

The Acquisition of L2 Phonology

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The Acquisition of L2 Phonology

Edited by

Janusz Arabski and Adam Wojtaszek

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Introduction

JANUSZ ARABSKI and ADAM WOJTASZEK

The volume is a collection of 12 chapters focused on various aspects of acquisition of the L2 phonological system. The authors represent five different nationalities, although the majority of them are Polish. They are researchers and practitioners, applied linguists and teachers, who share their experience and knowledge related to the leading theme of the book, which has been divided into three major parts.

The first one, titled *Phonetic Analysis*, revolves around selected aspects of second-language production and perception, including reports on five stimulating studies of language learners in both naturalistic and formal-educational settings. In the second part, a more abstract and comparative perspective is taken in order to provide accounts for observable tendencies in learner behaviour in the light of recent theories modelling the route of L1/L2 pronunciation and reading ability development. Its title, *Phonological Analysis*, reflects the shift of focus towards a more theoretical domain of abstract conceptualisations of the acquisition of L2 phonology. The third part, *Pedagogical Perspectives*, will be of major interest for those language teachers who believe that the mastery of native-like or highly intelligible pronunciation is an important asset and component of L2 education. It consists of four contributions of high practical value for those practitioners who find it worthwhile and stimulating to base their actions on the latest outcomes of scientific research.

The scope of the volume is fairly broad, but definitely not exhaustive. It was not the editors' purpose to cover all important theoretical models or directions in L2 phonology research; instead, the contents highlight a selection of up-to-date motifs in the area. The approach to the selection and organisation can be compared with two other volumes: *Focus on Phonological Acquisition* (Hannahs & Young-Sholten, 1997) and *Phonology and Second Language Acquisition* (Hansen Edwards & Zampini, 2008). Both these publications present a choice of contemporary theoretical approaches to acquisition of L1 and L2 phonology, illustrated with examples from several different languages. In its structure, the present volume resembles Hansen Edwards and Zampini (2008), and it could even be treated as a

form of supplement and expansion to the issues included there. Its editors make it clear in the Introduction that although the book aims at presenting a comprehensive overview of the field, the limits related to a reasonable size and length of the publication led them to abbreviated treatment of certain themes (Hansen Edwards & Zampini, 2008: 9). Some of them have been developed in the present collection.

The first chapter summarises its author's experience, both as a learner and as a teacher, related to the acquisition of the phonetic productive skills of French learners of English. Abeer Naser Eddine focuses mainly on the vowel system, which turns out to be one of the major challenges facing French learners. Alongside reporting on a case study illustrating the problem, the author also provides the reader with a collection of useful hints related to the creative use of various tools and materials in the process of teaching the English vowel system.

In a similar vein, Luo Xiaorong and Gao Jian summarise major challenges awaiting Chinese learners on their route to the mastery of English pronunciation. The paper starts with a brief comparative outline of English and Chinese segmental phonetics, pointing to the areas of potential difficulty, which are later examined for evidence of negative phonetic transfer. The authors point to an interesting variability in this phenomenon related to different dialectal backgrounds of the learners, showing how dialectal differences may lead to systematic discrepancies in the L2 phonetic attainment.

After two initial chapters focusing on production, the third chapter by Linda Shockey offers an interesting and stimulating account of the differences in speech comprehension between different groups of learners of English. The contribution first outlines outcomes of a study performed on Greek and Polish learners, placed against the background of native speakers of English, to develop into a discussion of factors potentially accounting for the differences. The author convincingly argues for an explanation enrooted in the phonotactic features of the languages in question.

The fourth chapter describes a very interesting study, in which Arkadiusz Rojczyk managed to demonstrate how the manipulation of the Voice Onset Time (VOT) following an initial fortis plosive sound may lead to an elaboration of very precisely measurable differences between English native speakers and different groups of Polish learners of English. The study focuses on an important aspect of the English phonetic input processing, described by many scholars.

The final chapter in the section by Marta Nowacka combines the two perspectives represented earlier, focusing both on production and perception of English consonants in connected speech by Polish learners. It reports on a three-year longitudinal study, which shows both the route of development of the items selected for the study, as well as the hierarchy of the most problematic areas, established thanks to the investigation. An

additional value of the contribution lies in an extensive list of references to the literature on the subject in the initial part of the chapter.

In the initial chapter of the second section, Monika Kusiak explores the implications of an interesting division of orthographic systems into 'Chinese' and 'Phoenician' types, introduced by Baron and Strawson (1976), for the development of phonological awareness in the process of learning to read in a given language. Subsequently, three English language coursebooks are evaluated against the background of factors contributing to the optimal development of phonological awareness. This ability is seen by the author as an indispensable condition of successful growth of productive and receptive skills.

Anna Bloch-Rozmej seems to move in the opposite direction. She uses evidence from L1 acquisition by Polish and English children as support for theoretical conceptualisations of phonological strength within the non-derivational framework of *Government Phonology*. The implications related to the sequence of acquisition of the constructs can easily be adopted into language teaching syllabi.

Liliana Piasecka returns to the issue of phonological awareness, touched upon by Monika Kusiak, to expand the discussion with some more references and to illustrate the problem of negative transfer, detected in Polish learners of English. They are shown to employ their L1 strategies in deciphering and interpreting English orthography. The necessity of extensive training in the area of spelling-pronunciation interface of L2 is expressed.

The final section of the volume starts with Danuta Gabryś-Barker's comprehensive overview of the subject area within the pedagogically oriented perspective. She presents a selection of recently published research articles in a number of important journals in order to show which topics are most up-to-date and what is the position of L2 phonetics and phonology research relative to other areas of investigation. This contribution is of significant value for both researchers and language teaching practitioners. The former will find there numerous references to important recent contributions, while the latter will benefit from the useful guidelines provided by the author, concerning practical applications.

Wiesława Ferlacka and Włodzimierz Sobkowiak present a very useful tool for enhancement of graded e-readers with phonetically related content. They perform an analysis of a corpus of graded e-readers with the use of Phonetic Difficulty Index (PDI) developed by Sobkowiak (2006), to support and expand the usefulness of those valuable materials and to help the teachers in their more effective use.

Tammy Gregersen turns to suprasegmentals and their importance in marking and recognition of a number of important psychological traits in the learners. In her subjective and personal account she shares some of her most important experiences as an applied linguist, researcher and teacher.

The final chapter by Mirosław Pawlak rounds up the volume with a presentation of the learners' perspective on the process of acquisition of L2 phonology. After an extensive introduction, providing the reader with an excellent review of the literature, the author moves on to discuss diary data collected from his subjects. The discussion is enlightening and intriguing for both researchers and teachers, as they are informed of many aspects of the struggle in which the learners are engaged on their way to development of intelligible L2 pronunciation, which seldom surface in more quantitative research designs.

All in all, the editors hope that the volume will be received as informative and inspiring for many readers, no matter whether they represent the more theoretically oriented or the more practically focused readership. Both language scientists and language teachers should find in it many interesting threads to follow. With this expectation we encourage you to explore the contents.

References

- Baron, J. and Strawson, C. (1976) Use of orthographic and word-specific knowledge in reading words aloud. *Journal of Experimental Psychology: Human Perception and Performance* 2, 386–393.
- Hannahs, S.J. and Young-Scholten, M. (1997) *Focus on Phonological Acquisition*. Amsterdam: John Benjamins.
- Hansen Edwards, J.G. and Zampini, M.L. (2008) *Phonology and Second Language Acquisition*. Amsterdam: John Benjamins.
- Sobkowiak, W. (2006) *Phonetics of EFL Dictionary Definitions*. Poznań: Wydawnictwo Poznańskie.

Part 1

Phonetic Analysis

Chapter 1

Second Language Acquisition: The Articulation of Vowels and the Importance of Tools in the Learning Process

A. NASER EDDINE

In oral communication, notably in technical discourse when a non-native speaker is mentally involved thinking about his utterance, he is more likely to mispronounce words, because more importance is given at this point to transmitting a message rather than producing correct sounds. However, the message is sometimes unintelligible and its reception is not always deemed successful, especially when the speaker is uncertain of word choice and, as such, resorts to a literal equivalent hoping it would be appropriate. In an attempt to find a suitable counterpart, a French learner would, for instance, say 'to *retire* the medicine from the market', thus misleading the listener unless meaning can be understood from the general context (noting that the French verb 'retirer' is used in this sense to mean 'to withdraw'). There are also cases where the speaker is hesitant and unsure of the phoneme, and so he comes up with different productions of the same word as in 'acquainted' [əkwənti:d/əkwi:nti:d/əkwəntɪd].

With respect to text-based reading, the reader is supposed to be less tensed, and articulation ought to be more correct. Here, too, we realize that mistakes at the level of pronunciation are quite obvious due to the inability to associate characters or groups of characters with sounds. Innately, a learner relates encountered forms to similar occurrences in his own language and produces French-like sounds in such a way that ultimate syllables in disyllabic and multi-syllabic words are remarkably stressed as in 'strategy' [strætə'gi:], 'indicator' [ɪndɪkæ'tɜ:r] and 'propagated' [prɒpəgeɪ'ti:d]. While talking about stress in French, Wise (1965: 330–350) states that 'there is appreciably greater stress on the final syllable' in monosyllables as much as in polysyllables. To support his view, he presents a detailed description of the characteristics of French sounds and then compares them with English sounds.

