On the role of perception in the acquisition of the peach – pitch *contrast by Polish learners of English*

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1. Introduction

This paper tries to account for the difficulty that Polish learners of English have with producing the English /iː/ – /ɪ/ vowel contrast by investigating the hypothesis that the difficulty with producing the contrast has its roots in the inability to perceive it[1]. The above-mentioned difficulty is notoriously widespread among Polish learners. As any English teacher who has had experience with Poles will know, getting them to produce *leave* and *live*, *seat* and *sit*, *reach* and *rich*, *feel* and *fill*, or *eat* and *it* as pairs of differing words can be a struggle. What Polish learners have been observed to do is neutralize the contrast and use only one vowel in all the above mentioned words, a peripheral vowel similar in quality to English /iː/.

A substitution of this sort is hardly surprising as far as, for instance, French or Spanish learners of English are concerned. Their phonological systems have only one high front (unrounded) vowel, while English has two, traditionally transcribed as /iː/ and /ɪ/. Polish, unlike Spanish or French, but in common with English, however, has been thought of as having two contrasting (unrounded) sounds in the high front region of the vowel space. Aside from a peripheral /i/, it also has its lower and less advanced counterpart, traditionally transcribed as /ɨ/. The bar across the symbol suggests that it is a central vowel. In acoustic terms, however, it is only slightly more central than English /ɪ/. It is acoustically a front (centralized) rather than a truly central vowel, as suggested by an acoustic test (Gonet 1993: 249), which found /ɨ/ to

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1 The present contribution is based on the author's MA thesis entitled *The 'pitch' – 'peach' problem - On the acquisition of the /iː/ – /ɪ/ contrast by Polish learners of English*, written at the English Department of Adam Mickiewicz University, Poznań, and supervised by prof. dr hab. Katarzyna Dziubalska-Kołaczyk

be situated between /i/ and /e/, rather than /i/ and /u/ in the acoustic space. With regard to the relationship between this Polish /ɨ/ and English /ɪ/, Gussmann (2007) states that "[/ɨ/] in terms of its positioning on the vowel diagram, is very close to the English vowel of *bit*", and that "the English *bit* and the Polish *byt* [bɨt] 'existence' sound remarkably similar" (Gussmann 2007: 1). On this reckoning, that is having two analogous phonological categories, Poles should be expected not to have any difficulty in perceiving the contrast. They should simply map the English contrast onto the similar vowel pair they already have in Polish. Somewhat intriguingly, they do not do so. What usually happens instead is that both English vowels are substituted in production by only one Polish vowel, namely /i/. Thus, the problem in production calls for an explanation. Following is the rationale behind considering perception of the two sounds responsible.

Despite the ease which Polish students of English could be predicted to have with distinguishing the two vowels, a typical students' response to a teacher pointing out that the given two words are in fact pronounced with two different vowels is: "no, they sound the same". The recurrence of such comments had contributed to my considering the inability to perceive the contrast responsible for the apparent failure to distinguish them in production. There are two reasons for which the hypothesis with perception might be worth pursuing. The first reason is that the two vowel contrasts are realized differently in the two languages. Aside from a quality difference, there is also a quantity difference between the vowels in English, while the feature of vowel length is absent from Polish. Additionally, the more peripheral vowel has a diphthongal character in English, a situation unlike in Polish, where both vowels are relatively pure. These differences might lead to Polish listeners relying on the 'wrong' acoustic cues (i.e. cues relevant for Polish, but not for English), and therefore failing to perceive the contrast. For example, in Polish, the vowel target is reached at the very beginning of its articulation, unlike in English, where a relatively long onglide stage is detectible. Thus, focusing on the initial portion of the vowel could result in misalignments. The second reason why Polish learners might fail to distinguish perceptually between the two vowels is the somewhat dubious phonological status of Polish /i/ and /ɨ/. While most recent analyses treat them as separate phonemes (Jassem 2003, Gussmann 2007, Rubach 2007,), there are also some regarding them as allophones of a single phoneme (see Feldstein & Franks 2002), taking the view of Polish phonology in which the two sounds are in complementary distribution, with [ɨ] surfacing after non-palatal consonants, and [i] elsewhere. The issue is not as clear-cut as it seems, since such an analysis relies on assigning phonemic status to palatalized

consonants, which in itself is not uncontroversial (for a comparison of the two approaches see Gussmann 2007).

Due to the reasons mentioned above, it seems legitimate to make the hypothesis that the contrast is not produced, because it is not perceived in the first place. To verify whether or not Poles differentiate perceptually between the English vowels in question, a perceptual test was conducted. The results of this test along with their potential implications are discussed in the present contribution.

2. The starting hypothesis

The possible explanation pursued in this paper is that both English vowels are perceptually assimilated by Polish learners to only one, rather than two Polish vowels, and that this perceptual neutralization of the contrast is then reflected in production.

