Perception of Czech speech
by Czech monolinguals and Czech-Vietnamese bilinguals

Alžběta Kučerová

Student number: 13091891

Under the supervision of:
Dr. Suki Yiu

Second reader:
Mw. dr. Silke R. Hamann

Abstract

This thesis examines the speech of Czech-Vietnamese bilinguals as they are an inseparable part of today's Czech Republic. The aim of this thesis is to assess the perception of Czech declarative sentences produced by both Czech-Vietnamese bilingual speakers and Czech monolingual speakers. An ED perception experiment was conducted to see whether the two groups of participants can distinguish finished declaratives from unfinished declaratives based on the intonation contour. Results show a significant difference in the perception of the bilingual recordings in comparison to the monolingual ones by both Czech monolingual and Czech-Vietnamese bilingual participants. The bilingual recordings tend to be interpreted much more often incorrectly, prevailingly in the case of unfinished sentences being judged as finished. The statistical analysis showed, however, that the participant groups did not significantly differ from each other in distinguishing the sentence types, no matter their or the speakers' language background.

KEYWORDS: Czech, Vietnamese, Intonation, Bilingualism, Monolingualism, Heritage Speakers, ED

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Chapter 1: Introduction

The Vietnamese community is an important part of today's Czech Republic. At the present day, the Vietnamese are the third largest minority in the country, officially listing 70 000- 100 000 citizens, who are active and present in various societal areas of life, such as politics, acting or entrepreneurship. Moreover, first generation bilingual children have been growing up alongside the Czech monolinguals, speaking Czech most of their time and Vietnamese almost only at home. Unfortunately, not much attention and account have been dedicated to this fact in current scholarly work.

The coexistence of these two vastly different languages – Czech and Vietnamese – resulted in the establishment of a bilingual community of mostly first-generation immigrant children, who are now growing up under the influence of both Czech and Vietnamese. In most cases, both their parents speak Vietnamese, and Czech is taught to the children only later in their childhood. This is then mostly executed by a "Czech grandmother" (a commonly used term) – usually an older, empty-nested lady, who offers to au-pair the child while parents are at work, and the education system.

One of the rather important topics in the studies of tone languages, such as Vietnamese or Chinese, has been the intonation phenomenon (Vance, 1976; Gu, 2006; Ma et Al, 2011). That is, to such extent, that some authors regard it as non-existent and some as just as functional and akin looking as in other world-languages. It is to no doubt, however, that in tone languages, intonation stands under the direct influence of tone, which largely projects into how the intonation is produced (or rather reduced).

It is for that reason, that this thesis investigates how the influence of a tone-language background interferes with the standard Czech pronunciation in Czech-Vietnamese bilinguals' Czech and how that is perceived by not only the mentioned bilinguals, but also by Czech monolinguals.

This thesis examines whether differences between the intonation patterns of the two types of speakers of Czech play a role in expressing different types of sentences, i.e., finished and unfinished declaratives and whether it is noticeable to the Czech monolinguals and also to the Czech-Vietnamese bilinguals.

In current spoken Czech, the intonation contour is mirrored through three main melodemes (Palková 2013):

1) the finishing falling melodeme (M1)
2) the finishing rising melodeme (M2)
3) the non-finishing melodeme (M3).

In some scholarly work, these are also sometimes regarded as *falling cadence, rising cadence and end-cadence* respectively (Daneš 1957).

In declarative sentences, one finds two of the upper mentioned melodemes – the M1 and the M3. The finishing falling melodeme (also referred to as falling-cadence, Daneš 1957) is when a declarative is finished. The intonation falls from the intonation centre towards the end of the sentence. This way, native speakers are able to tell, that an utterance – or conveying of a certain information – has come to an end. If it has not, on the other hand, the non-finishing

melodeme is present (also referred as half-cadence, Daneš 1957). In complex clauses, before a subordinate clause follows, the main intonation does not experience any significant changes but a slight rise towards the sentence boundary (usually marked with a comma in the orthography). This way, an uncertainty is communicated, and the listener is able to tell, that a sentence is about the continue.

In Vietnamese, the intonation contours operate slightly differently. Intonation is generally a topic rather hard to grasp in any tone language (Zeng, Martin and Boulakia, 1999; Brunelle 2012, 2016) and even if researchers do describe it, very often, their answers and explanations differ (Ha and Grice 2010, Cruttenden 1997). This thesis bases its presupposition mostly on the work of Brunelle (2012, 2016), Ha & Grice (2010, 2017) and Thompson (1988).

According to the traditional division by Thompson (1988), intonation in Vietnamese declaratives is used as follows: If the sentences are unfinished, one talks about the so-called *decreasing* intonation. Contrary to spoken Czech, this decrease in the intonation contour informs the speaker that somebody has not yet finished speaking, was interrupted or simply left something unsaid (Thompson, 1986, Ha & Grice, 2017). In finished sentences, on the other hand, a *fading* intonation is present[1]. This one is used for statements of fact and commands and, in interrogatives, to which the speaker assumes the answer. In interrogatives, Brunelle (2012) concludes, sentence-final particles also play a vital role. Without them, an interrogative sentence, might sound declarative.

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1 Fading intonation is described as a rapid decline in force on the final syllable. The tones of such syllables are lowered – that is, they begin and end lower than syllables with the same tones or decreasing stress (Thompson, 1965).

The hypothesis established within this present thesis assumes a direct influence onto the standard intonation contour in the Czech language in the case of Czech-Vietnamese bilinguals. It predicts that this results in the expressing of certain conditions in a non-standard way, that will be noticeable not only to the Czech monolingual, but also to the Czech-Vietnamese bilingual listeners participating in the experiment. For this thesis, two conditions are examined: the intonation contour in declarative clauses, both finished and unfinished. Czech-Vietnamese bilinguals' Czech speech carries signs of certain suprasegmental features from Vietnamese onto Czech, such as intonation. This is expected to result in the production of a falling intonation in unfinished Czech declaratives, and a less prominent falling intonation in finished Czech declaratives. This research presumes that because of that, Czech-Vietnamese speech might be misinterpreted.

The upper mentioned was put to a test via ED (Vet, 2021). This consisted of an online perception experiment, featuring recordings of twenty finished Czech declaratives and twenty unfinished ones. Fifty percent of these was recorded by a Czech monolingual, the other fifty by a Czech-Vietnamese bilingual. Participants were then invited to decide, whether the recording that just appeared on their screen, appeared to be of a finished or an unfinished declarative. When the experiment finished, participants were asked to describe, what led them to decide between finished and unfinished declaratives. Just like the speakers, equal parts of participants consisted of Czech monolinguals and Czech-Vietnamese bilinguals.

Chapter 2: Theoretical Background

Vietnamese native speakers have been emigrating to the Czech Republic continuously, though not steadily, since 1940. This phenomenon, nonetheless, has not been documented by many scholars, as described by Ičo (2012). Most of the times, Vietnamese immigrants to the Czech Republic arrived with the goal of taking care of their families in Vietnam by earning more money abroad. As the Czech Vietnamist describes it: "almost none of the Vietnamese immigrant arrived here [in the Czech Republic] with the intention of staying indefinitely. Vietnam, as their home country, lies very close to their heart and is criticized only rarely." Even from the side of Vietnam, their immigration is seen as positive, as it brings wealth and new opportunities to Vietnam once they return. On top of that, the immigrant group stays quite heterogenous, including not only the economically motivated members, but also people who are politically persecuted. The community is very tightly knit, as reflected by the creation of the Small-Hanoi - SAPA, "a business and cultural centre" at the outskirts of Prague, featuring not only a plethora of various shops and markets, but also Vietnamese schools, doctors 'offices, hairdressers' etc. and a 2015 established non-profit organization VietUp that "advocates for better coexistence and mutual understanding between Czech society and the Vietnamese diaspora in the Czech Republic" (Viet Up, 2016). This way, the bilingual speakers from all over the country attain knowledge about their Czech-Vietnamese identity, and about the cultural heritage of both Vietnamese and Czech. This facilitates the comprehension and cohabitation of the Vietnamese diaspora and the Czech society. Over the years, especially with the first generation of Czech-Vietnamese bilingual's growing up alongside Czech monolinguals, the community begins to be largely accepted and understood as one with the rest of the inhabitants of the country.

The proficiency, with which Czech-Vietnamese bilinguals speak one or both languages, differs. In most cases, Czech becomes their dominant language and Vietnamese is perfected only later in life, perhaps in one of the courses offered by SAPA or VietUp. This is not the case for all bilinguals, however, as some do speak both of the languages at a high proficiency level. A significantly smaller group of individuals whose knowledge of Czech is rather sparse, exist, too (Ičo, 2012, May 29). The social sub-culture of young Czech-Vietnamese bilinguals is now a completely different group to their Vietnamese counterparts. "[…]so they look Vietnamese, but practically speaking, they are Czechs speaking various dialects and by only hearing them, one is not able to guess where they come from" (Ičo, 2012, May 29).

