Bakalářská práce

Discrimination of voiced and voiceless consonants in minimal pairs

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Zadání bakalářské práce

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Zásady pro vypracování:

<p>This bachelor thesis examines the discrimination of voiced and voiceless consonants in minimal pairs. The thesis will be divided into two parts: theoretical and practical.</p> <p>The theoretical part will overview the slight difference in pronunciation in the words that make a minimal pair. It is necessary to discriminate between them since if switched, the sound might change the whole meaning of the word or a phrase, and it could possibly lead to a misunderstanding or even a communication barrier. The distinction in the pronunciation of the phonemes within minimal pairs is very slight, and certain countries might not have these sounds in their language. Therefore, the sounds might be very unusual and hard to hear and repeat for the students. If the student is unable to hear the sound correctly, they are not able to discriminate between the different sounds. If they do not discriminate between these sounds, they are unlikely to be able to pronounce them differently. If they do not pronounce correctly, they might struggle to use their English in the world.</p> <p> The second part will consist of research. I plan to use statistical analysis or possibly qualitative analysis. The aim of the research is to find out whether the students can hear and discriminate between the voiced and voiceless consonants, as it affects their attempts to discriminate them in pronunciation. This research will use a questionnaire with audio recordings, where the students are asked to choose which sound in isolation/word/phrase they hear.</p> <p>I plan to work with British English. More specifically, for the intent of the questionnaire standard English (received pronunciation), since it is a geographically neutral accent. The research will offer a study of three possibilities: a sound in isolation, in a word, and a sentence. Therefore it is possible to observe whether the context helps the students to discriminate between them. The results are likely to show whether the suspected problem truly exists within the students, and therefore it is possible to offer a solution or at least a recommended part of the lessons that needs to be focused on.</p> <p>
 </p> <p>Tato bakalářská práce bude zkoumat rozlišení znělých a neznělých souhlásek v minimálních párech. Práce bude rozdělena na dvě části: teoretickou a praktickou.</p> <p>V teoretické části shrnu drobné odlišnosti ve výslovnosti u slov, která tvoří minimální pár. Je nezbytné mezi nimi rozlišovat, jelikož pakliže jsou prohozeny, mohou tyto zvuky pozměnit význam slova či fráze, a může dojít k nedorozumění, či dokonce komunikační bariéře. Rozdíl ve výslovnosti je v případě minimálních párů velmi jemná a některé země tyto fonémy nemusí ve svém jazyce mít. Tyto zvuky je proto pro studenty náročné poznat a zopakovat. Pakliže student neslyší daný zvuk správně, není schopen rozlišit mezi odlišnými zvuky. Pokud mezi nimi není schopen rozlišovat, velmi pravděpodobně se jim nepodaří vyslovit je odlišně. Pakliže nevyslovují korektně, bude jejich užití AJ ve světě poměrně problematické.</p> <p>Druhá část bude sestávat z výzkumu. Plánuji statistický či potencionálně kvalitativní výzkum. Cílem výzkumu je zjistit, zda studenti slyší a dokáží rozlišit znělé a neznělé hlásky, jelikož toto ovlivňuje jejich pokus je rozlišit při jejich vyslovování. Pro účely tohoto výzkumu bude využit dotazník s audionahrávkami, v němž budou studenti požádáni vybratkterý zvuk slyší v osamocení, ve slově a ve frázi.</p> <p>Mám v plánu pracovat s Britskou angličtinou, konkrétně pro účely dotazníku hodlám užít standardní angličtinu (RP), jelikož toto je geograficky neutrální přízvuk. Vázkum poskytne studii tří možností: zvuku v izolaci, ve slově a ve větě. Je proto možné pozorovat, zda kontext pomáhá studentům tyto zvuky rozlišovat. Výsledek pravděpodobně ukáže, zda je tento problém skutečný, a proto bude možné nabídnout případné řešení nebo přinejmenším část lekcí, na kterou je potřeba se zaměřit.</p>

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<p>1) Baker, Ann, and Sharon Goldstein. Pronunciation Pairs: an Introduction to the Sounds of English. Cambridge: Cambridge University Press, 2008. </p> <p>2) Brown, Adam. Pronunciation and Phonetics, A Practical Guide for English Language Teachers. Firsted. Abingdon, United Kingdom: Routledge, 2014. </p> <p>3) Kawashima, Hirokatsu. The Journal of Nagasaki University of Foreign Studie, December 30, 2003, 81–93. http://id.nii.ac.jp/1165/00000283/.</p> <p>4) Pavlík, Radoslav. Phonetics and Phonology of English, A Theoretical Introduction. Bratislava, Slovenská republika: Pedagogická fakulta Univerzity Komenského v Bratislave, 2000.
 5) Roach, Peter. English Phonetics and Phonology, A Practical Course. Seconded. Cambridge, United Kingdom: Cambridge University Press, 1991. </p> <p>6) Zsiga, Elizabeth C. The Sounds of Language, An Introduction to Phonetics and Phonology. Oxford, United Kingdom: Wiley-Blackwell, 2013. </p>

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12. října 2023   Kristina Erin Čižinská

Thanks

Annotation

This bachelor thesis examines the discrimination of voiced and voiceless consonants in minimal pairs. The thesis will be divided into two parts: theoretical and practical. The theoretical part will overview the slight difference in pronunciation in the words that make a minimal pair. The second part will consist of research. Students of the English language will be given a questionnaire, where the person filling it will hear the sound in isolation, in a word and a sentence. The goal will be to find out whether people are able to recognize the sound correctly, and therefore distinguish between the words that make a minimal pair.

Key words

Minimal pairs, voice, English language, consonants, phonemes, pronunciation, listening skills, phonetics and phonology

Tato bakalářská práce bude zkoumat rozlišování znělých a neznělých souhlásek v minimálních párech. Práce bude rozdělena na dvě části: teoretickou a praktickou. V teoretické části shrnu drobné odlišnosti ve výslovnosti u slov, která tvoří minimální pár. Druhá část bude sestávat z výzkumu. Studenti anglického jazyka dostanou dotazník, kde tázaná osoba uslyší daný zvuk v izolaci, ve slově a ve větě. Cílem výzkumu je zjistit, zda studenti jsou schopni souhlásku správně rozpoznat, a tedy rozlišovat slova, která tvoří minimální pár.

Klíčová slova

Minimální páry, znělost, anglický jazyk, souhlásky, fonémy, výslovnost, poslechové dovednosti, fonetika a fonologie

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Introduction

As a second or foreign language learnt, English language is the largest by the number of speakers. Not only are there many countries where it is the first language, which makes the number of the native speakers immense, but lots of people also speak it as a secondary language. In most parts of the world, English is learnt in some form, either as a first or second language, or as a foreign language.

In today's world, it is practically impossible for the need to speak it not to occur in some moment of one's life. Because it is widely used, there are also immense opportunities for miscommunication. With the range of use being very wide, this can lead to various serious issues, but most of all, it vitiates the main purpose of the language. Every language has the intent of communicating with others. If the language is not used properly, people are not understood well.

The use of English, as in every other language, consists of mastering three of its most essential parts: grammar, vocabulary and pronunciation. This thesis will focus on neither the grammar, nor the vocabulary. Even though both these aspects of the process of language learning are of great importance, I shall confine my attention strictly to the pronunciation.

Firstly, the pronunciation can change the meaning greatly. This is also true for grammatical mistakes or incorrect use of vocabulary, however, in many cases, the meaning of the message is still understandable if the speaker makes a mistake. On the other hand, switching some of the English sounds can create a whole different meaning, and it often does.

Secondly, while the written form is important for many people, many more only need the spoken form for their everyday interactions. While learning a foreign language, people often focus mainly on the spelling on its own. The learners, however, also typically struggle with the pronunciation. As English pronunciation has certain patterns, learning how to pronounce correctly can also help the learners with the spelling. This applies mainly to people with disorders like dyslexia, who find it difficult to focus on specific letters.

If switching two sounds in a word creates a different meaning, those examples are called minimal pairs. While most of the English sounds called phonemes can create a minimal pair, this thesis will focus on consonants in their ending position.

Being a teacher of English, I can often see the students struggling with pronouncing the voiced and voiceless consonants correctly. It is not unusual for

them to switch the words unintentionally and use a completely different one not because of their lack of knowledge, but because of incorrect pronunciation.

There may be various reasons why it is so difficult for the learners to properly differentiate between the voiced and voiceless sounds. The suspected cause I built this thesis on is that people might not be able to hear the sounds as two different ones. If the two phonemes sound the same to them, it is certainly almost impossible for them to differentiate between them. Learning how to pronounce them correctly may make that a very hard task. Hence, it could conceivably be hypothetised that the pronunciation being challenging is directly caused by the inability of the learners to discriminate between the voiced and voiceless consonants.

An inquiry into the differenciation between the minimal pairs would make a significant contribution to teaching English as a second or foreign language not only by elucidating the reason behind the problematic pronunciation of the contrasting consonants while also offering possible solutions for this issue. By examining the very common struggle of the learners of English, this paper can contribute to a greater understanding of its cause and therefore be immensly helpful for the field of teaching English as a second and foreign language both. By confirming or disproving the study's original hypothesis that the pronunciation problem is caused by the unability to hear the sounds correctly and therefore differentiate between the voiced and voiceless consonants.

The first part of the thesis summarises the discoveries already made in the phonology. I will explain the specifics of how the phonemes are created and how they work, focusing mainly on the consonants that create minimal pairs. The reasons why they are problematic will be specified and later observed in the research.

