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The Most Problematic Aspects of American Pronunciation for Polish Learners of English with and without Prior Phonetic Training

Abstract

Previous research on the topic of contrastive phonetics and phonology of Polish and English and studies of pronunciation errors focused only on British RP without examining General American (GA). Hence, this paper aims to describe the most problematic pronunciation errors that may be made by a Polish learner of American English as a second language, and it also evaluates the role of explicit training in phonetics received by Polish learners as well as determines whether it is possible for learners without prior phonetic training to adopt certain aspects of pronunciation from a native General American English teacher. Furthermore, this paper focuses on pronunciation errors that are caused by the linguistic contrasts. These aforementioned pronunciation errors are verified through a linguistic experiment, which relies on an analysis of parameters regarded as significantly influencing an accent (such as voicing or aspiration) present in recordings of two groups of ten participants, one consisting of learners with a prior phonetic training, and the other without any phonetic knowledge. The results of the experiment show that the most challenging aspect of GA English pronunciation for less advanced learners is the production of sounds that do not exist in the learners' native language, whereas for the learners with prior phonetic experience the most problematic are the rules of releasing the plosives. The experiment also indicates that the role of a native speaker in the pronunciation learning process can be beneficial; however, learners require explicit corrective feedback to avoid distortion and negative transfer.

Keywords: phonetics, phonology, General American English, Polish, contrastive study.

1. Introduction

Correct, flawless pronunciation has frequently been a problematic aspect of language learning and a demanding goal that is hard to achieve for Polish students learning English as a second language. One reason for this problem might be the fact that this area of language is sometimes deprioritized by language instructors in favour of focusing on correct grammar or basic communication (Marks 2017). Previous research on the topic of contrastive phonetics and phonology of Polish and English and resulting from the contrast pronunciation errors, such as Sobkowiak's "English Phonetics for Poles" (2004), focused only on British RP without mentioning General American English (GA), which is a variant of English much widely spread in mass media and popular culture, therefore making this variety more relevant than in the past. The aforementioned popularity of GA interferes with RP taught in schools, causing even more confusion among students, influencing thereby their accent in a rather negative way. Furthermore, pronunciation difficulties and inaccuracies may be also caused by the students' unawareness of the differences between the sound systems and phonological rules of their native language and the second language that is being taught. Hence, in the light of these concerns, this paper provides an updated outlook on current pronunciation problems concerning Polish students of English.

The goal of this paper is two-fold. The first objective is to describe the most problematic pronunciation errors that may be made by a Polish learner of GA English as a second language. The second main aim is to determine whether it is possible for a Polish learner to adopt certain aspects of pronunciation of a native speaker without undergoing previous phonetic training. The study is driven by the following sub-aims: to establish how the Polish sound system affects the English pronunciation of learners with different experiences, to verify whether the phonetically trained students are more given to self-correction than the learners without prior phonetic knowledge (or whether the degree of the features adopted from a native speaker remains similar in both cases), and to establish how the possible pronunciation errors might be avoided and eliminated in the process of teaching. The preferred accent in this paper is General American English, further often referred to as GA English. However, the traits of RP (Received Pronunciation) have been marked as correct.

2. Foregoing research on pronunciation errors

In a broad sense, the notion of a foreign accented speech is characterized by non-native pronunciation features and patterns of speech production. Even

though a foreign accented speech does not always pose a problem, it might lead to misunderstandings in some situations. The communication difficulties that arise due to the differences between the first language (L1) and the second language (L2) of a given speaker are regarded as errors and the most cardinal pronunciation mistakes are those which hinder effective communication (Derwing/Munro 2015). For example, obliterating the difference between minimal pair words by merging certain phonemes can significantly impede the intelligibility of a speaker.

The severeness of communication difficulties may depend on the functional load of a particular phoneme. The notion of functional load (Catford 1987), also known as phonemic load, alludes to the significance of specific elements in making differentiations in a given language. Phonemes with a high level of functional load are very problematic to distinguish when they are distorted, deleted, or substituted. Hence, errors concerning sounds with a high functional load are the most serious ones. The relative functional load of selected pairs of English phonemes has been estimated by Catford (1987). For example, according to Catford, initial consonants with the highest functional load are /k/ and /h/ with the score of 100%, /p/ and /b/ with 98% and /p/ and /k/ with 92% while /t/ and /d/ with 73%. For final consonants, /d/ and /z/ are marked as 100%, /d/ and /l/ with 76%, /n/ and /l/ with 75% and /s/, while /z/ score only 38%. Vowels with a higher functional load are /ɪ/ and /æ/ with 100%, /i:/ and /ɪ/ with 95%, /ɔ:/ and /oʊ/ with 88%, whereas /æ/ /ɑ:/, /i:/ /u:/ are marked with 50%. Therefore, for final codas, it is less problematic to confuse /s/ and /z/ than /d/ and /z/.

Basically, pronunciation errors can be classified into three categories: segmental (a lack of complete control over its vowels and consonants resulting in insertion, deletion, substitution, or distortion), suprasegmental (inappropriate stress, rhythm and intonation) and other (affecting fluency, speaking rate and voice quality).