2.1 Intonation in Czech

Intonation is a supra-segmental prosodic phenomenon primarily signalled by a change in the pitch level of the voice. In many languages, such as English (or Czech), it serves a grammatical role, distinguishing one type of phrase or sentence from another. In Czech, for example, the pitch change and scale are what plays a major role. They signal the finiteness or continuity of an utterance, or distinguishes between a declarative and interrogative clause, in sentences that do not otherwise differ in their word order (see (1)) The following differentiation between intonation patterns (also regarded as cadences and melodemes) is employed.

(1) differentiating between declaratives and interrogatives

- Herectví je její vysněnou kariérou. (Acting is her dream carrier.)
    - A declarative sentence with a falling intonation contour (falling cadence/melodeme)

- Herectví je její vysněnou kariérou? (Is acting her dream carrier?)
    - An interrogative sentence with a rising intonation contour (rising cadence/melodeme)

2.1.1. Finishing rising melodeme/Rising Cadence

Rising cadence, as per Figure 1, is used in the intonation pattern of interrogative sentences (Daneš 1957, Palková 2013). It is characterized by a strict rise in the voice after the intonation center or right at it, that is abrupt and not continuous (Palková, 2013). There may be a slight fall observed at the end (straight rise or rise-fall), according to that, two types of interrogative sentence patterns in Czech are observed. Together with falling cadence, this is a quintessential intonation pattern in Czech signalling the end of an utterance.
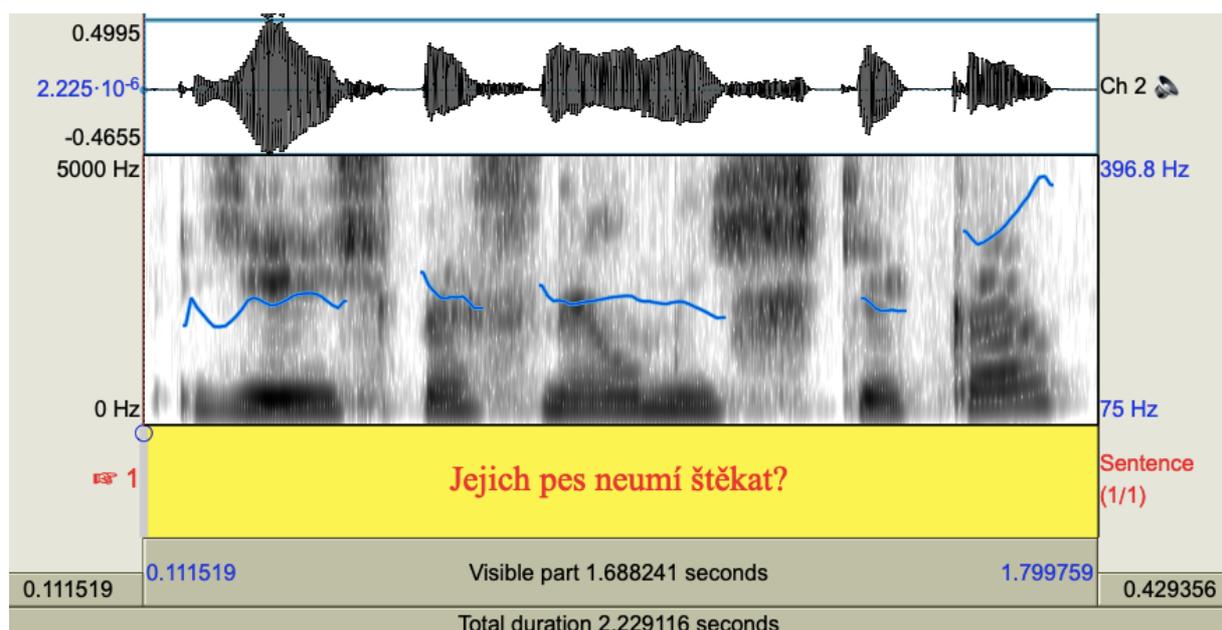
Figure 1: An interrogative clause in Czech and its rising cadence. "Their dog cannot bark?/Can their dog not bark?" (own recording)

2.1.2. Finishing falling melodeme/Falling cadence

Falling cadence, also known as descending intonation, is used in emotionally neutral declarative sentences, the tone descends from the intonation centre towards the end of the sentence. This type of intonation is mostly present in emotionally not-charged declarative sentences. Other than that, it is also employed in yes-no questions and carries an expressive function in sentences conveying an order or a forbiddance of some kind. An example of a falling melodeme is shown in Figure 2.
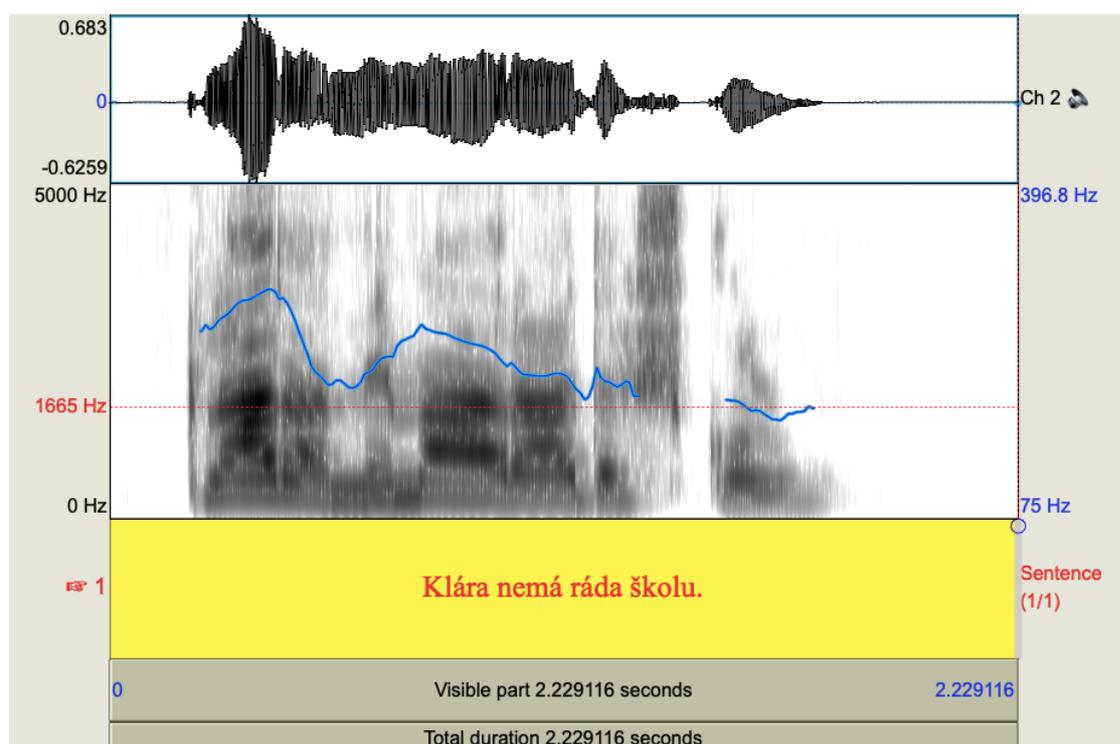
Figure 2: Finished simple declarative sentence in Czech and its intonation contour. "Klára does not like school." (own recording)

