

The influence of pronunciation learning strategies on mastering English vowels

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Abstract

The present paper focuses on the role of strategies in learning the pronunciation of the target language. First, an outline of various general classifications of language learning strategies is provided. Next, pronunciation learning strategies are defined and their various taxonomies are presented. This is followed by the description of the study which investigated the influence of pronunciation learning strategies on the perception and production of English pure vowels and diphthongs by first-year students of an English department. The results of the study indicate that students of English, who on average use pronunciation learning strategies rather occasionally, should receive some strategy-based instruction as there exists a significant relationship between the investigated phenomena, especially between the use of pronunciation learning strategies and the production of English monophthongs and diphthongs.

Keywords: pronunciation learning strategies, vowels, diphthongs, monophthongs

Since the so called good language learner studies (Rubin, 1975; Stern, 1975), which revealed characteristics of successful language learners, the field of learner autonomy and learning strategies has received a lot of interest. Language learning strategies were initially divided into learning strategies (O'Malley, Chamot, Stewner-Manzanares, Kupper, & Russo, 1985) and communication strategies (Faerch & Kasper, 1983). The former were divided into metacognitive, cognitive and socioaffective strategies, whereas the latter were

divided into avoidance and compensatory strategies. On the ground that it is sometimes difficult to distinguish between learning and communication strategies because language comprehension and production overlap in real communication, this division was later replaced with an alternative classification proposed by Oxford (1990), who divided strategies into those that influence learning directly and indirectly. Direct strategies were divided into memory, cognitive and compensation strategies whereas indirect strategies were divided into metacognitive, affective and social strategies. Next, strategies were divided with respect to different skills, such as listening, speaking, reading and writing (Cohen & Macaro, 2007; Oxford, 1990) and different language areas, such as vocabulary (Schmitt, 1997), grammar (Oxford, Lee, & Park, 2007) and pronunciation (Eckstein, 2007; Peterson, 2000). The present paper focuses on a very interesting and underresearched set of strategies, namely pronunciation learning strategies. Next to age, aptitude, intelligence, motivation and personality, these strategies may have an effect on mastering the target language pronunciation. More specifically, they may influence the perception and production of English pure vowels and diphthongs.

Pronunciation Learning Strategies

In line with Oxford's (1990) definition of language learning strategies, pronunciation learning strategies may be defined as "specific actions taken by the learner to make learning [pronunciation] easier, faster, more enjoyable, more self-directed, more effective and more transferable to new situations" (p. 8). At present, at least two taxonomies of pronunciation learning strategies are described in SLA literature. The first taxonomy, provided by Peterson (2000) on the basis of her pioneering study, is based on Oxford's (1990) classification and consists of six strategy groups, 12 strategies and 43 tactics. The second taxonomy of pronunciation learning strategies was proposed by Eckstein (2007). This taxonomy is different from other taxonomies of strategies in that it is not based on Oxford's (1990) work but on Kolb's (1984) learning construct. Eckstein (2007) enumerated 28 pronunciation learning strategies and linked them to four stages of pronunciation acquisition and one additional category, namely motivation. At the first stage called *concrete experience* learners use pronunciation learning strategies concerned with input and practice. At the second stage called *reflection on observation* learners use strategies connected with noticing and feedback. At the third stage called *abstract conceptualization* learners form hypotheses about the pronunciation of the target language. At the fourth stage, which is called *action based on new conceptualization*, learners test the hypotheses formed at the previous stage. The last component, namely motiva-

tional strategies, was added because research clearly indicates that motivation is a powerful factor in learning the target language pronunciation.

Studies on pronunciation learning strategies (PLS) may be divided into the studies which focused on the identification and description of PLS (Drożdżał-Szelest, 1997; Naiman, Frohlich, Stern, & Todesco, 1978; Osborne, 2003; Pawlak, 2006, 2008; Wrembel, 2008), the studies which resulted in the classification of PLS (Eckstein, 2007; Peterson, 2000) and the studies which involved PLS training (Bukowski, 2004; Varasarin, 2007). The study presented in this paper focuses on the relationship between learning pronunciation and strategies used to master this aspect of the target language.

Method

The aim of the present study was to find out which PLS are used by the first-year students of an English department who completed their pronunciation course without any strategy-based instruction, and to establish whether there exists a positive relationship between the students' use of PLS and their learning of English pronunciation, in particular of English monophthongs and diphthongs. The following zero hypotheses with the corresponding alternative directional hypotheses were formulated:

- H01. There is no systematic relationship between the students' use of PLS and their perception of English pure vowels and diphthongs.
- HA1a. There is a positive relationship between the students' use of PLS and their perception of English pure vowels and diphthongs.
- HA1b. There is a negative relationship between the students' use of PLS and their perception of English pure vowels and diphthongs.
- H02. There is no systematic relationship between the students' use of PLS and their production of English pure vowels and diphthongs.
- HA2a. There is a positive relationship between the students' use of PLS and their production of English pure vowels and diphthongs.
- HA2b. There is a negative relationship between the students' use of PLS and their production of English pure vowels and diphthongs.

In the present study, a number of variables have been identified. The dependent variable was defined as the students' perception and production of English monophthongs and diphthongs operationalized as their scores on the pronunciation test. An interval scale was used for this variable. The independent variable was conceptualized as the students' use of PLS operationalized as the scores on the PLS questionnaire, which was based on a Likert-type scale (Całka, 2011; see the Appendix). The intervening variable may be described as the influence of language learning strategies on second language acquisition,

the type of scale being interval. Control variables include gender, nationality, the same pronunciation course and a longer stay in the target language country, all established by means of a nominal scale. Finally, the moderator variable referred to age established by means of a nominal scale.