According to Speech Learning Model (SML), which is one of the current major models of second language pronunciation, sounds can be divided into three categories: new, similar, and same (Fledge 1995). This theory perceives similar sounds as virtually the most challenging category for L2 speakers because of the roughly minimal contrast between the L1 and L2. In view of this theory, errors can be categorized on the basis of their ease or difficulty for pronunciation or the degree of gravity of feature acquisition and then subdivided into segmental, suprasegmental, and connected speech problems.

Contrastive Analysis (CA) hypothesis (Brown 2006) can be seen as an alternative to SML. It states that the errors made in the L2 can be predicted by comparing the phonological inventories of the L1 and the L2. If the segments in both languages are identical (or nearly identical), the phenomenon of positive transfer occurs. Otherwise, L1 knowledge interferes with the L2 learning. A comparison of different phonological inventories has resulted in creating a hierarchy of errors, which predicts the relative level of difficulty that arises due to certain sound relationships. The most acclaimed scale of errors was created by Clifford Prator in 1967. Based on Prator's scale, there are 6 levels of difficulty while learning L2 sounds (Brown 2006):

1. Positive transfer, where L1 and L2 have (nearly) identical phonemes; for example, Polish and English have the same /m/ phoneme.
2. Coalescence, where two L1 phonemes converge into one item in L2, such as Polish /š/ and /ɕ/ coalesce into English /ʃ/.
3. Under-differentiation, when L1 treats two sounds as allophones of one phoneme, whereas L2 treats the two sounds as separate phonemes. For example, in Polish, /n/ and /ŋ/ are allophones of /n/, whereas in English they are separate phonemes, in as *sing* and *sin*.
4. Re-interpretation: a phoneme in L1 has a different distribution in L2. In Polish, /ŋ/ cannot occur in the word-final position, where it mostly occurs in English.
5. Over-differentiation, when L1 lacks a sound in the L2. For instance, Polish has no /θ/ phoneme.
6. Split - when a single L1 item is realized as two different items in the L2. For example, the Polish vowel /u/ corresponds to /ʊ/ and /uː/ in English.

As mentioned in the previous section, previous research on the topic of contrastive phonetics and phonology of Polish and English focused on RP. For example, Sobkowiak (2004) created a list of problematic English words for Polish learners, and Baran-Łucarz (2014) examined students' reflection with respect to individual practice of pronunciation at home. Other linguists and teachers, for instance Gimson (1980), Reszkiewicz (2005), and Bałutowa (1995) created textbooks that addressed teaching and learning English pronunciation in a practical way.

3. The most typical pronunciation errors made by Polish learners of English

The Standard Polish and GA English sound systems contain numerous contrasting phones and in fact very few of them are mutual. Moreover,

the GA phonology is very complex and features many rules absent in Polish, which is a phonetically written language. The rhythms of these two languages are also completely different, since Polish is syllable-timed and English stress-timed (hence the absence of the schwa sound in Polish).

Hence, one of the most common and problematic mistakes made by Polish learners of English is using Polish sounds instead of the English ones (see Table 1 below on the closest Polish equivalents). For example, the American retroflex [ɹ] is substituted by trill [r] or flap [ɾ]. As a matter of fact, Polish learners tend to substitute unfamiliar sounds, such as interdental fricatives, with a variety of other sounds, and in fact it is the substitution inconsistency that makes them unintelligible for a native speaker. For instance, the /ð/ sound in the word *this* is usually substituted by /d/, but in the word *smoothie* it is frequently replaced by fricatives /f/ or /v/ (Sobkowiak 2004; Hudson 2013).

Non-problematic sounds		Problematic sounds	
GA	Polish equivalent	GA	Polish substitution
/p/	/p/	/t/	[ṭ]
/b/	/b/	/d/	[ḍ]
/k/	/k/	/θ/	/f/
/g/	/g/	/ð/	/d/ /v/
/ʔ/	/ʔ/	/ʃ/	/š/
/f/	/f/	/ʒ/	/ž/
/v/	/v/	/h/	/x/
/s/	/s/	/tʃ/	/tš/
/z/	/z/	/dʒ/	/dž/
/m/	/m/	[ł]	[l]
/n/	/n/	[ɹ]	[r]
/ŋ/	/ŋ/	/æ/	/ɛ/
[ṭ]	[ɾ]	/ɑː/	/a/
/w/	/w/	/ɒː/	/ɔ/
/j/	/j/	/ɔː/	/ɔ/
/e/	/e/ (/ɛ/)	/ɜː/	/ɨ/
/i/	/i/	/ə/	–
/u/	/u/	/ɪ/	/ɨ/
[ç]	/ç/	/iː/	/ij/
		/ʌ/	/a/
		/ʊ/	/u/
		/uː/	/uw/
		/aɪ/	/aj/
		/ɔɪ/	/ɔj/
		/eɪ/	/ej/
		/aʊ/	/aw/
		/oʊ/	/ɔw/
		[ɦ]	/ɣ/

Table 1: The substitute Polish sounds and the closest Polish equivalents of GA English sounds

Another aspect connected to the aforementioned substitution that hinders intelligibility is merging distinctive phonemes, such as /æ/, /ʌ/, and /ɑ:/ and pronouncing all of them as /a/ (Hudson 2013). As a result, the difference between minimal pairs is obliterated, as in the case of the words *hat* /hæt/, *hut* /hʌt/ and *hot* /hɑ:t/ that are consequently turned into homophones and uniformly pronounced as /xat/, which can lead to communication breakdown.