The starting point for the study presented below is the widespread difficulty that Polish learners of English have been observed to have. Therefore, the subjects' production was not verified in the course of the experiment, although, admittedly, it would widen the perspective on the issue. In this paper, the notion that this difficulty with producing the contrast concerns the majority of learners is not called into question, and what is investigated is one possible explanation for this difficulty, i.e. that perceptual assimilation results in faulty production.

3. Approaches to the role of similarity in the acquisition of second language phonology

As phonemic contrasts of two languages are compared, the question of the role that similarity plays in second language acquisition has to be addressed. One take on this issue is represented by Robert Lado (1957), who, in the formulation of the Contrastive Analysis Hypothesis, observed that similarities between the target language and the native language of a learner lead to ease in acquiring an L2, and that differences lead to difficulties. This general idea, when applied to the phonological systems of Polish and English would make a prediction that the contrast under discussion here should be acquired easily. If we agree that in both languages there are two high front vowels, then two English vowels should be assimilated to two Polish vowels. This, however, is not the case. Lado already points out that a learner, when listening to L2 speech, hears L1 phonemes, not L2 phonemes (Lado 1957: 11). He does not,

however, go into detail about what happens when two foreign sounds are perceived as one native sound.

Research on categorical perception (Werker & Tees 1984) sheds light on the influence of the L1 on a person's perception of speech. Exposure to L1 speech leads to 'perceptual reorganization', i.e. to a situation where a listener pays attention only to those phonetic features of speech which are phonemically relevant in his or her language. Catherine Best's Perceptual Assimilation Model (PAM) is a model of speech perception that takes this into account and helps to conceptualize how speech sounds of an L2 are assimilated to L1 phonemes under the influence of language specific adjustments in speech perception. PAM also helps to conceptualize how this language specific way of perceiving speech can be un-learned in the process of second language acquisition.

According to PAM (Best 1994), when a learner is confronted with two L2 sounds, four things can happen:

1) Two foreign sounds can be assimilated to two native categories,
2) Two foreign sounds can be assimilated to a single native category, as equally good exemplars of it,
3) Two foreign sounds can be assimilated to a single native category, but one as a better exemplar and the other as worse,
4) The foreign sounds can be perceived as non-speech sounds (Best 1994: 191).

A comparison of the vowel systems of Polish and English allows potentially of any of the first three interpretations of how the English /iː/ – /ɪ/ contrast is perceived by Polish learners, the fourth one being excluded as there are no grounds to assume that either of the English vowels is not conceived of as a speech sound. A prediction that a situation like the one in point 1) seems feasible at first. That is to say, /iː/ should be assimilated to Polish /i/ and /ɪ/ should be assimilated to Polish /ɨ/. In such a scenario, the foreign contrast is realized by means of a native one, and no new phonemic categories have to be formed. However, the difficulties which the learners have been observed to have at the production level suggest that such a mapping does not take place. Instead, an instance of the assimilation of type 2) or 3) can be suspected.

If the starting point for a given learner for a specific contrast is like the one in point two or three, that is, when a learner's own phonology has only one phoneme where that of the target language has two, then the learner needs to establish a new category. The difference between the two types of assimilation is that a learner can make no distinction between two foreign sounds (type 2) or can evaluate one of the sounds as a good, while the other one as a deviant realization of the native category (type 3). If this is the

starting point for a learner, a new phonemic category has to be formed for one of the target sounds if the contrast is to be mastered. For a new category to be established, it is helpful for the new sound to be maximally different from the native one. So, on this level, it is actually dissimilarity between sounds of two languages that facilitates second language acquisition.

4. The hypothesis of the present study

To relate the starting hypothesis behind the perceptual test to the categorization of the possible scenarios outlined above, I hypothesized that a situation like in point 3) above takes place, i.e. the two English phonemes are assimilated to a single Polish category, with English /iː/ being the better and English /ɪ/ the worse exemplar of Polish /i/. As a prerequisite for the hypothesis, an assumption has to be made that English /ɪ/ is more similar to Polish /i/ than to Polish /ɨ/. Although there are two vowels in Polish – /i, ɨ/ – and two vowels in English – /iː, ɪ/ – in the same area of the acoustic space, my hypothesis is that both English vowels are sufficiently close to be assimilated, both acoustically and perceptually, to only one Polish vowel, namely to /i/. To verify whether there are acoustic grounds for such assimilation, acoustic data on the quality of the vowels was gathered through recordings, and the acoustics of the vowels were compared. To verify whether the perceptual assimilation actually takes place, a perceptual test was conducted.