In the practical part of this thesis, I use a questionnaire with audio recordings. The participants are asked to choose between two options. Every sound is presented in three different words, and the words then in sentences. In particular the research focuses, firstly, on finding out whether people have difficulties telling the voiced and voiceless consonants apart. Secondly, the results of considering each sound in a word and in a sentence both investigate to what extent the differentiation is contextual. Finally, the research aims to confirm or disprove the hypothesis that the problematic pronunciation of the contrasting consonants is caused by the inability to discriminate between them. For the purpose of both the research and this thesis, I use British English, specifically the RP.

There are three main research questions this thesis will focus on. After covering the theoretical part and summarising the already known aspects of the phonemes, and more so, specialising on the consonants creating minimal pairs while being at

the end end of the word, I will explain the methods used for the research, describe its procedure and results. In the disvussion section, I will later answer these questions with the use of the results of the conducted research.

Firstly, I will try to find out whether the learners are indeed able to discriminate between the voiced and voiceless consonants in their final position. After explaining why these sounds might be difficult for the learners of English as a second language or as a foreign language in the theoretical part of this thesis, I will focus on discovering the reason. This thesis is partly based on the hypothesis that the learners might not be able to hear the voiceless and voiced consonants as different sounds, and therefore might be unable to discriminate between the two. If this hypothesis is correct, it might show a reason of the learners finding the pronunciation of such sounds very challenging. The results of the questionaire will either confirm or discourage this hypothesis. If it is confirmed, it would make finding the solutions for the learners problem with the pronunciation possible, and thus, additionally, make the teaching of English as a second language or as a foreign language more advanced and focused on making the challenging parts of the language learning process slightly easier for the students.

Secondly, I will also try to find out whether the word context and sentence context help learners discriminate between the two better. Considering that every language use is often tied with its learnt patterns and the meaning might depend quite heavily on the whole context of the speech, it leads to a logical assumption that discriminating between the contrasting sounds in the minimal pairs will be easie for the learmers if tgey are not isolated, but in a word or sentence context.

Last of all, in regard to the results that the research will show, I would also like to consider which students should discriminate between the voiced and voiceless sounds. In theory, it would be ideal if every student would be able to perfect all the aspects of the language that they are learning. However, many students only get to a certain level through their compulsory education and often do not focus on advancing their skills after they achieve the compulsory level. It is also nevessary to consider that a large part of the learners will not used English on on more advanced level, or even on a regular basis. Even though the importance of learning English is almost unquestionable, it is vital to consider individual students' needs, speed of learning and final goals of their studies of the language. This thesis will try to observe of the level of the learner does make a difference for the discrimination of the voiced and voiceless consonants.

1. Language

Language is a characteristic trait of the human race. The concept of any language is that sounds are produced through the vocal cords. While using the air coming out of the lungs and spreading the vocal cords, different sounds come out if the way they are produced is even slightly changed. While animals can produce sounds as well, and many use the same methods as people, these sounds would need to be organised more to create a system that could be called a language.

Human beings use sounds to communicate. We put them together into words and the words into sentences, inventing an infinite number of things to say with them. Animals lack this kind of structure. Even though some sounds may be familiar to specific human languages, as in Khoisan languages, they are primarily used in particular situations to express an exact, monotonic meaning. However, people have found a way to use the sounds to their advantage, allowing languages to be born.

Though some of them may be very different, all of the language systems also have certain similarities. All of them have grammar rules. Every language is made to express feelings, communicate and describe the world around us. Though the vocabulary may vary because of this, every one of them is still potent to talk about the past, present and future. The set of grammar rules is different as some languages may use prefixes or suffixes, and some might only use a single word to let the listener know when the described experience is happening. Languages also change over time, and different accents and slangs often arise from some of these changes.

Humans have also developed a talent to use more than grammar to be expressive on a large scale. Though all people use their larynx, mouth, tongue, lips, teeth, and sometimes even the nasal cavity, each person is equipped with a slightly different body. Larynxes vary in their size, and people have different shapes of mouths and tongues. However, humans have also learned to work with the nonverbal aspects of language. We use intonation to suggest things. The sound system lets the stress and rhythm of the particular language in a particular situation carry the specific meaning, too.

Even though these can change the meaning as well, or, on the other hand, help us to differentiate between more possibilities of interpretation, this thesis will specialise on the change that comes from similar words made out of only slightly different sounds. Whereas the animal sounds, as already mentioned, are made to carry more or less the same meaning every time and thus make the communication severely limited, changing not only a word but even a simple part of it can change

the meaning of the utterance completely. If we switch two different sounds, the meaning is different. (Pavlík, 2000)

1.1 Language systems

There are many ways to classify different language systems and divide them. For example, traditional linguistics divided language into langue and parole. While the first is an abstract system of the language, the latter is the language in use, which we know as speech. This idea was proposed by the Swiss linguist Ferdinand de Saussure.

On the other hand, Noam Chomsky, an American linguist, distinguished between competence and performance. Competence lies in the knowledge of the language and its rules. In comparison, the performance is the expression that comes out of it; therefore, what is created when those rules are applied. This distinction is similar to the one between Saussure's langue and parole. (Pavlík, 2000)

1.2 Language properties

Each language has a finite number of sounds, creating whole words and even sentences once combined. (Pavlík, 2000) The specifics of the language are many, but the most important one is that it is systematic. There are several ways to divide the languages. This thesis will not focus on that. However, the properties that make a language as a concept different from other means of communication are worth mentioning.

The words that name things and actions around us were created arbitrarily. Humans considered the sounds they make and decided to put some of those together to form random words. These do not usually implicate the character of the object or process named that way. Considering all languages, the names created for the same object would differ from language to language. Since some of the languages have the same roots, some of the words would be more similar to each other. However, the sound sequence that names the object may not describe its characteristic features. Some words, however, were not made arbitrarily. These are called onomatopoeic words. They are words like splash, ding-dong or cock-a-doodle-doo. The sounds that form them are similar to those of the objects or processes concerned. (Pavlík, 2000) It is easy to recognise these words as they usually sound like interjections.

Every language has two levels: phonemes on one and words carrying a meaning on the other. (Pavlík, 2000) While the first do not necessarily have a meaning on their own, they create words and sentences once put together. Those utterances can communicate a specific meaning. This duality is unique to the human language as animal communication consists of only sounds, which limits it gravely.

Humans are able to create words with the sounds they make. They combine them in specific ways to make meaningful utterances. Human language is productive.

Another unique characteristic of human language is its ability to communicate both whenever the need arises and whenever the person wishes to express something to others. Humans are able to describe the past, present and future. Animals, on the other hand, can only communicate the necessary in a current situation. They lack the property of human language called displacement.

The thing that makes language the means of communication is the fact that it is creative and productive. People have learned to form not only a few words out of the sounds they know how to make but a whole variety of those, which carry different meanings. So while animal communication is limited, humans can create infinite possibilities with just a few sounds.

Another interesting attribute of the human language is that it is not hereditary. People learn the language mainly through their parents or a community and usually at a very early age. However, if a child were excluded from such conditions, it would not learn to use the sounds it can make productively and, therefore, communicate with a language. The language is not acquired genetically but transmissioned culturally. (Pavlík, 2000)

However, the attribute of the human language that reflects in this thesis the most is its discreteness. If one sound is exchanged for another, the meaning changes as well. While the sounds made by humans might be meaningless on their own, they create meaningful words or even a sentence.

The cases of very similar words that differ only because of one different phoneme are called minimal pairs. This thesis will focus on these in more detail in the forthcoming chapters.

1.3 Verbal vs non-verbal communication

While this thesis is focused on the primary means of communication, the human language, it is essential to highlight that it is not the only way people communicate with each other.

The verbal part of communication consists of the already mentioned creative way in which we use sounds to make words, clauses and sentences. These all carry most of the information. Every word has a precise meaning and creates a clear message in context with others. That is, in most cases.

However, other aspects affect the meaning of the utterance as well. Firstly, there are the intonation, stress and rhythm, which are all still part of the linguistic attributes. They can tell the receiver a lot about the meaning.

The rhythm of the speech is different for each language, and it can tell us information such as the speaker's origin, maternal or first language, and emotions.

The speech rate might suggest whether the speaker is calm, confident, or anxious and unsure. The intonation can change the meaning of the utterance as a whole. Both irony and sarcasm can be used as an example of this. The receiver will understand the following sentences slightly differently, depending on whether the speaker's voice goes up or down.

Yeah, right. ↓

Yeah, right. ↑

Stress can be a decisive factor as well. The word stress is crucial for the recognition of some verbs in comparison to the nouns created from the same root and carrying a similar meaning. Unstressed, some verbs and nouns would sound exactly the same. The stress helps to distinguish between them as it stays on the first syllable for nouns, and in the case of the verb, it is on the second or last syllable.

present (noun)

pre**sent** (verb)

The sentence stress can give us extra information about the speaker's intended "hidden" meaning. Again, this is often used in sarcastic or ironic remarks. However, it also changes the meaning according to the stressed word. In this case, the extra information consists mainly of what the speaker considers important. For example, in the following sentences, the stress clearly shows that the stressed word is the new, shocking revelation.

He believed her.

He **believed** her.

He believed **her**.