Not trained to discriminate major phonetic differences in the early stages of learning English as a second language, students care less for articulation usually giving more attention to comprehension skills and grammatical rules. 'As the phonological system of the mother tongue is first and foremost considered and is in fact never the aim of conscious learning, [L1 speakers] have difficulty recognizing the differences that [they] do not know how to produce and vice versa' (Huart, 2002: 70, translation mine).

Depending on the context in which a foreign language is used, 'for the vast majority of learners, a native-speaker pronunciation is neither necessary nor even desirable. The aim of most is to achieve an easily understandable pronunciation in most situations with most people, with both native and non-native English speakers' (Hewings, 2006: 13).

In this context, we are not minimizing the importance of phonetic correctness. We are simply differentiating between a wrong production that is 'feasible' and another that is 'not viable'. 'Feasible' in the sense that it is acceptable from a foreign learner as it does not do great harm to the original sense and we are still capable of comprehending it. 'Not viable', on the other hand, means inaccessible. And, unable to decipher the intended meaning, the receptor loses interest in the discourse, namely when it comes to technical key terms. Huart (2002: 7) assumes that 'The borderline between approximate but acceptable pronunciation and phonetic problems that impede comprehension is difficult to trace.'

Phonetic Confusion: A Cause or a Consequence?

Phonological differences marking both English and French in terms of vowels in general and diphthongs in particular are direct and major causes of errors. A chief problem encountered by French learners is the duration of an utterance which is, most frequently, tense and made longer or shorter than required. 'Consequently, it is not at all surprising that the French ear has difficulties grasping differences which it has never paid attention to' (Huart, 2002: 75). According to Wise (1965), the French vowel may sometimes be merely orthographic and sometimes phonetic.

This is to say, imitating sounds is a hard task, and even the identification of a distinct sound does not necessarily mean correct articulation due to limitations characterizing the vocal system of French learners that do not only concern vowels, but also consonants like /θ/, /ð/, /z/ or /h/. Hence, training, acquaintance and distinction do not really guarantee correct production. 'Language reflects a people's mentality or collective personality The Frenchman is said to be "nerveux" [whereas] the Englishman is said to be more "relaxed"' (Williams-Lacroix, 1995: 12). This explains the fact that there remain certain vocal difficulties that prevent a French speaker from sounding almost native and, thereby, 'he must be constantly aware of this essential difference in the production of sound and the resulting speech rhythms' (Williams-Lacroix, 1995: 13).

Yet, this is less often noted, even minimal and not significant, in those who learn both English and French and who reside in either French- or English-speaking countries. More specifically, learners who study both languages at an early age and practise them both almost daily are likely to master both, especially those whose parents are native speakers of either or both languages, because some argue that the classroom does not provide the ideal context for pronunciation practice and accuracy. Chiefly, Purcell and Suter (1980: 271–287) believe that it is ‘a matter substantially beyond the control of the educators’ and that ‘little relationship exists between teaching pronunciation in the classroom and attained proficiency in pronunciation’.

Indisputably, each language is characterized by distinct linguistic features, and an English speaker finds similar – if not greater – difficulties trying to recognize French speech sounds. We also have to bear in mind that a foreign learner has two major concerns at a time: speaking (expressing oneself and being understood) and listening (understanding the interlocutor and maintaining the communication). Schiller and Meyer (2003) talked about correlation and exchange of input between talker and hearer in natural contexts in the sense that ‘productive and receptive skills develop hand-in-hand’.

In order to master the pronunciation techniques of a second language, the learner must be trained right from the very beginning of the learning process, that is, while acquiring other essential skills such as reading comprehension, grammar, spelling and writing. Pronunciation should be stressed the same way morphosyntactic and lexical knowledge is. That is why it is not a supplementary lesson we could give later or separately, and, at the same time, it should not be considered an obstacle that prevents a learner from progressing. In this context, Petek (2002) raised an intriguing point that concerns the acquisition of ‘near-native like’ pronunciation and questioned if this is after all taught or primarily learnt. Besides, by speaking, we do not only mean the ability to construct phrases but also the ability to articulate well in order to be comprehended.

Therefore, could frequency of use be an answer to this problematic point? Definitely, it is the most frequently asked question that pedagogues have always linked with second-language acquisition. There is quite a consensus on its positive impact on a second-language learner, but there are different views in this respect. For instance, while considering the similarities and differences between the production and recognition of common words, Dell and Gordon (2003: 1–15) indicate that they are ‘adaptive systems designed to process the most likely events with the greatest ease’. They add: ‘One would be quite surprised to learn otherwise,’ and so both systems are supposed to be interrelated but, seemingly, this is not always true and commonness does not necessarily lead to correct production. On the other hand, while considering ‘lower and higher frequency forms’, Bybee (2008: 219) notes that learners tend to ‘regularize lower-frequency

paradigms' and they more easily retain generalizations because they conform to a larger category and are, thus, highly frequent. Yet, in terms of second-language acquisition, the effect of the repetition of exceptions or irregular forms is 'straightforward' in the sense that 'the more exposure a learner has to irregular forms, the greater the chance that he/she will produce them correctly'. To what extent is this applicable to second-language learning in terms of phonological recognition and production? To what extent can this be generalized keeping in mind the different variables that distinguish speakers? If this is true, then phonological difficulties should be less evident in speech processes. On the other hand, if comprehension precedes production, then this could explain the recurrence of mistakes in spoken forms. Fluency has always been the goal of a foreign learner, yet it is not a basic requirement as long as he/she speaks comprehensible English. Time though makes the achievement of this goal possible.

Teaching Methods and Techniques

In this chapter, our objective is to highlight means and practices that have proven to be efficient with intermediate to advanced learners based on the findings of a case study that we conducted on two different groups of scientific learners.

Vowels, among all other phonemes, are the most problematic for a French learner. This area constitutes a lot of confusion and its remedy is 'challenging'. Other than the French 'r', vowels are the second prominent feature that distinguish a French speaker. 'The learner must have at his disposal the 20 vowel phonemes (12 monophthongs and 8 diphthongs), together with the appropriate durational variations, especially when the latter are significant in such oppositions as *seed~seat, heard~hurt, road~wrote, etc.*' (Gimson, 1989: 321).

In most cases, the consequences are both phonological and morphological mistakes, the thing that raises semantic ambiguities which distract listeners, especially native English speakers who are not aware of typical French phonological characteristics.

Interestingly, though, it is quite known that in face-to-face and/or interactive communication, the speaker does not detach himself from the listener. Indeed, the former is keen on giving clearer and longer speeches if the latter lacks contextual and/or environmental knowledge necessary for a better comprehension (and vice versa). Conversely, he produces a 'more reduced speech' when the necessary relevant facts are known to the listener differentiated between 'hypo-speech' and 'hyper-speech' (Lindblom, 1990: 404–435). In his view, consonant and vowel deletion and shortening of vowels are also certain ways of the reduction in speech. Hence, in order for him to maintain intelligibility, the speaker considers the receiver's input and builds on it to construct his utterance. Producing a

more spontaneous speech (successive segments) then becomes possible and, as a result, less attention would be given to consonant/vowel sounds.

At this stage, we recall the 'phoneme substitution' method introduced by Greenberg and Jenkins (1964: 157–177) in which the substitution of a single phoneme by another creates 'neighbouring sounds or words' that differ from the target word. The influence of phonological neighbours on spoken word recognition has been extensively discussed by Luce (1986), Levelt *et al.* (1999) and Dell and Gordon (2003), who differentiate between 'sparse' and 'dense' neighbourhoods. Is it interesting though to consider neighbourhood between French and English sounds and modes of articulation? Are similar-sounding words easier to produce being easier to recognize? Regarding neighbouring words in the same language, Dell and Gordon (2003: 9–32) attributed the effect of 'phonological neighbourhood density' on speech production to the lexical–phonological interaction and to frequency: 'Neighbours are costly in recognition but beneficial in production.'

Since science students are mainly concerned with reading and synthesizing articles related to their major of study (engineering, medicine and sciences), little time is devoted to oral skills. Besides, the complexity of technical lexis presented in these articles is also to be taken into account. No wonder that learners find themselves helpless facing stacks of terms they come across daily! Stimulating them to overcome the barrier of speaking a second language is a key factor. At this stage, it would be helpful to commence with general topics referring to central themes that do not necessarily swarm with technical terms.

Furthermore, it is highly important to consider the following suggestions:

- Highlight confounding sounds in writing, where necessary only, as in: A fiscal stimulus was needed. Indeed, 'every effort should be made to associate spoken and written symbol in the learning process' (Wilkins, 1981: 64).
- In an attempt to remedy basic articulation problems evident among students in one class, give on-spot clear-cut tips showing how sounds should be produced and how meaning can be altered due to incorrect speech sounds.
- Do not stress more than one point at a time, especially when confounding new words are introduced.
- Listening to minimal pairs is a typical phonetics exercise that does not interest scientific learners. According to Huart (2002), auditory discrimination exercises are ineffective. Certain exercises together with a certain awareness of the orthographic system can, however, be profitable. As such, have students listen to short extracts or watch a screening, and instead of focusing on word meaning or association, they have to concentrate on the production of sounds. In addition, let

them pin down particular points or retell what has been said using as many words as can be from the recording.