If the two English vowels overlap acoustically with one Polish vowel, then there are grounds for them to be assimilated to a single category. If, in the next stage, the perceptual test confirms that such assimilation indeed takes place, then perception may be held responsible for problems with production. If not, however, then the reason for the faulty production of the contrast does not lie in the inability to perceive it.

5. Acoustic properties of the four vowels

The vowels looked at here are the English vowels of *peach* /iː/ and *pit* /ɪ/ as well as the Polish vowels that learners could be expected to substitute for them, namely the vowel of *bić* ‘beat’ /i/ and the vowel of *byt* ‘being’ /ɨ/.

All four vowels can be described as high and front, with /iː/ and /i/ being more peripheral than /ɪ/ and /ɨ/ (Jassem 2003: 105, Cruttenden 2008: 99). The English contrast is enhanced by the feature of length, absent from the Polish phonological system. The significance of this feature for the phonology of English is unclear. While certain authors see vowel length as the primary feature which maintains the contrast in English (cf. McMahon 2002: 72f), others acknowledge that only in comparable environments does length play a

crucial role in determining it (Roach 1991: 18). Yet others claim that length carries with it no contrastive weight whatsoever (Yavaş 2005: 79). Without making broad generalizations, it can be said that the difference of quantity is secondary to that of quality, as vowel length in English is strongly influenced by phonetic environments, to the extent that in certain environments the contrast is preserved by means of quality only, while the quantity is to a substantial degree dictated by the phonetic environment (Cruttenden 2008: 94f). A very clear example of the influence of phonetic context is the fact that the so-called 'long' vowel /iː/ can be shorter than the so-called 'short' vowel /ɪ/, if the former finds itself in a syllable closed by a voiceless consonant and the latter in a syllable closed by a voiced consonant (Kaźmierski 2009: 32). The quality distinction, on the other hand, remains to be expressed in these contexts. For example, the vowel of *beat* is shorter than the vowel of *bid*, so the feature of length cannot be used for determining the identity of the vowel. Qualitatively, however, the vowels are clearly distinct. Another supporting piece of evidence for the secondary importance of quantity comes from the results of an experiment involving a listening test (Clark & Hillenbrand 2003: 10ff), where portions of equal length (60ms) were extracted out of words containing either of the two vowels, /iː/ or /ɪ/. They were identified correctly at the rate of 79% and above. Also, a study involving a perceptual recognition test of vowels of digitally adjusted duration and quality (Bogacka 2003) suggests that native speakers of English rely on spectral cues (i.e. formant frequencies) for determining the contrast between high vowels /iː/ and /ɪ/, as well as /uː/ and /ʊ/ more so than on durational cues. Having this in mind, it seems safe to assume that though present in English, the feature of length is of secondary importance for maintaining the vowel contrast between /iː/ and /ɪ/, and so an acoustic comparison of the English and Polish vowels which takes into account quality only does have some currency.

In order to collect data on the acoustic properties of the vowels, recordings were made of native speakers of American English and of native speakers of Polish. Subjects read out lists of carrier sentences containing test words with either of the two vowels in question for the given language, i.e. /iː/ or /ɪ/ for the English subjects and /i/ or /ɨ/ for the Polish subjects (see detailed description below). The recordings were felt to be especially needed for Polish, as the data available was limited. Previous studies (Gonet 1993, Jassem 1999, Kleśta 1998), did not specifically focus on the two vowels, and so had only a few tokens containing them. Also, the number of subjects was small, which resulted in an overall small number of occurrences of the vowels relevant for the present study.

5.1 Recordings of American and Polish speakers – procedure

In the recordings of the English vowels, an overall number of 20 subjects participated, eleven of whom were female and nine male. They come from various regions of the United States, and belong to different age groups, with the age varying from 20 to 65. One subject was born in Germany, where she spent the first six years of her life, and four subjects had Polish ancestors in the third generation or earlier. In none of them, however, was a foreign (Polish or German) accent detectible.

The material used for the recordings took the shape of a list of token words embedded in carrier sentences. The tokens were one-syllable words of the CVC structure. The initial consonant was either a stop or a fricative, and the final consonant was a stop. The reason for the choice of words of homogenous structure, as well as for the avoidance of nasals, glides and liquids, was to enable the segmentation of the words for the purpose of vowel length measurements. Although length differences were not of primary interest for the English-Polish comparison, they were used for an intra-English comparison of the length relationship between vowels closed by voiced versus voiceless stops. The token words were embedded in a carrier sentence of the form *Say X one more time*. The reason for that was to ensure that the tokens receive the same degree of stress and be thus comparable. Apart from test words, a number of carrier sentences contained filler words in order to divert the subjects' attention away from the vowels tested (for a complete list of test words and filler words see Appendix A). The final list was randomized with the proviso that the first and last sentence was one containing a filler word (for the final list of sentences see Appendix B). The list took a following form:

Say 'bat' one more time
Say 'fit' one more time.
Say 'bead' one more time.
…

The subjects received instructions to read the list aloud at a moderate pace. Their performance of the task was recorded on a high quality portable recorder in the form of .wav files at the sampling frequency of 22 kHz. The analysis of the recordings was conducted with the help of the Praat speech analysis software (Boersma & Weenik 2007). Measurements of the first formant (F1) and the second formant (F2) were taken at a steady state or at midpoint where no steady state was discernible. Also, vowel duration was measured.