The method of the study is focused description as the scope of the study is narrowed to a particular issue, namely the influence of PLS on the ability to perceive and produce English pure vowels and diphthongs. The study is correlative in nature as the degree to which two selected phenomena are related is to be determined (Larsen-Freeman & Long, 1992).

The sample consisted of 66 first-year students of an English department, out of whom three subjects were excluded due to a longer stay in an English-speaking country. Thus, the results of 63 students, 44 females and 19 males were taken into account. The subjects were on average 20 years old, the youngest subject was 19 whereas the oldest was 26 years old. The subjects declared that they had learnt English at school for about 10.87 years. The shortest period of English instruction at school was equal to 6 years whereas the longest was 15 years. On average, the subjects did not receive substantial instruction apart from school as it was equal to 2.37 years. The shortest period was 0.5 year but the longest was 15 years. It is interesting to notice that almost half of the subjects, namely 29, did not receive any English instruction apart from school at all. As already mentioned, three subjects reported on a longer stay in the target language country, more specifically from 0.5 to 1 year. Nine other subjects reported on visits which lasted from 2 weeks to 1 month. What is more, nine subjects (14.3%) said that they had learnt English pronunciation prior to the course, 14 subjects (22.2%) maintained that they had learnt some, and 40 subjects (63%) said that they had not learnt it at all. At the English department, where the study was conducted, the subjects followed the pronunciation course which consisted of 30 hours and lasted one semester. They formed three groups, two of which were taught by the present author, whereas the third group was taught by another pronunciation teacher. The course was based on the course-books by Baker (2006) and Ponsonby (1992). Due to a limited number of hours, the course focused mainly on the perception and production of English monophthongs, diphthongs and selected consonants. Some typical activities included work with minimal pair words, minimal pair sentences, and dialogues. The course also involved short theoretical explanations and regular transcription practice.

The instruments implemented in the present study include a questionnaire on PLS and a pronunciation test. The PLS questionnaire was composed by Całka (2011) on the basis of Oxford's (1990) and Peterson's (2000) classifications (see the Appendix). The questionnaire investigated 18 strategies and 64 tactics. It consisted of 65 statements with a Likert-type scale from 1 to 5 where 1 stood for *never or almost never*, 2 for *rarely*, 3 for *sometimes*, 4 for *usually* and 5 for *always*

or almost always. The last question was an open one and referred to other tactics used by the respondents. The reliability of this instrument in the present study was measured by means of Cronbach alpha which was equal to 0.89.

The pronunciation test consisted of two parts, namely the perception test and the production test. The perception test was based on the material taken from Baker (2006) and consisted of three tasks in which the students listened to the native speaker. The first task required the students to establish the order of single monophthongs and diphthongs they heard twice on the CD. For this task the students could obtain 19 points, one for each correct sound. The second task required the students, when exposed to word pairs which included both minimal pairs and identical words (each pure vowel and diphthong occurred in both types), to decide if the two minimal pair words were the same or different and tick the right column accordingly. The students could obtain 41 points. In the third task, the students listened to minimal pair sentences and were to circle that one out of two minimal pair words which was included in a given sentence. For this task the students could obtain 20 points. In the first task of the production test the students were to produce single pure vowels and diphthongs, for which they could obtain 19 points. In the second task, they were to read minimal pair words, for which they could obtain 18 points. In the third task, they were to read an unknown text taken from Ponsonby (1992), for which they could obtain 115 points, each point for one correct sound. The words that were repeated in the text were scored only when they appeared in the text for the first time, while their repetitions were not taken into account. Altogether the students could obtain 80 points for perception, 152 points for production and 232 points for the whole test.

The students were assessed by the present author, who is a nonnative speaker but who has considerable experience in teaching pronunciation as she has been conducting pronunciation classes for over 12 years now. Next, the students' results were reviewed by a native speaker, who dispelled some doubts the nonnative pronunciation teacher had. Thus, it was the native speaker's version that constituted the basis for the statistical analysis in the present study. In order to assess the students, a 2-point scale was implemented for the perception tasks and a 3-point scale for the production tasks whereby 1 point was given for a correct answer, 0 for an incorrect one and 0.5 for the situation in which the evaluators had some doubts.

Results

The Use of Pronunciation Learning Strategies

The results of the questionnaire on the PLS show that the students involved in the present study used a variety of strategies belonging to different strategy

groups. In the group of memory strategies (see Table 1), the-most-often-used tactic was repeating a word aloud or silently many times. The students reported that they usually used this rote learning tactic ($M = 4.13$). The students also reported that they sometimes created visual-auditory associations, like linking the pronunciation of a word or sound with a situation in which they have heard it ($M = 3.56$), as well as visual associations, like linking the pronunciation of a word with the place where they have seen its transcription ($M = 3.16$), visualising the transcription of words ($M = 2.90$) and linking sounds with mental or actual pictures ($M = 2.78$). Purely auditory associations, like linking the pronunciation of a word or sound with words or sounds existing in other languages or nature ($M = 2.41$), were less common. Other tactics used from time to time included using phonetic symbols or one's own code ($M = 3.19$), revising the pronunciation of new words regularly ($M = 3.08$) and making up songs, rhymes and sentences to memorise pronunciation ($M = 2.65$). According to the results, the students rarely made notes, highlighted important information ($M = 2.40$) and grouped words ($M = 2.37$). The tactics that were the least often used included listening to a recorded list of words several times ($M = 1.70$) and using mechanical techniques such as flash cards ($M = 1.57$).