As for individual training (outside class), consulting electronic dictionaries that provide audio pronunciations (online dictionaries, software) are highly recommended, notably for checking technical terms. It is better to consult an electronic dictionary while preparing for a presentation so that one monitors his/her pronunciation and becomes familiar with terms, their mode of articulation as well as their meaning.

The above tips help learners to associate forms with sounds. The more they are involved in producing the sounds, that is, they are not passive listeners, the more their vocal system will be trained and they will be acquainted with the occurrence of words. This could be an answer to 'How can I improve my pronunciation?', a question recurrent among foreign language learners, thereby, a source of intimidation and a reason for not moving ahead.

In this context, another question can be posed: What are the chances for a science learner who has scholastic English level [corresponding to A1/A2 level (basic user) or B1/B2 level (independent user) according to the Common European framework of referencing] to acquire as many learning skills as possible in the limited number of hours he/she is assigned during his academic years? Are phonetic skills taken into account and which phonetic exercises are favourable? It is not always easy to find absolute solutions, yet integrating different multimedia services and electronic resources combined with frequent repetitive tips in class help learners mark explicit differences between English and French.

Vowels: A Continuous Challenge

Vowel confusion and durational variations concern not only foreign learners; English speakers themselves also have the same problem. Pronunciation continues to undergo changes or variations due to geographical reasons and the indirect effect of globalization. Yet, educational systems in European countries generally, but not strictly, follow the British English model.

Here are the major phonemes that usually confuse French learners. Let us take the case of monosyllabic words where long vowels are replaced with short vowels:

	<i>English word</i>	<i>French pronunciation</i>
/i:/	steel	[stɪl]
/i:/	beat	[bit]
/eɪ/	email	[i:məl]

/eɪ/	fade	[fəd]
/æ/	land	[lænd]
/ɔ:/	score	[skɔr]
/u:/	stool	[stul]
/əʊ/	whole	[ɔ:l]
/aɪ/	height	[eɪt], [aɪt]

In contrast, there are some other cases where short vowels are stretched, thus leading to miscomprehension:

	<i>English word</i>	<i>French pronunciation</i>
/ɪ/	pitch	[pi:tʃ]
/ʊ/	handful	[ændfu:l]
/ə/	further	[fɜ:rɜ:ɜ:f]

Such errors could be problematic to native speakers who are not familiar with the French phonological system and, as such, cannot easily recognize the difference. They would rather consider it a mistake in lexical choice, but those aware of basic differences would be less confused.

From a phonetic point of view, speech sounds are of two types: consonants and vowels. Consonants are usually articulated with an evident movement of the lips, tongue, teeth and the production of noise. However, this is not the case with vowels whose sounds are audible without perceptually distinct movements involved, minding that speech may vary from a person to another.

The fact that this chapter is titled ‘Second language acquisition: the *articulation* of vowels ...’ is particularly to underline that French learners produce English vowels with almost the same effort they articulate consonants, and so the vibrations, place and manner of sounds are well marked and articulated.

Comparative Case Study

Within the frame of our case study, science students who learn English as a second language for specific purposes have been observed. Two different groups of students have been involved in different English practice

activities. We would like to note here that both groups have been using different multimedia services. Group A mainly consists of science undergraduates whose tasks are limited to auditory skills, meaning that images and motion pictures are rarely included nor is there interaction with an interlocutor. Specifically, students listen to a tape or an electronic recording and, at the same time, they answer comprehension questions either in writing or electronically. On the other hand, Group B basically consists of business students who do various types of audio-visual exercises in addition to voice recording. As such, we notice that the first group does more or less classical phonetic exercises that are restricted to one sort of activities whereas the second one practices a variety of activities among which are:

- (1) Watching a video and filling in the gaps with words or phrases, a phonetic exercise that does not necessarily require acquaintance with words. Students are requested to grasp speech sounds and transform them into words without bothering about meaning nor about answering comprehension questions. And, in the case of a broadcast, reading the lips of the speaker is another clue to guess words. In addition, students will be indirectly observing intonation and stress.
- (2) Watching a video and looking for particular information, a listening exercise in which students list key terms or phrases that summarize the theme; draw a corresponding graph or a diagram; and so on. They usually work on their own, then the lab facilitator, a native or a non-native English speaker, interferes for correction, discussion and/or illustration. Once accustomed to a certain accent or language tone, learners generally prefer sticking to it as this promotes listening comprehension. Familiarity with a particular speaker makes recognition and reception more intelligible (Nygaard & Pisoni, 1995: 63–88).
- (3) Watching a video and illustrating specific parts or summarizing the topic orally. Learners record their speech, and then a discussion follows with the facilitator who comments on pronunciation, grammar and sentence structure. This interactive discussion is so motivating and learners do not hesitate to pose questions and request clarification. Translation is most often avoided, but in some cases, it proves indispensable for assuring comprehension or indicating phonetic or linguistic differences. This task is done individually or in pairs, and less often in groups.
- (4) Simultaneous voice recording enables learners to record their voices at the same time with the broadcaster/speaker. They can undo their work and repeat the same process as many times as they want, and then listen to it once saved. As a result, they indirectly become aware of accentuation, stress, and the production of sounds. At a start,

hesitation, lack of confidence and a low trembling voice prevent them from proceeding; yet as soon as they get involved, they enjoy imitating the native speaker's accent and try to be as fluent as possible. Still, they mispronounce certain speech sounds and, sometimes, they are not really able to distinguish them, for, 'a listener's reactions are normally conditioned by his experience of handling his own language' (Gimson, 1989: 27).

Accordingly, Group A work individually, minding that they are assigned a number of hours that they have to validate, and so lab work is not a personal choice. However, Group B work most often on their own, yet they can communicate with others and they consult multimedia services without any obligations nor for credit validation.

Lab work can be autonomous or collective, but in all cases the objective should be made clear with supervision and assistance provided where necessary. 'It is, however, not generally useful to expose a learner to a tape in a language laboratory without any preliminary instruction on the features which he is expected to perceive' (Gimson, 1989: 335).

Regarding the types of topics they deal with, both groups work on non-technical themes that are normally related to arts, health, social sciences and general knowledge. While Group A listen to recorded texts, Group B watch and listen to documentaries, broadcasts, ads, reports and short movies. The more extracurricular the subjects are, the more interesting and accessible they will be to the learners. We would like to add here that both groups have access to the following language assessment systems: Teaching English as a Foreign Language (TEFL), Teachers of English to Speakers of Other Languages (TESOL), Test of English as a Foreign Language (TOEFL), Test of English for International Communication (TOEIC) and Diagnostic LANGUAGE testing (DIALANG). Only those planning to pursue graduate studies or seeking an international job showed interest in these proficiency tests.

Students, however, do not all demonstrate a real interest in enhancing their linguistic competences due to a presumption that the French are weak at English: 'Les Français sont nuls en anglais.' Some take it for granted that it is a hard task they can never realize. On the other hand, and surprisingly too, some exhibit another reaction which is that of carelessness obvious through the repetition of the same mistakes. Reactions vary between lack of self-assurance, motivation and seriousness. For this reason, they hardly exert an effort and their English remains 'à la française!'

As for their English level, most learners in both groups represent B1 level and some A2 level while very few A1 level. Observation of both groups has manifested basic differences in terms of motivation and progress. It has also been clearly noted that both show lack of confidence, yet

Group A are generally more hesitant and less comfortable in expressing themselves. Not only this, but they have shown minimal to little motivation. This might be the result of the classical uncoloured activities they practice. They usually spend around 40–50 minutes in the multimedia room (not exceeding seven hours per semester). Group B, however, spend at least 60 minutes in the lab which may sometimes be extended to 90 minutes. This is usually done on a weekly basis (15 hours per semester that may sometimes reach 20 hours, that is, almost triple the number of hours learners in Group A spend).

Another element that is equally important in this respect is that of progress. What is the impact of these activities on their use and comprehension of the English language? How can we best assess that? We are concerned in this paper with phonological issues, but it is worth noting that other linguistic aspects are all interdependent. It has been observed that Group B have displayed considerable improvement in pronunciation and became more conscious of the way in which phonemes are articulated, still they could not produce totally correct English diphthongs like /əʊ/, /aɪ/, /aʊ/. In their oral exchanges, they became more self-assured and their intonation has become clearer, but recurrent phonetic errors persisted such as confounding the following sounds:

- /ɪ/ – usually stretched, thus, becoming tense. This is mainly the case with inflections: the simple past tense of regular verbs, for example, ‘fabricated’ [fæbrɪkeɪtɪ:d] and the plural inflection (-s), for example, ‘causes’ [kə:zɪ:z]. Some add needlessly a short /ɪ/ sound at the end of the word as in ‘produced’ [prədʒu:sɪd].
- /æ/ – reduced to /ə/ in certain occurrences, that is, the airflow is cut short, for example, ‘standard’ [stændərd], ‘compact’ [kəmpəkt].
- /ʌ/ – rather close, tense and the lips hardly open; articulated like /ʊ/ sound, for example, ‘discussion’ [dɪskʊʃi:n], ‘conduct’ [kɒndʊkt].
- /ɑ:/, /ɜ:/ – shortened especially when followed by the consonants /r/ and /l/ which are both articulated audibly.

We have also observed that common distracting errors are more frequent in the use of verbs and words beginning and/or ending with vowels. Consequently, we deduce that training one’s ear to listening and, at the same time, to speaking a foreign language enhances one’s phonetic abilities and increases one’s awareness of diverse and distinct sounds. Recognition of distinct sounds is a key element, yet it does not mean or guarantee proper pronunciation.