In the recordings of Polish vowels 19 native speakers of Polish participated, nine of whom were female and ten male. They were between the age of 19 and 26 at the time of the experiment. None of them was raised as a bilingual, although ten of the subjects are proficient speakers of English. Only one of them had spent a period longer than two months outside Poland, which was one year spent in Scotland.

The material used for the recordings took the shape of a list of token words embedded in carrier sentences. The tokens were two-syllable words of the CVCVC or CVCCV structure. Two-syllable rather than one-syllable words were used for Polish recordings since the number of Polish one-syllable minimal pairs for the contrast under investigation is insufficient for the goals of the present study. The consonants in the vicinity of the tested vowel were either stops or fricatives, and none of them was a velar, nasal, glide or liquid. The reason for such a choice of neighboring segments was to avoid their influence on the vowels studied. The token words were embedded in a carrier sentence of the form *Powiedz X jeszcze raz* 'Say X one more time'. In the end, the list took the following shape (for a complete list of test words and fillers see Appendix C, and for the final list of sentences see Appendix D):

Powiedz „stok" jeszcze raz.
Powiedz „widać" jeszcze raz.
Powiedz „piski" jeszcze raz.
…

The procedure was analogous to the one employed for the recordings of American speakers. At the analysis stage, no vowel length measurements were taken in the case of Polish recordings, as this feature was not of interest here.

5.2 Comparison of acoustic properties of the Polish and the English vowels

An overview of the results of the recordings described above can be seen in Figure 1 (for females) and Figure 2 (for males), the results for the two genders being presented separately due to universal differences in the quality of vowels produced by women and men. The tokens are represented on a graph, where F1 values are represented on the vertical axis and F2 values on the horizontal axis. Polish and English vowels are allotted on the same graph to enable comparison.

