CAN ORTHOGRAPHY INFLUENCE INTERLANGUAGE PHONOLOGY?

THE CASE OF POLISH LEARNERS OF ENGLISH AND THEIR PRONUNCIATION

OF DIPHTHONGS [eɪ] AND [əʊ]

Aneta Urbańczyk

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Supervisor: Mirjam Broersma, PhD

Radboud University

Centre for Language Studies

Second Reader: Haike Jacobs, prof. dr.

Radboud University

Centre for Language Studies

Abstract

According to Selinker, interlanguage is a separate linguistic system that adult L2 learners create during the acquisition of their target language (Selinker 1972), and it is linked to both their L1 and L2 as well (Tarone 1994). Interlanguage has already been studied taking into consideration its particular components, one of which are pronunciation patterns. What influences the pronunciation patterns of interlanguage is an orthography, which can trigger L1 like pronunciation. The present study aimed at testing the hypothesis in the case of adult Polish learners of English, levels Intermediate to Mastery, and their pronunciation of English diphthongs in spontaneous speech (according to Tarone (1982), it is during spontaneous speech when interlanguage is the most visible). The research consisted in analysing the database of mispronounced words, created within a project (called PLEC) ran at the University of Łódź in Poland. All the words in the database contained mispronunciations, but it was not always a diphthong that was mispronounced. All the tokens in the data bank that contained diphthong [eɪ] or diphthong [əʊ] in their target phonetic shape were taken into consideration. These diphthongs have their counterparts in Polish, but they are always written with two letters and the two grapheme-representations are fixed for particular diphthongs, which is not the case in English. Therefore, the expectations of the study were - inter alia - that the one grapheme-representations of the diphthongs would more often be mispronounced than their two grapheme-representations (two more hypotheses were also stated but the chi-square analyses showed that the results for them were insignificant). It turned out that the hypothesis was in fact rejected by the results for the diphthong [eɪ] but it had to be alternated in case of the diphthong [əʊ] (the majority of one grapheme-representations of the latter were mispronounced, but there were no two grapheme-representations of the diphthong in the database to make an appropriate comparison, that is why the second variable became more than one grapheme-representations, as there was one such in the database: a four grapheme-one) and then it was in fact confirmed. As no gratifying explanations for the contrastive results were found, it was finally assumed that what influences pronunciation patterns of interlanguage could be in fact a few factors that somehow cooperate with each other, hindering or facilitating L2 learners pronunciation. Such a hypothesis could be a subject of future studies.

1.Introduction

1.1. A statement of the problem

Second language acquisition (SLA) is a process influenced by many factors and the learners' native language seems to be the most crucial one (Zahnming 2014). In 1972 the American linguist Larry Selinker coined the term 'interlanguage', proposing that adult L2 learners create this separate linguistic system when they acquire their second language; the interlanguage is different from both the learners' L1 and L2 but it is linked to both of them as well (Tarone 1994) The interlanguage is believed to fossilize at some point, making it impossible for the adult L2 learners to achieve native-like proficiency in the target language (Tarone 1994). The notion of interlanguage seems to confirm the great influence of the learners' native language on the process of second language acquisition in the case of adults. Generally, the influence of L1, the so called 'transfer', is said to be either positive (when the similarities between L1 and L2 boost language acquisition) or negative (when the differences between L1 and L2 lead to mistakes in SLA) (Zahnming 2014). According to Zahnming (2014), the negative transfer from L1 is the most visible in case of L2 learners' pronunciation, when it makes the students distort the target sounds. Fukazawa and Miglio (2006) are one of many researchers who claimed that what strongly influences the interlanguage phonology (and therefore has an influence on L1-like pronunciation) is in fact orthography. In their opinion (Fukazawa and Miglio 2006), the spelling of L2 words can often lead adult learners to L1 pronunciation patterns, especially at the early stages of SLA. The focus of the present paper is to see whether the spelling hypothesis can be corroborated by the students at the higher levels of L2 proficiency (B1 to C2), namely if their pronunciation mistakes in fluent speech can be accounted for by orthography.

1.2. Literature overview

As mentioned above, Fukazawa and Miglio (2006) drew special attention to the influence of orthography on L1-like pronunciation patterns in case of adult L2 learners. The researchers formulated their claim after analysing outcomes of an experiment that they had conducted in order to see different phenomena (voicing and obligatory spirantization), but the results made them notice specific patterns in pronunciation mistakes that could have been explained by an impact of orthography on L2 pronunciation. The participants of the experiment were English speaking adults who were finishing their first year of Spanish. Their task was to read out loud isolated Spanish words as well as two-word phrases. Fukazawa and Miglio (2006) reported the effect of spelling on pronunciation mistakes in 63% of the students and concluded that eithe the whole words were pronounced following an English pattern (the words were so called phonetic 'false friends', see more about the term later in this section), or that only single sounds were mispronounced, following the English grapheme-phoneme relation. According to the researchers, the influence of spelling on pronunciation mistakes was evident, as the results could not be explained by other phenomena, like e.g. resorting to the target language or general markedness. Fukazawa and Miglio (2006) found the impact of orthography so important, that they even proposed an extension of Optimality Theory's constraints to situations where L2 spelling triggers L1 pronunciation patterns.

Another researcher who reported on the influence of orthography on pronunciation problems was Szpyra-Kozłowska (2012), who examined the sources of mispronunciations in the case of Polish learners of English at different levels of L2 proficiency. Szpyra-Kozłowska (2012) mentioned that already in 1999 another Polish researcher, Sobkowiak, had come up with the Phonetic Difficulty Index (PDI), which contains difficulty ratings of English lexical items for Polish learners, based on the observations of their pronunciation problems. The ratings led to creation of a list of sources of mispronunciations and the greatest source turned out to be spelling-related problems. Even though Szpyra-Kozłowska (2012) found the PDI valuable, she saw a need of relating pronunciation problems to particular language proficiency groups. The researcher conducted two experiments with adults - one with a group of intermediate Polish learners of English and the other with advanced Polish learners of English, asking the groups to read English sentences out loud- and then she

compared the results. After examining the intermediate learners, she isolated eight major sources of phonetic difficulties in their case, the first of which were, just as in the PDI, spelling-related problems. Szpyra- Kozłowska (2012) noticed that the problems were caused by the fact that students either followed the Polish grapheme-phoneme relation (so comparable to Fukazawa and Miglio (2006), but only a different L1 of the participants) or mistakenly followed the English grapheme - phoneme relation (making overgeneralizations). The typical example of how the students were following Polish grapheme - phoneme relation was pronouncing silent letters such as <t> in *nestle* and <b> in *tomb* (Szpyra-Kozłowska 2012), as they are no silent letters in Polish. The examples of overgeneralization were when the students uttered the digraph <ea> as the vowel [i:] in *steak*, because this is how the digraph is pronounced in words like *meat* and *teach* or when they uttered the sequence <ace> as [eɪs] in *surface* and *palace*, because this is how it is pronounced in words like *face* and *lace* (Szpyra-Kozłowska 2012).Therefore, my conclusion is that the influence of spelling on L2 pronunciation mistakes can actually go beyond the topic of native language transfer in SLA (as it is apparently also the topic of transfer within the target language), which actually only stresses its magnitude. The second major source of phonetic problems isolated by Szpyra-Kozłowska were phonetic 'false friends'. Those lexical items appear in L1 and L2 in similar or even identical orthographic form but the pronunciation is different. As the majority of them are cognates, not only the orthography of the words is similar or even the same, but also their meaning. Even though Szpyra-Kozłowska (2012) enumerated the phonetic 'false friends' and the spelling-related problems separately, she remarked herself that in case of the former it is their spelling that leads the Polish learners of English to mispronunciations. Therefore, it seems to me that one can simply treat phonetic 'false friends' as an example of spelling-related problems, not as a separate source of mispronunciations and this is actually what Fukazawa and Miglio (2006) already did in their work, claiming that they saw the influence of spelling on pronunciation when their participants were pronouncing the whole words following L1 pattern. When Szpyra-Kozłowska (2012) examined the advanced learners, she noticed that even though the group dealt better with some phonetic issues than the Intermediate one, there were still cases that were similarly difficult for both groups and phonetic 'false friends' were one of them. If mispronunciations of phonetic 'false friends' can indeed be considered an example of spelling-related problems, then one can hypothesize that

the influence of orthography on L2 pronunciation mistakes is visible even at the advanced level of language proficiency.