Here are basic similarities between both groups:

English level: B1 (majority), A2 (a few), A1 (very few)

Time limit per session: no restrictions

Number of times a recording is played: no restrictions

As for the differences:

Group A

- Text-based auditory exercises.
- Topics are more related to sciences.
- Time learners spend/semester: four to seven hours.
- Individual work.
- Correction is either provided on separate sheets or not at all provided.
- No voice recording.

Group B

- Extra-curricular audio-visual exercises.
- Topics are varied and less technical.
- Time learners spend/semester: 15–20 hours.
- Individual, pair or group work.
- Correction of answers and discussion with an English-speaking facilitator.
- Learners can record their own speeches.

Findings of a Questionnaire

Based on the findings of a questionnaire in which 150 students belonging to Group A have participated, 58% prefer discussing their work with an English-speaking lab facilitator while 42% prefer working on their own, mainly listening to a tape and answering comprehension questions. Those who are interested in communication favour watching a video and/or listening to a tape and summarizing the topic orally. Almost all admit having pronunciation difficulties, yet 20% only care to improve their phonetic skills for different purposes, among which are work, studies and tourism. The remaining 80% gave priority to other linguistic skills such as grammar and sentence structure as well as lexis. Surprisingly, learners do not devote much time for practising English outside university. Practice hours per week range between two and three hours and 12% of the learners hardly ever exercise at home.

Conclusions

After all, the objective of multimedia labs is primarily to train learners apprehend a foreign language – preferably – through extra-curricular activities making use of various skills and learning techniques. We, thereby, insist on the fact that integrating different types of activities increases the learner's interest and develops his competence in different areas, one of which is phonetics. As such, acquiring phonetic knowledge should

accompany the early stages of learning. Otherwise it would be hard to get rid of flaws once incorrect sounds are fossilized in one's subconscious.

Sound analysis and categorization is not within the scope of the current work. We are rather trying to pinpoint the necessity of incorporating tools into the learning process so that learners familiarize themselves with the sound system, understand oral speech and produce correct approximate sounds in their oral productions.

For instance, filming or audio recording students while they are giving a presentation enable both the instructor and the learner to go back to major mistakes and to highlight them. Interrupting students while giving a speech is acceptable only when the mistake is 'not viable'.

Furthermore, note taking from an audio and/or video recording is another useful method that helps students work out their phonological abilities as well as trains them to spot specific details. This can be done in class, in the lab or at home. Learners, as such, become used to public speaking (seminars, conferences, etc.), can follow a discussion, make a synthesis and comprehend the overall theme.

In conclusion, integrating tools into the learning process in the early stages of learning English as a second language helps to avoid some persistent articulation problems. This does not really eliminate inherent French sounds, but it makes learners aware of some distinctions. As Wilkins (1981: 22) argues: 'The learner's task in acquiring a second language is not so much to reach a native speaker's standard of pronunciation.' Nevertheless, neither fluency nor accent is a prerequisite as much as clarity and coherence are. Why not 'edit' your speech the way you edit an article?

References

- Bybee, J. (2008) Usage-based grammar and second language acquisition. In P. Robinson and N.C. Ellis (eds) *Handbook of Cognitive Linguistics and Second Language Acquisition* (pp. 216–236). New York: Routledge.
- Dell, G.S. and Gordon, J.K. (2003) Neighbors in the lexicon: Friends or foes? In N. Schiller and A. Meyer (eds) *Phonetics and Phonology in Language Comprehension and Production: Differences and Similarities* (pp. 9–37). New York: Mouton de Gruyter.
- Gimson, A.C. (1989) *An Introduction to the Pronunciation of English*. New York: St Martin's Press.
- Greenberg, J.H. and Jenkins, J.J. (1964) Studies in the psychological correlates of the sound system of American English. *Word* 20 (2), 157–177.
- Hewings, M. (2006) *Pronunciation Practice Activities*. Cambridge: Cambridge University Press.
- Huart, R. (2002) *Grammaire Orale de l'Anglais*. Paris: Ophrys.
- Levelt, W.J.M., Roelofs, A. and Meyer, A.S. (1999) A theory of lexical access in speech production. *Behavioral and Brain Sciences* 22, 1–75.
- Lindblom, B. (1990) Explaining phonetic variation: A sketch of the H&H theory. In W.J. Hardcastle and A. Marchal (eds) *Speech Production and Speech Modeling* (pp. 403–439). Dordrecht: Kluwer.

- Luce, P.A. (1986) *Neighborhoods of Words in the Mental Lexicon*. Bloomington: Indiana University.
- Nygaard, L. and Pisoni, D.B. (1995) Speech perception: New directions in research and theory. In J.L. Miller and P.D. Eimas (eds) *Speech, Language, and Communication* (pp. 63–90). San Diego: Academic Press.
- Petek, K.J. (2002) How to do it to do it right? Is near native-like pronunciation teachable/learnable? In E. Waniek-Klimczak and P. Melia (eds) *Accents and Speech in Teaching English Phonetics and Phonology*. Frankfurt am Main: Peter Lang.
- Purcell, E.T. and Suter, R.W. (1980) Predictors of pronunciation accuracy: A reexamination. *Language Learning* 30, 271–287.
- Schiller, N.O. and Meyer, A.S. (2003) *Phonetics and Phonology in Language Comprehension and Production: Differences and Similarities*. New York: Mouton de Gruyter.
- Wilkins, D.A. (1981) *Second-Language Learning and Teaching*. London: Edward Arnold Publishers.
- Williams-Lacroix, F. (1995) *Right Oh! A Practical Guide of Oral English for French Students*. Rennes: Presses Universitaires de Rennes.
- Wise, M.S. (1965) *Applied Phonetics*. New Jersey: Prentice-Hall Inc.

Chapter 2

On Phonetic Negative Transfer from Chinese to English

L. XIAORONG and G. JIAN

Introduction

Speech and writing are the two major media of language communication. Most languages in the world have both spoken and written forms, and of the two media, speech is more basic than writing. The natural or primary medium of human language is sound. Thus, in the study of language transfer, research on sound is essential, namely the study of language at the phonetic level. The research of language transfer began with the works of American linguists in the 1940s and 1950s. Lado (1957: 2) claims that individuals tend to transfer the forms and meanings, and the distribution of forms and meanings of their native language and culture to the foreign language and culture – both productively and receptively. Some scholars think that the old habits of the learners' mother tongue (L1) sometimes facilitate and sometimes hold back their L2 learning, and they also hold the idea that the difficulties of L2 acquisition can be determined by contrastive analysis (CA). As Faerch and Kasper (1986: 52) claim within a cognitive paradigm, transfer has been conceptualized as a problem in L2. That is to say, transfer is not just a mechanical transference of L1 structures into L2, but rather a complex cognitive mechanism involving many factors. Language transfer is the influence resulting from similarities and differences between the target language and any other language that has been previously acquired (Odlin, 1989: 27). The negative transfer is the interference of the native language with the target language, which takes place when the two languages are different from each other. In this case, the use of native language patterns or rules inevitably results in errors or inappropriate forms in the target language. English and Chinese belong to different phonetic systems, which makes phonemes differ in a big way actually. Accordingly, negative transfer at phonetic level is quite apparent in diversified ways. Chinese EFL learners, sometimes, seem to unconsciously turn to their mother tongue when

speaking English. This chapter describes the phonetic negative transfer from Chinese to English based on the Comparative Analysis Hypothesis and presents it on data obtained from 60 Chinese ESL learners at different proficiency levels.

The Comparison of Chinese and English Phonetic Systems

Comparison is the way in which human beings understand the world and study things. It is also a means to study the language. CA is a set of procedures for comparing and contrasting the linguistic systems of the two languages in order to identify their structural similarities and differences. As stated in *Longman Dictionary of Linguistic Teaching and Applied Linguistics* (2005: 152), CA is based on the following assumptions: the main difficulties in learning a new language are caused by interference from the first language; these difficulties can be predicted by CA; teaching materials can make use of CA to reduce the effects of interference. CA was more successful in phonology than in other areas of language.

Chinese language has its origin different from that of English language. Chinese belongs to the Sino-Tibetan family whereas English belongs to the Indo-European family. They are quite different from each other in the aspect of phonetics.

The Chinese phonetic system is composed of consonants and vowels. According to the features of articulation, there are 21 consonants and 35 vowels in Chinese.

Consonants: b, p, m, f, d, t, n, l, g, k, h, j, q, x, ʧ, ʦ, ʃ, r, ʒ, ʑ, s

Vowels: a, o, ə, ɪ, u, ü, ai, ɛi, ao, ou, an, ɛn, aŋ, ɛŋ, oŋ, ia, iɜ, iao, iou, ian, in, iaŋ, iŋ, ioŋ, ua, uo, uai, uɛi, uan, uɛn, uaŋ, uɛŋ, üɜ, üan, ün

The English phonetic system is also made up of the consonants and the vowels, which can be divided into 20 vowels, 26 consonants and two semivowels based on the features of articulation.