Why is the information essential or surprising? Why is the speaker telling it to someone else? It can be the fact that it is **him**, some other person substituted with a masculine pronoun. The sentence might be surprising because it is **him** that believed. It might also be surprising that he believed **her**. Maybe he should not have. The stress on this word in such a sentence implies that the mentioned lady might not be trustworthy. Moreover, it might be surprising that he **believed** at all. The person might usually not trust others.

Apart from all these non-verbal linguistic attributes of the language that are called prosodic (Pavlík, 2000), there are other features as well. The last of the auditory ones are paralinguistic, like voice qualifiers and voice qualifications.

Nevertheless, people do not communicate solely through auditory features. We get lots of information from the visual ones as well. The more obvious are the kinesic attributes. These are, for example, gestures, posture, and movements of eyes, hands, and facial expressions. Although in the case of standing features, the speaker might not intend the implied information in every case, they help the receiver gather more information and sometimes even affect the meaning of his utterances. Things like clothes, whole appearance and proxemics often tell us more about the person than one might think, especially since most people tend to give meaning to every tiny detail, whether that was the speaker's intention or not.

The importance of the nonverbal parts of the communication might be one of the reasons why in some cases, communication through the written form only may prove to be complicated. While the words and sentences remain the same as in the spoken one, the receiver does not hear the speaker's tone. They do not see their facial expressions and body movements, either. The missing nonverbal part of the language can make certain utterances challenging and harder to understand, especially those that might be ambiguous.

2. Phonetics and phonology

While both phonetics and phonology focus on speech sounds, and both terms are often used freely to exchange with one another, they differ. While the studied matter is the same, phonetics and phonology look at it from different points of view (Pavlík, 2000). Therefore, it is wise to distinguish between them properly.

2.1 Phonetics

Phonetic science, shortly phonetics, specialises in studying, describing, and classifying speech sounds. Sound identification depends firstly on how we produce the sound, otherwise known as articulation, secondly on how they are acoustically transmitted, and lastly on how we hear them, on the so-called auditory reception.

A specific written symbol represents every sound. The sounds differ between the specific languages. While some of them may share certain sounds, there are sounds specific to certain languages. Some might be unusual but used in various languages, as is the case of /Ɵ/ and /ð/, which are often, but not solely, used in English. Some might be rare and specific for only a few languages, like Czech /ř/, represented by the letter "ř". These differences are the main reason why the phonetic alphabets also differ. On the other hand, some phonemes might be the same or similar for most languages and use the same written symbols for these sounds. However, this rule does not necessarily apply to all languages.

The English language uses IPA (International Phonetic Alphabet). This alphabetical system was created in the 19th century and was based on the Latin script. The IPA symbols are used not only by linguists but also by language students and teachers. In some cases, even artists benefit from their merits. The most commonly used basic form of the symbols specifies the sound itself, especially in its place, manner and voice. Each sound that differs in those three characteristics has its own written symbol. However, the more advanced notations also indicate other features, such as rhythm, stress or quality. These are usually outlined by various diacritic symbols added to the main one.

2.2 Phonology

Phonology, also known as phonemics, functional phonetics or linguistic phonetics, classifies speech sounds from the functional point of view. Where phonetics studies phonemes and allophones, phonology tries to figure out how these function and what features make us able to distinguish between the sounds. (Pavlík, 2000)

While phonetics can be divided into several branches, depending on the point of view, phonology primarily distinguishes between two branches. One of them focuses on phonemes, which are the smallest unit of phonology and speech. This

branch, known as segmental phonology, deals with speech from the minimal units that make it. In contrast, suprasegmental phonology, also known as non-segmental, analyses syllables, tone units, utterances and more. These are all considered higher functional segments than phonemes.

3. Phonemes

The minimal unit of phonetics is a phoneme. With a specific written symbol, a phoneme represents a particular sound used in a particular language. They are abstract, and certain phonemes might be realised slightly differently in different words, depending on their position and both the preceding and the following sounds. For example, some consonants are aspirated under certain conditions. These specific members of phonemes are predictable, and we call them allophones. (Pavlík, 2000)

The English language divides its most frequent sounds into 44 phonemes. Twenty-four of these are consonants, which will be further described in more detail. They are: /p/ /b/, /t/ /d/, /k/ /g/, /f/ /v/, /s/ /z/, /θ/ /ð/, /ʃ/ /ʒ/, /tʃ/ and /dʒ/. The vowels in the English language can be divided into long and short. There are 7 short vowels: /ɪ/, /ʊ/, /e/, /ɒ/, /ʌ/, /æ/ and /ə/. The last vowel is called shwa. It is often at the end of the word and is unique in terms of stress. This vowel is never stressed. The 5 long vowels are: /iː/, /uː/, /ɑː/, /ɔː/ and /ɜː/.

Apart from long and short vowels, there are also eight diphthongs: /eɪ/, /aɪ/, /ɔɪ/, /əʊ/, /aʊ/, /ɪə/, /eə/ and /ʊə/. Diphthongs originate from two different targets. The tongue is moved between those two, and thus the diphthong sound is created.

The phonemic chart below shows the phonemes divided into vowels and consonants, monophthongs and diphthongs.

Image 1

3.1 Phonemic inventory

Every accent has a phonemic inventory, also known as a phonemic system or structure. This inventory is a system consisting of phonemes that make the language work. As already explained, every language and even accent has a different set of phonemes that form syllables, utterances and whole words. Although similar for some languages, the phonemes may still work slightly differently in particular accents.

English, and specifically RP accent (received pronunciation), which is considered a standard form of British English, has 44 phonemes. These consist of consonants and vowels. English phonemic inventory uses several diphthongs as well.

What can determine a phonemic inventory and, therefore, prove that a phoneme is a minimal unit that can be recognised within phonology while still having features unique enough for it to be necessarily considered a particular one, are the following tests.

One of them is the minimal pair test. If a particular phoneme in a particular word is replaced by another particular phoneme, a different word is created. There are several examples of this. Here are some of them. (Baker and Goldstein, 2008)

Fool /fuːl/ vs pool /puːl/

pie /paɪ/ vs buy /baɪ/

rope /rəʊp/ vs robe /rəʊb/

Shut /ʃʌt/ vs shirt /ʃɜːt/

bird /bɜːd/ vs bud /bʌd/

The second test is called the commutation test. In this test, a particular phoneme in a particular word is replaced by every phoneme of a given accent. That is if the replacement is possible. (Pavlík, 2000) Again, there are several examples. This test usually creates a chain of different words if a particular phoneme is replaced with another one. An example of this can look like this. (Baker and Goldstein, 2008)

/p/ vs /b/ pie /paɪ/ vs buy /baɪ/

/p/ vs /k/ cape /keɪp/ vs cake /keɪk/

/p/ vs /m/ pole /pəʊl/ vs mole /məʊl/

/p/ vs /d/ pot /pɒt/ vs dot /dɒt/

/p/ vs /t/ cap /kæp/ vs cat /kæt/

/p/ vs /s/ pack /pæk/ vs sack /sæk/

As one of the members of the Prague School of linguistics, Nikolai Trubetskoy (1973, cited in Pavlík, 2000), explained, a sound can be considered a particular phoneme if changing it creates another meaning. If the two phonemes occur in the same environment and can be changed without changing the word's meaning, they are not particular phonemes but optional phonetic variants of one. If the two sounds are interchangeable under the same conditions, they are phonetic realisations of two different phonemes.

The research of this thesis will focus on minimal pairs and how switching two phonemes, in this case, voiced and voiceless ones, create two different words. The intention is to study whether people can hear and tell apart those different phonetic realisations of two different phonemes and, therefore, can also pronounce them correctly.

3.2 Voice and voicelessness

The English language uses speech sounds represented by 44 phonemes, 24 of which are consonants. Consonants are speech sounds that are created when the airstream from the lungs is blocked in some way. All English speech sounds are made by modifying the expiration in a certain way, which then helps to create various types of sounds.

The movement of vocal cords makes these distinctive sounds. The muscles and folds of skin can either move or stay stagnant. When drawn together, the windpipe is wholly covered by them for a moment, and the airstream cannot pass through. Once the tension lets the vocal cords be forced apart, this pressure is lost, and they snap back together again. This final snap creates a slight vibration. (Brown, 2014)

Sounds involving such a vibration are considered voiced, as this vibration is called a voice. It creates an active and loud sound. Many consonants are voiced, and most of the vowels are as well.

On the other hand, if the muscles pull the vocal cords apart and leave them in a loose position quite natural for breathing, the airstream can pass through freely. Without obstruction, the created sound may have a noticeably stronger air force than the voiced ones. The vocal cords, however, do not vibrate, and the sound itself is quieter and much more passive.

3.3 Discrimination of voiced and voiceless phonemes

Since they were created very diversely, the voiced and voiceless sounds are consequently slightly different. While such a difference might seem very marginal, it is essential to distinguish between them, especially for ESL or EFL teachers.

For many reasons, English is quite attractive for learners, and many people need to learn it throughout their lives, be it for their work, travels, or simply as a result of education requirements. While there are four main parts of language learning, those who learn it thoroughly must focus on grammar, listening, writing and speaking. These are the most basic and necessary skills for a person who wants to understand a language at a level high enough to use it.

In many cases, speaking and listening are the most problematic ones, yet the most necessary ones. Whereas casual conversation allows lots of mistakes to become concealed during the speech, higher levels of communication are not this kind to the learners.