End-cadence, as per Figure 3, is applied to non-final parts of an utterance (also non-finite clauses) in various scenarios like sound declination of the starting point of an utterance, listing various items or a reproof etc. It has specific variations with sundry communicative functions. A drop in intonation right before the intonation centre or right in it is specific for this type. The adoption of end-cadence to signal the end of an utterance is considered non-standard (marked) (Krčmová, 2010).
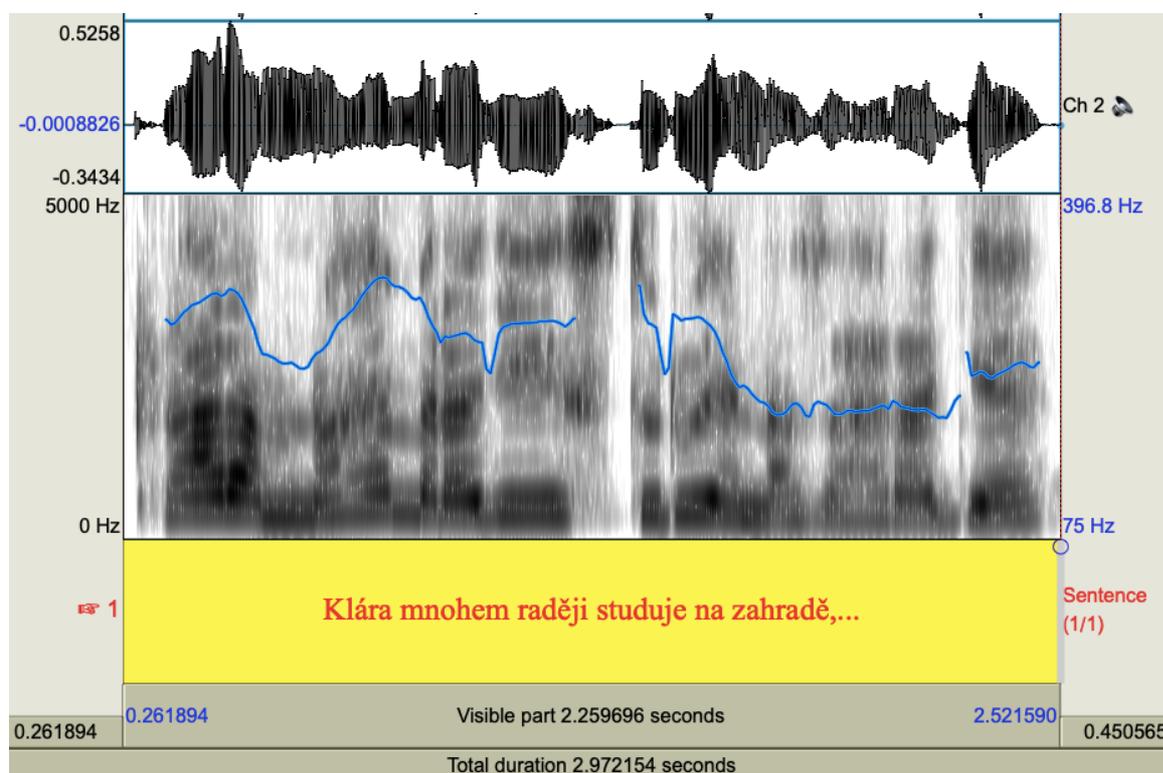
Figure 3: An unfinished complex declarative clause in Czech and its intonation contour. "Klára much rather studies in the garden, …" (own recording)

2.1.4 Standard Czech variant

The geographical area of the Czech Republic exhibits a plethora of dialectal variations, especially as one approaches the eastern parts of the country, commonly known as Moravia and Silesia. For the purpose of this study, three standard and commonly recognized variants

of Czech will be examined. They are Spisovná čeština (Formal Czech), Hovorová čeština (Spoken Czech) and Obecná čeština (General Czech).

Formal Czech (Spisovná čeština) is generally regarded as the essential variant of the Czech Republic and is the only codified one. It is used for public purposes and serves a representative function. It is taught to all pupils around the country and used by everybody in daily contact, no matter their geographical position within Czechia (also referred to as Czech Republic)– be it through the national broadcasting or via the education system. It originates in the end of 18th and the beginning of the 19th century. Its loose, spoken variant is regarded as *hovorová (spisovná) čeština* (Spoken (formal) Czech).

Spoken Czech (Hovorová čeština) differs from Formal Czech (Spisovná čeština) in terms of words and grammatical endings. The description of this variant is mostly about its lexical and morphological mirrorings, e.g., conjugation. The syntax and phonetics stay to this day under-investigated.

Formal Czech	Spoken (formal) Czech	English Translation
motocykl	motorka	a motorcycle
káva	kafe	a coffee
květina	kytka	a flower
garsoniéra	garsonka	a studio (flat)

Table 1: The difference between Formal and Spoken Czech

General Czech (Obecná čeština) comes into play in the majority of the centrally located regions within Bohemia and for youngsters, no matter their dialectal area. Even though some

of its parts might originally appear marked/not standard, via a movement upwards to Spoken Czech, they can slowly become standardized.

2.2 Intonation in Vietnamese

Vietnamese is traditionally recognized as a tonal language. That means that in it, a change of the pitch level and/or the intonation contour results in a change of meaning of a word (Nhung, 2010). What is crucial to keep in mind, is the fact that the syllable tone should be regarded as an essential part of a word as much as any consonant or a vowel (Nhung, 2010). In a sentence, however, it is thoroughly intertwined with intonation and it is therefore, hard to distinguish, where one begins and the other ends. All in all, on the thought that intonation is less prominent in Vietnamese, it does not work identically to the Czech one. In the recent years, authors have argued that intonation indeed exists in current Vietnamese (Brunelle (2012, 2016), Ha & Grice (2010, 2017), Thompson (1988)) and this is the outlook this thesis takes.

The Northern dialect of Vietnamese[2], which is considered the standard variety, features six tones (Thompson 1965), as displayed in Table 2. Five of the six tones are visible with a marking (also called diacritics) over or under one of the vowels of a syllable in the orthography. The tones are the following: midlevel, low-falling, mid-rising-tense, mid-falling-glottalized, mid-falling-rising, and mid rising-glottalized. Only the first one of them is not featured as a diacritic on a syllable. Each of the tones has its own pitch level.

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[2] The standard variety of Vietnamese is based on the educated elite of Hanoi, in Nothern Vietnam. Southern Vietnamese, though much less thoroughly investigated, only makes use of five of the six tones. The tones *hỏi* and *ngã* have merged into a single falling-rising tone (Brunelle, 2009).

Tone description	Tone name
midlevel	*ngang*
low-falling	*huyền*
mid-rising-tense	*sắc*
Mid-falling-glottalized	*nặng*
Mid-falling-rising	*hỏi*
Mid-rising-glottalized	*ngã*

Table 2: Six tones in Northern Vietnamese.

As indicated before, there has been much work done on the importance of the interaction between the lexical tone in Vietnamese and the sentence intonation patterns. Many models have been established in which the tones are interpreted as f0 targets, which are interpolated between to form the pitch or the intonation (Brunelle et al. 2012). There were overall two major outlooks on the status of intonation in the East-Asian languages such as Vietnamese. The first one consists of lexical boundary tones which are local in nature and thus tend to affect the pitch contour at the edges of prosodic utterances. The somewhat more traditional approach, nonetheless, suggest (Chao 1956) that tone and intonation are superimposed, and that the melody of a sentence is made up from the overlaying of a tone onto intonation. In this way, they understand intonation as realized by expansion or compression or upward/downwards shift in range of the pitch contour. Mostly, however these studies focus on Chinese. There, the research suggests, that intonation in these languages is realized as a combination of interpolation and superposition (Chao 1956) or superposition only (1976). This is also similar for Cantonese. The same can be discussed about Vietnamese (Brunelle et. Al, 2012).

It is important to mention, that Vietnamese accompanies the intonation and tone patterns also by final particles for marking communicative functions, such as *hả* or *đi* (Brunelle et Al., 2012, Nhung 2010). These particles can be omitted but they appear in spontaneous speech rather commonly and make intonation therefore seem somewhat secondary. When final particles are absent, it seems, intonation shines (Seitz, 1986, as per Brunelle, 2012). In fact, the intonation is [then] salient enough to be researched (Brunelle et. Al, 2012). The main focus in the analysis of the intonation in Northern Vietnamese appears to be the f0, intensity and duration.

For declaratives, it seems, the global trend is for the f0 to decline *only slightly* (Nguyen and Boulakia 1999, Brunelle et. Al 2012), also called the fading intonation contour (Thompson, 1988).

Interrogative sentences are described as having a high overall range and a rise starting just before the sentence final question marker (Do et al. 1998). In research on final particle – *missing* interrogatives, however, the intonation contour within an interrogative clause tends to be very similar to the one in declaratives (Vu et. Al. 2006). In unfinished declaratives, on the other hand, a falling (also called decreasing, Thompson 1988) intonation is present.

According to Nhung (2010), intonation in Vietnamese is closely connected to and restricted by syllabic tones and has a tendency to be used a bit more "cautiously" so as to avoid misunderstanding caused by a change in the syllabic tone. As in the following pair of examples (Nhung, 2010), change of tone will result in a shift of meaning, too.

(2) shift in meaning due to a change in syllabic tone[3]

a) Ông ấy đi **tu**.

He has become a buddhist monk.

b) Ông ấy đi **tù**.He has been sent to prison.

2.3. Aspects of Intonation that are different in Czech and Vietnamese

Given that tone is not a feature in Czech but in modern Vietnamese, intonation is easily

deductible from Czech speech whereas in Vietnamese, possible only under certain conditions.