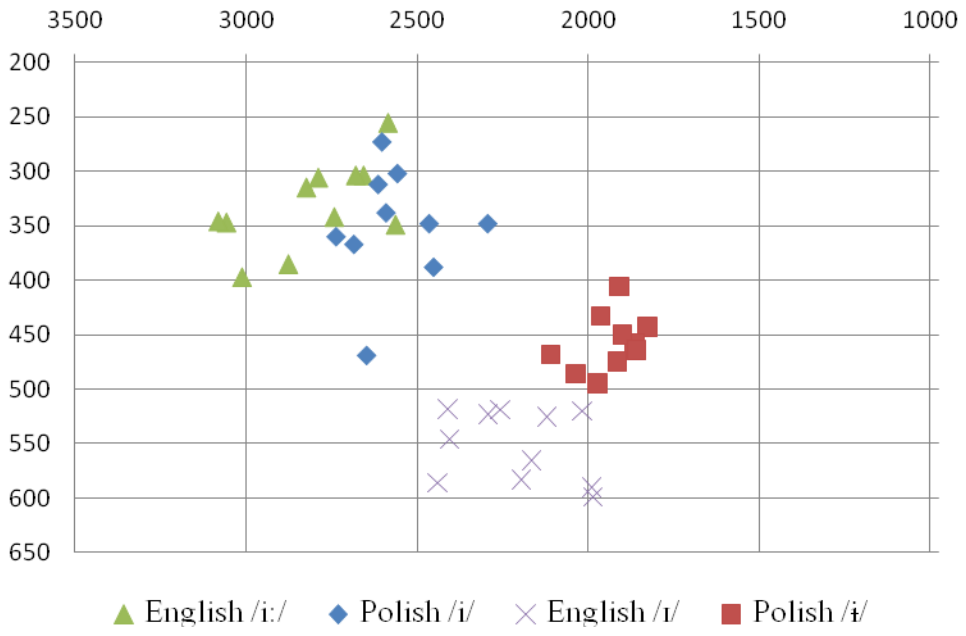

Figure 1: Polish and English high-front vowels – females

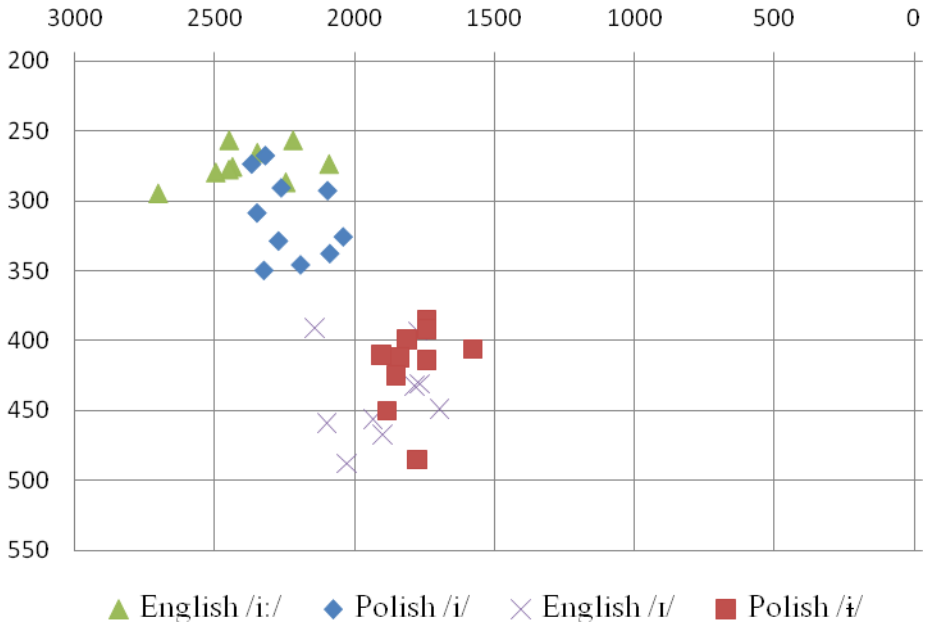

Figure 2: Polish and English high-front vowels – males

As can be seen, there is a good deal of acoustic overlap between /i:/ and /i/; and between /ɪ/ and /ɨ/ respectively. In the case of the first pair, the English vowel is more peripheral than the Polish one. In the case of the second pair,

the English vowel is situated slightly lower and more to the front in the acoustic space compared to the Polish one, especially for females. However, the distance between /ɪ/ and /i/ remains in all cases greater than the distance between /ɪ/ and /ɨ/. In order to illustrate the relation of the English /ɪ/ to Polish /i/ and /ɨ/, average distances between them are presented in Figure 3.

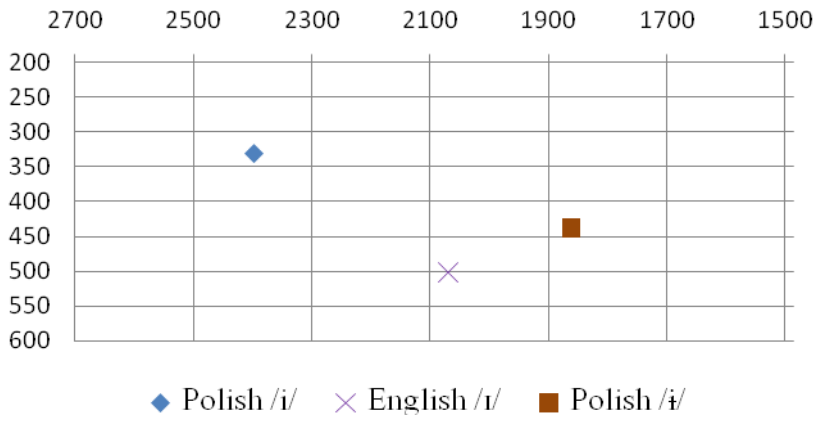

Figure 3: Average distance between /ɪ/, /i/ and /ɨ/

The comparison presented above suggests that there is no reason, acoustically speaking, for the substitution of Polish /i/ for English /ɪ/, as there is a Polish vowel closer to the English one, namely /ɨ/. Still, this comparison takes into account only the feature of vowel quality, represented by the first two formants of the vowel spectrum, and listeners could rely on additional cues for distinguishing between the vowels. Thus, a perceptual test is worthwhile to determine to which native categories are the English vowels assimilated when a learner is exposed to L2 speech.

6. Perception of the English vowel pair by Polish listeners

In the perceptual test, seven native speakers of Polish participated, six of whom were female and one male. Two of the female subjects took part only in one run of the test. All subjects were aged 16 at the time of the experiment, and they were all high school students learning two foreign languages, German and English. Polish speakers inexperienced in English would have represented a better sample, as their perception could not have been altered by exposure to English. However, due to technical difficulties subjects acquainted with some degree of English were used. Also, as their main second language was German, their English was hoped to exert little influence on their perception. In order to make sure that the test results be reliable, the test was run twice. The number of subjects was relatively small, but it is believed

that it was counterbalanced by a large number of tokens used in each test and by the fact that the test was run twice.

The above mentioned recordings of American English speakers were used as a source of samples for the perceptual test. Out of each recording, twelve tokens were extracted. Since there were twenty speakers altogether, the number of test words reached 240. These were then fed into a computer program that randomized them.