Vowels: i:, ɪ, e, æ, ɜ:, ə, ʌ, u:, ʊ, ɔ:, ɒ, a:, eɪ, aɪ, ɔɪ, aʊ, əʊ, ɪə, eə, ʊə

Consonants: p, b, t, d, k, g, f, v, θ, ð, s, z, ʃ, ʒ, h, ʧ, ʦ, m, n, ŋ, l, r, tr, dr, ts, ʤ

Semivowels: j, w

The differences between Chinese and English consonants

Each language has its own unique 'sound', yet the number of possible sound distinctions that may be made in any language is quite limited, and all languages share at least some sets of sounds (Xiao Liming, 2003: 48). It is customary to classify consonants according to the place of articulation and manner of articulation. The places involve both the upper and lower lips (labials: p, b, m); the lower lips and upper teeth (labio-dentals: f, v). Other sounds are produced by the tongue between the teeth (inter-dental: θ);

by movement of the tongue toward the hard ridge immediately behind the front teeth (alveolars: t, d, s, z); by movement of the tongue toward the hard palate behind the alveolar ridge (palatals: ʃ, ʒ); by movement of the tongue toward the soft palate (velars: g, k, ŋ). However, manner of articulation involves the presence or absence of voicing and of nasality, as well as degree of obstruction. A comparative study shows that the two languages differ in consonants in the following ways:

- (a) When pronounced isolated, the Chinese consonants are combined with vowels whereas the English ones are not: p-o, b-o, m-o, f-o, d-ɜ, t-ɜ, n-ɜ, l-ɜ, j-i.
- (b) The differences between labials: almost naught.
- (c) The differences between the labio-dentals: /f/ (Chinese) – the teeth right on the top of the lower lip, /f/ (English) – the teeth on the inner side of the lower lip, /v/ – no such a voiced consonant in Chinese.
- (d) The differences between the interdental: /θ/ and /ð/ – no such sounds in Chinese.
- (e) The differences between alveolars: the Chinese /s/ can make a syllable: si.
There is no /z/ in Chinese as a fricative but an affricate that sounds somewhat like the English consonant cluster /tʃ/.
There is no /ç/ in English, which sounds like the English consonant cluster /ts/.
- (f) The differences between palatals: both languages have /ʃ/ (sh) but the positions are different; the Chinese /r/ sounds like the English /ʒ/, whereas the English /r/ is produced as a liquid. Both languages have /tʃ/ (ch) and /tʂ/ (zh), but the positions are different.
- (g) The differences between velars: there is a velar /x/ in Chinese, while the English /h/ is a glottal (hot, hard).

The differences between English and Chinese vowels

A vowel is a speech sound in which the breath is let out without any stop or any closing of the air passage or throat that can be heard. A comparison of the two languages shows the differences in producing their vowels.

- (a) The English single vowels are divided into three types:
 - Front vowels: /i:/, /ɪ/, /e/, /æ/
 - Central vowels: /ɜ:/, /ə/, /ʌ/
 - Back vowels: /u:/, /ʊ/, /ɔ:/, /ɒ/, /ɑ:/

The Chinese vowels are classified according to the shape of the lips:

- Open vowels: /ɪ/, /a/, /o/, /ɜ/
- Dental vowels: /ɑ/, /ʊɑ/
- Protruded vowels: /ü/, /üɜ/

- (b) The differences between the diphthongs
 The Chinese diphthongs are /ɜɪ/, /aɔ/, /oʊ/, /aɪ/, /ɪaɔ/, /ɪoʊ/, /ʊaɪ/, /ʊɜɪ/
 But the English diphthongs fall into:
 Closing diphthongs: /eɪ/, /aɪ/, /ɔɪ/, /aʊ/, /əʊ/
 Central diphthongs: /ɪə/, /eə/, /ʊə/
- (c) The English language has no nasal vowels but the Chinese language has 16:
 aŋ, ɪaŋ, uaŋ, üaŋ
 ɜŋ, ɪŋ, uɜŋ, üŋ
 aŋ, ɪaŋ, uaŋ
 ɜŋ, ɪŋ, uɜŋ
 oŋ, ɪoŋ

Analysis on the Phonetic Transfer in FLL

Comparison is a means to study the language, by which the features of the studied object may be revealed. Through the comparison and contrast, we may analyze the English and Chinese phonemes in the following ways.

First, similarities between the phonemes of the two languages produce two effects. On the one hand, they cause generalizations in listening and pronouncing English, which, in turn, makes learners mistakenly treat the similarities between the phonemes as sameness, and substitute Chinese phonemes for English ones, resulting in the negative transfer of NL. On the other hand, owing to the existence of some regularity that governs the differences between the two phonetic systems, it is a very useful step to perfect English pronunciation for most Chinese learners of English. Once the student realizes these regularities through elaborate language comparison and becomes skillful in using them, he will adapt his NL pronouncing skills and pronounce English phonemes correctly, hence forming the positive transfer of NL. For example, with the vowel /ə/ removed, the Chinese initial consonants (b, p, m, f, d, t, n, l, g, k, h, s, w) are very similar to English consonants /b/, /p/, /m/, /f/, /d/, /t/, /n/, /l/, /g/, /k/, /h/, /s/, /w/. It greatly shortens the natural process of discrimination which, in ordinary situations, is rather long. These 13 English phonemes may constitute a great deal of negative transfer of NL when not corrected, or a lot of positive transfer of NL when corrected. This example indicates that the role of NL in FLL is not fixed and constant but changeable, sometimes helpful and sometimes harmful.

Second, a few English phonemes have no counterparts in Chinese, and so learning them correctly in speaking and discerning them definitely in listening are quite demanding. For instance, the English phonemes /θ/ and /ð/ are utterly new, it is difficult for some Chinese learners to pronounce them correctly. Beginning learners often mispronounce 'thin' as 'sin',

'though' as /'ðəʊ/ or /dəʊ/. Some learners fail to discern the two in listening and speaking even after many years of learning.

Next, there are words that end in vowels of open syllables and consonants of closed syllables in the English vocabulary. However, most Chinese characters are monosyllables, ending in vowels (except ɲ and ŋ). Due to this unique feature, beginning learners frequently add a vowel /ə/ when they read an English closed syllable subconsciously, resulting in 'work' being pronounced as 'worker', 'bet' as 'better'. This is a typical phonetic negative transfer from Chinese in learning English.

Finally, a few English phonemes have the features of Chinese phonemes. On the one hand, some English diphthongs such as /eɪ/ and /əʊ/ are quite similar to Chinese phonemes (ɜɪ) and (ou), but more effort is required in pronouncing English diphthongs than in pronouncing Chinese ones. English diphthong is a vowel in which there is a change during a single syllable, as in the English words 'bay' and 'bow'. Diphthongs can be analyzed as a sequence of two vowels or vowel + glide (Hu Zhuanglin, 2002: 48), that is, there is a glide from the first single vowel to the second one, but the glide in Chinese is not as clear as in English. So 'bay /beɪ/' is often mispronounced as Chinese /bɜɪ/ and 'bow /bəʊ/' as /bou/ by Chinese learners of English. On the other hand, there are some English single vowels similar to Chinese ones, but the length is different, English /i:/ is longer than Chinese (ɪ), and thus, some Chinese learners would pronounce /i:/ shorter than it is; tea /ti:/ may be pronounced as /tɪ/.

Based on the analysis above, we can divide the phonemic comparison of Chinese and English into four types in Table 2.1.

Materials and Subjects for the Experiment

The materials

We took three phonemes from each type of English phonemes in Table 2.1 as the first item on the material.

- I /eɪ/ /əʊ/ /æ/
- II /i:/ /u:/ /ɛ/
- III /θ/ /ð/ /r/
- IV /s/ /p/ /tʃ/

The second item is 12 sentences with the phonemes specified above.

/eɪ/ Great changes have taken place only in one year.

/əʊ/ A rolling stone gathers no moss.

/æ/ The rat is running on a narrow track.

/i:/ Seeing is believing.

/u:/ The new troops air the boots and shoes on the roof.

/e/ Remember to tell Ted about the test.

Table 2.1 A phonemic comparison of Chinese and English

<i>Types of analysis</i>		<i>Phoneme examples</i>	
		<i>English</i>	<i>Chinese</i>
Similar phoneme with different richness (I)		/ei/ /əu/ /æ/	(ei) (ou) (ai)
Similar phonemes with different lengths (II)	English longer, Chinese shorter	/i:/ /u:/ /a:/ /ɔ:/	(i) (u) (a) (ao)
	English shorter, Chinese longer	/ɔ/ /e/ /i / /u/	(ao) (ai) (i) (u)
No similar counterparts in Chinese (III)		/θ/ /ð/ /r/	() () ()
Similar phonemes in both English and Chinese (IV)		/s/ /p/ /m/ /f/ /g/ /k/ /dz/ /tʃ/ /ʃ/	(s) (p) (m) (f) (g) (k) (z) (ch) (sh)

/ð/ My mother, together with Tom, went to the market yesterday.

/θ/ Something is better than nothing.

/r/ Rite reads nursery rhymes to her children every night.

/s/ Sam, pass me the salt, please.

/p/ Peter is picking the pears and pumpkins.

/ɔ:/ She hides her coats and boots in the wardrobe.

The third one is a short English paragraph in which there are the above identical 12 English phonemes.

Obtaining an audience with son No. 1, I snarled, 'I'll kill you if you threaten one of

/eɪ/ /aɪ/ /θ/ /e/

those kids again! Idiot! You should be offering a bonus of a dollar every hour to the

/ɔ:/ /əʊ/

worker who fills the most bags.' 'But that would cut into our profit,' he suggested.