Research, nonetheless, shows that it is feasible (Thompson, 1988) and when it is executed, the

intonation patterns between Czech and Vietnamese differ largely.

Declarative clauses in Czech have a stricter falling contour starting in the middle of the

intonation centre, while the ones in Vietnamese appear flatter and only fall slightly (*fading*

intonation, Thompson 1988). Similarly, the so-called End-Cadence appears in Czech at a

sentence boundary in a complex clause. In Vietnamese, however, this sentence boundary has

a tendency to carry a falling contour (*decreasing intonation,* Thompson 1988). To continue,

interrogative clauses in Vietnamese only follow a strict rising contour, if they feature a

sentence final particle, signalling a question. If this particle is omitted, the contour of an

interrogative seems to be very similar to the one in Vietnamese declaratives. This is quite

different to the Czech rising-cadence, where the contour always strictly and abruptly rises.

To sum up, intonation contours in Czech and Vietnamese might be of hardship for Czech-

Vietnamese bilinguals, as they vastly differ.

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[3] In the first sentence, the word *tu* features the one tone without a mark on the letter in the orthography. This tone, *ngang*, is flat, high and long. On the other hand, the tone on the word *tù (huyền)* in the sentence below is a low falling one, and the meaning of word changes completely.

2.4 Research question and hypotheses

For the reasons stated in 2.3 the following predictions are established for the present experiment. Czech declarative clauses are put to a test in an online perception experiment, using recordings made by a native Czech monolingual and a Czech-Vietnamese bilingual.

There are two groups of participants under focus: Czech monolinguals and Vietnamese-Czech bilinguals. The Czech monolinguals were raised in a household where both parents speak Czech. And only started learning a foreign language, such as English later in life. For the Vietnamese-Czech bilinguals, there are two types. The first subgroup grew up in a household in which both parents speak Vietnamese. Czech was only learnt outside of the individual's home. The second group, on the other hand, grew up in a household in which one parent spoke Czech and the other spoke Vietnamese. The individual was thus under the influence of both languages from birth.

Sentences with intonation contours of declaratives in Czech are presented to both Czech monolinguals and Vietnamese-Czech bilinguals to examine whether they perceive the intonation differently. In particular, the falling intonation towards the end of a sentence from the intonation centre is considered as the standard Czech variant, together with the end cadence at the sentence boundary in complex declarative clauses.

The Czech recordings serve the role of a control because we expect the same behaviour from both Czech monolingual listeners and Vietnamese-Czech bilingual listeners. The Czech-Vietnamese bilingual recordings, due to the influence of tones in Vietnamese on the intonation of the Czech produced by Vietnamese-Czech bilinguals, are predicted to be

perceived differently by Czech monolingual listeners and Vietnamese-Czech bilingual listeners. The two types of listeners may struggle to identify the correct sentence type.

The research is based on two hypotheses presented as following:

1) The standardness hypothesis: The intonation of Czech declarative sentences in the speech of Czech Vietnamese bilinguals is influenced by Vietnamese. Both types of participants are predicted to perceive the Czech monolingual variant as the standard one and experience issues in identifying the correct sentence type when produced by the Czech-Vietnamese bilingual.

2) The frequency of contact hypothesis: The bilingual variety is identified more often correctly by the bilinguals than by the monolinguals, because the bilinguals are more frequently in contact with other Czech-Vietnamese bilinguals and Vietnamese monolinguals.

A simplified table is provided to show the expected tendencies of participants:

Participant	Czech-Vietnamese speaker	Czech monolingual speaker
Czech-Vietnamese listener	1) **Unfinished sentence** *evaluated as finished with a tendency towards unfinished* 2) **Finished sentence** *evaluated as unfinished with a tendency towards finished*	3) **Unfinished sentence** *evaluated as unfinished* 4) **Finished sentence:** *evaluated as finished*
Czech listener	1) **Unfinished sentence** *evaluated as finished* 2) **finished sentence** *evaluated as unfinished*	3) **Unfinished sentence** *evaluated as unfinished* 4) **Finished sentence** *evaluated as finished*

Table 3: Predicted outcomes: Finished and unfinished declarative sentences.

In brief, this table summarizes the predicted responses of the participants to both Czech monolingual and Czech-Vietnamese bilingual speech. Both participant groups are expected to experience misinterpretation of the bilingual recordings – to be more exact – to classify the finished sentences as unfinished and vice versa. The Czech-Vietnamese group is assumed to score slightly more correctly in comparison to the monolinguals, due to the frequent exposure to the examined dialectal variant. Czech speech serves the role of a control, as it contains a standardized variant of the language.

In Czech, declarative clauses have a strict falling intonation stemming from the intonation centre towards the end of the utterance in a simple declarative sentence. In complex and

compound sentences, however, this is different. In them, the intonation starts falling slightly but this stops and stagnates or slightly rises just before the sentence boundary between the first and the second sentence part. In Vietnamese, this is different. Firstly, as mentioned before, Vietnamese intonation is a phenomenon that is hard to grasp, as it is tightly connected to the syllable-tone. On top of that, the scale on which the intonation there, per say, varies is much smaller and in finished declarative clauses, strictly differs from Czech. There, the intonation does not fall quite as strikingly and in its quality largely resembles the one in Czech complex and compound sentences. In Vietnamese unfinished declaratives, on the other hand, the intonation decreases, much like in Czech finished declaratives. Given the above, the Czech participants, and partly also the Czech-Vietnamese participants, may assume that the declarative simple finished sentence produced by a Czech-Vietnamese bilingual is a part of a yet to be finished finite clause. Similarly, unfinished declaratives might be perceived as finished by both participant groups, when produced by a Czech-Vietnamese bilingual.

The prediction was, that Czech participants would have a higher tendency to classify the finished Czech-Vietnamese recordings as unfinished and unfinished as finished, due to the lack of a sufficient falling or stagnating intonation contour. Czech-Vietnamese participants were expected to recognize more often than not, which of the Czech-Vietnamese recordings included an actual unfinished or a finished sentence. Czech monolingual recordings served the role of a contour, as they included a standardized Czech dialect, which was expected to be understood well by both of the participant groups.

To test that, forty sentences – twenty simple and twenty complex declaratives – were created and recorded by a Czech monolingual speaker and a Czech-Vietnamese bilingual speaker. The ones that included complex and compound sentences were then cut there, where a

sentence boundary, a comma, would standardly appear in current Czech and where the stagnation and slight rise of intonation was expected. The participants then were asked to play a random recording that appeared on their screen and to judge, whether what they heard was a finished (simple declarative) or an unfinished (complex) sentence. At the very end of the forty recordings, the participants were asked to describe using their own words, what lead them to decide which sentence was which.

Chapter 3: Methodology

3.1 Participants

Twenty-four participants in total were included in this experiment (14 female, 10 male). Out of the mentioned participants 12 were bilingual (Czech-Vietnamese) and 12 were monolingual (Czech). Their age significantly varied (mean age 25,5, age range 17-60).

All the monolingual and bilingual participants were born and raised in the Czech Republic, meaning they lived under the influence of standard Czech and the prosodic features of their pronunciation in Czech therefore align with the standard, codified ones (As per 2.4). On top of that, the Czech-Vietnamese participants were those, whose parents' mother tongue (L1) was Vietnamese or Vietnamese and Czech (in case of a bilingual household). The experiment was only conducted with participants over the age of 16, resulting in no need for a form of consent from their primary caretakers.

3.2 Stimuli

Fourty sentences in total were presented to the participants. A set of twenty items (ten trimmed complex clauses and ten simple declarative clauses) was recorded by a Czech monolingual and a Czech-Vietnamese bilingual. The complex clauses were recorded as a whole and later cut using Praat (Boersma and Weenik 2021) where a comma in written speech would appear. Two people were recruited for the recording of the material - Czech monolingual speaker (woman, Central Bohemia and Prague) and a Czech-Vietnamese bilingual (woman, Central/East Bohemia and Prague). The Czech recording was created by a 24-year-old female Czech monolingual, as this accent is considered to be the standard one. For the Czech-Vietnamese recording, a bilingual 23-year-old female born and raised in central Bohemia and Prague with parents from the Northern/Central part of Vietnam was

chosen. The recordings were recorded using the Voice Recorder Pro software (mono, 44.1 kHz, wav format).

3.3 Experiment procedure

The experiment was run in ED (Vet, 2021). The form of consent and brochure in Czech (see Appendix A) were presented at the beginning of the online experiment. The participants were not allowed to proceed to the experiment, unless they had read and agreed to the voluntary participation on this study. This was ensured by a designated button "Souhlasím s účastí na experimentu." (I agree to participation in this experiment, in Czech).