Table 1 Direct PLS – memory strategies

Memory strategies	Tactics (questionnaire item)	<i>M</i>	<i>SD</i>
A. Representing sounds in memory	1. Grouping (3)	2.37	1.13
	2. Making up songs, rhymes, sentences, etc. to memorise pronunciation (11)	2.65	1.11
	3. Making associations:		
	a) visual		
	– associating the pronunciation of a word with the place where one has seen its transcription (7)	3.16	1.17
	– associating sounds with mental or actual pictures (2)	2.78	1.28
	– visualising the transcription of a given word (6)	2.90	1.15
	b) auditory		
	– associating the pronunciation of a word or sound with words or sounds existing in other languages or nature (1)	2.41	1.13
	c) visual-auditory		
	– associating the pronunciation of a word or sound with a situation in which one has heard it (8)	3.56	1.03
	4. Using phonetic symbols or one's own code (5)	3.19	1.40
B. Reviewing well	1. Regular revisions of the pronunciation of new words (12)	3.08	0.96
C. Employing action	1. Using mechanical techniques, e.g. using flash cards (13)	1.57	1.10
	2. Making notes: creating posters, vocabulary lists with transcription, highlighting, etc. (4)	2.40	1.30
D. Rote learning	1. Repeating a word (aloud or silently) several times over (9)	4.13	1.02
	2. Listening to a recorded list of words several times over to memorise their pronunciation (10)	1.70	1.13

The group of cognitive strategies and tactics was the most numerous in the questionnaire (see Table 2). In order to practice pronunciation in a formal way, the students usually used such tactics as reading aloud paying attention to pronunciation ($M = 4.0$), talking to oneself in the target language ($M = 4.0$), doing transcription exercises ($M = 3.75$), and listening to recordings to identify the pronunciation of new words ($M = 3.52$). They sometimes repeated after target language speakers ($M = 3.29$), did phonetic drills ($M = 3.24$) and recited and/or acted out dialogues ($M = 2.97$). Rarely did they practice articulation through whispering ($M = 2.52$) or completing various phonetic exercises ($M = 2.40$). Equally seldom did they repeat simultaneously with native speakers ($M = 2.40$) imitating their mouth movements ($M = 2.11$), voice and gestures ($M = 1.84$). The least-often-used tactics in formal pronunciation practice consisted of exercising speech organs ($M = 1.48$) and observing them in the mirror ($M = 1.83$). In order to practice pronunciation in a naturalistic way, the students usually used media ($M = 3.78$) and sometimes talked to foreigners in the target language ($M = 2.96$). In order to receive and send messages on pronunciation, the students often looked up the pronunciation of new words in dictionaries, especially the electronic ones ($M = 4.30$), but they did not often look for information on phonetics and phonology in books or in the Internet ($M = 2.63$). While analysing and reasoning, the students usually resorted to deductive reasoning concerned with forming and using pronunciation rules and hypotheses ($M = 3.71$). Sometimes they resorted to contrastive analysis in that they compared English sounds with sounds existing in other languages ($M = 2.92$) and looked at mistakes made by target language native speakers who spoke the students' mother tongue ($M = 3.05$), but they did not imitate these speakers to feel the differences between the languages ($M = 1.97$). While taking notes, the students said that they usually used phonetic symbols or their own code to write down the pronunciation of new words ($M = 3.75$), but rarely noted down pronunciation rules and information on phonetics and phonology ($M = 2.19$).

Table 2 Direct PLS – cognitive strategies

Cognitive strategies	Tactics (questionnaire item)	<i>M</i>	<i>SD</i>
A. Practising pronunciation	1. Formally practising with sounds		
	a) phonetic drills (14)	3.24	1.27
	b) repeating after target language (TL) speakers (15)	3.29	1.20
	c) repeating simultaneously with TL speakers (16)	2.40	1.21
	d) repeating simultaneously with TL speakers, imitating their voice, gestures, etc. (17)	1.84	0.92
	e) imitating mouth movements made by TL speakers (20)	2.11	1.23
	f) listening to recordings to identify the pronunciation of new words (practising perception) (34)	3.52	1.08

	g) reciting and/or acting out dialogues (25)	2.97	1.19
	h) reading aloud paying attention to pronunciation (26)	4.00	1.06
	i) whispering in order to "feel" articulation better (27)	2.52	1.23
	j) exercising speech organs (22)	1.48	0.78
	k) observing speech organs in the mirror when speaking the TL (21)	1.83	1.14
	l) talking to oneself in the TL (24)	4.00	1.03
	m) rehearsing (23)	3.08	1.38
	n) completing various phonetic exercises (32)	2.40	0.96
	o) doing transcription exercises (33)	3.75	1.02
	2. Practising naturalistically with a clear communicative aim		
	a) using media (18)	3.78	1.04
	b) speaking with foreigners in the TL (19)	2.96	1.25
B. Receiving and sending messages on pronunciation	1. Using resources		
	a) checking the pronunciation of new words in dictionaries (28)	4.30	0.99
	b) looking for information on phonetics and phonology in books and in the Internet (29)	2.63	1.04
C. Analysing and reasoning	1. Reasoning deductively: forming and using pronunciation rules and testing hypotheses (30)	3.71	0.92
	2. Analysing contrastively		
	a) comparing TL sounds with sounds existing in other languages (31)	2.92	1.21
	b) imitating TL native speakers speaking the learner's mother tongue in order to feel the differences between the languages (36)	1.92	1.00
	c) analyzing mistakes made by TL native speakers while speaking the learner's mother tongue (37)	3.05	1.34
D. Creating structure for input and output	Taking notes		
	a) using phonetic symbols or one's own code to write down the pronunciation of new words (33)	3.75	1.02
	b) noting down pronunciation rules and information on phonetics and phonology (35)	2.19	1.05

The results also show that when the students compensated for the lack of knowledge in the area of the pronunciation of the target language, they quite often used proximal articulation ($M = 3.62$; see Table 3). Sometimes they guessed the pronunciation of new words, for instance on the basis of spelling ($M = 3.22$). Rarely did they avoid words whose pronunciation they did not know or used L1 pronunciation if the word in the L2 and L1 was spelled in a similar way ($M = 1.90$).