What is more, not applying aspiration significantly hinders intelligibility of utterances as well (Hudson 2013). As has been pointed out by Cavasso (2020), English native speakers differentiate minimal pairs not on the basis of voicing but rather aspiration. An example of such mispronunciation is the word *take* [tʰeɪk] pronounced as [teɪk], [t̪eɪk] or [t̪ejk].

Moreover, in accordance with the Polish rule of devoicing word-final obstruents (Cyran 2013), Polish learners of English substitute the final voiced obstruents with their voiceless equivalents, affecting also thereby the rule of lengthening and shortening of vowels and omitting it. For example, the word *lid* [ɫɪ̄d] is most likely to be pronounced as [ɫɪt] (as long as the /l/ sound and the vowel are pronounced correctly; otherwise, it will be [lit] or [lɨt]). Hence, this type of mispronunciation again obliterates the difference between minimal pair words, such as *lid* and *lit*. Besides, the Polish rule of voice assimilation described by Cyran (2013) interferes with the English one, which does not feature voicing but only devoicing. As a result, voiceless sounds might be fully voiced and therefore replaced by their voiced equivalents even across morpheme or word boundaries, as in the word *disguise* /dɪsˈgaɪz/, which could be mispronounced as /dɪzˈgaɪs/ since the /s/ sound would be assimilated to /g/.

Apart from substitution, Polish speakers typically insert a devoiced /g/ (so therefore /k/) after the velar nasal /ŋ/, which is a result of a negative transfer from Polish, where the velar nasal occurs only before /k/ and /g/. Besides, most of the Polish learners are not aware of this phonotactic rule since it is hardly ever taught. Mispronouncing the -*ing* endings is the most frequent example of this error, as in the word *sing* /sɪŋ/, usually pronounced as /sɪŋk/, which results in merging minimal pairs such as *sing* and *sink.*

Conversely, Polish speakers tend to delete the /ʊ/ sound by monophthongizing the /oʊ/ diphthong, as in the word *don't* /doʊnt/. As a result, the words *won't* /woʊnt/ and *want* /wɑ:nt/ (/wɒnt/) may become homophones, which consequently can lead to misunderstandings.

Furthermore, due to the lack of nasalization in GA English, nasalizing vowels is regarded as a mistake. Polish speakers of English are inclined

to do so in the typical Polish nasalization environment, that is especially before fricative sounds, as in the words *constituent* /kənˈstɪtʃ.u.ənt/ *pence* /pens/ or *tension* /ˈten.ʃən/, pronouncing them as [kɔ̃w̃ˈstɪtʃuənt], [pɛ̃w̃s] and [ˈtɛ̃w̃ʃən], respectively.

Additionally, applying the Polish rhythm while speaking English and timing it to make each syllable approximately the same in duration significantly hinders intelligibility. As a result, there is no schwa sound and therefore the vowel reduction rule is disregarded. It can be seen not only in individual words (e.g. in *computer* /kəmˈpjuːt̬ɚ/, pronounced as /kəmˈpjuːtɛr/) but also in phrases (as in he *could have done it* /hiː kət̬əv dʌn ɪt/ being pronounced as /hiː kʊd hæv dʌn ɪt/ or even /hiː kut xɛf dan ɨt/).

Similarly to sentence stress, word stress in English can also be displaced according to the Polish rules of stressing words, that is, usually on the penultimate syllable (Ostaszewska/Tambor 2000). That is why errors in stress placement concern especially similar words present in both languages, such as *America* /əˈmerɪkə/ (*Ameryka* /amɛˈrɨka/ in Polish) or *autobiography* /ˌɑːtəbaɪˈɑːɡrəfi/ (*autobiografia* /awtɔbjɔˈɡrafja/ in Polish).

Eventually, the last area of typical errors are the exception words that are commonly mispronounced, mainly due to their spelling, such as the word *said* /sed/, which tends to be pronounced as /seid/ or the word money /ˈmʌn.i/, frequently mispronounced as /ˈmʌn.ei/ (Sobkowiak 2004:351).

4. The study

4.1. Research questions

This section presents the experiment based on the comparison of the GA English and Standard Polish sound systems and the predictions of the most typical pronunciation errors made by Polish learners of English discussed in the previous section.

The primary aims of this research are to experiment and establish the most problematic aspects of GA English pronunciation for Polish learners, describe how the Polish sound system affects the English pronunciation performed by learners with a different level of linguistic experience, and to verify the predictions regarding the most common mistakes described in Section 3. Subsequently, the third primary objective is to determine whether it is possible for a learner to adopt certain aspects of pronunciation of a native speaker without previous phonetic training. If such is the case, the sub-aim is to describe these aspects that are adopted naturally and without

much effort. Furthermore, the second sub-aim is to verify whether the pho-netically trained people are more prone to self-correction than the learners without prior phonetic knowledge (or whether the degree of the features adopted from a native speaker remains similar in both cases). Eventually, the conclusive area of this research concerns the most problematic pro-nunciation mistakes made by Polish learners and focuses on the potential means to avoid and eliminate the errors in the process of teaching English, since the ability to use of English in the modern world is frequently man-datory, especially in reference to the labor market.