It turns out that the influence of spelling on L1-like pronunciation in case of L2 learners was already an object of interest earlier: the research by Ogorodnikova (1992) gives a background to one of the main concerns of the current thesis, namely the visibility of influence of spelling on pronunciation in spontaneous speech. Ogorodnikova (1992) examined the impact of orthography on pronunciation not only in the instance of reading L2 words (as it was the case of Fukazawa and Miglio 2006 and Szpyra-Kozłowska 2012) but also in recalling lists from memory, simple additions and, as I have already mentioned, in spontaneous speech. The participant was an English speaking adult Russian student, whose L2 proficiency level was estimated at Intermediate-Low. In order to test the hypothesis, Ogorodnikova (1992) decided to focus on the pronunciation of Russian words that involve vowel reduction which is not in any way marked in spelling. What she found out was that there were in fact more target-like than non-target-like productions in case of all the tasks except for the listing from memory, task where there was 50% correctness. The task consisted in saying out loud lists of words like days of the week or months, when their written forms were not present. Ogorodnikova (1992) claimed that as the task requires no linguistic or grammatical creativity and it simply retrieves words from memory it can be in fact very informative about the phonology of lexical items that are stored there (and the influence of spelling on it). When it comes to the percentage of non-target-like realizations in case of the remaining tasks, Ogorodnikova (1992) found it considerable: 33% in spontaneous speech, 43% in reading and 46% in simple additions. She also considered possible reason for the higher percentage of target-like productions as the fact that the words elicited from the student were in fact the high frequency ones, which are believed to be often heard and therefore easily acquired in their correct phonetic shape.

1.3. The present research

The present study will also try to examine the influence of orthography on L2 pronunciation mistakes. As Szpyra-Kozłowska (2012) noticed, Polish learners of English have more access to written rather than to spoken target language and for her

this is the reason why spelling turns out to have such a great effect on their pronunciation (the effect visible in the PDI (Sobkowiak 1999) as well as in the results of her own studies). In my research I will also analyse the pronunciation mistakes of Polish English learners. Even though Fukazawa and Miglio (2006) claimed that the influence of spelling is a powerful force at the early stages of SLA, the studies of Szpyra-Kozłowska (2012) showed that the spelling-related pronunciation problems are still true not only for intermediate but even for advanced L2 learners, at least in the case of Polish students of English. As it seems to emphasise the magnitude of the phenomenon, the present research will concentrate on the levels of L2 proficiency ranging from Intermediate to Mastery. Szpyra-Kozłowska (2012) gave her participants the task of reading sentences out loud, in order to analyse their pronunciation problems. What Ogorodnikova (1992) pointed out in her study, referring to the work of Tarone from 1982, was that the actual interlanguage of L2 learner is most visible in spontaneous speech, when he does not pay that much attention to the form of the language. This would mean that in order to see the influence of spelling on interlanguage pronunciation patterns one needs to examine pronunciation mistakes of L2 learners in a situation of spontaneous speech. Although the results that Ogorodnikova (1992) obtained from her participant in spontaneous speech were more target-like than non-target-like productions she also mentioned the limitation of her study that could have contributed to such outcomes (the high frequency vocabulary). The present study will also focus on spontaneous speech, but, contrary to Ogorodnikova (1992), I will not try to elicit particular lexical items from the participants (Ogorodnikova chosen the high frequency words for her study in order to be sure that she would elicit them from the participant in the interview, created for the task of spontaneous speech).In my research I will analyse the PELCRA Learner English Corpus (PLEC). PLEC is an electronic database created within a research project run at the University of Łódź in Poland. The database contains samples of English written and spoken by Polish learners, whose L2 proficiency level ranges from Intermediate to Mastery. In order to see the influence of spelling on pronunciation mistakes, I will analyse the instances of mispronounced words, that were listed on the bases of recordings of informal interviews conducted with the learners. The list of manually annotated mispronunciations is available at the website of the project (http://pelcra.pl/plec/downloads). I will focus on the words containing diphthongs - whether a diphthong in a particular word is pronounced correctly,

independently of other mistakes made in a word (every word in the database is mispronounced, but it is not always a diphthong that is mispronounced). A diphthong can be defined as a combination of a vowel and a semi-vowel (glide) (Kalisz 1974). Whereas it is well known that diphthongs exist in English, the case is not that clear in Polish. As Kalisz (1974) points out, many phoneticians do not mention their existence in Polish at all. He himself, following the definition of diphthongs mentioned above, treats all the combinations of vowels with /j/ and /w/, which are glides in Polish, as diphthongs. Balas (2009) is one of the phoneticians who claimed that there are actually no diphthongs in Polish - that there are only vowel plus glide sequences, which are very similar to English diphthongs and therefore the latter should not be mispronounced by Polish learners of English. Her arguments against the existence of typical diphthongs in Polish are that the already mentioned sequences in Polish are normally not followed by a consonant in the same syllable and that their occurrence in Polish is less frequent than of the other vowels in the language. Also, there are differences of vector lengths between the English diphthongs and the Polish sequences. Nevertheless, the present study will stick to the opinion that the vowel plus glide sequences in Polish are in fact diphthongs, as such a sequence is basically a definition of what a diphthong is, as provided by Kalisz in 1974. Even if one accepts his view on diphthongs in Polish, it must be stated that although Polish diphthongs have phonetic equivalents in English, they are always written with two graphemes and, moreover, particular sequences of graphemes are always pronounced as a particular diphthong (Kalisz 1974). This is not a case in English, where, depending on a lexical item, the same diphthong can be written either with one or with two or even with more graphemes, and the sequences of graphemes are not fixed for particular diphthong (Kalisz 1974). Therefore, what I expect to find out after analysing the PELCRA Learner English Corpus(considering the words that can contain at least one mispronunciation) is that Polish English learners mispronounce the diphthongs more often in the following cases:

1) when a diphthong is spelled with one letter than when it is spelled with two letters

2) when even if it is spelled with two letters the sequence refers to a different diphthong in Polish than when the graphemes in Polish do not occur in such sequence

3) when a lexical item is a phonetic 'false friend' than when it is a non-"false

friend"(following Szpyra-Kozłowska (2012) findings that phonetic 'false friends' are problematic even for the advanced Polish learners of English)

2. Research

2.1. Sources [1]

As it has already been mentioned, to find out whether an orthography can possibly have an influence on pronunciation mistakes made by L2 learners, the database of mispronounced words of the PELCRA Learner English Corpus (PLEC) was used. PELCRA (Polish and English Language Corpora for Research and Applications) has been developed by research group at the Department of English Language at the University of Łódź in Poland, which came into being in 1997. PLEC is one of their projects, which was ran at the University of Łódź , among Polish learners of English ,levels Intermediate to Mastery. The project lasted from 12.01.2010 to 11.01.2013 and was funded by the Polish Ministry of Science and Higher Education and resulted in an electronic database, created for investigating the language competence of Polish learners of English and therefore containing samples of written and spoken English of Polish learners. The spoken subcomponent of the corpus contains 15 hours of recordings of informal interviews with Polish learners of English, levels Intermediate to Mastery, which were transcribed to 131, 542 words. All the mispronunciations were then manually annotated and the database of mispronounced words was created, in which the words were transcribed orthographically and phonetically (phonetically in their target and in non-target phonetic shape), resulting in the data bank of 2320 mispronounced words. The database, format text/xml, is available on the website of PLEC (see References).