Table 3 Direct PLS – compensation strategies

Compensation strategies	Tactics (questionnaire item)	<i>M</i>	<i>SD</i>
A. Guessing intelligently	1. Guessing the pronunciation of new words (e.g., on the basis of spelling) (38)	3.22	1.24
B. Overcoming limitations in pronunciation	1. Using L1 pronunciation if the word in the TL and L1 is spelled in a similar way (40)	1.90	1.00
	2. Using proximal articulation (41)	3.62	1.05
	3. Avoiding words whose pronunciation one does not know (39)	2.48	1.28

In the group of metacognitive strategies (see Table 4), the tactics most often used by the students included planning for a language task ($M = 4.57$), paying attention to pronunciation in general ($M = 4.44$), monitoring oneself ($M = 4.41$), looking for information on pronunciation learning ($M = 4.02$), organising one's own learning ($M = 3.89$) and seeking practice opportunities ($M = 3.70$). The tactic used the least often was evaluating one's own pronunciation on the basis of the recording ($M = 1.87$). Other tactics involved setting short- and long-term goals ($M = 3.25$), revising theoretical knowledge on phonetics before doing a pronunciation task ($M = 3.00$), concentrating on a single phonetic feature ($M = 2.87$) and planning pronunciation learning by selecting materials, exercises and strategies ($M = 2.68$).

Table 4 Indirect PLS – metacognitive strategies

Metacognitive strategies	Tactics (questionnaire item)	<i>M</i>	<i>SD</i>
A. Centring one's learning	1. Revising theoretical knowledge on phonetics before doing a pronunciation task (47)	3.00	1.19
	2. Paying attention to pronunciation a) in general (directed attention) (43)	4.44	0.71
	b) concentrating on a given phonetic feature (selective attention) (44)	2.87	1.30
B. Arranging and planning one's learning	1. Searching for information on pronunciation learning (45)	4.02	0.83
	2. Organising learning (46)	3.89	1.08
	3. Setting short- and long-term goals (49)	3.25	1.31
	4. Planning for a language task (50)	4.57	0.80
	5. Seeking practice opportunities (42)	3.70	1.06
	6. Planning pronunciation learning (selecting materials, exercises, strategies, etc.) (48)	2.68	1.37
C. Evaluating one's learning	1. Self-monitoring (51)	4.41	0.69
	2. Self-evaluation (recording oneself to evaluate one's pronunciation) (52)	1.87	1.08

In the group of affective strategies (see Table 5), the students quite often used relaxation techniques such as breathing, laughter and music ($M = 3.89$), and encouraged themselves to speak in the target language ($M = 3.87$), to work on their pronunciation ($M = 3.65$) as well as maintain a sense of humour about their own mispronunciations ($M = 3.68$). In addition, the students sometimes used the tactic of listening to one's body ($M = 3.27$). They rarely analysed their own feelings about learning pronunciation ($M = 2.48$) or discussed them with others ($M = 2.03$). Equally seldom did they reward themselves for success or effort put in learning pronunciation ($M = 2.32$).

Table 5 Indirect PLS – affective strategies

Affective strategies	Tactics (questionnaire item)	<i>M</i>	<i>SD</i>
A. Reducing your anxiety	1. Using relaxation techniques, e.g., breathing, laughter, and music (53)	3.89	1.21
B. Encouraging yourself	1. Encouraging oneself to work on one's pronunciation (55)	3.65	1.12
	2. Encouraging oneself to speak in the TL (54)	3.87	1.02
	3. Rewarding oneself for success or effort put in pronunciation learning (56)	2.32	1.18
C. Taking one's emotional temperature	1. Listening to one's body (57)	3.27	1.44
	2. Having a sense of humour about one's mispronunciations (58)	3.68	1.19
	3. Analysing one's feelings connected with pronunciation learning (59)	2.48	1.06
	4. Discussing feelings with others (60)	2.03	1.23

Finally, as far as the group of social strategies is concerned (see Table 6), the students indicated that they quite often asked others for help ($M = 3.83$) and that they sometimes asked for correction ($M = 3.33$), cooperated with others ($M = 3.33$) or were involved in peer tutoring ($M = 3.19$).

Table 6 Indirect PLS – social strategies

Social strategies	Tactics (questionnaire item)	<i>M</i>	<i>SD</i>
A. Asking questions	1. Asking for help (62)	3.83	1.19
	2. Asking for correction (61)	3.33	1.40
B. Cooperating with others	1. Cooperating with peers and/ or advanced users of the TL (63)	3.33	1.28
	2. Peer tutoring (64)	3.19	1.12

In general, the students used PLS at the level of 60.81% (see Table 7 and Figure 1). The mean frequency of use was equal to 3.04, which indicates that on average they used the strategies only sometimes. Standard deviation was equal to 0.40, which means that the use of PLS was rather homogenous in the sample. What is more, the students made a greater use of indirect than direct PLS. More specifically, they used the former at the level of 67.44%, whereas the latter at the level of 57.09%. The mean frequency of use for the former was 3.37, whereas for the latter it was 2.85. Still, it is important to point out that the number of direct strategies measured by the questionnaire was higher than the number of the indirect ones. In addition, *SDs* in the two strategy groups were low, which indicates that the students' use of the strategies was rather similar.