3.4 Minimal pairs

Whilst certain grammar mistakes may lead to the person giving an uneducated impression, incorrect pronunciation alteration might be even graver. Concerning the consonants, the previously mentioned voiced and voiceless sounds divide these into two groups. For some words, a slight change in pronunciation could change the meaning because of a mistakenly replaced phoneme. The reason for this is that the words consist of phonemes, and certain words have a phonemic structure similar to others. When replacing one single phoneme creates another word with a different meaning, we talk about minimal pairs. Voicing plays a crucial role in distinguishing between words that differ in a meaning while also differing with a single sound only, which is the case of the minimal pairs. (Afifah, 2023)

The research will focus mainly on the minimal pairs where the voiced and voiceless consonants contrast. These words may consist of voiceless consonants, which are /k/, /t/, /p/, /f/, /θ/, /s/ and /tʃ/. On the other hand, there are voiced consonants, such as /g/, /d/, /b/, /v/, /ð/, /z/ or /dʒ/.

As already mentioned, the distinction between these sounds is not exactly moderate. It might be hard for some learners to detect it. Certain countries may not even have these sounds in their language. Therefore, the sounds might be very unusual and relatively strenuous to hear and repeat for the students. The learner may hear two practically the same sounds if the difference is unclear. Since the learner is unable to distinguish between the sounds and does not fully hear them, it is almost impossible to understand and learn to repeat them at all, more so while pronouncing the sounds correctly.

More than that, what makes the pronunciation problematic is also a relatively large gap between the assumed ability to distinguish certain sounds and the actual performance of the learner. In the study made in Japan, Kawashima Hirokatsu explains the statistics of research meant to answer some of the questions about the difficulty of differentiating minimal pairs. Although the research would need more participants and he focuses mainly on vowels, this thesis intends to focus on the voiced and voiceless consonants. It is evident that the learners are often struggling through learning and perceiving sounds different from their maternal language. In Japanese, because its alphabet is syllabic and the vowels are either on their own or always preceded by a consonant and followed by a consonant in most cases, the problem consists mainly of telling apart particular vowels. (Kawashima, 2003) For Czechs, the difficulty inherits in discerning the voiced and voiceless consonants.

Another interesting thing from this study is that it proves with various statistics that the learners' opinion about the difficulty does not always respond correctly to the actual performance. The learners were asked to assess which sounds they found challenging and then recognise them in minimal pairs. While for some pairs, the learners seemed to be aware of them being difficult, some were considered easy. However, the actual performance of the learners did not always show the expected results. That clearly shows that some aspects of pronunciation might be severely problematic, even though the problem does not seem evident. (Kawashima, 2003)

The students ability to understand minimal pairs and discriminate between the different phonemes is based on several factors. Firstly, it is essential that the students are aware of the phonetical system of the English language. The extent to which the learners are used to hearing and using the different sounds is crucial for their ability to discriminate between them all, including the voiced and voiceless consonants that this thesis focuses on. Secondly, the context of the sounds is presumably vital as well. Thirdly, the ability to discriminate between the sounds will differ according to the platform used. Records on media like CD's or tapes are considerably easier for the listeners, especially if the records were made for the learning purposes as such audio records tend to be clear and often consist of slower and well-articulated speech. (Sanjaya, 2019) In contrast to this, understanding spoken English in real life might face certain difficulties.

When a problem occurs, the solution can only be found if we are aware of the problem. For example, suppose the distinction between the voiced and voiceless consonants does not seem problematic for the learners. In that case, it is impossible to find a way to make learning and teaching these consonants easier. Minimal pairs can be used fir training the learners on distinguishing specific phonemes of English language. Results show that using the minimal pair technique for teaching English

is quite effective for the learners' ability to discriminate between the different sounds. (Nur, 2018)

4 Consonants

When a sound is made, the air passes from the larynx to the lips. If simplified, there are two types of sounds: those when an obstruction to the flow of air happens while the sound is made and those where the flow is unobstructed. The first are called consonants, while the latter are vowels. However, different languages have different ways of dividing those sounds into specific categories.

The sounds are also affected by the phonemes preceding them and the ones that follow. A phoneme might sound slightly different at the beginning of a word and in the middle or as an ending sound. (Roach, 1991)

Vowels often follow consonants. When at the end of a word, they are also, in many cases, preceded by them, even though a combination of consonants can occur. Even though the rules for the syllables are not as strict as in the syllabic alphabet systems like in Japanese, the syllables in English are very often created by combining a consonant and a vowel.

Apart from voicing and the changes caused by its place in the word, there are two other aspects of consonants that are very important. They are place and manner.

The place can be bilabial, where the sound is produced through the lips, which are pressed together. Another type is labiodental, where both lips and teeth are used. The tip of the tongue is pressed against teeth in case of interdental consonants. Alveolar consonants are produced with the tip of the tongue touching the alveolar ridge. When the tongue presses against the hard palate, we talk about palatals. When it touches the area between the hard palate ending and the soft palate beginning, velars are produced. The last types are glottal, which are articulated with the glottis. Those will not be mentioned in the upcoming parts of this thesis since, in English, the only glottal consonant is /h/. Because it is the only one, it does not have a voiced counterpart.

In the case of manner, we divide the consonants into plosives, nasals, fricatives, laterals, rhotics and glides. There is no need to go into specifics of nasals, which consist of /m/, /n/ and /ŋ/, and neither of lateral /l/, rhotic /r/ and glide /j/, as these do not create minimal pairs in regard of the voicing. However, the remaining ones will be used for the purpose of the research. Plosives make a loud sound called plosion, which is produced when the airflow is obstructed entirely by the lips pressing together or by the tongue blocking it while pressing against the alveolar ridge, hard palate or the space between the hard and soft palate. Fricatives consist of hissing sounds made when the air is partially obstructed. (Zsiga, 2013)

In the IPA pulmonic consonant chart, we can see how the individual consonants are divided by both manner and place. However, the thesis will specialise in the voicing of consonants and distinguishing between the voiced and voiceless ones.

CONSONANTS (PULMONIC)

	Bilabial	Labiodental	Dental	Alveolar	Postalveolar	Retroflex	Palatal	Velar	Uvular	Pharyngeal	Glottal
Plosive	p b			t d		ʈ ɖ	c ɟ	k ɡ	q ɢ		ʔ
Nasal	m	ɱ		n		ɳ	ɲ	ŋ	N		
Trill	ʙ			r					R		
Tap or Flap		ⱱ		ɾ		ɽ					
Fricative	ɸ β	f v	θ ð	s z	ʃ ʒ	ʂ ʐ	ç ʝ	x ɣ	χ ʁ	ħ ʕ	h ɦ
Lateral fricative				ɬ ɮ							
Approximant		ʋ		ɹ		ɻ	j	ɰ			
Lateral approximant				l		ɭ	ʎ	ʟ			

Symbols to the right in a cell are voiced, to the left are voiceless. Shaded areas denote articulations judged impossible.

Image 2

In the following chapters, I will describe each pair of consonants that create a minimal pair in terms of the voicing.

4.1 /p/ vs /b/

Both /p/ and /b/ are bilabial plosives. They are produced with lips pressing together, and the resulting sound is a loud plosion. However, while /p/ is voiceless, /b/ is voiced.

4.2 /f/ vs /v/

The consonants /f/ and /v/ are labiodental fricatives. They are pronounced with the lower lip pressing against upper teeth. The resulting sound has a hissing quality that is especially audible in case of /f/. While /f/ is voiceless, its counterpart /v/ is voiced.

4.3 /t/ vs /d/

The plosives /t/ and /d/ are alveolar. Their pronunciation consists of the blade of the tongue pressing against the alveolar ridge. The resulting sound is either the voiceless /t/, or the voiced /d/.

4.4 /Ɵ/ vs /ð/

These interdental fricatives are probably the most problematic for the foreign learners, since they are specific for English. Both of them are created by the tip of

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the tongue pressing against the upper teeth. /Ɵ/ is voiceless and /ð/ is voiced. The research will not focus on these two phonemes. Interestingly, there are no minimal pairs differing only with these two sounds.

4.5 /s/ vs /z/

Other fricatives that create minimal pairs are /s/ and /z/. These consonants are alveolar, and they are made by the blade of the tongue gently pressing against the alveolar ridge. The resulting sound is a strongly hissing, voiceless /s/, or a voiced /z/ that has more of a buzzing quality.

4.6 /k/ vs /g/

These plosives are velar, which means that the sound is produced with the back of the tongue that touches the space where the hard palate ends and the soft palate begins. While /k/ is voiceless, /g/ is voiced. This pair is often hard to distinguish for some learners of English since in some other languages, those two phonemes differ only slightly.

4.7 /ʃ/ vs /ʒ/

The /ʃ/ and /ʒ/ are post-alveolar fricatives. They are produced with the front of the tongue pressing against the hard palate. They both have audible vibrations accompanying them; however, /ʃ/ is voiceless and /ʒ/ is voiced. This research will not focus on these two sounds. Although some minimal pairs where the difference is between the voiceless /ʃ/ and its voiced counterpart /ʒ/ do exist, there are only a few of them where the sounds are in the final position.

4.8 /ʧ/ vs /ʤ/

Both /ʧ/ and /ʤ/ are both affricates. Affricates begin as a stop, but the released sound is a fricative. The place of articulation generally stays the same, or similar to its close fricative. Therefore, /ʧ/ and /ʤ/ are post-alveolar. /ʧ/ is often a digraph, which means that the single phoneme is representing two letters in the written language. While /ʧ/ is voiceless, /ʤ/ is voiced.