4.2. Participants

The respondents (on average university students at the age of 21-24 years old, with two 50 year old speakers and two 16 year old high school stu-dents; half of them were women and the other half men; mostly from the Lower Silesia region; almost every speaker uses or used to use English on a daily basis, according to the questionnaire) were divided into two groups of ten: the one consisting of Polish speakers that had been phoneti-cally trained in GA English accent (C1 or nearly C2 proficiency level) and the other including Polish students speaking English (varying from A2 to C1 proficiency levels) without any phonetic knowledge. The phonetically trained group comprised participants who have studied English phonetic and phonology following a standard academic course at a university. The total results of the two tested groups calculated in percentage terms are described in section 5.

4.3. Experiment format and procedure

The experiment conducted to examine the research questions presented in the previous subsection had a form of a survey sheet containing words and phrases. Each item was selected with regard to a certain phonetic or phonological aspect that had been predicted to be potentially problematic for a Polish learner of English (see Section 3). The complete list of words and phrases used in the experiment is presented in Table 2 below and the actual sheet is included as Appendix 1 at the very end of this paper.

Phonetic/phonological feature	Test word / phrase
final voicing	*Fred*
final voicing (neighboring voicing contrast)	*fret*
voicing, voiceless interdental fricative /θ/	*thread*

Phonetic/phonological feature	Test word / phrase
voicing (neighboring voicing contrast), voiceless interdental fricative /θ/	*threat*
palatalization, yod-dropping, vowel quality	*new*
vowel quality, aspiration	*come*
the /nk/ cluster, voiceless interdental fricative /θ/, vowel quality, neighboring phonemic contrast	*think*
velar nasal /ŋ/, voiceless interdental fricative /θ/, vowel quality	*thing*
vowel quality (phonemic contrast between /ɪ/ and /iː/), /l/ velarization, velar nasal /ŋ/	*feeling*
vowel quality, /t/ release and place of articulation	*it*
vowel quality (neighboring phonemic contrast), /t/ release and place of articulation	*eat*
schwa, rhoticity and /r/ quality, vowel quality	*before*
schwa, final voicing, vowel quality	*because*
voiceless affricate /tʃ/, final voicing, vowel quality	*choose*
voiced affricate /dʒ/, diphthong quality	*joke*
r-coloring, rhoticity, final voicing, vowel quality	*bird*
vowel quality, /t/ release and place of articulation	*but*
/l/ velarization, diphthong quality	*low*
vowel quality (neighboring contrast), /l/ velarization	*law*
/t/ lateral release, /l/ velarization, vowels quality	*outlaw*
ash-raising and vowel quality	*fan*
friction in the [ʈɽ] cluster, vowel quality	*tree*
rhoticity and /r/ quality, vowel quality, /t/ release and place of articulation	*art*
flap, rhoticity and /r/ quality, vowel quality (especially the final /i/)	*forty*
/h/ quality, reduction of /lf/ cluster, vowel quality	*half*
aspiration, /t/ place of articulation, vowel quality	*time*
nasal flap or /t/ deletion, word stress, schwa, vowel quality, /t/ release and place of articulation, rhoticity and /r/ quality	*Internet*
aspiration, vowel quality, final cluster reduction	*past*
vowel quality, final voicing (a separated case)	*good*
vowel quality, aspiration and /t/ place of articulation, /l/ velarization	*tool*
vowel quality, aspiration, final voicing (a separated case) or final cluster reduction	*pond*
vowel quality	*boy*
surface palatalization, vowel quality	*sea*
vowel quality	*say*
aspiration, diphthong quality	*cow*
word stress, post-alveolar voiceless fricative /ʃ/, voiced affricate /dʒ/, vowel quality	*imagination*

Phonetic/phonological feature	Test word / phrase
flap, word stress, vowel quality (especially final /i/)	*autobiography*
the /s/ sound quality, vowel quality	*basic*
voice assimilation of /s/, final voicing (a separated case), vowel quality, /l/ velarization	*mislead*
nasalization, word stress, yod- dropping	*constituent*
rhythm and sentence stress, schwa and weak forms	*The glass is on the table.*
release of the /db/ cluster, rhythm, schwa and weak forms	*This is a good bike.*
rhythm and sentence stress, flap, vowel quality, intonation	*What do you want?*
palatalization, elision, intonation	*What happened last year? Did you find it?*
intonation, rhythm, flap	*Which house is better?*
intonation, rhythm, weak forms	*I asked You to CLOSE not to open it!*
intonation, word stress	*It's ridiculous!*
intonation, rhythm, weak forms	*No one wants to force you to play...*

Table 2: A complete list of words and phrases used in the experiment with primarily examined phonetic and phonological aspects

Every respondent was asked to read the words and phrases out loud and was recorded during the activity (the influence of orthography was not taken into account, since all the respondents were rather proficient in English). Thereafter, they listened to the recording of an American native speaker reading the same list and subsequently, they were asked to read the list again while being recorded. Afterwards, the two recordings were closely examined by a qualified phonologist with regard to the features assessed described in the table above, together with any additional errors that were also registered. The evaluating criteria were boolean, meaning they comprised, for example, either aspiration or a lack of aspiration. Eventually, the results of the two attempts were compared with the aim of searching for the areas of potential improvement.