After the participants gave their consent, they were asked to answer five language-background questions as presented in the below. The questions were there to serve as a control to ensure two homogenous participant groups, Czech monolinguals and Czech-Vietnamese bilinguals, and to later use for analysing the influences of various factors on the outcomes of the experiment.

1) Kolik je vám let? "How old are you?"

2) Jste žena, muž či non-binary? "Do you identify as a woman, man or non-binary?"

3) Jaký je Váš mateřský jazyk/mateřské jazyky? "What is/are your mothertongue/s?"

4) Jakým jazykem mluvíte doma/s rodiči? "What language do you speak at home/with your parents?"

5) Byl/a jste dvojjazyčně (čeština-vietnamština) či jednojazyčně vychováván/a (čeština)?

   "Were you raised bilingually (Czech-Vietnamese) or monolingually (Czech)?"

After agreeing to the consent form and answering the language background questions, the
participants were presented twenty sentences produced by the Czech-Vietnamese bilingual
and twenty by the Czech monolingual speaker (see Appendix B). One additional question
after this main part of the experiment was asked to check for the main motivation of the
answers of the participants.

3.4 Data processing

The data gathered in the experiment was then individually and anonymously uploaded to the
official UvA Online Storage and was only accessible to the author and the supervisor. The
answer sheets were taken one by one, separated into two participant groups and checked for
homogeneity.

A few recordings from each of the stimuli groups was chosen and analyzed via the phonetic
software Praat (Boersma&Weenik, 1992-2014) The outcomes are shown throughout the
thesis. The focal point of the analysis was the intonation contour.

3.5 Data analysis

Linear mixed models were run in R (R core team 2021). The main focus of the testing was the
language background (monolingual vs. bilingual) of both the speakers and the participants
(listeners). The R script is accessible in Appendix C.

Chapter 4: Experimental Results

This chapter presents the experimental results and main findings of the present thesis. Section 4.1 presents results in regard to the declarative sentences and section 4.2. briefly comments on the leading decisive factors in deciding for one or the other sentence type, submitted by the participants themselves. Several examples are given to explain the intonation patterns in the specific environments, for better comprehension of the possible difference in the production of them, that might cause an issue in perception.

4.1 Results for declarative sentences

The data exported from ED (Vet, 2021) was organised as a .csv file to be processed in R (R core team 2021), where a generalized mixed effects model (GLMER) was run. The fixed effects that were modelled were the linguistic background of the speaker (monolingual Czech/bilingual Czech Vietnamese), the linguistic background of the participants (monolingual Czech/bilingual Czech-Vietnamese) and the finiteness of the sentence (finished/unfinished). The results are discussed throughout this section, the relevant part of the script itself is located in Appendix C.

As previously mentioned, participants were assigned a task to distinguish, based on listening, whether what they have just heard was a *finished* or an *unfinished* Czech sentence. As explained in the theoretical part, based on the intonation patterns, one assumes a certain intonation contour for both finished and unfinished (continuing) sentences in current spoken Czech. These are now again presented in Figure 2 and 3.
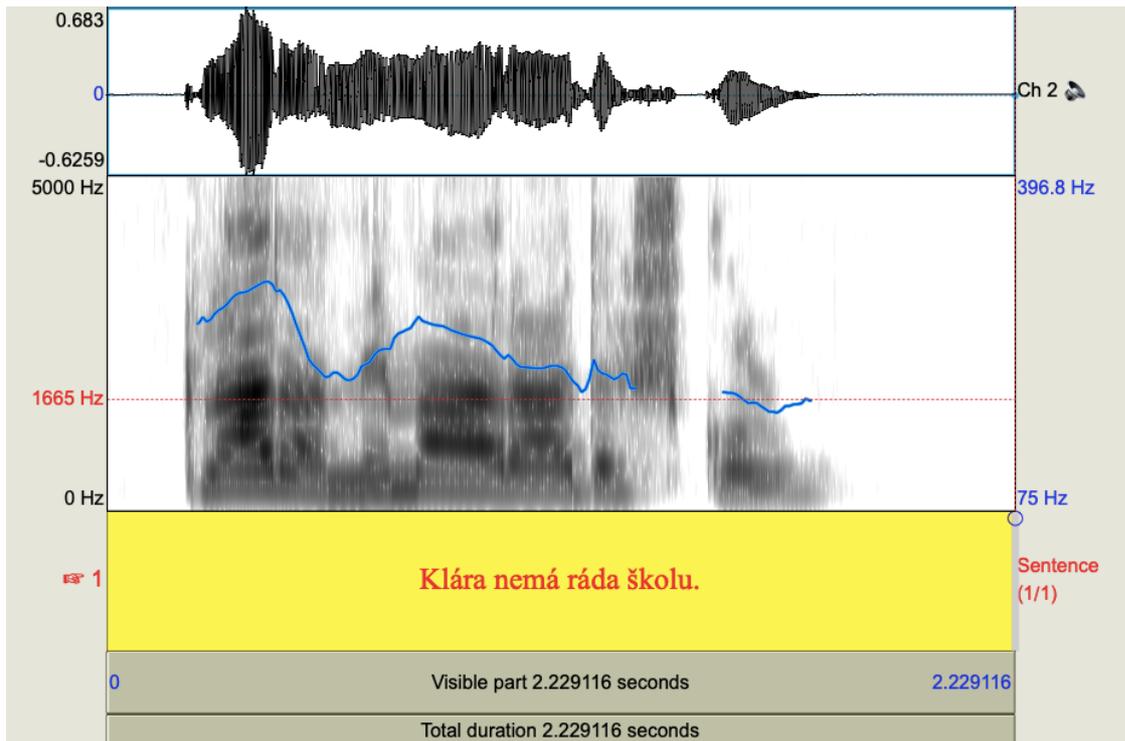
Figure 2: Finished simple declarative sentence in Czech and its intonation contour. "Klára does not like school." (own recording)
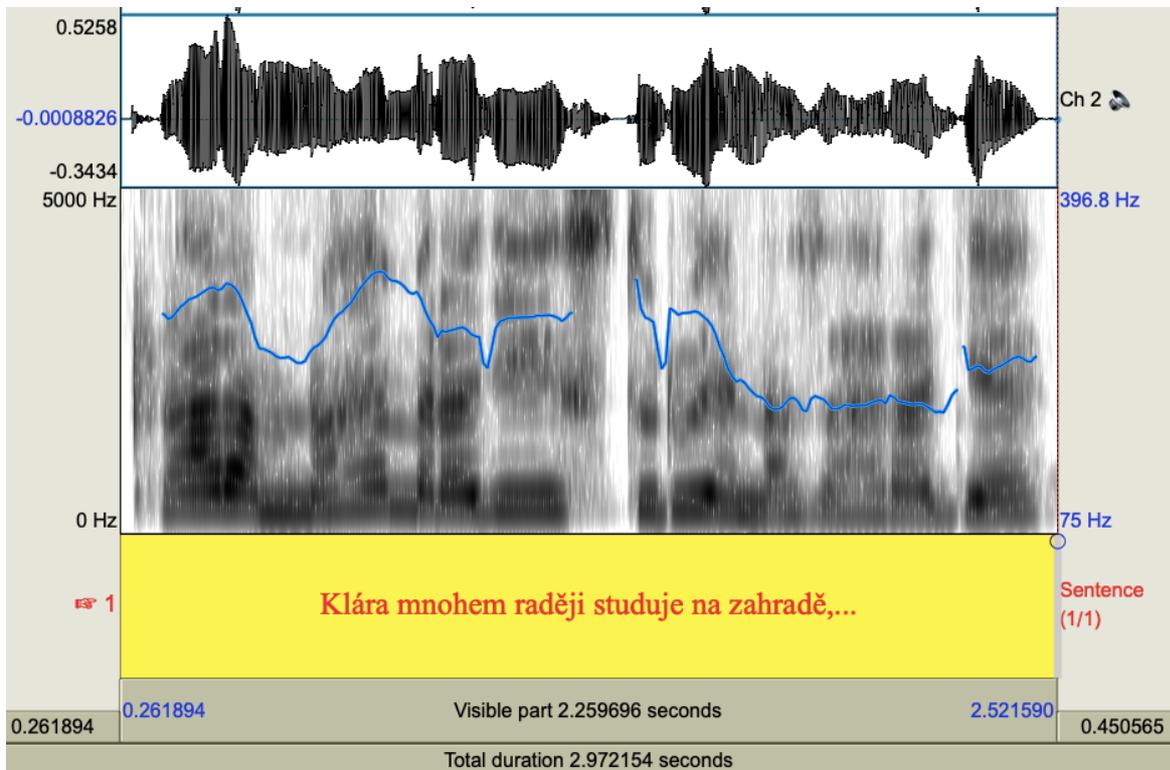
Figure 3: An unfinished complex declarative clause in Czech and its intonation contour. "Klára much rather studies in the garden, …" (own recording)