Table 7 The use of PLS

Data	Direct	Indirect	Total
Percentage	57.09	67.44	60.81
Mean frequency of use	2.85	3.37	3.04
<i>SD</i>	0.38	0.52	0.40

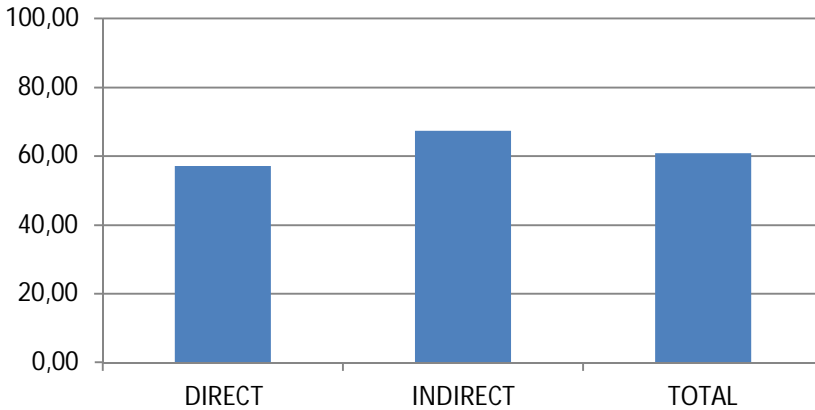


Figure 1 The use of PLS

As far as direct PLS are concerned (see Table 8 and Figure 2), the students used the three strategy subgroups at a similar level, that is, memory strategies at the 55.21% level, cognitive strategies at 58.27% and compensation strategies at 56.11%. However, the number of cognitive tactics measured by the questionnaire was higher than the number of tactics in the other groups. What is more, the mean frequency of use for memory strategies was equal to 2.76, for cognitive strategies to 2.91 and for compensation strategies to 2.81. Bearing in mind that on the Likert-type scale used in the questionnaire in the present study 2 stands for *rarely* and 3 for *sometimes*, these results do not indicate regular and frequent but rather occasional use of the three direct strategy groups. In addition, *SDs* were low for all three strategy groups, which means that their use was rather similar among the students involved in the present study.

Table 8 The use of direct PLS

Data	Memory	Cognitive	Compensation	Total
Percentage	55.21	58.27	56.11	57.09
Mean frequency of use	2.76	2.91	2.81	2.85
<i>SD</i>	0.53	0.48	0.71	0.38

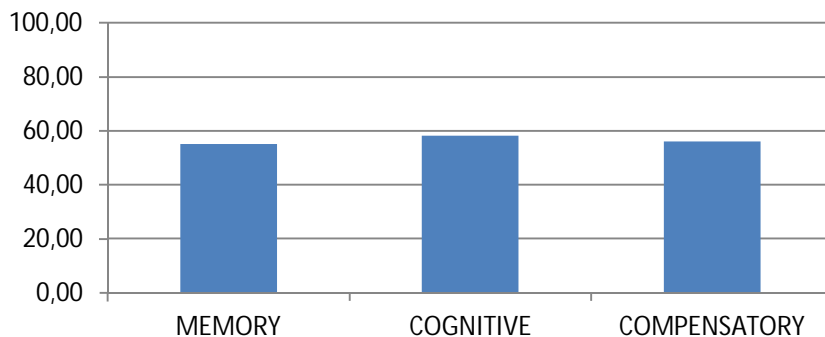


Figure 2 The use of direct PLS

As far as indirect PLS are concerned (see Table 9 and Figure 3), the students made a greater use of metacognitive strategies (70.39%) than of affective (62.98%) and social (68.25%) strategies. It is important to notice that in general the use of metacognitive strategies was the highest of all the direct and indirect groups of PLS. However, as already mentioned, the number of cognitive tactics measured in the questionnaire was higher than the number of metacognitive tactics. The mean frequency of use for metacognitive strategies equalled 3.52, for affective strategies – 3.15 and for social strategies – 3.41. These results show that the use of indirect strategies was more frequent than the use of direct strategies. However, bearing in mind that on the Likert-type scale, 3 stands for *sometimes* while 4 for *usually*, the use of these strategies is still occasional rather than regular. In addition, the values of *SDs* indicate a rather homogenous use of these strategy groups.

Table 9 The use of indirect PLS

Data	Metacognitive	Affective	Social	Total
Percentage	70.39	62.98	68.25	67.44
Mean frequency of use	3.52	3.15	3.41	3.37
<i>SD</i>	0.61	0.62	0.90	0.52

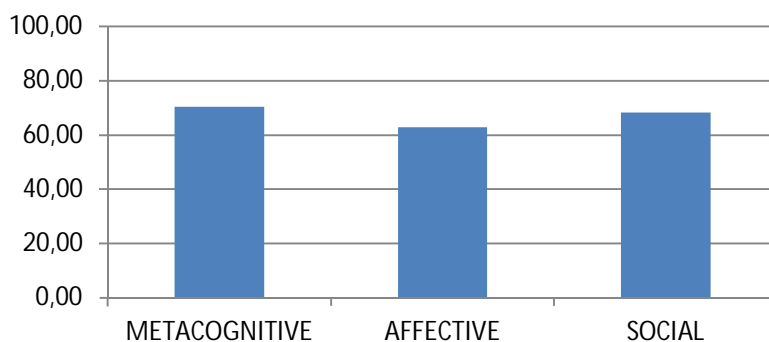


Figure 3 The use of indirect pronunciation strategies

The Results of the Pronunciation Test

The results of the pronunciation test show that on average the students obtained 75.25 points out of the total of 80, that is, 94.07%, on the first part of the test, which measured the perception of English monophthongs and diphthongs (see Table 10 and Figure 4). More specifically, for the first task, which required the students to identify the monophthongs and diphthongs, the students scored 17.46 out of 19 points, that is, 91.90%. For the second task, which involved the recognition of identical pairs, the students scored 39.10 out of 41 points, that is, 95.35%. For the third task, which was based on the recognition of minimal pair sentences, the students obtained 18.70 out of 20 points, that is, 93.49%. Standard deviations for single tasks varied from 1.23 to 2.05, which indicates homogenous group performance. However, *SD* for the whole perception test was higher, namely 3.09, which does indicate some minor differences among the subjects' general performance.