5. Results

This section focuses on presenting and analyzing the results of the experiment described in the previous sections. The tables below illustrate the total results of the pronunciation errors recalculated in percentage terms with regard to the two groups respectively assessed in the experiment.

Word / phrase	The percentage of errors in the phonetically trained group	Corrections
Fred	–	
fret	–	
thread	final devoicing 10%	voiced /d/ 100%
threat	–	
new	/ɲ/ palatalization 40%	/n/ yod dropping 25%
come	/ɔ/ wrong vowel 10%	
think	–	
thing	/ŋg/ insertion 10%	
feeling	merging /ɪ/ and /i:/ 10% /ŋk/ insertion 10% /ŋg/ insertion 10%	
it	–	
eat	–	
before	/i/ wrong vowel 10%	/ɪ/ corrected 100%
because	final devoicing 20% /i/ wrong vowel 10%	/ɪ/ corrected 100%
choose	final devoicing 20%	
joke	–	
bird	non-rhotic 10% final devoicing 10%	
but	/a/ wrong vowel 20%	
low	–	
law	/a/ wrong vowel 10% /ɔ:/ wrong vowel 10%	corrected vowel 50%
outlaw	/tl/ no lateral release 50% /oʊ/ wrong vowel 10% /a/ wrong vowel 10%	corrected vowel 100%
fan	/ʌ/ wrong vowel 10% /a/ wrong vowel 10%	corrected vowel 50%
tree	–	
art	–	
forty	no flap 40%	flap 75%
half	/l/ insertion 30% /e/ wrong vowel 10% /a/ wrong vowel 10% /a:/ wrong vowel 10%	corrected vowel /ć/ 33% deleted /l/ 67%
time	–	
Internet	/nt/ no deletion 50% non-rhotic 10%	rhotic 100% /t/ deletion; flap 20%
past	/a/ wrong vowel 10% /a:/ wrong vowel 20% no aspiration 10%	corrected vowel /æ/ 33%

Word / phrase	The percentage of errors in the phonetically trained group	Corrections
good	–	
tool	dentalization [t̪] 10%	
pond	final devoicing 10% /ɔ:/ wrong vowel 10%	
boy	–	
sea	–	
say	–	
cow	no aspiration 20%	aspirated 50%
imagination	/š/ wrong consonant 30% /e/ wrong vowel 10%	corrected consonant /ʃ/ 33% corrected vowel /æ/ 100%
autobiography	no flap 40% /ɔ:/ wrong vowel 30%	flap /ṭ/ 50% corrected vowel /a:/ 33%
basic	–	
mislead	/ɪ/ wrong vowel 10% wrong stress 20%	correctly 33%
constituent	could not pronounce 10% wrong stress 10% /tʃ/ deletion 10%	correctly 67%
The glass is on the table.	–	
This is a good bike.	/db/ plosion 10%	/d/ lack of plosion 100%
What do you want?	no weak forms 10%	improved intonation 100% fast speech rules applied 30%
What happened last year? Did you find it?	no fast speech rules 60%	improved intonation 10%
Which house is better?	no flap 10% tap /r/ 10%	improved intonation 10%
I asked You to CLOSE not to open it!	–	improved intonation 10% fast speech rules applied 30%
It's ridiculous!	/i/ wrong vowel 10%	improved intonation 10% correct vowel 100%
No one wants to force you to play...	no fast speech rules 50% dentalization [t̪] 10% /fɔ:rz ju:/ wrong voicing 10%	improved intonation 10% /fɔ:rs ju:/ correctly 100%

Table 3: The total results of pronunciation errors recalculated in percentage terms with regard to the phonetically trained group assessed in the experiment

As Table 3 shows, in the phonetically trained group, the processes of releasing the plosives seemed to be the most challenging aspect to learn, since as many as 50% of the respondents pronounced the /t/ sound without releasing it laterally (or with an optional glottal stop) in the word *outlaw*. Furthermore, not applying the flap sound concerned up to 50% of the ex-

amined subjects, though the failure of the application of the flap depended on its distribution: 50% of the respondents did not apply it in the /nt/ clusters and about 40% of the respondents failed to use it in an intervocalic position. Another problematic area was incorrect palatalization, which occurred in 40% of cases in the word *new*, which was pronounced as /ɲuː/. Furthermore, 30% of the respondents inserted the /l/ sound in the word *half,* which is likely to result from phonetically read spelling. Moreover, about 30% of the speakers using General American English evinced slight traits of British RP, such as occasionally using /ɔː/ instead of /aː/. Combining these two accents is generally regarded as an error, especially when done by a speaker with a high proficiency level. The last noticeable aspect that was present in the recordings of 60% of the speakers is not applying (or applying only partly) the rules of casual speech; however, it is highly possible that it stems from the fact that the respondents used careful, monitored speech which is typical of recorded speech.

The easiest feature to adopt (to correct in the second trial) from a native speaker for a phonetically trained person is the flap sound, since altogether 40% of the respondents who had not used it in the first attempt applied it in the second one in various examples, mostly in the words *forty* (75% of improvement) and *autobiography* (50% of improvement). Furthermore, improper vowels are frequently reviewed and corrected after hearing the native speech model. Additionally, initially absent causal speech rules were applied by 30% of the respondents after hearing the model. Generally, the post-listening recordings usually did contain improvements and corrections.