/æ/ /æ/ /s/

'There won't be any profit unless those kids enable you to make all the deliveries on time.

/p/ /e/ / ð / /eɪ/ /r/ /aɪ/

If they don't, you two will have to remove all that paper by yourselves. And there will be

/u:/ /ð/

no eating and sleeping until it is moved.' (Hu Wenzhong, 1992: 3)

/i:/

The subjects

The participants in the experiment were 60 English major students at different proficiency levels, 20 of whom were freshmen of Grade 2002, 20 sophomores of Grade 2001 and 20 juniors of Grade 2000. They came from three different provinces in China – Liaoning, Jilin and Hubei. They were mixed together first and then were classified at random into three groups. There were still 20 students in each group. They had the same syllabus for their instructional guidance on weekends or their spare time. Moreover, they followed the same teaching plans with the same textbooks. Their teacher's experiences were similar. However, later results showed that variations occur in the experimental and control groups.

The control group

Twenty students in the control group have six contact hours with the teacher per week for intensive English reading, which is teacher-centered. The teacher dominated the class by explaining the text in detail while the students listened and took notes passively. The students in this group never had the instruction on phonetics by the teacher. Consequently, they had little learning flexibility in class.

The experimental groups

The other 40 students in the experimental group were divided into another two parts according to their willingness whether to contact the native language outside of the class or not. Those who were willing to were in experimental group one and the rest were in experimental group two. Like the students in the control group, the students in these two groups had to follow their teachers to study the intensive English reading in class for six hours a week. For the students in group one, they were asked to contact the target language at least two hours per week in the

natural environment rather than in the classroom. They might talk to the native speakers, listen to the English radio and watch English TV program as well as give an English performance. Learning English in this way offered the learners more independence and learning flexibility. But the students in group two were given another two hours per week for phonetic practice with the teacher's guidance. They were told the essentials of each phoneme and given the chances to practice and read the phonemes one by one. The teacher would correct them whenever they made errors in their pronunciations. Later, they improved their pronunciation a little.

During nearly two academic years, we examined and observed them periodically by asking them to read the same materials with the phonemes in Table 2.1 or by giving them the oral tests. We have recorded their readings at that time. Then we analyzed their pronunciations of the 12 single phonemes and the accuracy of these phonemes in sentences and a short paragraph. Each student's pronunciation has been evaluated by English native speakers. For each student, the accurate marks were given by the same group of native speakers. The total score was 10 points for each phoneme. We averaged the students' marks for each phoneme. The results showed that variations occur in the experimental groups and the control group. These variations occurring in the teaching and learning environments for the experimental and control groups are illustrated in Table 2.2.

Findings

We can see from Table 2.2 that the accuracy of the students' pronunciation decreases progressively from the single phonemes, sentences to paragraph. The biggest decreasing margin occurs in the first type of the phonemes, then in the second type. The phonetic negative transfer is easy to occur in these two types of phonemes. Influenced by Chinese language, Chinese learners of English are likely to pronounce the English /eɪ/ and /əʊ/ as Chinese (ɜɪ) and (oʊ). Their pronunciation of these two English phonemes does not sound as rich and full as that of the English native speaker. It is also common for the Chinese learners to pronounce /i:/ shorter than it is, while /ɪ/ and /e/ longer than they are. As far as the third type is concerned, Chinese learners have difficulty in mastering the manner of articulations of /θ/ and /r/, it is customary for them to pronounce these two as /s/ and Chinese /r/ because there are no such phonemes in Chinese. Sometimes, their pronunciations are mainly influenced by their dialect. We found that anyone from Tonghua district, Jilin province, who articulates 'shuǐ' (water) as 'suǐ', 'shì' (yes) as 'sì' in Chinese, is liable to pronounce /θ/ as /s/. Interestingly, those who do not speak this dialect articulate the sound accurately. Concerning the last type of the English phonemes such as /s/, /f/, /p/ and /g/, there are their counterparts in Chinese. They have

Table 2.2 Results from the experimental and control groups

<i>Types of phonemes</i>	<i>Phonemes</i>	<i>Results of the experimental group one</i>			<i>Results of the experimental group two</i>			<i>Results of the control group</i>		
		<i>Ph</i>	<i>S</i>	<i>P</i>	<i>Ph</i>	<i>S</i>	<i>P</i>	<i>Ph</i>	<i>S</i>	<i>P</i>
I	/ei/	9.5	8.1	8	9.4	7.6	7.1	9.1	7.2	7.1
	/əu/	9.4	8	8	9.1	7.9	7.2	9.1	7.9	7.1
	/æ/	9	7.9	7.9	8.5	7.5	7.1	8.4	7.5	7.2
II	/i:/	9.5	8.9	7.9	9.5	8.2	7.9	9.1	8.1	7.5
	/u:/	9.5	9	7.9	9.5	8.4	7.8	9.5	8.2	7.4
	/e/	9.5	8.5	8	9.3	8.3	7.9	9.1	8.2	7.7
III	/θ/	9.5	9.1	8	8.5	8.4	8	9.3	8.3	7.8
	/ð/	9.2	9	8.9	9.2	9	8.5	8.4	8.3	8.1
	/r/	9.2	9	8.5	9	8.6	8.2	9	9	8.5
IV	/s/	9.3	9.8	8.4	9.8	9.8	9.8	9	8.4	8.1
	/p/	9.8	9.8	9.8	9.9	9.9	9.9	9.8	9.7	9.8

similar manner of articulation in the two languages. So their pronunciations for these phonemes are hardly influenced by L1.

The results in Table 2.2 also show that the students, especially the ones in the experimental group one, who had more chances to contact target language in the natural environment and imitate the native speaker's pronunciation, made less errors and made rapid progresses in English pronunciation. This fits the regularity of phonetic acquisition and is similar to the process of first-language acquisition.

We also found from the experiment that the factors resulting in the phonetic negative transfer may be divided into linguistic factors and non-linguistic factors. Linguistic factors include the influence of Chinese consonants on English consonant clusters and Chinese vowels on English vowels.

Consonant cluster is a sequence of two or more consonants at the beginning of a syllable or at the end of a syllable. In English, with clusters of two, either the first sound is /s/ or the second one is an approximant (l, w, r, j); in initial clusters of three, the first sound is always /s/, the second is a voiceless stop /p, t, k/ and the third is an approximant. In final position,

many more clusters are possible, but most final clusters of three or more consonants are formed as the result of adding a plural or past tense inflection to a stem and therefore end in /t/, /d/, /s/ or /z/ (*Longman Dictionary of Linguistic Teaching and Applied Linguistics*, 2005: 110). In English, clusters are very common, while they do not occur in Chinese except for the word ending (ŋ). In Mandarin Chinese, each consonant (except ɲ and ŋ) is always followed by a vowel, like (b-o, p-o, d-ɜ, t-ɜ) while in English consonant clusters, a vowel is never inserted between the consonants, the word ending in consonants is never followed by additional vowels. This is quite different from Chinese. Generally speaking, in initial consonant clusters, the first consonant should be pronounced short and clear, while the second one comparatively louder and longer, especially the one close to the vowel. In Chinese, each sound should be pronounced clear and loud. Influenced by this fact, many Chinese learners of English are used to inserting a schwa /ə/ between the consonants. Therefore, the word 'blue' /blu:/ is often pronounced as /bəlʊ:/, 'flood' /flʌd/ as /fəlʌd/. This phenomenon is more common in clusters of three. For instance, 'screen' and 'spring' are articulated as /skəri:n/ and /spəriŋ/. This Chinese habit affects seriously the pronunciation of English.

A vowel is produced with a vibration of the two vocal cords but with no closure or obstruction when the airstream passes through the mouth though with some restriction of the tongue and the shape of the mouth. Vowels usually make up the nucleus of syllables and can stand alone as syllables. In Mandarin, the phoneme (ɑ) is a vowel with the features of [+low], [+back], [+lax], [+unrounded], while English /æ/ belongs to [+low], [+front], [+lax], [+unrounded] vowel. In pronouncing /æ/, the tip of the tongue should be against the lower teeth, the front part of the tongue is raised a little, with two lips opened. Chinese learners of English are able to grasp the essentials of this single phoneme. They can pronounce the single word with this phoneme correctly, but when they read the sentences aloud with it or speak quickly, the influence of mother tongue would occur. For example, *He sat on a sack as he had no mat* might be read as /hɪ sɑt ɒn əsɑk ɑz hɪ hɑd nəʊ mɑt/.

Nonlinguistic factors include the influence of the geographical environment on the learners' pronunciation, the features of sound quality, individual differences, and so on.

Chen Linhua (1999: 256) claims different geographical dialects of a language may occur if the language is widely used in different areas. The different geographical dialects are the different varieties of the same language spoken in different areas. China is a large country with large population, 31 provinces and over 50 minorities. Learners from different regions have different dialects. In learning English, many learners speak English with their own dialects and accents. Learners from Hubei province cannot tell Chinese phonemes /l/ from /n/. They say Chinese /rʊlɑu/ ('cheese'

in English) as /rʊnɑʊ/. When they speak English, they pronounce 'large' /lɑ:ɔ:/ as /nɑ:ɔ:/. Learners from Chaoyang district, Liaoning province, pronounce 'cake' and 'date' as /ki:k/ and /di:t/. Such pronunciation is normal because language itself is a sign of the region.