5. Methodology

5.1 Method

As previously stated, the aim of the research conducted for this thesis consisted of finding out whether students of English as a second or as a foreign language can effectively discriminate between the voiced an voiceless consonants at the end of the word. The aim was to explore a quite under-researched topic. Since pronunciation is a major part of language skills learnt and used by the students, such an ability might be vital for both expressing oneself accurately and being understood.

As different language systems have different sets of phonemes an work slightly different with consonants, recognising and producing voiced and voiceless consonants can be challemging for the students, and from a personal ecperience as a teacher, many often struggle with the discrimination.

For this reason, this research aimed to find out whether the reason for this struggle is auditorial. The statistical analysis approach allowed to use a questionnaire for collecting data and made it possible to decide whether the participants of the research were unable to discriminate between the voiced and voiceless consonants by gathering a percentage of correctly chosen sounds. I combined both qualitative methods and quantitative ones. The gathered data from the questionaire showed percentage of correct answers in graphs and allowed to orient easily in the results, observing the backgound situation of the participants and understanding which sounds they find more difficult and which sounds, on the other hand, they consider easy, was also vital.

5.2 Procedure

The first part of the research consisted of preparing the needed materials. The participants were tested on their ability of discriminating between the voiced and voiceless consonants at the ginal position. For the questionaire, audio records of each sound were necessary. The sounds were studied in isolation, in a word context and also in a sentence context.

Before recording, the examples for each consonant were decided. The chosen words representing the voiced and voiceless consonants that create a minimal pair were intentionally such words that an average student of English would have been either familiar with them, or would have heard them either in everyday life or in materials tied to their studies, work or free time activities. The sentence context was chosen to get better chances at understanding which word, and therefore which sound has been used. However, at the same time the structure of the sentences was

identical for the purpose of confirming whether the participants are truly able to discriminate the sound in both word and sentence context. This avoided the possibility that the participants would have intuitively chosen their answers based on the most logical assumption grounded with their usual experience of English phrases, and regardless of what they heard.

In the next phase, those examples were written down in a Word document and given to the volunteer who recorded the audio. The examples were sorted by the sounds that create minimal pairs. Each time, a voiceless consonant was presented in isolation, then in the word and in the sentence context. In comparison to this, each process has been done to the voiced opposite.

The audio records were made by a native English speaker who has been teaching English as a foreign language for a few years. The variant of English used for this research has been RP. The technology used for the revording consisted of a mobile phone with a microphone. As the device did not allow for very short samples to be recorded, each session has been recorded together and later cut to individual records using Audacity. The final audios consisted of pack of each consonant in isolation, in a word context and in a sentence context.

After recieving the audio records, the parts needed to be cut for the questionaire. Each cut record consisted of either the phoneme on its own, a word or a whole sentence.

Once finished, the records were put in the questionaire. The Google form that was used for this research allows to create several questions while the option to upload an audio that has been saved on the creator's Google disc is also available. The questionaire consisted of two parts. The first part gathered data about the participant, such as their education level achieved so far and the time for which they have been studying English. The second part asked the participants to choose which sound, word or sentence they hear. Presented answers always offered either the voiced or the voiceless option.

The aim was to gather between 20 to 30 fully completed questionaires. In the end, there were 24 participants. After ending the research, it was time to go through the data colected. Creating graphs from the individual answers, the results showed the participants' ability to discriminate between the voiced and voiceless consonants at the end of the word. The chosen graphs are circular as those demonstrate the results very visibly and easily even for readers who have not got strong statistical and mathematical knowledge.

Contrary to the initial assumption that the problems with pronouncing these sounds might be caused by the inability to hear them differently and, therefore,

differentiating between them, the results showed that most of the participants recognised the sound correctly. Some of the sounds proved to be more difficult for the learners than other. More so, part of the participants was still unable to differentiate between the voiced and voiceless consonants and therefore even between the minimal pairs.

5.3 Participants

The participants of the research were people from different areas and their use of English would most probably also vary. All the participants studied or are still actively studying English as a foreign language. Most of these have been studying English for more than 10 years at the time of participation.

Thus the sample offered results of a group of people that had been learning English for longer than average time range typical for both compulsary education and usual education level achieved in the Czech republic, for example.

5.4 Materials

Materials used for this research consisted of audio records and a questionaire, both created specifically for its purpose. From the technological department, several devices were needed as well. Firstly, a mobile phone with a microphone to create the audio record. Secondly, a computer with a program to cut the audio records into smaller and isolated units of sounds, words and sentences. A Google account was also necessary to create the questionaire through Google firms. Thirdly, an Office Word programme was used to write down first the examples for the research, and then its results.

5.5 Auditors

My survey had 24 respondents in total. Such a number of participants is only a fractional sample; however, it should be sufficient to show the respondents ability to differentiate between the voiced and voiceless consonants. It is also reasonably small to avoid having an overly broad range of respondents.

Most of the respondents had attained average, or higher than average educational goals. Out of 24 participants, 15 had high school education, and 8 finished university. I purposefully did not specify the degree, as for the aims of this research, it is not vital whether the respondent finished undergraduate, postgraduate or even doctoral studies. Only one respondent has had just a secondary school education. I had no respondents who did not finish their secondary school years yet.

As visible on the graph, this makes 95,8% of the respondents educated through more than the compulsory education in Czech republic, and about the same as the minimum of years spent studying in many other countries.

What education have you achieved?
24 odpovědí

● Primary school (first to fifth grades in Czech republic)
● Secondary school (sixth to ninth grade in Czech republic)
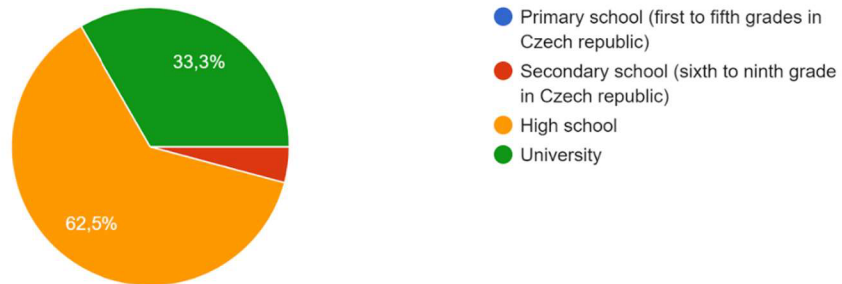● High school
● University

Image 3

Achieved education is not necessarily the only aspect that affects how well one knows a foreign language. The length of such studies is vital, as well. In this research, 95,8% of the respondents studied English for more than 10 years. This number corresponds to the number of respondents who finished more than a secondary school education.

Therefore, the survey shows results of more experienced learners. 23 people have studied English for more than 10 years, and 1 person has studied it for 9 years. None of the participants have studied the language for less than 9 years.

For how long have you been studying/have you studied English?
24 odpovědí

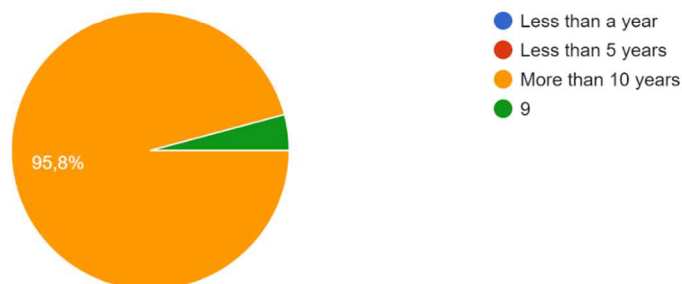● Less than a year
● Less than 5 years
● More than 10 years
● 9

Image 4

As the graph on Image 5 shows, the vast majority of the respondents studied English at school. Only one person studied the language through courses.
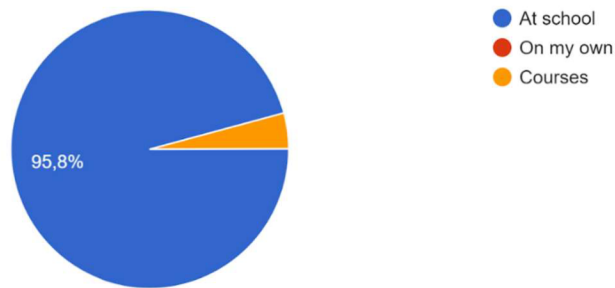
Where did you study English?
24 odpovědí

95,8%

● At school
● On my own
● Courses

Image 5

6. Research

6.1 Results

In the case of /p/ and /b/, 66,7% of the respondents considered the first recording as a /p/, while only 33,3% of them chose /b/. That makes 16 people hearing a wrong sound, while only 8 consider the sound /b/, which it was. On the other hand, with the /p/ recording, 22 people recognised the sound correctly, which makes it 91,7% to only 8,3%.

When the sound was a part of a word, it appeared to be much easier for the respondents to differentiate between the two. In the minimal pair of "cup" versus "cub", only 1 person didn't recognise the two correctly, which makes 95,8% of the respondents successful. Same numbers apply to both words in sentences. Only 1 person had trouble telling the "It was a cute cup." and "It was a cute cub." apart. The difference between the words "pup" and "pub" shows the same results. The sentences made no difference, only 1 person could not recognise which recording says "It was the pup they wanted." and which one "It was the pub they wanted.". The words "cap" and "cab" apparently presented a more difficult task. Only 83,3% of the respondents heard the word "cap" correctly, while 87,5% of them chose "cab" correctly. That makes 4 respondents unable to differentiate between the two with certainty. However, once the words were in a sentence, only 2 respondents chose "He ordered a cab." when the recording said, in fact, "He ordered a cap.". Only 1 person considered the sound voiceless in the sentence context while the recording was of a sentence with a voiced variant.