2.2. Method and Analyses

In order to see if the spelling has an effect on mispronunciations made by Polish learners of English in spontaneous speech, I decided to analyse the database of

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[1] The information provided in this subsection can be found on the following websites: Meta-Share, Pelcra and PLEC (see References)

mispronounced words looking for the ones that contained diphthongs in their target phonetic shape. Even though all the words in the database were mispronounced, there was not always a diphthong that was mispronounced (they were some other mistakes like voicing, devoicing, wrong stress, etc.) and my interest was to see whether in a given mispronounced word that contained a diphthong it was the diphthong that was mispronounced, by how many graphemes it was represented (when with two graphemes, was the representation linked to a different diphthong in Polish) and if the word itself was a phonetic 'false friend'. For the analyses I chose to search for the words containing either a diphthong [eɪ] or a diphthong [əʊ] in their target pronunciation. According to Kalisz (1974), the former has its counterpart in Polish, which is [ej], whereas the latter has the counterpart of its American English version in Polish, namely [ow] (as English diphthongs are vowel and glide sequences like in Polish, and the English glides are also [j] and [w], the English diphthongs can alternatively be transcribed as [ej], [əw] and [ow] as well). The reason why I chose these specific diphthongs for the analyses was their frequent occurrence in the database (especially of the diphthong [əʊ]). Both diphthongs are so called falling diphthongs, meaning that a vowel precedes a glide (it can be also the other way round, then the diphthong is called rising) which have their equivalents in Polish, unlike centring diphthongs, that consist of vowel + schwa sequences and exist in English but not in Polish (Kalisz 1974). Choosing the diphthongs which are present in Polish seemed reasonable due to the fact that it is only the orthography that can be misleading for Polish learners of English in this case (one grapheme representations or different two grapheme representations than in Polish), not the novelty of sounds themselves.

2.3. Procedure

At first, I listed all the tokens containing the diphthong [eɪ] in their target phonetic shape. "Tokens", as I took a word into consideration every time it appeared in the database, also its derived or inflected forms, in order to have precise data about the diphthong. What I analysed in every token that I found was whether the diphthong itself was pronounced correctly and what are the answers to the three following questions: 1) how is the diphthong spelled (with one or with two letters)? 2) if it is

spelled with two letters, is the graphic representation linked to a different diphthong in Polish or do the graphemes in Polish not occur in such sequence? 3) is the word a phonetic 'false friend' or a non-'false friend'? The next step was to find all the tokens containing the diphthong [əʊ] and to analyse them in exactly the same way. After analysing both diphthongs in this way and therefore having general statistics about the correctness of pronouncing them among the Polish learners of English, the final stride were chi-square analyses made in order to test the most important hypotheses for this study and to see the possible influence of orthography on pronunciation problems by trying them:

1) The proportion of mispronounced diphthongs will be larger when they are represented with one grapheme than when they are represented with two graphemes. The chi-square analyses for the hypothesis consisted in comparing how many one grapheme -representations of diphthongs were pronounced correctly or incorrectly with how many two grapheme-representations were pronounced correctly or incorrectly.

2) The proportion of mispronounced diphthongs will be larger when their two grapheme- representations are linked to different diphthongs in Polish than when the graphemes in Polish do not occur in such sequence.

The chi-square analyses for the hypothesis consisted in comparing how many two grapheme- representations linked to different diphthongs in Polish were pronounced correctly or incorrectly to how many two grapheme representations that do not occur in Polish (the graphemes do not appear in such sequences) were pronounced correctly or incorrectly. The reasoning here was that it could be easier for the students to accept unfamiliar sequences of graphemes as alternative representations of familiar diphthongs than to accept that the sequence of graphemes fixed for the particular diphthong in Polish can be pronounced as a different diphthong, also existing in the language.

3) The proportion of mispronounced diphthongs will be larger when they are embodied in phonetic 'false friends' than when they are embodied in non-'false friends'.

The chi-square analyses consisted in comparing how many diphthongs embodied in phonetic 'false friends' were pronounced correctly or incorrectly to how many diphthongs embodied in non-'false friends' were pronounced correctly or incorrectly. All the Polish equivalents of phonetic 'false friends' that were present in the database

contained no representation of the diphthongs. The expectation that diphthongs embodied in phonetic 'false friends' would be mispronounced more often than when they are embodied in non-'false friends' was caused by the reasoning that due to similar or even identical spelling of phonetic 'false friends' in both languages the whole words would be pronounced following the Polish grapheme-phoneme relation, in this case without diphthongs.

An important thing is that before the research was conducted, the first idea was to make the chi-square analyses for both diphthongs together, as the focus of the study was to see the influence of orthography on pronunciation considering diphthongs ([eɪ] and [əʊ] as the representation of diphthongs common for both English and Polish) embodied in words containing at least one mispronunciation. However, after the very first statistics, it became clear that the chi-square analyses had to be made separately for every diphthong, as the Polish learners of English responded to them differently.

3.Results

3.1. The diphthong [eɪ]

After listing all the tokens that contained the diphthong [eɪ] in a target pronunciation (having counted a word every time it occurred in the database), I was left with 145 items. In case of the vast majority of them (135; 93%) the diphthong was written with one grapheme. In case of the remaining 10 tokens it was written with two graphemes. As far as phonetic 'false friends' are concerned, they constituted the majority of tokens that contained the diphthong [eɪ] in their target phonetic shape (namely 99; 68%). The diphthong was pronounced correctly in the majority of tokens (108 of 145; 74%). The Table 1 below illustrates the results in numbers:

Table 1. *The number of tokens in case of which the diphthong [eɪ] was correctly pronounced and when it was mispronounced, divided according to its grapheme representation and a phonetic 'false friend' status of a token.*

Diphthong [eɪ]						
Total number of tokens: 145						
	One grapheme	**More than one grapheme**	*Marginal Row Totals (1)*	**Phonetic 'false friends'**	**Non-'false friends'**	*Marginal Row Totals (2)*
Correctly pronounced	104	4	*108*	74	34	*108*
Incorrectly pronounced	31	6	*37*	25	12	*37*
Marginal Column Totals	*135*	*10*	*145*	*99*	*46*	*145*

3.1.1. The proportion of mispronounced diphthongs will be larger when they are represented with one grapheme than when they are represented with two graphemes.

The first of my three hypothesis was that the Polish learners of English would mispronounce diphthongs more often when they are spelled with one letter than when they are spelled with two letters, as Polish diphthongs are always spelled with two letters. Contrary to my predictions, the analyses of how the tokens that have the diphthong [eɪ] in their target phonetic shape were pronounced by the learners showed, that the majority of one-grapheme representations (104 of 135; 77%) was pronounced correctly. In order to see if the result was significant, I made a chi-square analyses in which I compared the number of correctly and incorrectly pronounced one-grapheme representations to the number of correctly and incorrectly pronounced two grapheme- representations. The chi-square statistic was 6.7197, the *p*-value was .009535 and that result was indeed significant at *p* < .05, which rejected my first hypothesis, by showing that the proportion of mispronounced diphthongs was smaller when they were represented with one grapheme than when they were

represented with two graphemes.

The chi-square statistics are shown in the Table 2 below:

Table 2. *The chi-square statistics for correctly and incorrectly pronounced one grapheme and two grapheme-representations of the diphthong [eɪ]. The following information is provided: the observed cell totals, (the expected cell totals) and [the chi-square statistic for each cell]*

Diphthong [eɪ]			
	One grapheme	**Two graphemes**	*Marginal Row Totals*
Correctly pronounced	104 (100.55) [0.12]	4 (7.45) [1.6]	*108*
Incorrectly pronounced	31 (34.45) [0.35]	6 (2.55) [4.66]	*37*
Marginal Column Totals	*135*	*10*	*145 (Grand Total)*
Significance level: .05			

3.1.2. The proportion of mispronounced diphthongs will be larger when their two grapheme- representations are linked to different diphthongs in Polish than when the graphemes do not occur in Polish in such sequence.