Subjects listened to successive words and were forced to label them as containing either of the two vowels, i.e. an 'i' or an 'y', where <i> and <y> are Polish spelling conventions for the qualitatively corresponding vowel pair in Polish, with <i> standing for the vowel /i/ roughly corresponding to English /iː/, and <y> standing for the vowel /ɨ/ roughly corresponding to English /ɪ/. Graphemes were used since subjects were not acquainted with the phonetic alphabet. Since it was the assimilation to native categories that was to be investigated, forcing the subjects to listen through the grid of their phonology was in keeping with the premises of the test. Additionally, the correspondence between spelling and pronunciation of the two vowels is nearly bi-unique in Polish, and so the graphemes could arguably be treated in this case as no less reliable representatives of the phonemes than the actual phonetic symbols would be. The grapheme 'i' nearly always refers to /i/ (except for cases where it does not stand for a vowel but acts as a marker of palatalization of the preceding consonant, e.g. *pies* 'dog' /pʲɛs/) and 'y' nearly always refers to /ɨ/ (except for the loanword *yeti* 'yeti' /ˈjɛti/, where the letter 'y' stands for the glide /j/).

In the course of the experiment, the majority of instances of the English /ɪ/ were assimilated to the Polish /ɨ/ and the majority of instances of the English /iː/ were assimilated to the Polish /i/. Thus, contrary to expectations, the listeners consistently discriminated between the two vowels. The greatest number of the anticipated 'misalignments', that is of assimilating the English /ɪ/ to Polish /i/, can be found in the case of speaker 4, who assimilated 25 per cent of the instances of /ɪ/ to the Polish /i/, with the percentage being smaller for the remaining subjects. The results of the first perceptual test can be seen in Figure 4 below.

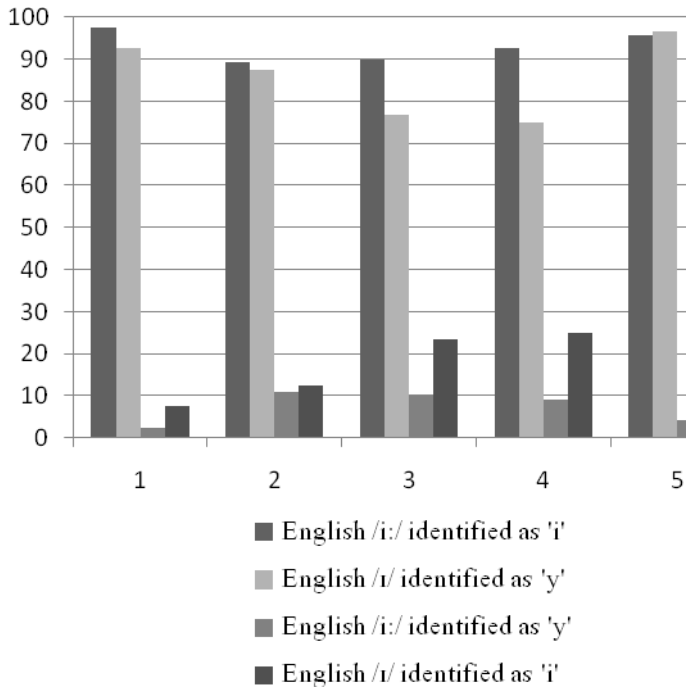

Figure 4: Assimilation of English vowels to Polish categories - test 1

At the second run of the test, the already small number of 'misalignments' fell further. In the case of speakers 1 and 5, it dropped to almost zero, and a drop is observable for all other speakers too. For the results of the second perceptual test see Figure 5.