Summary

The two-year-long experiment has shown that in learning a foreign language, it is important for the teachers to instruct learners in phonetics. But in order to improve their pronunciation, students should be given time to contact the native speakers as much as possible. In this way, the students may learn a language in a more natural way. Learner's contacting the target language with their ears and imitating it seems to agree with the regularity of the phonetic acquisition, which is similar to the way of first-language acquisition. In children's language acquisition, they were seldom told to place the tip of the tongue between the upper and lower teeth. However, children's accuracy about phonetic learning is identical to that of the adults (Zhao Wenhui, 2002: 29). Since learning phonemes is just for communication, language contact may improve learner's sound system considerably in practice.

References

- Faerch, C. and Kasper, G. (1986) *Cognitive Dimensions of Language Transfer*. Oxford: Pergamon Press.
- Lado, R. (1957) *Applied Linguistics for Language Teacher*. Michigan: University of Michigan.
- Liming, X. (2003) *English-Chinese Comparative Studies and Translation*. Shanghai: Shanghai Foreign Language Education Press.
- Linhua, C. (1999) *An Introduction to Linguistics*. Jilin: Jilin University Press.
- Longman Dictionary of Language Teaching and Applied Linguistics* (2005) Beijing: Foreign Language Teaching and Research Press.
- Odlin, T. (1989) *Language Transfer-Cross-Linguistic Influence in Language Learning*. Cambridge: Cambridge University Press.
- Wenhui, Z. (2002) New attempts to English phonetic teaching. *Reign Language Electronic Teaching* 84, 4-19.
- Wenzhong, H. (1992) *College English Course Book*. Beijing: Foreign Language Teaching and Research Press.
- Zhuanglin, H. (2002) *Linguistics: An Advanced Course Book*. Beijing: Beijing University Press.

Chapter 3

Understanding L2 and the Perspicacious Pole

L. SHOCKEY

Introduction

Most linguists emphasise that spoken language and (alphabetically) written language are fundamentally different. Written language is composed of rule-governed sequences of discrete symbols, that is words, separated by spaces and normally arranged into sentences with characteristic punctuation. Lexical items have prescribed spellings, and deviations are not recognised as standard. Spoken language is composed of sounds which are produced and perceived sequentially in the time domain, but which 'leak into' each other, so that no precise time can be attributed to each linguistic unit. (Coarticulation is a necessary feature of connected speech, since the vocal tract does not pass instantly from one discrete state to another.) In addition, spoken language allows for enormous variation among different tokens of the 'same' linguistic unit. You could argue that this is equivalent to using different fonts, italicising or underlining, but consider that a simple English word like 'and' can be pronounced (at least) as [ænd], [æɪn], [ən], [ɪ], [n] or [ə̃]. While these all have a nasal property, they are structurally very different. Nevertheless, they are perceived as equivalent by native speakers of English when used in the appropriate context.

The process of speech perception is thus dealing with input that is quite different from the raw material for reading, but the decoding processes used by the brain may be similar. In speech perception, we must do some acoustic–phonetic analysis (otherwise, there is no need for the speech signal at all), some analysis of the context in which sounds are occurring, and some holistic analysis in which the characteristic features of longer spans of input are evaluated. One aspect of the latter is 'normalisation', which allows us to understand people with strong foreign accents or severe vocal tract anomalies.

Pelli and Tillman (2007) say that reading has three very similar components: mechanical letter decoding, sentence context and holistic recognition of words by their overall shape. The question of how many words are recognised at the same time is still being investigated (cf. Rayner & Pollatsek, 1989: 129), though it is known that words are sometimes skipped, suggesting a holistic or impressionistic interpretation.

In this chapter, I will argue that the Polish subjects I have found for my speech perception experiments are unusually good at understanding casual English pronunciation because they are looking for overall shapes as well as small details, thereby showing skill in all three aspects. My earlier experiments have shown that native speakers of English are not fazed by phonological reduction and, in fact, hardly notice it at all. I have tested this using the 'gating' technique, in which one truncates all but a small amount of the beginning of an utterance, and then re-introduces the deleted material in small increments ('gates') until the entire utterance is heard. This yields a continuum of stimuli with ever-greater duration and hence ever-greater information. When gated speech is played to subjects and they are asked to make a judgment about what they hear, the recognition of a sound/word/sentence percept can be tracked.

Gating has revealed that word recognition often occurs non-linearly: a word can be recognised considerably after its production. Bard *et al.* (1988) presented sentences gated in words to their subjects. Although the majority of recognition outcomes (69%) yielded success in the word's first presentation with prior context only, 19% of all outcomes and 21% of all successful outcomes were late recognitions. These late recognitions were not merely an artefact of the interruption of word-final coarticulation. Approximately 35% of them were identified not at the presentation of the next word, but later still. The mean number of subsequent words needed for late identification was closer to two than one ($M = 1.69$, $SD = 1.32$).

This and other evidence suggest that the interpretation of casual speech sentences taken out of context is not straightforward. But native speakers of English can normally unravel them, as they do daily in normal discourse. My research and the late-recognition results quoted above suggest that the unit of understanding may not be the word, but may lie closer to the phrasal level – just as we recognise a syllable or word faster than its phonetic components (Foss & Swinney, 1973; Savin & Bever, 1970), we may process larger linguistic units before deriving the component words possibly not unlike the behaviour of skilled readers.

Results from Shockey (2003) and Koster (1987) suggest that perception of a foreign language often reflects a different balance of these skills. On the one hand, non-natives often depend even more on context than native speakers, and on the other, they sometimes depend on fine-grained phonetic cues more than native speakers. On the whole, their performance at understanding casual English is considerably lower than that of those who have grown

up speaking English. This could be traced to lack of practice, but is arguably also related to the type of language they have as a model when learning English. In my experience, English teachers shy away from teaching ‘sloppy’ pronunciation and hence aim for a style which is overly articulated. But in doing so, they avoid exposing students to exactly the style they will need to deal with in everyday conversations. The following reports an experiment in the perception of casual speech by native speakers, Greeks and Poles.

The Experiment

The stimuli consisted of a single gated sentence of English. It is a highly reduced sentence that was taken from a monologue by a woman in the 30–40 age range about her brother’s wedding, ‘So it was quite good fun actually on the wedding, though.’

I chose this sentence because it does not have a highly predictable sequence of lexical items, and so semantic context effects were reduced. All the suprasegmental cues for position in utterance were present, including the intonation pattern.

Phonetically, the sentence was:

[sə^wɪ^ws^wɪ^tkwaɪ^lgʊf^lʌnætʃuɪn:ⁿ:ə^lwɛdɪŋ...d̥əʊ]
/səʊ it wɒz.....ækʃʊəli..... d̥əʊ/

There was no ‘t’ in ‘it’, the [w] in ‘was’ was represented by rounding in the first syllable, the ‘t’ in ‘quite’ was a glottal stop, there was no ‘d’ in ‘good’, ‘actually’ was quite reduced, there was no separate dental fricative in ‘the’ and the fricative at the beginning of ‘though’ was pronounced as a dental stop.

The utterance was presented in a gated fashion (20 gates of 30 ms, with three seconds between each stimulus), and subjects were asked to write what they heard in normal spelling after each stimulus. Two test stimuli were presented before the writing began, to accustom subjects to the input. The answer sheet resembled the following:

Test 1 _____
Test 2 _____

Now please write what you hear. Don’t forget to use a new line each time.

Do not change any of your earlier answers if you change your mind.

1. _____
2. _____
3. _____
4. _____

Subjects were instructed to write on each line, but to include only new material. If a stimulus was perceived as identical to the previous one, they could use 'ditto' marks.

The recording was presented to four groups of subjects, five native speakers of English, eight Greeks between the ages of 20 and 30 who had studied in the United Kingdom for an average of three years and 10 Polish students with the same profile and 13 Polish students of English who lived in Poland.

Results

Native speakers

The grey bars show where in the utterance the word on the left was recognised. The number inside the grey bar shows how many subjects made the identification at that time. The column 'Total' on the right gives the total number of correct answers for each word. Only one native speaker got 'so', and that was after or at the same time as 'it'. No one got 'was', although a few people wrote 'is'. The following seven words were all relatively well identified, with some sequentiality, but there is a strong tendency to hear more than one word at a time, as represented by the 'stacks'

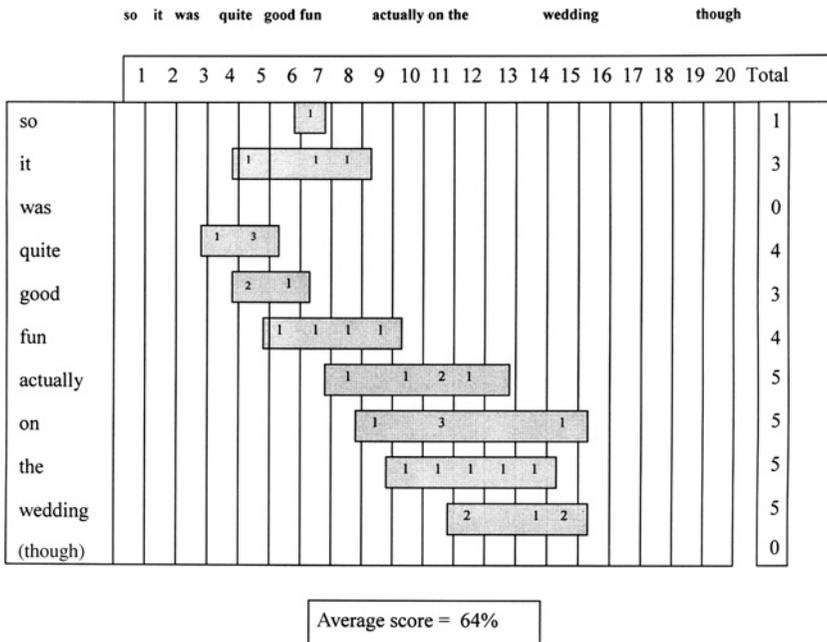


Figure 3.1 The results from English native speakers

of grey boxes. No one heard ‘though’ because everyone heard ‘day’: you can see from the phonetic transcription that the vowels were quite fronted, and this together with the expectation of the familiar phrase ‘wedding day’ led to a wrong conclusion. Total correct score was only 64% overall, although the score reached 85% on the next seven words (see Figure 3.1).