The second hypothesis was that Polish learners of English would mispronounce diphthong more often - even when it is spelled with two letters (so in the way it is always spelled in Polish) - when the sequence of graphemes is pronounced as a different diphthong in Polish than when the graphemes do not occur in such sequence in Polish. In the database I found 10 tokens in which the diphthong [eɪ] was represented by two-graphemes and in 6 of them (60%) the sequence of letters referred to a different diphthong in Polish. The majority of them (4 of 6; 67%) were pronounced incorrectly, following the Polish grapheme-phoneme relation, so compatibly with my second hypothesis. In order to see the significance of the result, I

made a chi-square analyses, in which I compared the correctness of pronouncing two-grapheme representations that were linked to a different diphthong in Polish with the correctness of pronouncing two-grapheme representations when the graphemes did not occur in such sequence in Polish. The chi-square statistic was 0.2778, the *p*-value was .598161 and that result was *not* significant at *p* < .05. The results did not support the second hypothesis and therefore no strong conclusion can be drawn about the proportion of mispronounced diphthongs when their two grapheme-representations were linked to different diphthongs in Polish compared to when the graphemes did not occur in such sequence in Polish. The chi-square statistics are shown in the Table 3 below:

Table 3. *The chi-square statistics for correctly and incorrectly pronounced two-grapheme representations of the diphthong [eɪ], referring either to a different diphthong in Polish or not occurring in Polish as such sequence. The following information is provided: the observed cell totals, (the expected cell totals) and [the chi-square statistic for each cell]*

Diphthong [eɪ]			
	Two graphemes refer to a different diphthong in Polish	**Two graphemes do not occur in Polish in such sequence**	*Marginal Row Totals*
Correctly pronounced	2 (2.4) [0.07]	2 (1.6) [0.1]	*4*
Incorrectly pronounced	4 (3.6) [0.04]	2 (2.4) [0.07]	*6*
Marginal Column Totals	*6*	*4*	*10 (Grand Total)*
Significance level: .05.			

3.1.3. The proportion of mispronounced diphthongs will be larger when they are embodied in phonetic 'false friends' than when they are embodied in non-'false friends'.

The third hypothesis was that Polish learners of English would mispronounce diphthongs more often when they are embodied in phonetic 'false friends', than when they are embodied in non-'false friends'. Among the 145 tokens containing the diphthong [eɪ] were as many as 99 phonetic 'false friends' (68%). As the database contains only words that were mispronounced it seems to further confirm the findings of Szpyra-Kozłowska (2012) that phonetic 'false friends' are problematic in terms of pronunciation even for advanced Polish learners of English. However, the analyses of the tokens containing the diphthong [eɪ] showed that it was certainly not the diphthong that was mostly mispronounced in case of phonetic 'false friends', as in the majority of them (74 of 99; 75%) the diphthong was pronounced correctly. What is interesting here, is that in Polish orthographic equivalents of the phonetic 'false friends' they were no representations of any diphthong at all and yet the mispronunciations were rare. In order to see if the result, that was inconsistent with my predictions, was significant, I made a chi-square analyses in which I compared the correctness of pronouncing the diphthong in case of phonetic 'false friends' to the correctness of pronouncing the diphthong in case of non-'false friends' (meaning the tokens that exist in English but not in Polish). The chi-square statistic was 0.0115., the p-value was .914579 and that result was *not* significant at $p < .05$. It means that also my third hypothesis was not supported for the diphthong [eɪ], and no strong conclusion can be drawn about the proportion of mispronounced diphthongs embodied in phonetic 'false friends' compared to the proportion of mispronounced diphthongs embodied in non-'false friends'.

The chi-square statistics are shown in the Table 4 below:

Table 4. *The chi-square statistics for correctly and incorrectly pronounced representations of the diphthong [eɪ], embodied in phonetic 'false friends' or in non-'false friends'. The following information is provided: the observed cell totals, (the expected cell totals) and [the chi-square statistic for each cell]*

Diphthong [eɪ]			
	Phonetic 'false friends'	**Non-'false friends'**	*Marginal Row Totals*
Correctly pronounced	74 (73.74) [0]	34 (34.26) [0]	*108*
Incorrectly pronounced	25 (25.25) [0]	12 (11.74) [0.01]	*37*
Marginal Column Totals	*99*	*46*	*145 (Grand Total)*
Significance level: .05			

3.2. The diphthong [əʊ]

I found 422 tokens containing the diphthong [əʊ] in their target phonetic shape (again, counting a word every time it occurred in the database), which means there were more of them than of the tokens containing the diphthong [eɪ] . Similarly to the diphthong [eɪ] , the diphthong [əʊ] was also represented mostly with one grapheme, but here the numbers were astonishing: in only one token the diphthong [əʊ] was spelled with more than one letter (which constitutes 0,2%). Moreover, it was not the two-grapheme sequence, but the diphthong [əʊ] was represented by as many as four letters in the token. When it comes to phonetic 'false friends', they were minimally more of them (218) than of non-'false friends' (204). Contrary to the previous one, the diphthong [əʊ] was mispronounced in the vast majority of tokens (411 of 422; 97%). Because of such differences, all the chi-square analyses for the two diphthongs were made separately . The Table 5 illustrates the results for the diphthong [əʊ] in numbers:

Table 5. *The number of tokens in case of which the diphthong [əʊ] was correctly pronounced and when it was mispronounced, divided according to its grapheme representation and a phonetic 'false friend' status of a token.*

Diphthong [əʊ]						
Total number of tokens: 422						
	One grapheme	**More than one grapheme**	*Marginal Row Totals (1)*	**Phonetic 'false friends'**	**Non- 'false friends'**	*Marginal Row Totals (2)*
Correctly pronounced	10	1	*11*	5	6	*11*
Incorrectly pronounced	411	0	*411*	213	198	*411*
Marginal Column Totals	*421*	*1*	*422*	*218*	*204*	*422*

3.2.1. The proportion of mispronounced diphthongs will be larger when they are represented with one grapheme than when they are represented with two graphemes.

Just as in case of the previous diphthong, I decided to try all the three hypotheses that I formulated at the beginning of this study. The first one was that Polish learners of English would mispronounce diphthong more often when it is spelled with one letter, than when it is spelled with two letters. The results for the previous diphthong contradicted it, but the statistics for the diphthong [əʊ] showed only that the one grapheme-representations of the diphthong were largely mispronounced. In as many as 411 of 421 tokens (98% (!)) in which the diphthong was written with one letter it was also pronounced incorrectly. However, the problem was that they were no two grapheme-representations of the diphthong in the database: the only more than one grapheme representation of the diphthong [əʊ] in the data bank consisted of as many as four graphemes. There are no such diphthong-representations in Polish, but, surprisingly, it was pronounced correctly. I decided to make the chi-square analyses in which I compared the number of correctly and incorrectly pronounced one-grapheme representations of the diphthong to the number of correctly and incorrectly pronounced more than one-grapheme representations, in order to prove

statistically that the number of mispronounced one grapheme -representations is significant. In other words, due to the limitations of the data, in case of the diphthong [əʊ] the first hypothesis was alternated to: the proportion of mispronounced diphthongs will be larger when they are represented with one-grapheme than when they are represented with more graphemes. As I have already mentioned, they are no four grapheme-representations of diphthongs in Polish, but due to the fact that orthography in this language is quite phonemic one can assume, that it is easier for Polish learner of English to associate diphthongs with a sequence of a few graphemes than with only one grapheme. The chi-square statistic was 37.4524 and that result was indeed significant at $p < .05$, showing that the hypothesis was in fact confirmed. The chi-square statistics are shown in the Table 6 below:

Table 6. *The chi-square statistics for correctly and incorrectly pronounced one-grapheme and more than one- grapheme representations of the diphthong [əʊ]. The following information is provided: the observed cell totals, (the expected cell totals) and [the chi-square statistic for each cell]*

Diphthong [əʊ]			
	One grapheme	**More than one grapheme**	*Marginal Row Totals*
Correctly pronounced	10 (9.97) [0.09]	1 (0.03) [36.39]	*11*
Incorrectly pronounced	411 (410.03) [0]	0 (0.97) [0.97]	*411*
Marginal Column Totals	*421*	*1*	*422 (Grand Total)*
Significance level: .05			

3.2.2. The proportion of mispronounced diphthongs will be larger when their two grapheme- representations are linked to different diphthongs in Polish than when the graphemes do not occur in Polish in such sequence.