The results of the second part of the test, which measured the production of English monophthongs and diphthongs, show that on average the students obtained 118.94 points out of the total of 152, that is, 78.25%. For the first task, which consisted of the production of single pure vowels and diphthongs, the students were given 16.08 out of 19 points, that is, 84.63%. For the second task, which entailed reading minimal pair words, the students obtained 13.81 out of 20 points, that is, 76.72%. For the third task, which involved reading the text, the students scored 89.05 out of 115 points, that is, 77.43%. Standard deviations were rather low for the first and second task. However, *SDs* for the third task and for the whole production part of the test was high, namely 6.24 and 8.57 respectively, which means that some considerable differences among the subjects' performance were observed.

On average the students obtained 194.19 out of 232 points on the whole pronunciation test, which yields the general result of 83.70%. The median was equal to 194 while the lowest score was equal to 174 and the highest to 215. Standard deviation for the whole pronunciation test was equal to 9.37, which indicates some substantial variations in the students' performance on the test.

Table 10 The results of the pronunciation test

Data	Vowel perception				Vowel production				Total
	Task 1	Task 2	Task 3	Total	Task 1	Task 2	Task 3	Total	
%	91.90	95.35	93.49	94.07	84.63	76.72	77.43	78.25	83.70
<i>M</i>	17.46	39.10	18.70	75.25	16.08	13.81	89.05	118.94	194.19
<i>Mdn</i>	18	40	19	76	17	14	89	118	194
Low-High	14-19	33-41	14-20	67-80	11-19	7-18	73-103	103-136	173-215
<i>SD</i>	1.78	2.05	1.23	3.09	2.02	2.75	6.24	8.57	9.37

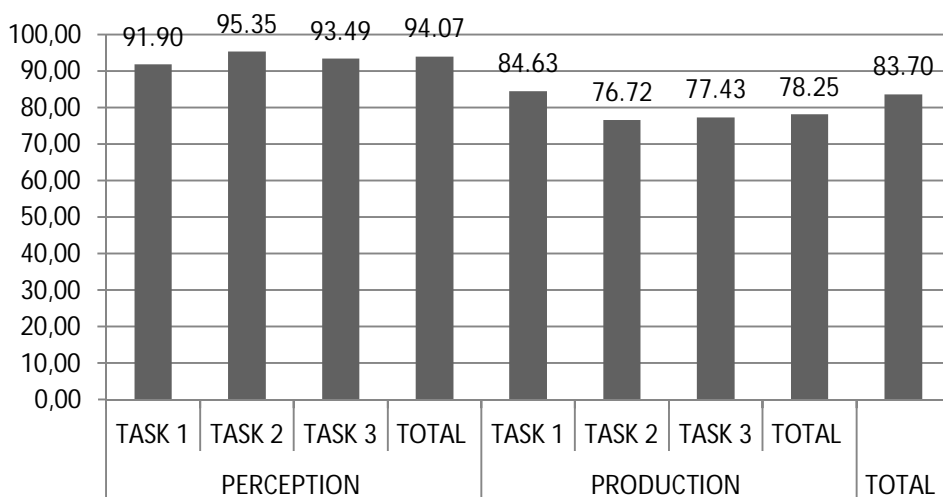


Figure 4 The results of the pronunciation test

The Relationship Between Strategy Use and Pronunciation

The correlation coefficient (see Table 11) between the students' use of PLS and their results on the pronunciation test was calculated on the basis of Spearman's rho for one-tailed hypothesis with the level of significance equal to $p < .05$. The results show that the correlation coefficient between PLS and the perception of English vowels and diphthongs is equal to .06, and for task 1 it is equal to .13, for task 2 it is -.04 and for task 3 it is .01. The correlation coefficient between direct PLS and the perception of English vowels and diphthongs is equal to .06 while the correlation between indirect PLS and the perception of English pure vowels and diphthongs is equal to .05. These results show correlation coefficients close to 0 and as such do not provide a sound basis for the rejection of the first zero hypothesis (H_01), which states that there is no systematic relationship between the students' use of PLS and their perception of English vowels and diphthongs.

Furthermore, the correlation coefficient between PLS and the production of English vowels and diphthongs is equal to .68, and for task 1 it is .40, for task 2 it is .48 and for task 3 it is .59. In addition, the correlation coefficient between direct PLS and the production of English monophthongs and diphthongs is equal to .63, while the correlation between indirect PLS and the production of English vowels and diphthongs is equal to .62. These results are statistically significant and show a positive but weak correlation between the two variables. Thus, on the basis of these results the second zero hypothesis

(H02) may be rejected in favour of the alternative hypothesis (HA2a), which states that there exists a significant positive relationship between the students' use of PLS and their production of English vowels and diphthongs.

It is important to add that in spite of the fact that the correlation coefficient for the perception part of the test is close to zero, the correlation for the whole test is positive. More specifically, the correlation coefficient for PLS and the scores on the pronunciation test equals .64, that for direct strategies and the test equals .63, and that for indirect strategies amounts to .62.