With the standard intonation contour of both the finished and unfinished (continuing) clauses in Czech in mind, one can proceed to the results themselves. These are first visualized in Figure 4 below. They combine all answers of all participants and compare whether there have been differences in identifying one or the other speaker's sentences. One can observe, that in almost a half of the cases (44%), bilingual speaker's sentence seemed problematic to identify.
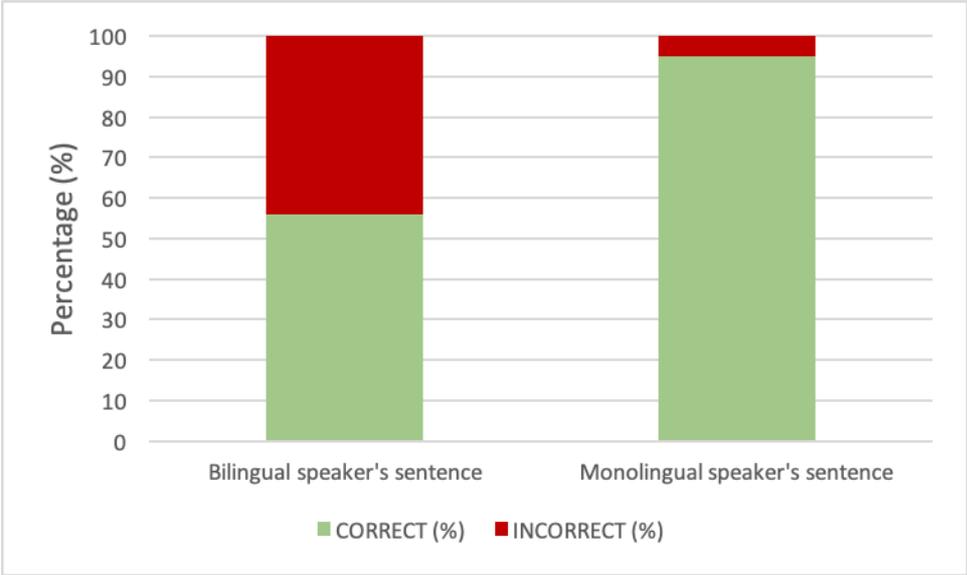
Figure 4: Average listener's rate in choosing the correct sentence type (%) when listening to a bilingual speaker (left) and a monolingual speaker (right).

This being said, another bar chart was drawn (Figure 5) to see whether there was a pattern distinguishing which sentence type in particular was the cause of the ambiguity. Figure 5 shows that in 5% of the cases, it was the finished sentence and in more than 40% of the cases, it was the unfinished sentence, that was inaccurately identified as finished.
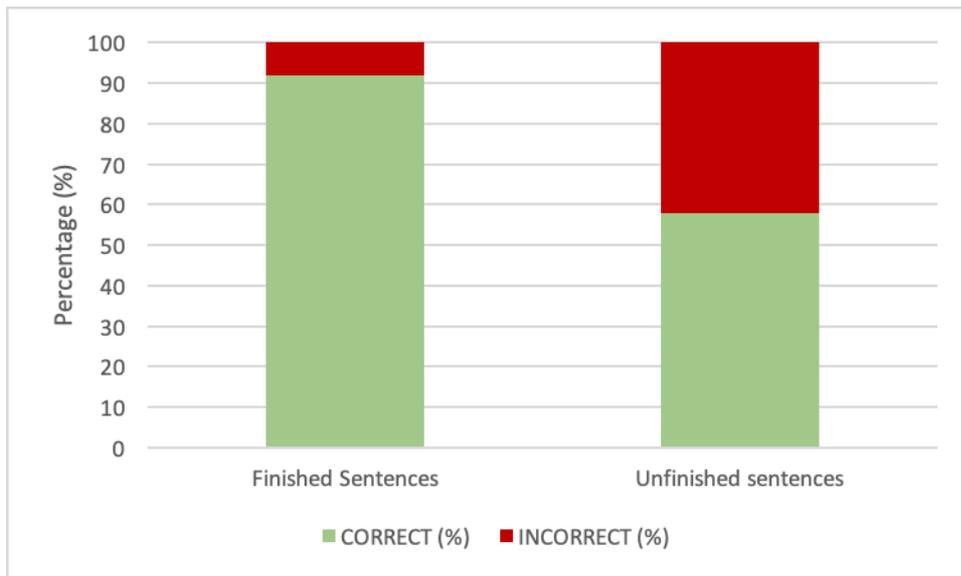
Figure 5: Average listener's rate in choosing the correct sentence type (%) when listening to a finished sentence (left) and an unfinished (right).

The estimated average odds for assigning the correct type of a sentence is 22.64, which is significantly greater than 1 (95% confidence interval = 4.567 ... 112.2962; p= 7.63^{10-5}, z=3.956). We conclude that the average person is more likely to assign the sentence type correctly than incorrectly when listening to a finished rather than unfinished sentence.

To understand, whether there was a difference in reaction to the two types of speakers, Figure 6 was created. It displays one by one the correctness of assigning the accurate type of a sentence to both the bilingual and monolingual sentences. This graph shows, that in more than 70% of cases, bilingual unfinished sentences were identified incorrectly, together with 11% in finished bilingual sentences. Monolingual sentences were mostly identified correctly although there was a 5% error rate identified in unfinished sentences.
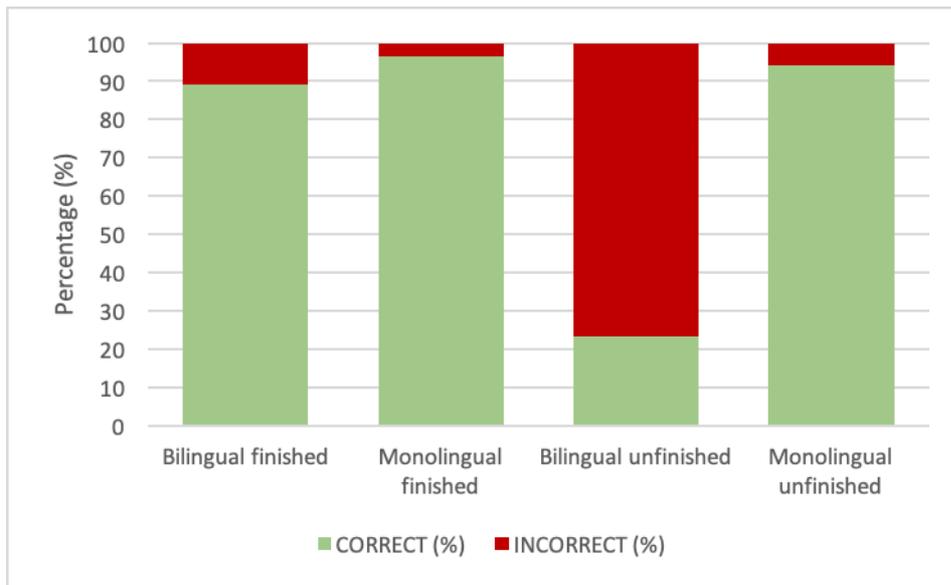
Figure 6: In/Correctness rate in assigning the finished/unfinished sentence type, separated by speaker (Bilingual/Monolingual).

The estimated average odds for assigning the correct type of a sentence is 131.578, which is significantly greater than 1 (95% confidence interval = 6.48 ... 2671.352; p= 0.00119, z=3.241). We conclude that the average person (averaged over finiteness and speaker language) is more likely to assign the sentence type incorrectly than correctly when listening to an unfinished rather than finished sentence and when the recording was conducted by a bilingual speaker.