The second hypothesis was that the students would mispronounce diphthongs more often when they are orthographically linked to different diphthongs in Polish then when the graphemes do not occur in such sequence in Polish. The analyses of the previous diphthong showed that even though the two grapheme-representations referring to different diphthongs in Polish were mostly mispronounced, the result was not significant. Unfortunately, it was impossible to make such analyses of the diphthong [əʊ], as there was only one more than one grapheme-representation of the diphthong in the database and it consisted of four graphemes for which it would not be pronounced as a diphthong in Polish (nevertheless, it was pronounced correctly). All in all, it was impossible to say whether the second hypothesis was supported or not in case of the diphthong [əʊ].

3.2.3. The proportion of mispronounced diphthongs will be larger when they are embodied in phonetic 'false friends' than when they are embodied in non-'false friends'.

The third hypothesis was that Polish learners of English would mispronounce diphthongs more often when they are embodied in phonetic 'false friends' than when they are embodied in non-'false friends'. As it has already been mentioned, even though there were more phonetic 'false friends' than non-'false friends' among the tokens containing the diphthong [əʊ], their dominance was minimal (218 to 204; 52%). What is more, the diphthong [əʊ] was mostly mispronounced in the phonetic 'false friends' and in the non-'false friends' as well, so again, quite differently than in the situation of the diphthong [eɪ]. In the Polish orthographic equivalents of the phonetic 'false friends' containing the diphthong [əʊ] there were no representations of any diphthong, at least in the part of a word where it appeared in English (there were two tokens that in Polish have a different diphthong, meaning [ɛw], in another part of a word and therefore it does not seem influential in this case; the tokens were "Euro" and "Euros"). In order to see if the result was significant, I made a chi-square

analysis in which I compared the correctness of pronouncing the diphthong in the case of phonetic 'false friends' to the correctness of pronouncing the diphthong in the case of non-'false friends'. The chi-square statistic was 0.1741, the *p*-value was .676501 and that result was *not* significant at $p < .05$. It means that the third hypothesis was not supported, and no strong conclusion can be drawn about the proportion of mispronounced diphthongs embodied in phonetic 'false friends' compared to the proportion of mispronounced diphthongs embodied in non-'false friends'.

The chi-square statistics are shown in the Table 7 below:

Table 7. *The chi-square statistics for correctly and incorrectly pronounced representations of the diphthong [əʊ], embodied in phonetic 'false friends' or in non-'false friends'. The following information is provided: the observed cell totals, (the expected cell totals) and [the chi-square statistic for each cell]*

Diphthong [əʊ]			
	Phonetic 'false friends'	**Non-'false friends'**	*Marginal Row Totals*
Correctly pronounced	5 (5.68) [0.08]	6 (5.32) [0.09]	*11*
Incorrectly pronounced	213 (212.32) [0]	198 (198.68) [0]	*411*
Marginal Column Totals	*218*	*204*	*422 (Grand Total)*
Significance level: .05			

4. Discussion

4.1. Summary of the study

The present study tried to test the hypothesis that an L2 orthography can lead L2 learners to L1 pronunciation patterns and is visible even in case of spontaneous speech. The database which was analysed for the purpose of the study consisted only of words that were mispronounced by Polish English learners, levels B1 to C2. The

analyses focused on the pronunciation of two English diphthongs, [eɪ] and [əʊ]: the tokens which contained these diphthongs in their target phonetic shape were listed, and the correctness of pronouncing the diphthongs, independently of other mispronunciations made in the tokens (every token was mispronounced but it was not necessarily the diphthong that was mispronounced in it), was taken into consideration. According to Kalisz (1974), the diphthongs [eɪ] and [əʊ] (and some other diphthongs too) have their counterparts in Polish but they are never written with one letter and their two grapheme-representations are always pronounced as the particular diphthongs. As the diphthongs can be spelled with one letter in English and the two grapheme - representations are not fixed for them, the expectations concerning the influence of orthography on pronunciation were the following:

1) when the diphthongs are written with one letter it would make the students mistakenly follow a Polish rule that vowels written with one grapheme should be pronounced as monophthongs; therefore, the first hypothesis was that one grapheme-representations of the diphthongs will be more often mispronounced than the two-grapheme representations

2) when the diphthongs are written with two graphemes, but referring to another diphthong in Polish, it would also make the students mistakenly follow the Polish grapheme-phoneme relation; it led to the statement of the second hypothesis that two-grapheme representations will be more often mispronounced when they refer to a different diphthong in Polish than to when the graphemes do not occur in such sequence in Polish.

Due to the fact that Polish learners of English turned out to have spelling-related problems with pronunciation in the study by Szpyra-Kozłowska (2012) and that mispronouncing phonetic 'false friends' even at the advanced level of L2 proficiency (Szpyra-Kozłowska 2012) could be considered an example of such problems, one more hypothesis of the current study was the following:

3) when the tokens containing the diphthongs are phonetic 'false friends', it would make the students pronounce the whole words mistakenly following the Polish grapheme-phoneme relation, which means without a diphthong (considering the Polish equivalents of phonetic 'false friends' from the database); therefore, the third hypothesis was that the diphthongs-representations embodied in phonetic 'false friends' would be more often mispronounced than the representations embodied in non-'false friends'.

However, the results did not entirely fulfill the expectations: it turned out that the diphthong [eɪ] contradicted the first hypothesis. In the vast majority of tokens (135 of 145; 93%), it was represented by one grapheme and pronounced correctly in as many as 104 cases (77%), whereas its two grapheme - representations were mispronounced in 6 of 10 tokens (60%), which rejects the first hypothesis that I stated. Also, the phonetic 'false friends' that contained the diphthong (and had no diphthong-representations in their Polish orthographic equivalents) did not show a mispronunciation of the diphthong in the majority of the tokens (74 of 99; 75%), which could have contradicted my third hypothesis, but those statistics compared to the ones of non 'false friends' turned out to be insignificant. The only hypothesis that might have been confirmed in case of the diphthong [eɪ], was that the two grapheme-representations that were linked to another diphthong in Polish were mostly mispronounced as a Polish diphthong (in 4 of 6 tokens; 67%). However, the chi-square analyses showed that the result was not significant compared to statistics of two grapheme representations of the diphthong that do not occur in Polish (the graphemes do not occur in such sequence in the language). The situation with the diphthong [əʊ] was quite distinct. First of all, the diphthong was mostly mispronounced. They were more tokens containing the diphthong than containing the previous one (namely 422 tokens). It was also represented by one grapheme in the majority of the tokens, but this time the number was astonishing: 421 tokens (99,8%), which means that only one token in the database contained more than one grapheme-representation of the diphthong. As 411 of 421 one grapheme-representations were mispronounced (98%), the diphthong [əʊ] could have confirmed my first hypothesis: however, they were no two grapheme-representations of it in the database, only one four grapheme- representation and the correctness of pronouncing it was compared to the correctness of pronouncing one grapheme-representations of the diphthong (it means the second hypothesis was alternated in case of the diphthong [əʊ]). Even though the result turned out significant, the reliability of the test is dubious: there was only one more than one grapheme-representation of the diphthong and it was compared to as many as 421 one grapheme - representations. Going further, the representations embodied in phonetic 'false friends' were also pronounced incorrectly in most cases (213 of 218; 98%), and the Polish orthographic equivalents of the 'false friends' contained no representations of any diphthong (except for two tokens in case of which the Polish

equivalent contained a representation of another diphthong, but not in the corresponding part of the word). Therefore, the third hypothesis could have also been said to be confirmed, but the chi-square analyses showed that the result was not significant, compared to statistics of non-'false friends' that contained the diphthong. Trying the second hypothesis was undoable in case of the diphthong [əʊ] because (as it has already been mentioned) only one more than one grapheme-representation occured in the database and it consisted of as many as four graphemes. There was not enough data to make the chi-square analysis but an interesting observation is that even though the representation would certainly not be pronounced as a diphthong in Polish (too many graphemes) it was pronounced correctly. It could be explained by the assumption that for the native speakers of Polish (which has quite phonemic orthography) it is easier to accept a sequence of a few graphemes as a representation of diphthong than only one grapheme as a representation of it.