Table 11 Correlations of strategies and pronunciation

Strategies	Pronunciation test								Total
	Vowel perception				Vowel production				
	Task 1	Task 2	Task 3	Total	Task 1	Task 2	Task 3	Total	
PLS	.13	-.04	.01	.06	.40*	.48*	.59*	.68*	.64*
Direct PLS				.06				.63*	.63*
Indirect PLS				.05				.62*	.62*

* $p < .05$

Discussion

Firstly, the results of the study indicate that the first-year students of the English department use PLS rather occasionally. They use more of the indirect strategies than direct ones. In the group of direct strategies, the use of cognitive strategies is the highest, whereas in the group of indirect strategies, the use of metacognitive strategies is the highest. However, as far as tactics are concerned, cognitive tactics measured by the questionnaire outnumber the metacognitive ones. The fact that the students use PLS only sometimes is hardly surprising since most students did not learn pronunciation in a formal way prior to the study and did not receive any strategy training. It seems that the students rely to a great extent on some cognitive tactics, such as reading aloud, phonetic drills and transcription exercises, which were indirectly taught through different formal activities during their classes. High use of these tactics contrasts sharply with low use of tactics for naturalistic practice, especially talking to foreigners. This indicates that the students are rather dependent on the teacher and that they may not be aware of the fact that formal classroom practice is not sufficient to succeed in learning not only pronunciation but any other aspect of the target language as well. As far as the affective factors are concerned, it seems that the students try to reduce their anxiety, encourage themselves and use some sense of humour, but they do not analyse their feelings or share them with others. They do not cooperate much with others, either. It is very impor-

tant to add that the students do not pay much attention to setting their own reasonable goals in learning pronunciation. Knowing what one would like to achieve, even if it is not authentic pronunciation, is a very important element of motivation, which in turn is a powerful factor in learning pronunciation.

Secondly, the study reveals that the students obtained good results on the test measuring the perception of English monophthongs and diphthongs but no systematic relationship between PLS and such perception has been found. High scores on the perception test irrespective of the average use of PLS might be attributed to different factors. The test measuring the perception of English monophthongs and diphthongs used in the present study was based on an intermediate pronunciation course. The test focused on single sounds and on one-syllable words used in minimal pair words and minimal pair sentences. It was congruent with the content of the course but it might not have fully measured the learners' ability to perceive English vowels. In other words, a test based on more advanced language might have yielded different results. Still, it may also be the case that the perception of English vowels is not so troublesome for Polish learners of English. Furthermore, the instrument used to measure PLS includes fewer strategies which refer to perception than those related to production. Hence, despite sufficient reliability of the instrument in the present study, further calibration of this test might help to keep the balance between the strategies responsible for perception and those responsible for production. In addition, the use of the questionnaire in any study involves the so called self-flattery syndrome which accounts for the fact that the respondents may provide data which present them in a favourable way but which may not be fully accurate. One way of dealing with this problem is reducing the time limit for filling in the questionnaire. In the present study, the students did the questionnaire in around 15 minutes.

Thirdly, the study shows that the students obtained quite good results on the test measuring the production of English monophthongs and diphthongs but their performance was not homogenous. The study has also revealed a positive relationship between PLS and the production of English vowels. The relationship is significant but weak, which indicates that other important factors, besides PLS, influence the complex process of mastering target language pronunciation. Furthermore, measuring the production of English vowels is a challenging task. Although in the present study the students' performance was assessed by quite an experienced pronunciation teacher and a native speaker, a more accurate assessment would have been possible if a more advanced computer-based analysis used in the field of acoustic phonetics had been conducted. Still, it must be noticed that on everyday basis teachers assess their students' pronunciation on their own in the classroom and not

in a computer laboratory. It is also important to add that all the production tasks included in the pronunciation test were highly controlled and as such did not tap the students' pronunciation in authentic communication. This issue requires further study planned as the second part of the research project of which the present study is a part.

In general, the study suggests that the students might benefit from strategy-based instruction as part of their pronunciation course. However, for the reasons discussed above it must be clearly stated that the role of PLS in learning English vowels requires further detailed study and attention.

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Appendix

The PLS questionnaire (Całka, 2011, pp. 162-167)

Read the statements below and circle the response which indicates how often you use a given way of learning English pronunciation according to the following scale:

1 – never or almost never, 2 – rarely, 3 – sometimes, 4 – usually, 5 – always or almost always

PART A

- | | | |
|-----|--|-----------|
| 1. | In order to memorise the pronunciation of a given word I try to associate it with the pronunciation of a different word (in another language I know) or with some sounds (e.g. animals sounds, sounds of machines, devices). | 1 2 3 4 5 |
| 2. | I memorise the pronunciation of a given word by associating it with an image or a picture (in mind or in actual drawing). | 1 2 3 4 5 |
| 3. | I group words that sound similar in order to memorise their pronunciation. | 1 2 3 4 5 |
| 4. | I use visual aids to memorise the pronunciation of new words (e.g. posters with transcription of new words, and marking phonetic symbols with various colours). | 1 2 3 4 5 |
| 5. | In order to memorise the pronunciation of a given word I use phonetic symbols or my own code to write down its pronunciation. | 1 2 3 4 5 |
| 6. | I memorise the pronunciation of a given word by visualizing its transcription. | 1 2 3 4 5 |
| 7. | I memorise the pronunciation of new words by remembering the location of their transcription on the page, board etc. | 1 2 3 4 5 |
| 8. | I memorise the pronunciation of new words when I associate them with a situation in which I have heard them. | 1 2 3 4 5 |
| 9. | I repeat a word several times over (aloud or in my mouth) to memorise its pronunciation. | 1 2 3 4 5 |
| 10. | I record words whose pronunciation I want to memorise and listen to the recording several times over. | 1 2 3 4 5 |
| 11. | I memorise the pronunciation of a given word by putting it in a context (a sentence, a story, a rhyme, etc.) | 1 2 3 4 5 |
| 12. | I review the pronunciation of recently learnt words regularly. | 1 2 3 4 5 |
| 13. | I use flash cards which I put from 'I want to learn' pile to 'I haven't learnt' pile. | 1 2 3 4 5 |