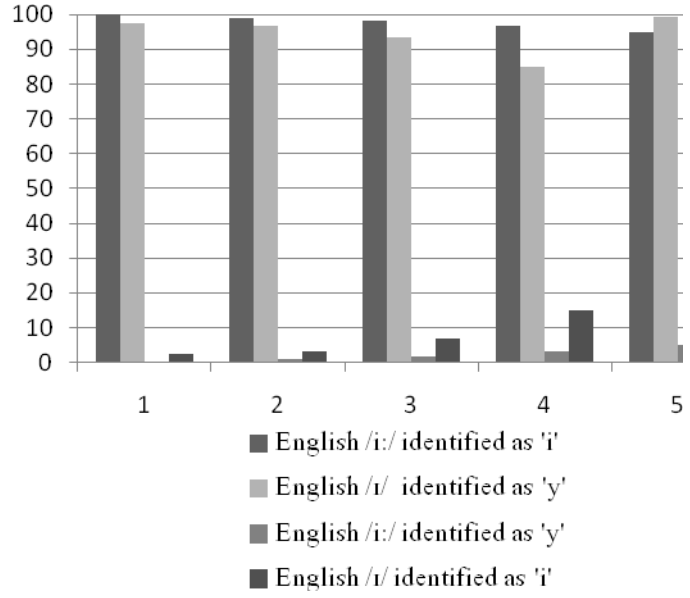

Figure 5: Assimilation of English vowels to Polish categories - test 2

Summing up, subjects could perceive the contrast in the test situation. This suggests that even though Poles generally have a problem with acquiring the English /iː/ - /ɪ/ contrast, they can perceive it. Admittedly, the very subjects who performed the perceptual test were not tested for production, and to advance any firm claims their production would also have to be verified. Yet, English was not their primary interest in foreign language study, and the production problem concerns even advanced Polish learners of English. Consequently, it could be assumed that their ability to perceive the contrast does not translate into the ability to produce it.

7. Conclusion

In this paper, I have tried to account for the situation where on comparing the phonological systems of two languages (Polish and English) we come to the conclusion that there is a systemic correspondence, and so learners of one of the languages should not have problems with acquiring this particular area of the second; however, actual encounters with Polish learners of English reveal that the contrast is not produced. An assumption made at the outset of this study was that although the two languages have two distinctive vowels in the same area of the vowel space, it is possible that their actual acoustic qualities are such that two phonemes of English are subsumed under only one category for a Polish listener, and that this perceptual assimilation of two foreign categories to a single native category can be held responsible for faulty production. However, measurements of the acoustic properties of the vowels in question showed that there are no grounds for such assimilation, and the results of the perceptual test confirm that it does not take place. Hence, the hypothesis has been falsified and the explanation for the faulty production has to be sought elsewhere.

A number of other paths of explanation could be pursued to try and account for the problem. The fact that the subjects were able to perceive the contrast, but cannot be assumed to produce it, poses two questions. The first question is general, namely how is it possible that a contrast can be perceived but not reproduced (and articulatory difficulty is disregarded here, as Poles do produce the contrast in their native language) and the second is specific, i.e. what is the reason for this particular problem that Polish learners of English face, if perception does not offer the answer. A tentative answer to the more specific question, namely that the distribution of the Polish phonemes hinders production in numerous environments, which then results in making false assumptions about English spelling at early stages in language learning is presented below.

One possible path is to investigate any potential effects of differences in distribution of the vowels in English and in Polish. It could be posited that when speaking English Poles are influenced by their L1 phonology. Although, arguably, it is a phoneme (Jassem 2003), the distribution of /ɨ/ in Polish is restricted. For example, there is no contrast between the two vowels in certain environments, or the contrast is very rare (word initially, and after /k, g, l, dz̨/). When this restriction is applied to English words, it results in a number of mistakes, such as *it* */it/ (=*eat*), *live* */liːf/ (=*leave*, *leaf*), *list* */list/ (=*least*). Also, certain sequences, as /fɨ, nɨ, dz̨ɨ/ are frequent in Polish, but only at morphological boundaries, and are virtually non-existent word-internally. Therefore, Polish learners may not construe them as valid sequences within English words, either; hence pronunciations such as *fill* */fil/ (=*feel*), *gin* */dz̨in/ (=*Jean*, *gene*), *animal* */ˈaɲimal/ (with the coronal nasal /n/ palatalized to the palatal nasal /ɲ/ when followed by /i/, which is obligatory in Polish). It might be argued, then, that although when forced to decide, Poles do register the distinction (which means that speech perception is not blocking it), they transfer Polish distribution rules into English, and neutralize the contrast to /i/ in certain environments.

Another factor that might play a role is that of Polish spelling. As already mentioned, there is a near one-to-one correspondence in Polish, where the grapheme <i> nearly always stands for the sound /i/ and the grapheme <y> nearly always stands for the sound /ɨ/. The erroneous transfer of Polish spelling to pronunciation rules into English can be abetted by the fact that aside from 'looking like' /i/, grapheme <i> in English often appears in environments where only /i/ is allowed in Polish, for example *is*, *it*, *in*, *live*, or in environments, where /ɨ/ occurs extremely rarely, for example *give*, *kiss*, *fifty*. Thus, an explanation taking into account both distribution differences and spelling as reinforcing each other could be employed to account for production difficulties.

The role of phonotactics, however, would have to be verified through further research. Although there are certain consonant + /ɨ/ combinations which are disallowed or dispreferred in Polish, there are still a number of others that are fully acceptable, and yet /ɨ/ is not produced in analogous consonant + /ɪ/ combinations in English anyway.

By means of an experiment involving perception and reproduction of the contrast in various phonological environments, conducted on subjects inexperienced in English, the validity of those tentative claims could be tested. Through such an experiment, it could be verified, whether in sequences used in Polish the contrast is reproduced more easily than in others.