Fukazawa and Miglio (2006) claimed that the influence of orthography on interlanguage pronunciation patterns is especially visible at the early stages of second language acquisition. Their participants were adults who were finishing their first year of learning L2. The present study partially demonstrated that the problem is visible also at the higher levels of L2 proficiency, as the participants were Polish learners of English levels Intermediate to Mastery. Partially, as the chi-square analyses showed that the orthography seemed to have an influence on the students' mispronunciations only in case of the diphthong [əʊ], not in case of the diphthong [eɪ], concerning their one grapheme - representations. It seems that the magnitude of influence of orthography on interlanguage phonology is not that reliant on the stage of SLA as Fukazawa and Miglio (2006) suggested, but on some other issues that the researchers did not take into consideration in their work. What seems the to be an interesting outcome of my analyses of the database is that the diphthong [eɪ] was pronounced correctly in the vast majority of the tokens (108 of 145; 74%), whereas the diphthong [əʊ] was mostly mispronounced (in 411 of 422 tokens; 97%). As the only results that were significant considered the first hypothesis (one grapheme-representations of the diphthongs will be more often mispronounced than the two-grapheme representations) , which was not supported in case of the diphthong [eɪ] and which was alternated in case of the diphthong [əʊ] (one grapheme-representations will be more often mispronounced than more than one grapheme-representations) and then supported, I will focus on finding possible explanations of

these particular results. Every time I mention the first hypothesis in the subsequent sections, I will also take into account its alternated version in the case of the diphthong [əʊ].

4.2. Possible explanations

4.2.1. Overgeneralization

Szpyra-Kozłowska (2012) was the one who showed that the spelling- related problems pose the greatest source of mispronunciations at the intermediate level of L2 proficiency and that phonetic 'false friends' tend to be mispronounced even at the advanced level of SLA. Her participants were Polish learners of English, just as in case of the present study. An interesting thing that Szpyra-Kozłowska (2012) pointed out was that the spelling-related problems with pronunciation that the intermediate Polish English learners had were caused by either following the Polish grapheme-phoneme relation or mistakenly following the English grapheme-phoneme relation, meaning making overgeneralizations. If one would like to explain the results for my first hypothesis by the learners resorting to English, she could observe that all the one grapheme-representations of the diphthong [eɪ] that were pronounced correctly (104 of 135; 77%) were spelled with the letter "a", which is pronounced as [eɪ] in English. It could be therefore claimed that the Polish learners of English linked the letter "a" to the diphthong and had no problems with pronouncing it correctly even though it is a one grapheme-representation, unacceptable for diphthongs in Polish. However, the problem is that the letter "o", which constituted all the mispronounced one grapheme -representations of the diphthong [əʊ] (411 of 421; 98%) is actually pronounced as the diphthong [əʊ] in English. In other words, as explanation based on overgeneralization apparently works for the diphthong [eɪ], but is inconsistent with the results for the diphthong [əʊ], an account is therefore unconvincing.

4.2.2. Highly frequent vocabulary

The data of Fukazawa and Miglio (2006) and of Szpyra-Kozłowska (2012) as well were obtained by asking their participants to read out loud. The database used in the current study was created after analysing informal interviews with Polish learners of

English, meaning the mispronunciations occured in spontaneous speech. The researcher who tried to see the influence of orthography on interlanguage phonology also examining spontaneous speech was Ogorodnikova in 1992. She cited Tarone (1982) who claimed that the actual interlanguage of a learner is the most visible when there is not much focus on form, meaning in spontaneous speech. Ogorodnikova (1992) had only one participant for her study, who was an English learner of Russian with L2 proficiency level estimated at Intermediate-Low. She decided to focus on Russian words that contain vowel reduction that is not marked in spelling and in order to successfully elicit the words from the participant she chose topics for the interview with the student that involved high frequency vocabulary (e.g. family, daily schedule, weather). As her participant performed also a few different tasks for the comparison of the outcomes (namely reading out loud, recalling lists from memory and simple additions) and in all the cases except for listing (where there was 50% correctness) there were more correct than incorrect realizations in the student's performance, Ogorodnikova (1992) hypothesised, that maybe such similar results among different tasks are due to the fact that highly familiar words were used (such words are often heard in their target phonetic shape and therefore it can be easier to acquire them). She suggested, that the results could have been different for less familiar words. If one would like to explain the results for my first hypothesis with the frequency of occurrence of words in English, one could point out that the two grapheme-representations of the diphthong [eɪ] that were mispronounced were in fact all embodied in low-frequency words. On the other hand, one could be surprised seeing that some one grapheme - representations of the diphthong [əʊ] which were embodied in high-frequency words (like e.g. *also, only*, *old,* highly frequent in British National Corpus) were in fact over averagely mispronounced, meaning in 32 (*also*), 30 (*only*) and 58 (*old*) tokens (when the average number of mispronounced tokens for a word containing the diphthongs was less than 6, in case of each diphthong). Therefore, even though the explanation that seemed suitable for the research of Ogorodnikova (1992) works for the mispronounced two grapheme-representations of the diphthong [eɪ], it is not really convincing as it is again inconsistent with the results of my own study for the diphthong [əʊ].

4.2.3. Consistency of orthography ²

One more possible explanation of the results for my first hypothesis is the consistency of orthography: namely, one can hypothesise that the students find it easy to pronounce the diphthong [eɪ] correctly when it is spelled with one letter as it is a more frequent representation of it than the two grapheme ones. Analysing possible one grapheme - representations, one can observe that the diphthong [eɪ] can be written with a letter "a" (the grapheme can also represent the sounds [æ], [a:], [ə]) and, less often, with a letter "e" (at the end of English words of French origin; normally, the grapheme can also represent the sounds [i:], [i], [e], [ə]). As far as two grapheme-representations of the diphthong are concerned, [eɪ] can be written with "ai", "ei" (the sequence can also represent the diphthong [ai]), "ay", "ey" (the sequence can also represent the diphthong [ai]), "ea", "ee" (the sequence can also represent the sound [i:]), "et" (the sequence can also be pronounced as [it]). The conclusion that can be drawn after such analyses is that in fact the diphthong shares its representations - one and two grapheme as well- with some other phonemes, which should easily lead Polish learners of English to confusion in case of both kinds of grapheme representations of the diphthongs (as grapheme representations in Polish are fixed for particular sounds). As it was not confirmed by the results for my first hypothesis, I will look for the possible explanation in the frequency of occurrence of particular representations, as mentioned at the beginning of this subsection. In order to find out how frequent the representations of the diphthong are I will search for how many regularities of their usage exist. Maybe there is a difference in the number of rules regulating when the diphthong is represented by the particular graphemes that could make the one grapheme -representation of the diphthong [eɪ] more frequent and therefore easier to acquire than the two grapheme - ones. Due to the fact that in all the tokens where the diphthong [eɪ] was spelled with one letter and pronounced correctly it was represented with the letter "a", and this is more frequent representation of the diphthong than the letter "e", I will only stick to this one when comparing the one grapheme-representations of both diphthongs. The letter "a" represents the diphthong [eɪ] in the open syllable in the root, in the root in the initial syllable that is not easily recognizable as an open syllable, and sometimes in the closed syllable. It also represents the diphthong in the verbal suffix "ate". All

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² All the information provided in the subsection is not based on scientific papers but on the materials available on the website Useful English (see References)

the two-grapheme representations of the diphthong [eɪ] have less regularities than the one grapheme - representation, which may explain why they were more often mispronounced. It seems that the consistency of orthography is another explanation that seems to work for the diphthong [eɪ]. Nevertheless, it is again inconsistent with the results for the diphthong [əʊ]. The latter, when spelled with one letter, can only be represented with "o", which is already some kind of regularity that should make the pronunciation of it easier, even though the particular grapheme can also represent different sounds (namely [ɔː], [ɒ], [uː], [u], [ʌ], [ə]). What is more, there are even more regularities concerning the one grapheme -representation of the diphthong [əʊ] than for the diphthong [eɪ]: it represents the diphthong in the open syllable in the root, in the root in the syllable that is not easily recognizable as an open syllable and in the closed syllable of the root, usually before LD (e.g. *old* [əʊld]),

LT (e.g. *bolt* [bəʊlt]), LL (e.g. *roll* [rəʊl]). It also represents the diphthong in the

prefix "co" and in some cases in the prefix "pro" and in the final position in the word. Moreover, the two grapheme - representations of the diphthong have less regularities than the one grapheme- one. Once more, the explanation that apparently works for the diphthong [eɪ] cannot be claimed convincing as it is inconsistent with the results for the diphthong [əʊ].