PART B

- | | | |
|-----|--|-----------|
| 14. | I practise pronunciation by repeating sounds, words, sentences, etc., several times in the same way or in different ways (changing speed, dividing words into syllables, etc.) | 1 2 3 4 5 |
| 15. | I repeat sounds, words, sentences, etc., after English speakers. | 1 2 3 4 5 |
| 16. | I repeat sounds, words, sentences, etc., simultaneously with English speakers. | 1 2 3 4 5 |
| 17. | I repeat sounds, words, sentences, etc., simultaneously with English speakers, imitating their gestures and facial expressions. | 1 2 3 4 5 |
| 18. | I listen to the radio and/ or watch TV in English. | 1 2 3 4 5 |
| 19. | I speak to foreigners in English. | 1 2 3 4 5 |
| 20. | I imitate mouth movements made by English speakers. | 1 2 3 4 5 |
| 21. | I observe the movements of articulators in the mirror when speaking English. | 1 2 3 4 5 |
| 22. | I do exercises recommended by speech therapists in order to make my tongue, lips and jaw more flexible. | 1 2 3 4 5 |
| 23. | Before I say something aloud, I practise saying a given word, sentence, etc., in my mind. | 1 2 3 4 5 |
| 24. | I practise my pronunciation by speaking to myself in English. | 1 2 3 4 5 |
| 25. | I practise my pronunciation by reciting texts and/ or acting out dialogues. | 1 2 3 4 5 |
| 26. | I practise reading aloud, paying particular attention to my pronunciation. | 1 2 3 4 5 |
| 27. | I practise whispering to focus on the feeling of articulation. | 1 2 3 4 5 |
| 28. | I look up the pronunciation of unknown words in a dictionary. | 1 2 3 4 5 |
| 29. | I search for information on phonetics and phonology in books, on the internet, etc. | 1 2 3 4 5 |
| 30. | I try to identify and use pronunciation rules. | 1 2 3 4 5 |
| 31. | I analyse the differences between English pronunciation and the pronunciation of other languages. | 1 2 3 4 5 |
| 32. | I complete various phonetic exercises which I find in course-books, computer programs and on internet sites. | 1 2 3 4 5 |

33. I use phonetic symbols. 1 2 3 4 5
34. I listen to recordings several times in order to identify the pronunciation of unknown words (perception practice). 1 2 3 4 5
35. I make notes on interesting phonetic problems. 1 2 3 4 5
36. I imitate native speakers of English, speaking Polish in order to feel the difference between the two languages better. 1 2 3 4 5
37. I pay attention to pronunciation errors made by native speakers of English speaking Polish. 1 2 3 4 5

PART C

38. If I do not know how to pronounce a given word, I guess its pronunciation. 1 2 3 4 5
39. If I do not know how to pronounce a given word, I avoid using it. 1 2 3 4 5
40. If I do not know how to pronounce a given word and its spelling is similar to a Polish word, I use Polish pronunciation hoping that I will be understood. 1 2 3 4 5
41. If I cannot produce a given English sound, I produce a sound as similar to it as possible. 1 2 3 4 5

PART D

42. I try to find as many different ways of practising my pronunciation as I can. 1 2 3 4 5
43. I pay attention to pronunciation when someone is speaking English. 1 2 3 4 5
44. I choose a phonetic problem (e.g. a given sound, word stress, intonation, etc.) and pay attention to it when someone is speaking English. 1 2 3 4 5
45. I try to find out how to improve my pronunciation. 1 2 3 4 5
46. I care for appropriate learning conditions so that my work on pronunciation is as efficient as possible. 1 2 3 4 5
47. Before practising a given pronunciation feature I revise appropriate theoretical knowledge. 1 2 3 4 5
48. I plan pronunciation learning – I set the time of learning, select materials, strategies, etc. 1 2 3 4 5
49. I have clear goals for improving my pronunciation. 1 2 3 4 5
50. When I prepare a talk in English, I look up the pronunciation of new words in a 1 2 3 4 5

dictionary and practise their pronunciation.

- | | | |
|-----|---|-----------|
| 51. | I notice my pronunciation problems and I try to overcome them. | 1 2 3 4 5 |
| 52. | I evaluate my progress in pronunciation by recording myself and comparing my pronunciation to the pronunciation of native speakers. | 1 2 3 4 5 |

PART E

- | | | |
|-----|---|-----------|
| 53. | I try to relax whenever I feel afraid of reading aloud or speaking in English. | 1 2 3 4 5 |
| 54. | I encourage myself to speak English even when I am afraid that my pronunciation is not good. | 1 2 3 4 5 |
| 55. | I encourage myself to work on pronunciation even when I think that something is too difficult for me or when I do not feel like learning. | 1 2 3 4 5 |
| 56. | I give myself a reward or treat when I have worked hard on pronunciation. | 1 2 3 4 5 |
| 57. | I notice if I am tense or nervous when I am learning English pronunciation or speaking English and I try to relax. | 1 2 3 4 5 |
| 58. | I use a sense of humour about my mispronunciations. | 1 2 3 4 5 |
| 59. | I analyse my feelings connected with learning pronunciation. | 1 2 3 4 5 |
| 60. | I talk to someone else about how I feel when I am learning pronunciation. | 1 2 3 4 5 |

PART F

- | | | |
|-----|--|-----------|
| 61. | I ask English speakers to correct my pronunciation when I speak. | 1 2 3 4 5 |
| 62. | I ask others for help if I do not know how to pronounce a given sound or word. | 1 2 3 4 5 |
| 63. | I learn pronunciation with other students, friends. | 1 2 3 4 5 |
| 64. | I help others in learning pronunciation. | 1 2 3 4 5 |

OTHER

- | | | |
|-----|--|-----------|
| 65. | I use other way(s) of learning pronunciation (explain what you do) | 1 2 3 4 5 |
|-----|--|-----------|