The following two figures show how the two types of listeners reacted to the two accents of Czech, one produced by a Czech monolingual speaker and the other by a Vietnamese-Czech bilingual speaker. Figure 7 shows the reaction of both types of listeners to monolingual speaker's sentences, Figure 8 displays the listeners' reactions to bilingual recordings.
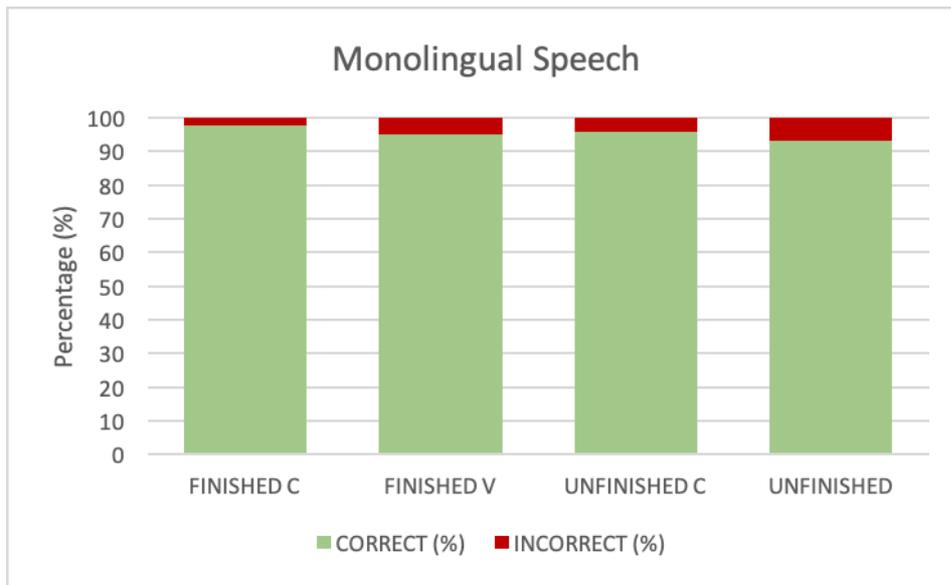
Figure 7: Reactions of both types of listeners to monolingual recordings. (C: Czech monolingual listeners; CV: Czech-Vietnamese bilingual listeners)
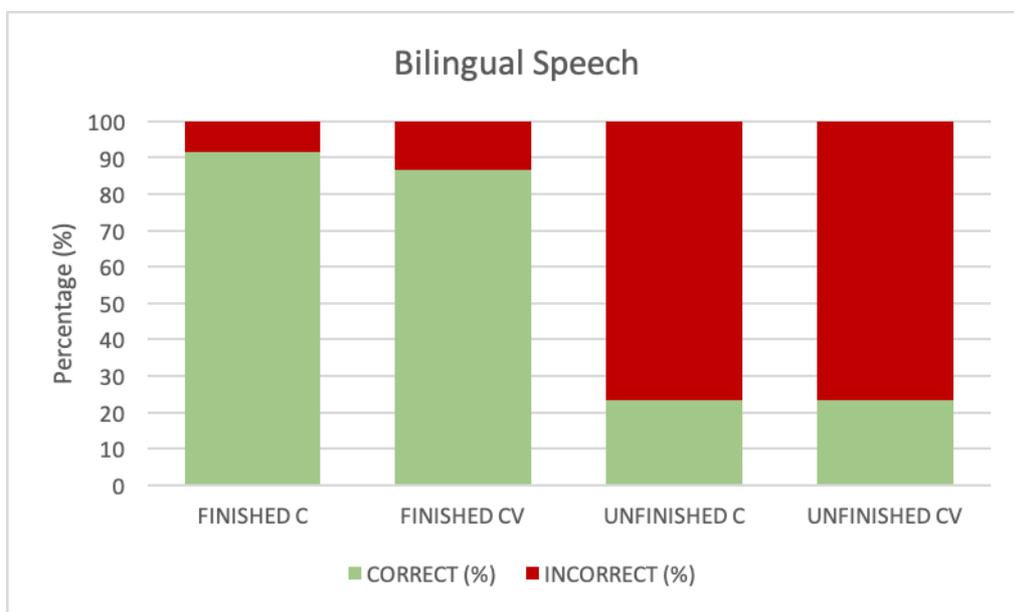
Figure 8: Reactions of both types of listeners to bilingual recordings. (C: Czech monolingual listeners; CV: Czech-Vietnamese bilingual listeners)

To test for the frequency of contact hypothesis, Figure 7 and Figure 8 were established. It appears that the Czech monolinguals have a higher success rate in perceiving both monolingual and bilingual sentences in comparison to the bilingual participants (except the unfinished bilingual recordings, where both listener groups behaved similarly). In terms of odds, however, this observation did not prove to be significant. The estimated average odds for assigning the correct type of a sentence (averaged over bilingualism and monolingualism in listeners) was 1.622, (95% confidence interval = 0.548.. 4.46; p= 0.975, z=0.030).

Similarly, the estimated odds ratio for the interaction effect of being a Czech monolingual participant rather than a Czech-Vietnamese one, listening to a Czech monolingual recording rather than a bilingual one and to a sentence, that is finished rather than unfinished was 4.23, which is not statistically significant (95% confidence interval = 0.22 ... 81.60; p= 0.997, z=0.328). We cannot conclude that the extent to which people assign the right sentence type when being a Czech monolingual than when being a Czech-Vietnamese bilingual and when listening to a finished rather than unfinished sentence is greater when listening to a Czech-monolingual recording than a Czech-Vietnamese recording.

4.2. Average participant's reasons for assigning a sentence type

As a part of the experiment, an informative question field was implemented after each of the sections of the experiment. The most common answers in percentages are presented in Figure 9.
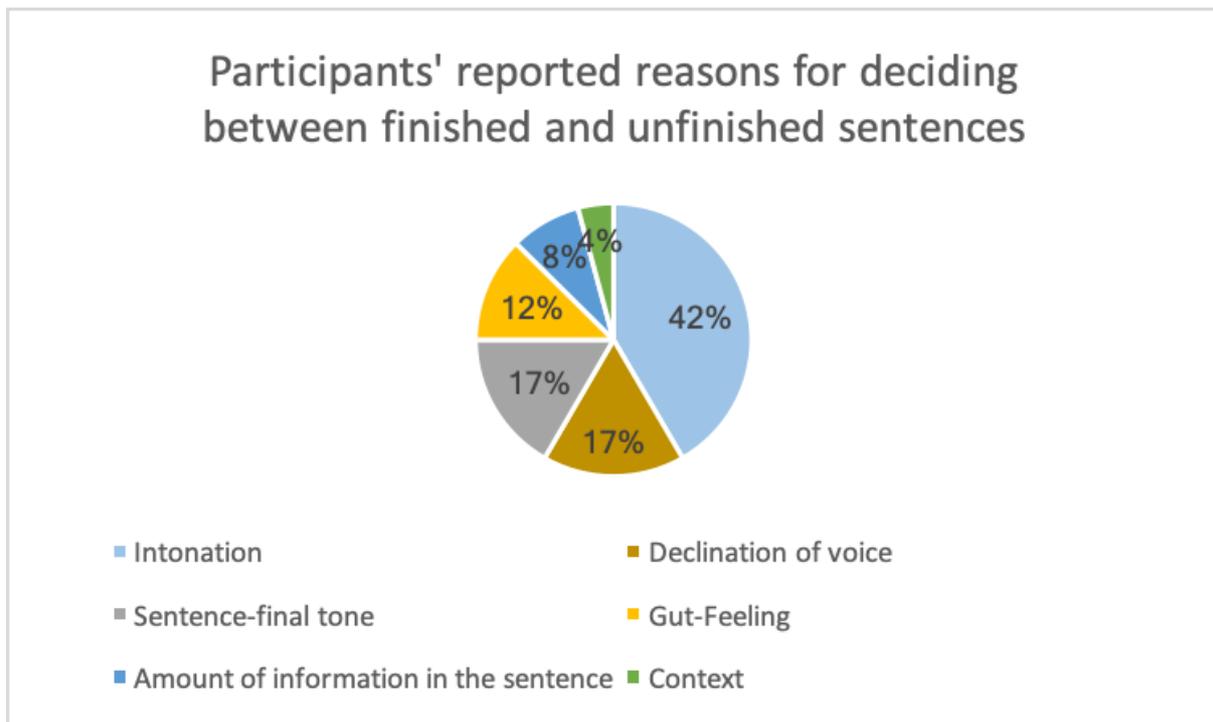
Figure 9: Participants' reported reasons for deciding between finished and unfinished sentences.

In the vast majority of cases, the participants' answers referred to intonation, declination of voice or sentence-final tone. For that reason, we can conclude that the participants were prevailingly guided by the falling or stagnating/slightly increasing contour of the speaker's voice, although they might not have been familiar with the term *intonation* as such.

Chapter 5: Discussion

This thesis has tested two hypotheses: the standardness hypothesis and the frequency of contact hypothesis. For the standardness hypothesis, results in section 4 lend support for a difference in both participants' and speakers' language background. The statistical report has shown a significant effect of the speaker's language background, in particular. This resulted in the conclusion that a sentence, when produced by a Czech-Vietnamese bilingual, seems rather intricate to identify correctly, especially in the case of unfinished sentences. These were, in the majority of cases, identified inaccurately as finished and seem to carry distinct Vietnamese-influenced prosodic features, in comparison to the Czech monolingual sentences. The standardness hypothesis is therefore confirmed, indicating that there is a difference in the prosodic features of the investigated bilingual speech.