4.2.4. Database of mispronounced words

Another explanation for the fact that the one grapheme - representations of the diphthong [eɪ] were mostly pronounced correctly whereas the two grapheme - representations were mostly mispronounced, can be sought in the database that was used for the analyses. All the words in the data bank were somehow mispronounced, which means that they could hold more mispronunciations than those of the diphthongs. The thing is that some other mistakes made in a word could led to a deviated pronunciation of the diphthongs: for instance, word stress put in the wrong place might have required the reduction of a diphthong to a short vowel. I decided to count in how many tokens containing the mispronounced two grapheme-representations of the diphthong [eɪ] they were also other pronunciation mistakes made. It turned out that in fact there was only one such token, whereas in case of 5 tokens (83%) the mispronounced two grapheme - representation of the diphthong

was the only mispronunciation made. It looks like this time the explanation does not work for the diphthong [eɪ] (and even if it worked, it again would not be convincing as it does not work for the diphthong [əʊ]: in as many as 361 tokens (88%) the mispronounced one grapheme-representations of the diphthong [əʊ] were the only mispronunciations made).

4.2.5. Natural Phonology account: an alternative explanation.

What one can see clearly after analysing the possible explanations of the results for my first hypothesis is that they cannot be convincingly explained by resorting to the target language (overgeneralization), non by the frequency of the tokens in English, non by the consistency of particular grapheme representations non by the fact that the database used for the study consisted only of mispronounced words. What is interesting here and what should give food for thought is that the majority of already given possible explanations (all of them except for the database of mispronounced words) work for the results for the first hypothesis in case of the diphthong [eɪ] (why the two grapheme-representations were mostly mispronounced or why were the one grapheme- representations mostly pronounced correctly) but it is unconvincing as it is inconsistent with the results for the first hypothesis in case of the diphthong [əʊ] (according to those explanations, the one grapheme - representations of the diphthong should be mostly pronounced correctly and it was not the case). As some of the explanations that I elaborated on were about an influence of orthography on pronunciation and they failed, it is time to take a look at the results for my first hypothesis from a different perspective: namely, from the perspective of the perception of foreign sounds. A Polish researcher who already noticed that Polish learners of English substitute monophthongs only for certain English diphthongs was Balas (2009). What she focused on in her work was that the diphthong [aɪ] is usually pronounced correctly whereas the diphthong [oʊ] is usually mispronounced by native speakers of Polish. Due to the fact that the second part of her observation is in a way consistent with the results for my first hypothesis (the diphthong [oʊ] is an American English equivalent of the diphthong [əʊ] analysed in the current study) I will describe her account for it. In other words, the alternative explanation will have a different focus than the previous ones, as the question will be why the diphthong [əʊ]

was so difficult for the Polish learners of English and the answer will be provided from outside the impact of orthography.

Balas (2009) resorted to the influence of perception on pronunciation as she is actually against the idea that the spelling can have an influence on it and the arguments she gives are as follows: that Polish speakers tend to keep as closely as possible to original pronunciation of loanwords, that some English sounds are mispronounced by Poles who do not learn English and therefore cannot be influenced by its orthography, and that there is no unified theory about the impact of spelling on pronunciation that could predict why some diphthongs are mispronounced by Polish learners of English and others are not. Nevertheless, the present study will stick to the opinion that orthography can influence pronunciation, because of the results of Fukazawa and Miglio (2006), Sobkowiak (1999) and Szpyra-Kozłowska (2012) that are described in the introduction to this paper. As already mentioned in section 1.3. of the current paper, Balas rejected the existence of diphthongs in Polish, claiming that they are only vowel plus glide sequences that are similar to English diphthongs (the present study does not follow the opinion but tilts to the one of Kalisz (1974), that diphthongs exist in Polish). In her work (2009) she transcribed English diphthongs with [ʊ] and [ɪ], whereas the Polish sequences with [w] and [j] respectively, but for the current study, following Kalisz 1974, the English diphthongs can also be transcribed with [w] and [j], as the glides are their components.

  I will consider the perception of foreign sounds as an alternative explanation of my results for the first hypothesis as I am inclined to believe that the orthography is simply not the only possible factor that may influence the pronunciation patterns of an interlanguage. It could be an interesting issue for some further studies to investigate all possible factors that may influence L2 learners pronunciation and to find out why a particular factor plays a paramount role in case of some mispronunciations and not in case of others.

Coming back to the paper by Balas (2009), the model that she used to explain the mispronunciation of one diphthong and not of the other from the perspective of perception of foreign sounds was Natural Phonology, the theory founded by Stampe in 1969 and further developed by other researchers (like e.g. Donegan). Natural Phonology makes a distinction between phonological processes and rules (Balas 2009). The former are the responses to phonetic difficulties which are natural, as they are not acquired cognitively and they are applied unconsciously; processes can

be stable in a given language (e.g. final devoicing in Polish) or they can depend on for example a style or tempo of speech (e.g. palatalization of fricatives before /j/in English) (Balas 2009). When it comes to rules, they are not reactions to pronunciation difficulties: they are learned and habitual, and, contrary to processes, they tolerate exceptions (Balas 2009). Rules are claimed to apply earlier than processes, as the latter operate on their outcomes (Balas 2009). In Natural Phonology, speech production as well as speech perception are based on processes that are common to production and perception capabilities (Balas 2009). Perception consists in undoing the derivation until a form stored in a permanent memory is reconstructed (Balas 2009). Natural Phonological derivations observe two general rules: that fortition applies first and lenition second, and that morphological rules apply before phonological processes (Balas 2009). When it comes to fortition and lenition, the former is a listener-oriented process that strengthen phonetic properties of phonemes, whereas the latter is a speaker-oriented process which optimizes sequences of phonemes to the needs of the vocal tract (Balas 2009). Fortition applies usually when the increased perceptibility is expected, whereas lenition applies mostly in casual styles (Balas 2009). Both processes when applied in L2 will influence L2 sound perception, which means that e.g. some L2 phonemes can be perceived as lenitised L1 sounds(Balas 2009). Taking all the information into account, Balas (2009) investigated the pronunciation problems that Polish learners of English encounter with the diphthong [oʊ]. For this purpose, she analysed the case of a word "Coca" (from "Coca Cola"), which tends to be mispronounced by Poles as [kɔka] (instead of [koʊkə] or [kəʊkə]). As Balas claimed that they are no diphthongs in Polish, only vowel plus glide sequences, she referred to the Polish counterpart of the diphthong [oʊ] as to the sequence [ɔw] (but for the current study it is in fact a diphthong). In her opinion, what prevent Poles from interpreting the word as underlying [kɔwka] to which a lenition process of smoothing [ɔw] has applied (the vector length of [ɔw] is bigger than that of [oʊ] or [əʊ]), are three things: that the English diphthong involves too small a transition for Poles, that in Polish a lenition process of the particular sequence (diphthong) never takes place before consonants, and that lenitions are generally more expected in informal style, so not in the classroom where the Polish English learners hear the English diphthong. Therefore, Polish learners of English cannot perceive the diphthong as the Polish [ɔw] that underwent lenition and they choose the second possibility to interpret it as [ɔ], which

results in mispronunciation. Can the Natural Phonology account give an explanation of the results for the first hypothesis for the diphthong [eɪ]? The other diphthong that Balas (2009) analysed in her work was the diphthong [aɪ]. It is similar to the diphthong [eɪ] analysed in the present study in this respect that they are both falling diphthongs that consist of a glide [j] (their alternative transcription is therefore [ej] and [aj]). As the same glide used may actually result in similar vector lengths and lenition processes (also in case of the relation between their Polish counterparts) I decided to cite her analysis here as a possible explanation of the results for my first hypothesis for the diphthong [eɪ], from the perspective of perception. The explanation that Balas (2009) gave of why the diphthong [aɪ] does not cause pronunciation problems (taking into consideration a word Sprite, which is pronounced by Poles as [sprajt], so using the Polish counterpart of the English diphthong) was simply that the difference in transition between the two is not substantial. Therefore, it is not that difficult to perceive the English diphthong and its Polish counterpart as very similar and have no pronunciation problems in this case (again, for Balas (2009) the Polish counterpart is a vowel + glide sequence, but for the current study it is indeed a diphthong).