All the respondents were able to differentiate between the /f/ and /v/ and 100% of them could tell the words "leaf" and "leave" apart. However, once set in a sentence, 2 people were unable to recognise the sentence with the voiced sound, and 1 person struggled with the voiceless one. "Caren signed her leaf." against "Caren signed her leave." still had more than 90% correct answers in both cases. The words "safe" and "save" showed the same results. 100% of the respondents can tell the words apart by listening. Sentences "He didn't manage the safe." and "He didn't manage the save." proved difficult as well, and 2 people chose the wrong variant. This could imply that learners tend to recognise the sounds based on the context, which makes the unusual combinations improbable once considering the two. Same issue presents itself with the words "duff" and "dove", although only 1 person could not tell the sounds apart in the comparison of sentences "Said duff was in the forest." and "Said dove was in the forest."

100% of the respondents could tell /t/ and /d/ apart, even in the words "not" and "nod. Sentences proved difficult yet again, as 2 people could not say which

recording says "She did not." and which one "She did nod.". The words "built" and "build" seemed easier for the respondents. All of them could tell them apart, and only 1 person did not recognise neither the sentence "They built houses." nor "They build houses.". Such a result is satisfying in a way, as the voiced and voiceless sounds differentiate between the present tense and the past tense in case of this verb. Switching a sound in such a word can change the meaning drastically. The comparison between the words "tight" and "tied" showed interesting results. Only 1 person could not recognise the sound in the word "tight", but 2 people did not hear "tied" correctly. Once set in the sentence context, only 1 person could not tell "Unfortunately, it was tight." and "Unfortunately, it was tied." apart.

In the case of the /s/ and /z/, 23 people recognised /s/ correctly and 22 respondents recognised /z/. The sounds showed no difficulties in the words "price" versus "prize", but in the questions "Is this the price?" and "Is this the prize?", 2 people did not differentiate between the two correctly. The minimal pair "race" and "raise" proved to be more difficult. 1 person could not tell the two apart, while two people were unable to recognise which recording says the sentence "Would you race them?" and which one "Would you raise them?". The comparison of the words "ice" and "eyes" showed the same results as "race" and "raise". 1 person did not hear them correctly. Interestingly, all the respondents recognised the sounds in the sentences "It's in the ice." and "It's in the eyes." correctly.

The respondents could tell the voiceless /k/ and the voiced /g/ apart quite well, too. The words "sink" and "sing" presented no difficulties on their own, either. However, when the respondents had to recognise the sound difference between the sentences "Did she sink?" and "Did she sing?", 1 person struggled with the voiced /g/. The voiceless /k/ in the sentence seemed to be even more challenging, as 2 people did not recognise it correctly. 22 people could differentiate between the words "dock" and "dog", which makes 8,3% of the respondents incorrect. Interestingly, once the words were set in the sentences "They only stopped once they could see the dock." and "They only stopped once they could see the dog.", all of the respondents could tell these two apart. The words "back" and "bag" did not seem difficult for the respondents, either. At least not on their own. 100% of the respondents recognised them correctly, however, in the sentences "She's got a pink ribbon on her back." and "She's got a pink ribbon on her bag.", 2 people were unable to differentiate between those two.

/ʧ/ and /ʤ/ proved to be one of the more difficult sounds. Only 23 people could differentiate between the voiced and voiceless consonants correctly. Same result shows in the case of the letter "H", where the final sound is voiceless once the letter is named. Surprisingly, 100% of the respondents recognised the word "age" correctly. The voiced sound /ʤ/ seemed to be easier in the word on its own, though,

because in the sentences "Write 'H'." and "Write 'age'.", 1 person switched the two incorrectly. Same result repeated with the words "batch" and "badge", where again 1 person could not tell the two apart. The sentences with these two words, however, proved to be the most difficult ones yet. Only 83,3% of the respondents could tell which recording says "She put the final batch on the table." and which "She put the final badge on the table.", while 4 of the respondents were unable to differentiate between the two. The words "letch" and "ledge" seemed to be considerably harder to tell apart as well. 2 people were unable to recognise each of them correctly. Once they were in the sentences, the result from the previous sentence context repeated itself. Only 20 people were able to recognise the voiceless /ʧ/ in "There was this letch he could not get rid of." and 21 the contrasting voiced /ʤ/ in "There was this ledge he could not get rid of.".

6.2 Easy or difficult?

In my thesis, I combined both quantitative and qualitative research methods in the end. While working with the statistics from the questions where only one answer was correct, I was also curious about the respondents background, and more importantly, about which sounds they found easy to tell apart.
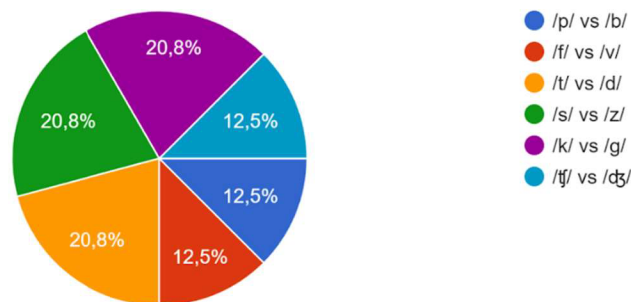

Image 6

As can be seen in the graph, 20,8% of the respondents found the pairs /k/ versus /g/, /t/ versus /d/ and /s/ versus /z/ easy to recognise. That makes 5 people considering those three pairs easy. On the other hand, pairs /f/ versus /v/, /p/ versus /b/ and /ʧ/ versus /ʤ/ seemed more difficult to the respondents. Only 3 considered these three pairs easy, which makes it 12,5%.

This partly corresponds with the results of the survey. It is clear that the respondents are aware of the difficulty when it comes to differentiating between the /p/ and /b/. 8 participants did not recognise the sound /p/. Although learners seemed to be struggling considerably less with the sound /b/, 8 of the respondents still recognised the sound incorrectly. The contrasting sounds seemed slightly easier to differentiate when in context. As for the word context, fewer people were unable to tell them apart, with the exception of the words "cap" and "cab", which proved to be problematic for the learners. The sentence context, the voiced versus voiceless sounds seemed less challenging to recognise.

In the case of the /ʧ/ versus /ʤ/, the respondents recognised the difficulty in telling them apart, even though the actual results showed that they were easier than the /p/ versus /b/ pairs. Participants did seem to struggle with recognising these voiced and voiceless sounds. The issue was not very prominent when the sounds were isolated, and not even when they were in words. However, the sentences representing these two sounds in minimal pairs showed that only about 80% of the respondents can differentiate the two immaculately.

On the other hand, sounds /f/ and /v/ were considered uneasy, even though the results showed otherwise. The respondents recognised the sounds both on their own and put in the context of a word or a sentence. The results showed only an occasional mistake with the minimum of 90% successful answers in the questionnaire.

The /k/ and /g/ sounds were considered easier to differentiate between than the previous three pairs. This was also proved by the results of the survey. Most respondents could recognise these phonemes quite well, isolated and in context as well. I personally find this quite surprising as from my own experience as an English teacher, learners often struggle with pronouncing these two properly, and especially so at the end of the word. It might be possible that the problem does not lie in the listening ability, as I initially suspected, but somewhere else.

The same issue applies to the contrast of voiceless /s/ and voiced /z/. For these sounds, no matter the position in the word, learners often switch between the two, or pronounce them both exactly the same. Even so, the respondents considered this pair easy to differentiate between, and the results also showed that is the case, at least for this research's sample.

The minimal pairs consisting of the contrast between /t/ and /d/ are a bit different in that area. The respondents did not consider these terribly challenging, and again, they mostly succeeded in differentiating between the two. Unlike the /k/ versus /g/ and /s/ versus /z/ though, the /t/ and /d/ sounds do not seem to be challenging in terms of pronunciation, either. From my personal experience, learners tend to

pronounce /k/, /g/, /s/ and /z/ incorrectly more often than they do struggle with /t/ and /d/.

In the following table, you will find the sounds in isolation, the numbers of the respondents that recognised the sound correctly, and the percentage of the total sample.

Sound	/p/	/b/	/f/	/v/	/t/	/d/	/s/	/z/	/k/	/g/	/ʧ/	/ʤ/
Correct answers	22	8	24	24	24	24	23	22	24	24	23	23
Percentage	91, 7%	33, 3%	100 %	100 %	100 %	100 %	95, 8%	91, 7%	100 %	100 %	95, 8%	95, 8%

Table 1

Table 2 shows the sounds /p/ and /b/ in minimal pairs "cup" and "cub", "pup" and "pub" and lastly "cap" and "cab". It is clear that unlike the first two pairs, the last one was challenging for the respondents.

Word	cup	cub	pup	pub	cap	cab
Correct answers	23	23	24	24	20	21
Percentage	95,8%	95,8%	100%	100%	83,3%	87,5%

Table 2

Table 3 shows the sounds /p/ and /b/ in minimal pairs put into sentence context. It is clear that the sounds were much easier to differentiate between in the sentence context, then in the word context only. Although the words presenting the sounds /p/ and /b/ stayed the same, the statistics show a 95,8% success in each of them, except for the sentence "He ordered a cap.".

