po celém světě.

Dr. Laczi zamířil zpět do Maďarska, aby tam bojoval s místní byrokracií, zatímco Tom Kremer vyrazil do světa hledat potenciálního výrobce, respektivě distributora.

Uvědomoval si, že pro obchodní úspěšnost **kostky** je třeba najít distribuční síť větší mezinárodní společnosti.

Ani jemu se však příliš nedařilo. Díky víře ve výjimečnost **kostky** se nevzdával a neustále pátral po vhodném společníku.

Tom Kremer přesvědčil šéfa marketingu firmy Ideal Toy Corporation, aby se v Maďarsku na vlastní oči přesvědčil, jak ta „věc“ vlastně funguje.

Stalo se tak v září roku 1979 v době, kdy byla **kostka** v Maďarsku mezi **lidmi** velmi oblíbená.

V té době **lidé** „točili **kostkou**“ doslova na každém kroku, na ulicích, v tramvajích, kavárnách apod.

Po pěti dnech spletitých vyjednávání mezi váhajícím kapitalistou a neústupnými úředníky tehdejšího režimu neuznávajícího působení volného trhu došlo nakonec k dohodě.

Pánové Laczi a Kremer se zoufale snažili dát obě strany dohromady a výsledkem nakonec byla objednávka na jeden milion **kostek**.

Hlavní debut však **kostka** zaznamenala na veletrzích v Londýně, Paříži, Norimberku a New Yorku v únoru 1980.

Za pomoci názorných ukázek Erno Rubika sklízela **kostka** úspěch a objednávky **lidí** se jen hrnuly.

Mělo to však jeden háček. Nebylo tolik kusů **kostek**.

První **kostky** začaly opouštět Maďarsko již v květnu 1980, a jakmile se objevily v rukou **lidí**, bylo zřejmé, že počáteční objednávka jednoho milionu kusů nebude stačit rostoucí poptávce.

I přes zvýšení výroby nebyl **kostek** dostatek.

Výrobní centra se tedy musela z Maďarska rozšířit dále do Hongkongu, Thaiwanu, na Costa Ricu i do Brazílie.

Snaha složit **kostku** zaměstnávala snad všechny věkové skupiny **lidí** a doslova po celém světě.

Nejlépe na tom byla studentská mládež. Byli to právě tito mladí **lidé**, kteří vytvářeli různé algoritmy vedoucí ke snadnému a úspěšnému složení Rubikovy **kostky**.

Bylo vydáno více než šedesát knižních publikací na téma pomoci při zvládnutí **kostky**.

Prodej **kostky** v roce 1982 vzrostl do takové výše, že na Západě (podle některých odhadů) každá třetí domácnost vlastnila Rubikovu **kostku**.

Pojem „RUBIC CUBE“ se dokonce dostal jako samostatné heslo do Oxford English Dictionary.

Je nesnadné odhadnout počet prodaných kusů **kostek** po celém světě. Experti se domnívají, že tato cifra převyšuje dvě stě milionů.

Svoji roli zde sehrály pirátské výrobky původem z Asie (ostatně existují i v současnosti). A tak se stalo, že obchod s Rubikovou **kostkou** se zhroutil již v roce 1983.

Některé hračky často podléhají módním trendům a nejinak tomu bylo i v případě Rubikovy **kostky**.

Tom Kremer se však nevzdal. Po celou dobu považoval **kostku** za klasickou hračku, a v roce 1991 začal postupně uvádět **kostku** znovu na světové trhy.

Rubikova **kostka** se stala součástí široké „rodiny hlavolamů a her“, které s sebou nesou známku geniality svých tvůrců.

Sám Erno Rubik se za ty roky příliš nezměnil. Je hluboce zaneprázdněn tvorbou nových her a hlavolamů.

7.3 Part 3 - questionnaire

- 1) Age:
- 2) Gender:
 - a) Male
 - b) Female
- 3) How often do you speak English? (how many hours a week/a day)
- 4) At what age did you begin to learn English?
- 5) How many years of English education do you have?
- 6) How long have you been living in an English speaking country (overall number in years or months)? When was it?
- 7) Do you have any experience with interpreting? If yes, how many years/months/days/hours of experience do you have?
- 8) Do you interpret more from Czech into English or from English into Czech?
- 9) Do you have any theoretical background in English phonetics? Have you ever attended any course/seminar in English phonetics or phonology?
- 10) What do you think is the focus of this experiment?

7.4 DVD

The slideshow used in the research consisting of two parts, 3 questions in English and 117 sentences in Czech, is enclosed on the DVD. Recordings of the subjects, annotation of these recordings and the data collected in the research are also enclosed on the DVD.

8 ANOTACE

Autor:	Anna Gaurová
Katedra:	Katedra anglistiky a amerikanistiky FF UPOL
Název česky:	Vliv mateřského jazyka na produkci cizího jazyka při tlumočení
Název anglicky:	The influence of native language on production of second language during interpreting
Vedoucí práce:	Mgr. Šimáčková, PhD.
Počet stran:	49
Počet příloh:	3 + DVD
Počet titulů použité literatury:	73
Klíčová slova v ČJ:	mateřský jazyk, cizí jazyk, tlumočníci, produkce, percepce, výslovnost, interference, doba nástupu hlasivkového tónu (VOT), aspirace
Klíčová slova v AJ:	native language, foreign language, interpreters, production, perception, pronunciation, interference, Voice Onset Time, aspiration
Anotace v ČJ:	Hlavním cílem této práce je zjistit vliv mateřského jazyka na produkci cizího jazyka v situacích typických pro tlumočníky. Práce je rozdělena na teoretickou a praktickou část. V teoretické části jsou představeny dosavadní poznatky z oblasti vlivu mateřského jazyka na produkci cizího jazyka, dále tato část poskytuje přehled ostatních vlivů na cizí jazyk a také základní teorii týkající se bilingvismu. Subjekty výzkumu jsou dva čeští studenti anglického jazyka oboru tlumočnictví a překladatelství a dva tlumočníci. Studenti nejprve produkují cizí jazyk po poslechu cizího jazyka (odpovídají na anglické otázky v angličtině) a poté po poslechu mateřského jazyka (tlumočí věty z češtiny do angličtiny). Výzkum se specificky zaměřuje na

rozdíl hodnot doby hlasivkového tónu fonému /k/ u jednotlivých subjektů. Pro češtinu je typická kratší doba hlasivkového tónu než pro angličtinu. Výsledky této studie významně nepotvrzují, ale ani nevyvrací vliv mateřského jazyka.

Anotace v AJ:

The main aim of this paper is to determine the influence of the native language on production of the foreign language in situations typical for interpreters. This paper is divided into theoretical and practical part. The theoretical part presents the existing and recent findings concerning the influence of the native language on the foreign language, afterwards the overview of other factors influencing foreign language and basic theory of bilingualism are presented. The subjects of the research are two students of the interpreting and translation. Firstly, the subjects speak in foreign language after listening to the foreign language (they answer English questions in English). Secondly, the subjects speak in foreign language after listening to the native language (they interpret Czech sentences into English). The research aims specifically on the shift of VOT values for phoneme /k/ in initial position. VOT is typically shorter for the Czech language. The results did not significantly confirm, nor deny the influence of the native language on the foreign language. Possible future research is discussed.