Another suggestion for further research would be to investigate differences in the accuracy of the perception of the contrast between a forced-choice experiment and a more naturalistic setting. In the case of the experiment described above, the listeners knew that there was a contrast and had to seek relevant cues to establish it. When confronted with natural speech, however, the task of the listener is to decode what she hears, which does not necessarily presuppose that a sound heard at a given time has to be different from another one. Substantial differences in the rates of correct identification would point to the importance of discrimination exercises in listening training for acquiring the perception of L2 phonemes.

Although the hypothesis of the study has been falsified, the results of the experiments might have implications for teaching. Arguably, using the already present native contrast should be encouraged in the case of Polish learners. The avoidance of using it on the grounds that the quality of the Polish /i̇/ is not exactly the same as that of the English /ɪ/ seems counterproductive, as it has so far mostly lead learners to collapsing the contrast into one category. It seems that making the learners aware of the parallel between the English and Polish vowel contrasts and encouraging them to use the native Polish sound when they speak English would be helpful for them to keep the relevant word contrasts apart, even if the Polish sound is not a perfect equivalent of the English one. Still, exactly why this sound is thought of as not perfect and why there is resistance to using it in English remains a puzzling issue. After all, none of the remaining Polish vowels can be seen as a perfect counterpart of any of the English vowels, and still they are obliviously substituted for the English vowel sounds.

Appendix A: The list of test and filler words - English

Test words: Fit, Sit, Sick, Hid, Bid, Pit, Bit, Bead, Seat, Feat, Beat, Peat, Seek, Heed.
Filler words: fake, side, bat, sad, caught, code.

Appendix B: The list of test sentences - English

Say 'bat' one more time
Say 'fit' one more time.
Say 'bead' one more time.
Say 'sit' one more time.
Say 'sick' one more time.
Say 'seat' one more time.
Say 'hid' one more time.
Say 'feat' one more time.

Say 'hid' one more time.
Say 'bit' one more time.
Say 'fake' one more time.
Say 'heed' one more time.
Say 'side' one more time.
Say 'sick' one more time.
Say 'bat' one more time.
Say 'bid' one more time.
Say 'beat' one more time.
Say 'sad' one more time.
Say 'side' one more time.
Say 'feat' one more time.
Say 'peat' one more time.
Say 'pit' one more time.
Say 'seek' one more time.
Say 'beat' one more time.
Say 'caught' one more time.
Say 'sad' one more time.
Say 'code' one more time.
Say 'seek' one more time.
Say 'caught' one more time.
Say 'sit' one more time.
Say 'bit' one more time.
Say 'seat' one more time.
Say 'bead' one more time.
Say 'code' one more time.
Say 'bid' one more time.
Say 'heed' one more time.
Say 'fit' one more time.
Say 'peat' one more time.
Say 'pit' one more time.
Say 'fake' one more time.

Appendix C: The list of test and filler words – Polish

Test words: widać, piski, pita, bity, biwak, Wisła, bywa, pyski, wyszła, byty, pytaj, wydam.
Filler words: jabłko, mięso, są, Irenka, stok.

Appendix D: The list of test sentences - Polish

Powiedz „stok‟ jeszcze raz.
Powiedz „widać‟ jeszcze raz.
Powiedz „piski‟ jeszcze raz.
Powiedz „bywa‟ jeszcze raz.
Powiedz „pita‟ jeszcze raz.
Powiedz „pyski‟ jeszcze raz.
Powiedz „wyszła‟ jeszcze raz.

Powiedz „byty" jeszcze raz.
Powiedz „jabłko" jeszcze raz.
Powiedz „pytaj" jeszcze raz.
Powiedz „pita" jeszcze raz.
Powiedz „Irenka" jeszcze raz.
Powiedz „wydam" jeszcze raz.
Powiedz „stok" jeszcze raz.
Powiedz „bity" jeszcze raz.
Powiedz „piski" jeszcze raz.
Powiedz „Wisła" jeszcze raz.
Powiedz „wyszła" jeszcze raz.
Powiedz „jabłko" jeszcze raz.
Powiedz „Wisła" jeszcze raz.
Powiedz „mięso" jeszcze raz.
Powiedz „bywa" jeszcze raz.
Powiedz „byty" jeszcze raz.
Powiedz „biwak" jeszcze raz.
Powiedz „mięso" jeszcze raz.
Powiedz „wydam" jeszcze raz.
Powiedz „widać" jeszcze raz.
Powiedz „są" jeszcze raz.
Powiedz „biwak" jeszcze raz.
Powiedz „Irenka" jeszcze raz.
Powiedz „pyski" jeszcze raz.
Powiedz „bity" jeszcze raz.
Powiedz „pytaj" jeszcze raz.
Powiedz „są" jeszcze raz.

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