Word / phrase	The percentage of errors in the group without any phonetic training	Improvements
Fred	final devoicing 40%	voiced /d/ 25% prolonged vowel 50%
fret	wrong vowel 20%	corrected the vowel 50%
thread	/f/ 80% /t/ 20% instead of /θ/ final devoicing 50% wrong vowel 20%	pronounced the interdental fricative 20% worsened in vowel quality 10%
threat	/f/ 70% /t/ 30% instead of /θ/ wrong vowel 30%	pronounced the interdental fricative 20% corrected the vowel 33%
new	/ɲ/ palatalization 100 %	
come	no aspiration 90% /a/ wrong vowel 50% [ɔ̃w̃] wrong vowel 10%	

Word / phrase	The percentage of errors in the group without any phonetic training	Improvements
think	/f/ 80% /t/ 10% instead of /θ/ /i/ wrong vowel 80% /k/ deletion 10%	corrected the vowel 13%
thing	/f/ 80% /t/ 10% instead of /θ/ /i/ wrong vowel 70% /k/ insertion 60% /g/ insertion 30%	voiced the inserted /k/ 67% corrected the *-ing* ending 11% corrected the 14%
feeling	first vowel /i/ 70% /ɨ/ 20% second vowel /i/ 80% /k/ insertion 60% /g/ insertion 10% clear /l/ 80%	corrected the vowel second vowel while changing the first one to /ɪ/ 22% corrected the *ing* ending 14% worsened in vowel quality 11%
it	wrong vowel /i/ 40%	corrected the vowel 75% worsened in vowel quality 25%
eat	wrong vowel /i/ 30% wrong vowel /ɨ/ 30%	corrected the vowel 50%
before	distorted /r/ 60% tap 10% wrong vowel /i/ 80%	changed tap to distorted /r/ 100% corrected the vowel 25% corrected the /r/ 17%
because	final devoicing 100% wrong first vowel /i/ 90% wrong second vowel /ɔ/ 40% wrong second vowel /ɔu/ 10% no aspiration 100%	aspirated the /k/ 10% corrected the first vowel 11% corrected the /ɔu/ to closer /ɔ/ 100%
choose	final devoicing 90% wrong onset /tš/ 70% wrong vowel /u/ 50% wrong vowel /ɨ/ 10%	corrected the /ɨ/ to closer /u/ 100% corrected the onset 29% voiced the coda 11%
joke	wrong onset /dž/ 80% wrong vowel /ɔw/ 80%	corrected the vowel 25%
bird	wrong vowel /i/ 10% wrong vowel /ɛ/ 30% wrong vowel /ɪ/ 40% distorted /r/ 70% non-rhotic 30% final devoicing 50%	corrected the vowel 38% deleted the /r/ 14%
but	wrong vowel /a/ 80% wrong vowel /e/ 10%	corrected the vowel 13% changed the /e/ to closer /a/ 100%
low	clear /l/ 90% /w/ 10%	
law	clear /l/ 90% /w/ insertion 40%	10% who pronounced an acceptable vowel /ɔ:/ changed it to /ɒ:/

Word / phrase	The percentage of errors in the group without any phonetic training	Improvements
outlaw	clear /l/ 80% no lateral release 100% wrong vowel final /w/ insertion 40% wrong initial vowel /ɔw/ or / aw/ 50%	corrected the initial vowel 20%
fan	wrong vowel /a/ 50% wrong vowel /ʌ/ 10% wrong vowel /ɛ/ 10%	corrected the vowel 43% worsened in vowel quality 10%
tree	no fricated release /tr/ 50% wrong initial sound /f/ 10% wrong vowel /i/ 50%	worsened the initial sound substituting if for /f/ 10% corrected the vowel 60%
art	distorted /r/ 90% non-rhotic 10% wrong vowel /ɛ/ 10% wrong vowel /a/ 10%	improved the /r/ quality 11%
forty	distorted /r/ 70% no flap 100% dentalization [t̪] 30% wrong vowel /ɔ/ 10%	flap 20% corrected the vowel 100%
half	wrong onset /x/ 70% wrong vowel /a/ 90% /l/ insertion 80%	deleted /l/ 38%
time	no aspiration 90% dentalization [t̪] 70% wrong vowel and /j/ insertion 60%	corrected the vowel deleting /j/ 17%
Internet	wrong vowel /i/ 70% no schwa 70% incorrect stress 10% distorted /r/ 40% /nt/ no deletion 80%	final /t/ lack of plosion 10% worsened in vowel quality [ɔ̃w̃] 10% deleted /r/ 10%
past	no aspiration 90% wrong vowel /a/ 90%	final /t/ deletion 20%
good	wrong vowel /u:/ 10% wrong vowel /u/ 70% final devoicing 40% glottalized /d/ 10% (not a mistake)	corrected the vowel 25% voiced the coda 25%
tool	dentalization [t̪] 80% no aspiration 60% clear /l/ 60% /l/ deletion 10% wrong vowel /u/ 60%	corrected the vowel 33% improved /l/ 17% applied aspiration 17% worsened in vowel quality 10%