Sentence	It was a cute cup.	It was a cute cub.	It was the pup they wanted.	It was the pub they wanted.	He ordered a cap.	He ordered a cab.
Correct answers	23	23	23	23	21	23
Percentage	95,8%	95,8%	95,8%	95,8%	91,3%	95,8%

Table 3

Table 4 shows results of the voiceless /f/ and voiced /v/ in a word context. I used the minimal pairs "leaf" and "leave", "safe" and "save" and "duff" and "dove". The results completely contradict the opinion of many of the respondents that these sounds are not as easy as for example //t/ versus /d/, /k/ versus /g/ and /s/ versus /z/. In the word context, all the respondents recognised the sounds correctly.

Word	leaf	leave	safe	save	duff	dove
Correct answers	24	24	24	24	24	24
Percentage	100%	100%	100%	100%	100%	100%

Table 4

Table 5 shows the same sounds not only in the word context, but with those words put into sentences. The task to recognised both /f/ and /v/ in complete sentences proved to be more challenging than differentiating between them in isolation or in words only. Even so, all the respondents reached more than 91% success.

Sentence	Caren signed her leaf.	Caren signed her leave.	He didn't manage the safe.	He didn't manage the save.	Said duff was in the forest.	Said dove was in the forest.

Correct answers	22	23	22	22	23	23
Percentage	91,7%	95,8%	91,7%	91,7%	95,8%	95,8%

Table 5

Table 6 shows the sounds /t/ and /d/ in a word context. Respondents considered sounds one of the three easier pairs. All respondents recognised the sounds correctly in the word context, except for the last pair. Words "tight" and "tied" seemed more difficult for the participants.

Word	not	nod	built	build	tight	tied
Correct answers	24	24	24	24	23	22
Percentage	100%	100%	100%	100%	95,8%	91,7%

Table 6

Table 7 shows the voiceless /t/ and voiced /d/ in a sentence context. Unlike the sounds in isolation and in words, the sentences proved to be more challenging again, Except for the first pair, "She did not." versus "She did nod.", the results show 95% of the correct answers.

Sentence	She did not.	She did nod.	They built houses.	They build houses.	Unfortunately, it was tight.	Unfortunately, it was tied.
Correct answers	22	22	23	23	23	23
Percentage	91,7%	91,7%	95,8%	95,8%	95,8%	95,8%

Table 7

Table 8 shows results of the comparison of the voiceless /s/ and voiced /z/ in words. Participants considered these sounds slightly more difficult than for example /ʧ/ and /ʤ/, /p/ and /b/, and /f/ and /v/. However, the percentage shows that in most cases, they had more than 95% correct answers.

Word	price	prize	race	raise	ice	eyes
Correct answers	24	24	23	23	23	23
Percentage	100%	100%	95,8%	95,8%	95,8%	95,8%

Table 8

Table 9 shows the sounds /s/ and /z/ in a sentence context. Unlike in words, these seemed a bit more challenging. The first pair, "Is this the price?" versus "Is this the prize?" proved to be the most difficult one, with only 22 respondents recognising them correctly.

Sentence	Is this the price?	Is this the prize?	Would you race them?	Would you raise them?	It's in the ice.	It's in the eyes.
Correct answers	22	22	23	23	24	24
Percentage	91,7%	91,7%	95,8%	95,8%	100%	100%

Table 9

Table 10 shows results of the comparison of a voiceless /k/ and voiced /g/. Because these sounds are often pronounced incorrectly, I suspected difficulties with recognising them. Yet, in the word context, they seemed to be quite easy. All the respondents correctly recognised "sink", "sing", "back" and "bag". The pair "dock" and "dog" seemed more difficult, with only 91,7% of the respondents answering correctly once asked to differentiate between them.

ord	sink	sing	dock	dog	back	bag
Correct answers	24	24	22	22	24	24
Percentage	100%	100%	91,7%	91,7%	100%	100%

Table 10

Table 11 shows the same sounds in a sentence context. The words in sentences seemed to be harder to differentiate between. The only ones that all the respondents recognised correctly were "They only stopped once they could see the dock." and "They only stopped once they could see the dog."

Sentence	Did she sink?	Did she sing?	They only stopped once they could see the dock.	They only stopped once they could see the dog.	She's got a pink ribbon on her back.	She's got a pink ribbon on her bag.
Correct answers	22	23	24	24	22	22
Percentage	91,7%	95,8%	100%	100%	91,7%	91,7%

Table 11

Table 12 shows the results of the voiceless /tʃ/ and voiced /dʒ/. Differentiating between these two proved to be less successful than was the case with some of the other pairs. However, only the word "age" was recognised correctly by all the respondents.

Word	H	age	batch	badge	letch	ledge
Correct answers	23	24	23	23	22	22
Percentage	95,8%	100%	95,8%	95,8%	91,7%	91,7%

Table 12

Table 13 shows the sounds /tʃ/ and /dʒ/ in a sentence context. Unlike with the word context where most sounds reached over 91%, a lot of the sentences presenting the same words had only 83,3% of correct answers. The easiest pair seemed to be "Write 'H'" versus "Write 'age'.".

Sentence	Write "H".	Write "age".	She put the final batch on the table	She put the final badge on	There was this letch he could	There was this ledge that he

				the table..	not get rid of.	could not get rid of.
Correct answers	23	23	20	20	20	21
Percentage	95,8%	95,8%	83,3%	83,3%	83,3%	87,5%

Table 13

7. Discussion section

The main research question of this Bachelor thesis has been whether the problematic pronunciation of the contrasting voiced and voiceless consonants is caused by the inability to differentiate between the ones creating minimal pairs. I will focus on this question later. However, firstly there is a need to summarise the findings of which sounds fall into these pairs.

The sounds that create the minimal pairs are voiceless /k/ and voiced /g/, voiceless /t/ and voiced /d/, voiceless /p/ and voiced /b/, voiceless /f/ and voiced /v/, voiceless /θ/ and voiced /ð/, voiceless /s/, voiced /z/, voiceless /ʃ/ and voiced /ʒ/ and voiceless /tʃ/ and voiced /dʒ/. The results of the research show that the pairs that are the most challenging are /p/ and /b/, /tʃ/ and /dʒ/. The less difficult ones then proved to be /s/ and /z/, /k/ and /g/, /t/ and /d/ and /f/ and /v/. I did not observe neither the pairs /ʃ/ and /ʒ/ nor /θ/ and /ð/. The reason for this is that there are only a few of minimal pairs where the sounds are in the final position, and most of the examples are not words that a regular learner would use commonly.

To discuss how marginal the effect of the context is, we ought to consider the number of correctly chosen answers first in a word context, then in the sentence context. As the results show, the word context seems to help the learners discriminate between the final sounds. However, the results of the same sounds in a sentence context proved to be more challenging in most of the cases, although the words used for the examples remained the same.

The comparison of the results showed that learners tend to rely on the context quite greatly. The sentences proved to be the most difficult from the three possibilities. Because they sounded exactly the same except for the voice and voiceless sounds in the minimal pairs, the respondents might have found it hard to choose what they hear, not what they think is the most probable context used.

The initial suspicion was that the learners have difficulties hearing the sounds correctly. This would explain the tendency to pronounce them incorrectly, as well. However, the results did not prove this hypothesis. Even though some people clearly found differentiating between the voiced and voiceless sounds hard, the percentage was very small. Although it is essential to consider that the small number of respondents might not be reliable enough to completely disregard the possibility of the suspected issue.

Most of the respondents did recognise the sounds correctly. The results slightly differed: firstly in the case of the isolated sounds, secondly in the words creating minimal pairs because of the voiceless consonants in the first case, and the voiced consonants in the other, and lastly in sentences using the specific example

words presenting the chosen sounds contrasting in the minimal pairs because of their voice or voicelessness.

This thesis examined the discrimination of voiced and voiceless consonants in minimal pairs, specifically at the final position. Although the pronunciation of the consonants seems to be often very difficult for the learners of English as a second or as a foreign language, it is vital to discriminate between them, because as I have already explained, once exchanged with other sounds, they create minimal pairs. These tend to be complicated, because they create two words that sound very similar, yet carry different meanings. Exchanging them may lead to confusion and miscommunication. Under ideal circumstances, all students would be able to reach the level of the English language where they are not only fluent, but also well-understood. For this reason, focusing on the proper pronunciation is very vital as well as other aspects of the language that they learn with time.

The research confirmed that most of the participants were able to discriminate between the voiced and voiceless consonants. However, regarding the advanced level of the learners participating in the research, the results still point out that even at this level, some people are unable to discriminate between the voiced and voiceless sounds. Because of the part of the questionaire that focused on the participants' background, the assumption that ome of the participants most probably use English quite often, regarding the fact that according their answers, most of them have bern learning English for several years, is quite logical. The results would probably differ were the research proceeded with less advanced learners; however, this speculation would need more researching to confirm. It is, though, quite clear from the results shown, that an advanced learner finds discriminating between the voiced and voiceless consonants often more challenging than the actual performance in the questionaire proves.

Conclusion

The aim of this thesis was to find out whether the learners of English as a foreign language are able to discriminate between the voiced and voiceless consonants at the end of the words. I personally consider this topic more important than it seems, because from my personal experience, learners often struggle with correct pronunciation. My initial suspicion was that the reason for this might not only be that the distinction in the pronunciation of the phonemes within minimal pairs is very slight, and certain countries might not have these sounds in their language. Because of this, the sounds may sound unusual for the learner. If the listening abilities are insufficient in the area of the voice discrimination, I considered the possibility of it directly affecting the pronunciation skills. If the learners do not hear the difference between the voiced and voiceless consonants, it is only logical that they will pronounce it incorrectly, or as I often noticed as a teacher, exactly the same.