The perception account proposed by Balas (2009) seems to be quite a suitable explanation of the part of my results for the first hypothesis (I would only stick to the opinion that the Polish sequence is in fact a diphthong, but simply with a different vector length than the English one) : it could explain why the diphthong [əʊ] was mispronounced in so many tokens (97%) and why was the diphthong [eɪ] mostly pronounced correctly (74 %, considering one and two grapheme representations as well). Nevertheless, the results for my first hypothesis showed that there is a significant relationship between the kind of a written representation (one or two grapheme) and the correctness of pronunciation in case of the diphthong [eɪ], and focusing only on the perception account would deprecate it. Also the great limitation of my data, which is only one token containing more than one-grapheme representation of the diphthong [əʊ] , makes it impossible for me to state whether the diphthong was mostly mispronounced only when represented with one grapheme or in general. If the correctness of pronouncing one grapheme and two grapheme representations was contrastive, then it could be said that the explanation of Balas (2009) is not sufficient in case of the diphthong too, as it does not take orthography into consideration. If it was not contrastive, it would be hypothesised that in case of

the mispronunciations of the diphthong [əʊ] made by Polish learners of English perception is the most influential or the only influential factor. As I have already mentioned in this subsection, my belief is that the factors like perception and orthography (and possibly some other factors) may somehow cooperate, all having an impact on pronunciation patterns of interlanguage. This is, however, the suggestion for some further studies to investigate it.

4.3. Limitations of the present study

The current study tried the hypothesis that orthography has an influence on pronunciation in case of Polish learners of English , even when it comes to spontaneous speech. The mispronunciations analysed were those of the diphthongs [əʊ] and [eɪ], which have their counterparts in Polish but they differ - inter alia - in this respect that they are always spelled with two letters and that particular two grapheme-representations are pronounced only as particular diphthongs. As it is not the case in English, three hypothesis about an influence of orthography on pronunciation of the diphthongs were stated; however, as the results for the two of them turned out insignificant after the chi-square analyses were made, the possible explanation of the results for only one of them were searched for. The results were that the diphthong [eɪ] was more often pronounced correctly when written with one letter than when written with two letters and that the diphthong [əʊ] was largely mispronounced when written with one letter. The results concerning the diphthong [eɪ] contradicted the hypothesis stated in this study (that two grapheme-representations will be more often pronounced correctly). When it comes to the diphthong [əʊ], there was only one more than one grapheme - representation of the diphthong in the database that I used for the analyses and it consisted of as many as four graphemes, which made it impossible to state whether two grapheme-representations of the diphthong [əʊ] were pronounced correctly more often than one grapheme-representations - so it was undoable to confirm or reject exactly the same hypothesis that was testable in case of the diphthong [eɪ] (that is why the hypothesis was alternated to comparing one grapheme to more than one grapheme-representations of the diphthong [əʊ]). It was one of the limitations of the study that could have contributed to the fact that no clear explanation of the results for the

hypothesis was found. As far as other limitations of the research are concerned, the database that I chose to analyse consisted only of mispronounced words - the mispronunciation of a diphthong could be one of at least two pronunciation mistakes made within a token, and in fact that another mispronunciation could have led to the mispronunciation of a diphthong (e.g. wrong stress). Although the subsequent analyses showed that the majority of mispronounced two grapheme- representations of the diphthong [eɪ] as well as of mispronounced one grapheme- representations of the diphthong [əʊ] constituted the only pronunciation mistake in the tokens where they appeared, it can be stated that looking for the words containing the diphthongs in the whole spoken component of the corpus would result in more tokens to analyse (especially two-grapheme representations of the diphthongs, as they were only little or none of them) and therefore maybe the different outcomes. More tokens means that there could exist some two grapheme - representations of the diphthong [əʊ] in the component : my chi-square statistics for the first hypothesis in case of the diphthong would gain in reliability then. There are, however, some reasons why analysing the whole spoken component of PLEC on my own would not be a good idea. At first, making phonetic transcription of a fluent speech is a task that requires more training and experience than what I have. Secondly, as I am of the same nationality as the students who were recorded and I started learning English also in the classroom environment (focusing more on written language than on the spoken one), I could in fact overlook some mispronunciations made by the students - my interlanguage pronunciation patterns may evince similar errors. The next limitation of the current study was that I took only the two diphthongs into consideration. They are more counterparts of English diphthongs in Polish and it could be reasonable to analyse one more falling diphthong that finishes with [w] ([əʊ] can be alternatively transcribed [əw]) and one more falling diphthong that finishes with [j] ([eɪ] can be alternatively transcribed [ej]). Such analyses could show whether e.g. diphthongs consisting of a particular glide are more problematic for Polish learners of English in terms of pronunciation.

5. Conclusions

The first hypothesis of this study, that the diphthongs [eɪ] and [əʊ] will be more often mispronounced by Polish English learners when represented with one grapheme than when represented with two, had to be alternated in case of the diphthong [əʊ] and only then it was confirmed (that the one grapheme-representations of the diphthong will be more often mispronounced than more than one grapheme-representations), whereas the results for the two remaining hypotheses (that the two grapheme-representations of the diphthongs will be more often mispronounced when linked to a different diphthong in Polish than when the graphemes do not occur in such sequence in Polish, and that the representations of the diphthongs will be more often mispronounced when embodied in phonetic 'false friends' than in non-'false friends') were proved insignificant. The further analyses could not find any possible explanations of the outcomes for the first hypothesis that could be suitable in case of both diphthongs: the results for the diphthong [eɪ] (namely more mispronunciations among the two grapheme-representations than among the one grapheme-ones) could have somehow been explained by overgeneralization, low-frequent words and less frequent occurrence of two grapheme- representation. The results for the diphthong [əʊ] (the vast majority of tokens containing one grapheme-representations of the diphthong was mispronounced) could not have been sufficiently explained by means of an influence of orthography, as they were no two grapheme - representations of the diphthongs to compare them with one grapheme-representations (there was only one more than one grapheme -representation of the diphthong) and the other explanations that worked for the diphthong [eɪ] did not work for the diphthong [əʊ]. If there were any two grapheme - representations of the diphthong [əʊ] and they would also be largely mispronounced, it could be claimed that the diphthong causes pronunciation problems because it is difficult perceptually whereas the diphthong [eɪ] is not . However, due to lack of such data, it simply could not be stated and, moreover, the perception account was not fully reliable already as it deprecated the relationship between the kind of grapheme representations and correctness in case of the diphthong [eɪ] . Generally, the limitations of the current study (like the narrow database and the narrow choice of diphthongs analysed) could have prevented the research from obtaining a clearer picture of the results. What can be done in the future then, is further research that would analyse a broader database and more

diphthongs to possibly find some patterns of mispronunciations which may exist depending on e.g. glides that diphthongs consist of or/and that would verify the hypothesis that there are in fact a few factors that can influence pronunciation pattern of interlanguage and that they cooperate facilitating or hindering L2 learners pronunciation.

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Table of contents