Word / phrase	The percentage of errors in the group without any phonetic training	Improvements
pond	no aspiration 80% final devoicing 60% wrong vowel /ɔ/ 80% nasalization [ɔ̃w̃] 10%	voiced the coda 17% clorrected the vowel 13%
boy	insertion /j/ 90%	corrected the diphthong 22%
sea	palatalization /sʲ/ 100%	
say	insertion /j/ 70%	corrected the diphthong 29%
cow	no aspiration 100% wrong vowel and/or /w/ insertion 100%	corrected the vowel 50%
imagination	/š/ 100% insertion /j/ 40% wrong vowel /ɛ/ 50% wrong vowel /i/ 20%	worsened in vowel quality 10% corrected the ash vowel 40%
autobiography	wrong stress placement 40% no flap 100% wrong vowel /ɔ/ 70% insertion /w/ 70%	placed an incorrect stress 10% corrected the stress 75% corrected the vowel 14%
basic	voicing /z/ 60% insertion /j/ 60% wrong vowel /i/ 100%	wrongly voiced /s/ 10% corrected the vowel 20%
mislead	clear /l/ 90% wrong first vowel /i/ 70% wrong second vowel /i/ or /ɪ/ 40% final devoicing 40% wrong stress 40%	corrected the first vowel 57% corrected the second vowel 50% 10% worsened in the second vowel quality
constituent	nasalization [ɔ̃w̃] 20% wrong stress 50% could not pronounce 10% deletion /j/ 30% no schwa 10%	removed nasalization 100% corrected the whole word 10%
The glass is on the table.	no weak forms 90% incorrect intonation 20%	improved rhythm 20% weak forms applied 11%
This is a good bike.	/db/ plosion 60% /tb/ plosion + devoicing 20% no weak forms 70% incorrect intonation 20%	weak forms applied 14%
What do you want?	nasalization [ɔ̃w̃] 30% no weak forms 100% incorrect intonation 60%	removed nasalization 33% applied casual speech rules 10% weak forms applied 10%
What happened last year? Did you find it?	no casual speech rules 90% incorrect intonation 60%	improved intonation 67% applied casual speech rules 11%

Word / phrase	The percentage of errors in the group without any phonetic training	Improvements
Which house is better?	incorrect intonation 80% no flap 90%	improved intonation 75% flap /ʈ/ 11%
I asked You to CLOSE not to open it!	no complex tones; incorrect intonation 80% plosion /skt/ 40%	improved intonation 63% corrected the cluster 25%
It's ridiculous!	no complex tones; incorrect intonation 80% could not pronounce 20%	improved intonation 38%
No one wants to force you to play...	no casual speech rules 90% incorrect intonation 70% non-rhotic 10%	improved intonation 43% rhotic 100%

Table 4: The total results of pronunciation errors recalculated in percentage terms with regard to the group without prior phonetic training assessed in the experiment

By contrast, the group without any phonetic knowledge made significantly more pronunciation errors and the most problematic aspects were weak forms and schwa (none of the respondents applied the correct English rhythm), consonant release (including aspiration, plosion and lateral release with up to 100% mispronounced examples depending on a word), palatalization (all the respondents applied it in the word *new*), the usage of the flap sound (used extremely rarely), vowels (primarily /æ/ and /ʌ/), retroflex /r/ (which was in almost all cases distorted), similar consonants (mainly /ʃ/ and /š/, as in *imagination*) and final devoicing (especially if it is not marked in spelling, as in *because*; otherwise the error frequency equals about 50% as opposed to 100 when it is not marked).

Furthermore, the easiest features to be adopted from a native speaker by a learner without any phonetic knowledge are intonation (up to 67% of improvement among the incorrect answers), word stress (up to 75% of correction) and vowels. However, vowels are not always exactly adapted but the speaker's vowel quality is improved. For instance, nasalization is removed or /i/ is substituted by /ɨ/ which is much closer to the base /ɪ/ sound than /i/.

Interestingly, in defiance of the assumptions formulated in Subsection 4.1. that native speakers can only influence learners in a positive way, some of the results among part of the respondents actually worsened in the second recordings. Perhaps it might have been caused by the lack of knowledge of the English sound patterns. Namely, a given respondent realized after hearing the recording that they should improve, but the only language patterns they were familiar with was the Polish ones, so their attempt to

improve their pronunciation resulted in an over-exaggerated efforts and an eventual distortion of the base sounds. This phenomenon can be observed in the word *tree*, where /t/ is supposed to have fricated release. One of the respondents pronounced it as [tri] instead of [tr̥ʰiː] in the first trial. After listening to the recording, he probably realized that the first attempt was incorrect, so he tried to correct it and because there is no fricated release of /r/ in Polish, he substituted the plosive /t/ for the fricative /f/ to sub-consciously add some friction to the syllable onset. Additionally, another possible explanation for the phenomenon of the decline in the pronunciation quality might be lowering the respondent's self-confidence after hearing the native speaker. Then, after realizing he is not as proficient as he thought he was, he might have unintentionally got worse because he stopped trying to pronounce everything the best he could.