The thesis was divided in two parts. In the first part, I explained the basic information about languages, phonetics and phonology and, more specifically, the consonants and their voice. The second part consisted of a small research. I created a questionnaire with recordings of the sounds in isolation and in word and sentence context.

The results of my research did not support the possibility of the listening abilities being the reason for the issue. Most of the respondents recognised the sounds correctly, especially so in isolation and words. The sentences proved to be much more challenging. This was surprising, as the context is more or less the same as in the case of the words. On the other hand, some of the learners made mistakes in the word recognition, but managed well in the case of the sentences.

This might lead to the conclusion that learners tend to pronounce the consonants incorrectly, even though they are able to hear it well and do not lack the ability to discriminate between them. There may be various reasons for this, which opens space for more analyses. This thesis focused on the problematic connection between the listening skills and the pronunciation ability. According to not only my personal experience as a teacher, but also to many examples from videos, shows or everyday conversations with people who learn English as their second or foreign language, the issue with the correct pronunciation does exist and should concern the teachers and the learners both. It is very easy to change the meaning of a word by simply switching the voiced and voiceless sounds, as has been explained in more detail in chapter 3.3.

The results did not prove that the problem exists on a large scale. However, they still highlighted that even though it might not be terribly common for the learners

to be unable to recognise the sounds, some of them still struggle with this ability. Considering that 95,5% of the respondents studied English for more than a decade, the inability to discriminate between the sounds by listening should occur even less. There are, of course, other aspects that might affect the final result of the individual respondents.

The results did not prove the hypothesis that the inability to recognise the voiced and voiceless sounds is the main cause of the existing problem. Because of this, it is unfortunately impossible to suggest a solution. However, a deeper research with learners of other levels might offer another perspective to this topic. My thesis worked mostly with advanced learners. It is possible that a research focused on beginners would bring different results.

The problem may be with the listening abilities, however, it is possible that learners overcome the difficulty by memorising the sounds in context. Therefore, the fact whether the person is able to hear the difference between the voiced and voiceless sounds, is irrelevant. Research focused on lower-levelled learners would either rule out this possibility, or prove it.

It is, however, possible that the reason why differentiating between the voiced and voiceless consonants is difficult for the learners of the English language lies elsewhere.

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List of tables

Table 1, The consonants in isolation

Sound	/p/	/b/	/f/	/v/	/t/	/d/	/s/	/z/	/k/	/g/	/ʧ/	/ʤ/
Correct answers	22	8	24	24	24	24	23	22	24	24	23	23
Percentage	91,7%	33,3%	100%	100%	100%	100%	95,8%	91,7%	100%	100%	95,8%	95,8%

Table 2, /p/ and /b/ in word context

Word	cup	cub	pup	pub	cap	cab
Correct answers	23	23	24	24	20	21
Percentage	95,8%	95,8%	100%	100%	83,3%	87,5%

Table 3, /p/ and /b/ in sentence context

Sentence	It was a cute cup.	It was a cute cub.	It was the pup they wanted.	It was the pub they wanted.	He ordered a cap.	He ordered a cab.
Correct answers	23	23	23	23	21	23
Percentage	95,8%	95,8%	95,8%	95,8%	91,3%	95,8%

Table 4, /f/ and /v/ in word context

Word	leaf	leave	safe	save	duff	dove
Correct answers	24	24	24	24	24	24
Percentage	100%	100%	100%	100%	100%	100%

Table 5, /f/ and /v/ in sentence context

Sentence	Caren signed her leaf.	Caren signed her leave.	He didn't manage the safe.	He didn't manage the save.	Said duff was in the forest.	Said dove was in the forest.
Correct answers	22	23	22	22	23	23
Percentage	91,7%	95,8%	91,7%	91,7%	95,8%	95,8%

Table 6, /t/ and /d/ in word context

Word	not	nod	built	build	tight	tied
Correct answers	24	24	24	24	23	22
Percentage	100%	100%	100%	100%	95,8%	91,7%

Table 7, /t/ and /d/ in sentence context

Sentence	She did not.	She did nod.	They built houses.	They build houses.	Unfortunately, it was tight.	Unfortunately, it was tied.
Correct answers	22	22	23	23	23	23
Percentage	91,7%	91,7%	95,8%	95,8%	95,8%	95,8%

Table 8, /s/ and /z/ in word context

Word	price	prize	race	raise	ice	eyes
Correct answers	24	24	23	23	23	23
Percentage	100%	100%	95,8%	95,8%	95,8%	95,8%

Table 9, /s/ and /z/ in sentence context

Sentence	Is this the price?	Is this the prize?	Would you race them?	Would you raise them?	It's in the ice.	It's in the eyes.
Correct answers	22	22	23	23	24	24
Percentage	91,7%	91,7%	95,8%	95,8%	100%	100%

Table 10, /k/ and /g/ in word context

Word	sink	sing	dock	dog	back	bag
Correct answers	24	24	22	22	24	24
Percentage	100%	100%	91,7%	91,7%	100%	100%

Table 11, /k/ and /g/ in sentence context

Sentence	Did she sink?	Did she sing?	They only stopped once they could see the dock.	They only stopped once they could see the dog.	She's got a pink ribbon on her back.	She's got a pink ribbon on her bag.
Correct answers	22	23	24	24	22	22
Percentage	91,7%	95,8%	100%	100%	91,7%	91,7%

Table 12, /ʧ/ and /ʤ/ in word context

Word	H	age	batch	badge	letch	ledge

Correct answers	23	24	23	23	22	22
Percentage	95,8%	100%	95,8%	95,8%	91,7%	91,7%

Table 13, /ʧ/ and /ʤ/ in sentence context

Sentence	Write "H".	Write "age".	She put the final batch on the table	She put the final badge on the table..	There was this letch he could not get rid of.	There was this ledge that he could not get rid of.
Correct answers	23	23	20	20	20	21
Percentage	95,8%	95,8%	83,3%	83,3%	83,3%	87,5%

List of pictures

Image 1, Phonemic chart

Image 2, Consonants

Image 3, Education graph

What education have you achieved?
24 odpovědí

- ● Primary school (first to fifth grades in Czech republic)
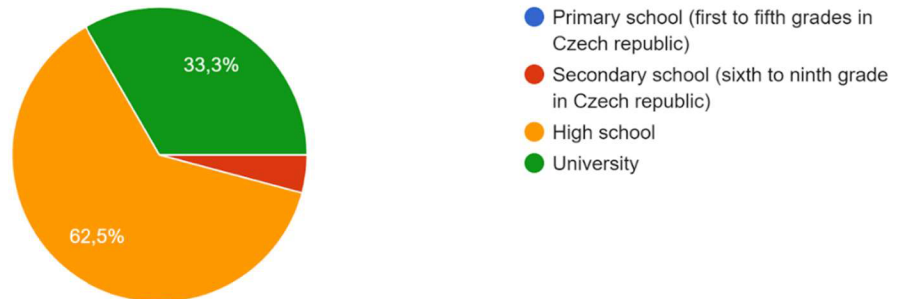- ● Secondary school (sixth to ninth grade in Czech republic)
- ● High school
- ● University

33,3%

62,5%

Image 4, Years spent studying English

For how long have you been studying/have you studied English?
24 odpovědí

- ● Less than a year
- ● Less than 5 years
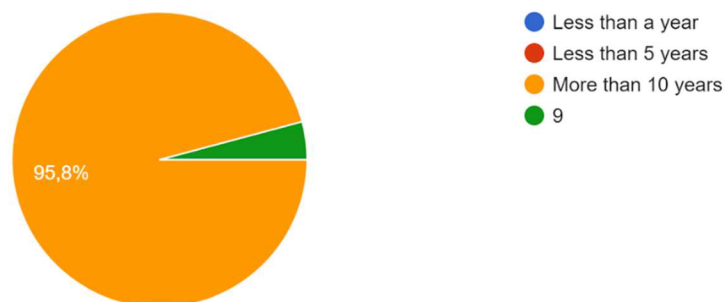- ● More than 10 years
- ● 9

95,8%

Image 5, The place of studies

Where did you study English?
24 odpovědí

At school
On my own
Courses

95,8%

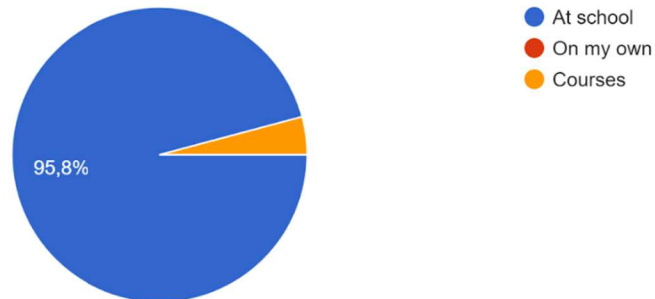Image 6, Easily differentiated sound

Which pair did you find easy to tell apart?
24 odpovědí

/p/ vs /b/
/f/ vs /v/
/t/ vs /d/
/s/ vs /z/
/k/ vs /g/
/tʃ/ vs /dʒ/

20,8% 12,5%
20,8% 12,5%
20,8% 12,5%