The results may be explained by the expectation of different prosodic properties in the two varieties of Czech. In Vietnamese, according to Thompson (1988) the intonation contour in declarative sentence that are not finished falls, and *fades* in the case of finished utterances. In Czech, this is not the case, as for unfinished declarative sentences, the end-cadence and for finished ones the falling contour, applies.

Nevertheless, the frequency of contact hypothesis had to be rejected. It originally presumed that due to the fact that Czech-Vietnamese bilinguals stand in a continual contact with other Czech-Vietnamese bilinguals and Vietnamese monolinguals, they would achieve overall higher odds for distinguishing the sentence types correctly. Quantitative analysis of the results hinged on the fact that it could, in fact, be the Czech monolingual participant group, who could assign the sentence type accurately more often, both in the case of monolingual and

bilingual recordings. Nevertheless, this did not prove to be statistically significant, and the

hypothesis has not proven to be true.

Chapter 6: Conclusion

All in all, this research has set out two main hypotheses. The standardness hypothesis and the frequency of contact hypothesis. The first mentioned has proven to be true within the investigated participant groups. The recordings created by a monolingual speaker had higher odds in being assigned the correct sentence type than the bilingual ones. On the other hand, the frequency of contact hypothesis has not proven to be true. The statistical analysis has shown that the effect to which one group (rather than the other) has a higher chance in assigning the correct sentence type no matter the speaker's language background is not significant.

Future research should include more participants. Also, a laboratory environment might be beneficiary for ensuring identical conditions and environment for the participating individuals. Other sentence structures, such as interrogatives or exclamatives can be included for an in-depth research on this topic. Production experiments can be carried out in a laboratory environment with various Czech-Vietnamese bilinguals and Czech monolinguals to investigate the intonation contours and patterns on a larger scale.

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Appendix A – Simplified Czech Consent Form

Vážený/á účastníku/účastnice lingvistického experimentu,

Právě se chystáte participovat na výzkumném experimentu pod názvem „Současná mluvená čeština", který byl vytvořen Alžbětou Kučerovou, pod dohledem Dr. Suki Yiu při University of Amsterdam, Faculty of Humanities, Department of Linguistics. Před tím, než experiment započne, je **nutné**, abyste si přečetl/a tuto brožuru.

Kdo se tohoto projektu může zúčastnit?
Zveme k participaci jednojazyčné rodilé mluvčí češtiny a česko-vietnamské bilingvály jakékoliv věkové skupiny, vždy ale starší 16-ti let.

Jednojazyčným mluvčím češtiny se rozumí kdokoliv, kdo nebyl vychováván v bilingvním prostředí např. angličtina-čeština (tj. dítě anglicky mluvících rodičů vyrůstající v Čechách, dítě anglicky mluvícího rodiče a česky mluvícího rodiče atp.). Fakt, že v dnešní době hovoříte dalším cizím jazykem, nehraje roli.

Česko-vietnamským bilingválem se rozumí kdokoliv, kdo byl vychováván Česko-Vietnamskými/Vietnamskými rodiči v České republice a v každodenním životě tedy používá nejen češtinu, ale také vietnamštinu. Fakt, že vietnamsky např. mluví hůře než česky, roli nehraje.

Co potřebujete?
Experiment proběhne online. To znamená, že jediné, co je potřeba, je stabilní internetové připojení, tiché prostředí a sluchátka. Prosím, nepoužívejte pro přehrávání nahrávek v tomto experimentu reproduktory.

Instrukce
Tento experiment se skládá celkem ze dvou částí a neměl by zabrat více než 20 minut. Na začátku se Vás budeme ptát na několik otázek týkajících se Vašich jazykových znalostí – prosím, snažte se odpovědět co nejpřesněji. Ihned na to započne první část experimentu. Vaším úkolem je vždy přehrát si danou nahrávku a poté vybrat jednu z dvou možností odpovědi na otázku, kterou vidíte na displeji. Snažte se odpovědět spontánně, tzn. bez hlubšího přemýšlení. Po skončení první části, proběhne část druhá. Ta má téměř identickou strukturu, instrukce se tedy nemění. Po skončení druhé části je experiment u konce.

Dobrovolná anonymní participace
Tohoto experimentu se účastníte dobrovolně. To znamená, že se kdykoliv můžete rozhodnout experiment opustit bez udání důvodu. Stejně tak je možné zažádat o odstranění Vaší odpovědi z naší anonymní databáze, kdykoliv po skončení experimentu. Všechna Vaše anonymní data budou pak nadobro smazána z naší databáze.

Data a rizika experimentu
Účastí na tomto experimentu se nevystavujete žádnému neobvyklému riziku v porovnání s běžnými denními činnostmi. Vaše informace jsou analyzovány anonymně a výlučně používány pouze pro publikaci ve vědeckých článcích, za všech okolností.

Pro další informace nás můžete kontakovat na těchto adresách:

Alžběta Kučerová, E-Mail: alzbeta.kucerova@student.uva.nl
Dr. Suki Yiu, E-Mail: s.y.yiu@uva.nl

V případě stížností týkajících se tohoto lingvistického projektu, kontaktujte prosím Etickou komisi:

Ethics Committee of the Faculty of Humanities of the University of Amsterdam
Email: commissie-ethiek-fgw@uva.nl

1) Czech-Vietnamese bilingual Declaratives
    1) Šla jsem včera do školy.
    2) Šla jsem do tanečních, abych viděla kamarády.
    3) Včera bylo hezky, dnes ale prší.
    4) V pondělí bylo mrazivo.
    5) Chtěla bych být zpěvačkou.
    6) Přála bych si být součástí nějaké hudební skupiny, abych mohla na turné po celém světě.
    7) Vůbec jsem tě nemohla poznat.
    8) Tohoto politika neznám, jestli se nepletu.
    9) Mám raději sladká jídla.
    10) Jana má nejraději rajskou s knedlíkem od babičky, protože to prý umí nejlépe.
    11) Řízky s kaší jsou moje nejoblíbenější jídlo.
    12) Boloňské špagety mám moc ráda, protože mi připomínají Itálii.
    13) Každý den začínám kávou.
    14) O víkendu piji čaj s mlékem, který si osladím cukrem.
    15) Ráda čtu životopisy herců.
    16) Ráda chodím do knihovny, mám-li nějaký volný čas.
    17) V Česku je momentálně mnoho specializovaných obchodů.
    18) Bezobalové obchody jsou k vidění hlavně ve větších městech, protože je tam větší odbyt.
    19) Jana má ráda hrušky.
    20) Tereza v létě jezdí k babičce, kde jí pomáhá na zahradě.

2) Czech monolingual declaratives
    1) Petr nemá žádné kamarády.
    2) Petr nemá žádné kamarády, protože je hodně stydlivý.
    3) Jana je třídní klaun.
    4) Janu má každý rád, protože je veselá.
    5) Klára nemá ráda školu.
    6) Klára mnohem raději studuje na zahradě, kde má klid.
    7) Studium na vysoké škole není nutností.
    8) Studium na vysoké škole bývá náročné, protože je tam hodně odborných předmětů.
    9) Učitelkou jsem chtěla být už od dětství.
    10) Být učitelem není zrovna populární volba, protože jsou podfinancováni.
    11) V květnu rostou jahody.
    12) Těším se na léto, protože budou růst jahody.
    13) Jazyky mne ve škole moc nebavily.
    14) Musím se naučit anglicky, abych mohla jet do zahraničí.
    15) Jezdím po Praze ráda na kole.
    16) Nejradši jezdím tramvají, protože se mohu dívat z okna.
    17) Filip jede v létě na Maledivy.
    18) Tereza má na léto mnoho plánů, protože je podnikavý typ.
    19) Tenhle květináč se mi nelíbí.
    20) Mám moc ráda květiny, protože ozvláštní design bytu.

Appendix C - R script of the general mixed effects model

```
library (lme4)
contrast <- cbind (c(-1/2, +1/2)) #ListenLan
colnames (contrast) <- c("-bi+mono")
contrasts (table$ListenLan) <- contrast

contrast <- cbind (c(-1/2, +1/2))
colnames (contrast) <- c("-bispeaker+monospeaker")
contrasts (table$SpeakerLan) <- contrast

contrasts (table$ListenLan)
contrasts (table$SpeakerLan)

modeldeclaratives <- glmer (Answer ~  ListenLan * SpeakerLan  + (SpeakerLan
| Participant) + ( ListenLan * SpeakerLan | Item), data=table,
family=binomial)
summary (modeldeclaratives)
```