6. Pedagogical implications

The presented study has showed a considerable difference between the two examined groups of non-native speakers of English with and without prior phonetic training. The study results therefore clearly indicate the importance of phonetic training in foreign language education. There are obviously other factors, such as individual differences. Some participants may have a better musical ability or are simply better at imitating. As mentioned in Section 2, the most cardinal pronunciation mistakes are those which hinder effective communication. That is why eliminating those errors should be the main goal in the teaching process. It would be worth mentioning that English has numerous sounds that do differ from the Polish ones and monolingual speakers' language patterns are fixed in only one language and therefore such learners are unaware of the existence of sounds other than the ones present in their native language.

For example, while introducing the new sounds, it would be very practical to categorize the importance of contrastive sounds (Levis 2018) on the basis of their functional load and put more emphasis on the most relevant ones, such as highlighting the contrast between /iː/ and /ɪ/ rather than /ɒː/ and /aː/.

Furthermore, for very experienced learners it would be beneficial to put more focus on the processes connected to releasing the plosive sounds such as aspiration, the lack of plosion, nasal release, and lateral release, since these have turned out to be the most problematic even for the very proficient speakers after a phonetic training.

The role of a native speaker in the pronunciation teaching process has proved to be beneficial, because the native pronunciation model prompts learners to self-correction. However, at the less advanced stages of learning, the role of a teacher providing feedback is crucial, since the pronunciation can sometimes worsen or get distorted after a student tries to imitate a native speaker.

7. Discussion

In the context of the previous research findings, the experiment presented in this paper has developed the foregoing knowledge concerning the pronunciation errors among Polish learners of English. The study has shown the exact phonetic and phonological areas that are challenging even for students who have finished academic phonetic training. Therefore, the results of this study can be beneficial for methodologists, who can employ the findings into their teaching strategies and put more focus on the problematic areas.

Furthermore, the study has confirmed the accuracy of the previous findings (such as the Functional Load theory, the Speech Learning Model, or the Contrastive Analysis hypothesis) simultaneously narrowing their scope, by focusing on other aspects, such as phonological rules.

Nevertheless, the results might have been different if the experiment had been conducted on a larger group of participants or engaged more phoneticians and phonologists in the process of analysis. Hence, further research could employ a larger group of participants in order to statistically confirm the current findings, and therefore making it more eligible. Additionally, another factor that could have been tested is the orthographic influence on pronunciation, which was disregarded in this test, due to potential irrelevance, since all the respondents could speak English fluently.

8. Conclusions

As was mentioned before in Section 3, the Standard Polish and GA English sound systems contain numerous contrasting phones; in fact, very few of them are mutual, and that was exactly the most problematic area for the beginner learners.

The primary aim of this paper was to describe the most problematic pronunciation errors that may be made by a Polish learner of English as a second language. According to the study reported in Section 4, the most problematic issue is the unawareness of the sounds non-existent in the learner's native language. With respect to the advanced learners, the most

challenging areas are the phonological rules of releasing the plosives. Hence, there should be more emphasis put on these aspects of pronunciation in the language teaching courses and their curricula.

Furthermore, the second main aim was to determine whether it is possible for a learner to adopt certain aspects of pronunciation of a native speaker who has not undergone any previous phonetic training. The research results show that the role of a native speaker in the pronunciation teaching process proves to be beneficial, because the native pronunciation model prompts especially more advanced learners to self-correction. However, at the initial stages of learning, the role of a teacher providing feedback is crucial, since the pronunciation can sometimes worsen or get distorted after a student tries to imitate a native speaker.

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Appendix - Research questionnaire sheet

wiek / age :

pochodzenie (miasto) / descent (city):

Odpowiedz na poniższe pytania krótko, w kilku słowach. / Answer the questions below in a few words.

a) Czy miałeś / miałaś jakikolwiek kontakt z osobą anglojęzyczną? (tak / nie) / Have you ever ha dany contact with a native speaker of English? (Yes/no)

b) Pobyt za granicą (tak / nie; ile czasu) / Stay in a foreign country (yes/ no; for how long)?

c) Kontakt poprzez media: muzyka, filmy, gry, itd. (wymień) / (contact via media: music, movies, games, etc. (list)?

d) W jakich celach używasz angielskiego (np. w pracy, do rozmowy ze znajomymi, itd.) / What are the purposes of your use of English (e.g. at work, to talk with friends, etc.)?

e) Jeśli używasz angielskiego, to jaką ma formę (pisaną, mówioną) ? / If you use English, then in which form (written, spoken)?

Przeczytaj na głos poniższe słowa. / Read the words below out loud.

Fred

fret

thread

threat

new

come

think

thing

feeling

it

eat

before

because

choose

joke

bird

but

low

law

outlaw

fan

tree

art

forty

half

time

Internet

past

good

tool

pond

boy

sea

say

cow

imagination

autobiography

basic

mislead

constituent

Przeczytaj zdania na głos tak szybko i naturalnie jak możesz. / Read the sentences out loud as fast and naturally as you can.

The glass is on the table.

This is a good bike.

What do you want?

What happened last year? Did you find it?

Which house is better?

I asked You to CLOSE not to open it!

It's ridiculous!

No one wants to force you to play...

Dziękujemy za udział w badaniu. / Thank you for your participation in the experiment.