Greek young adults studying in England

The Greek subjects predictably showed less successful perception than the native speakers, averaging 25% correct overall (see Figure 3.2). Like the native speakers, the poorest results were for the first three words and the best results for the word ‘quite’. On the subsequent seven words, their score was 34%. One speaker did hear ‘though’, in this case excelling the native speakers.

Polish young adults studying in England

Some of the profile is similar to that of the Greeks: the first three words were poorly identified and the following ‘quite’ universally recognised.

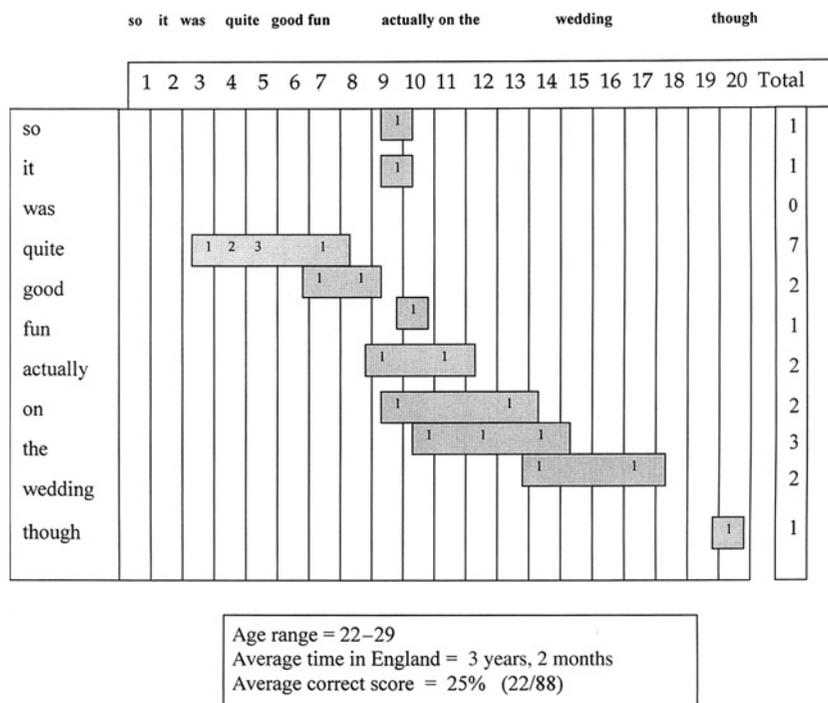
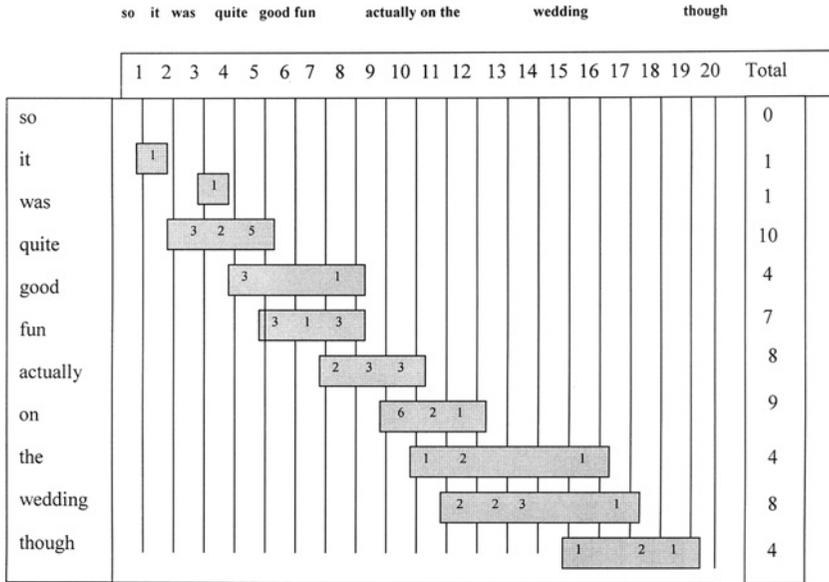


Figure 3.2 The results from Greek learners of English



Age range 20–29
 Average time in England = 3 years
 Average score of this sentence = 51%

Figure 3.3 The results from Polish learners of English in England

But the overall score was 51%, with 71% on the next seven words. Four Poles heard ‘though’, again excelling the native speakers (see Figure 3.3).

It is interesting that though there is some evidence of simultaneous recognition of words, in general word recognition follows the time course of the input, a feature not obvious for native speakers. This suggests that while the Poles are doing some holistic processing, they are hugging the phonetic ground more closely than native speakers of English.

It is tempting to conclude that Poles are simply better at language learning than Greeks, and this is partially borne out by results from 11 Polish students of English living in Poland.

Polish students of English living in Poland

Here the ‘totals’ column reflects students at two different levels of study. The first number is the total for all subjects, the first number in parentheses is results from 5th-year students, and the second is results from 7th-year students, with many thanks to Professor Wiktor Gonet who collected them for me (see Figure 3.4).

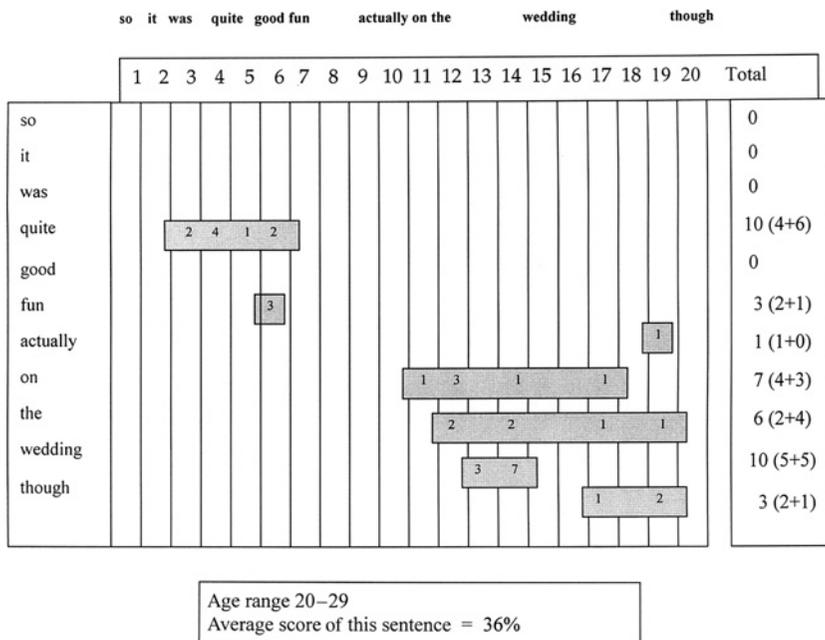


Figure 3.4 The results from Polish learners of English in Poland

In this case, no one identified the first three (very highly reduced) words, ‘quite’ and ‘wedding’ (the two most stressed words) got high scores, but ‘good’ and ‘fun’ did not fare well. Three subjects heard ‘though’, much the same as the Poles living in England. Here, again, we see ‘stacking’ of results, showing that several words were identified at nearly the same time. The overall accuracy rate was 36% and the score on the most recognised seven words, 48%. While the last two sets of results clearly indicate that living in the English language environment is very beneficial for the understanding of casually spoken English, it is still striking that the Poles living in Poland scored higher than the Greeks who had been living in England for three years.

Discussion

We are left asking why Polish students appear to have an advantage in identifying English casual speech intentions, and a number of guesses can be offered, including excellent teaching and high motivation. I suggest another reason is that Poles have a good mental model of difficult articulations.

Polish and English are unusual in that they allow several consonants at the beginning and at the end of a syllable. It is well known that the most

usual syllable structure in the world's languages allows at most one consonant at the beginning of a syllable and none at the end (the CV syllable).

Some examples include the following:

Polish

następstw [nastempstf] (consequences, gen. pl)

Strwiąż [strfjɔŋʃ] (place name)

English

angsts [aŋksts]

splints [splints]

While it is obvious that the clusters in English and Polish are different phonetically, it is also clear that they share complexity. Cyran (2006) goes so far as to say that they are very similar phonologically, differing only in that Polish has some empty vowel slots, so that the consonants aggregate. English follows a relatively strict rule that adjacent consonants must differ significantly in sonority and Polish allows equi-sonorous sequences such as kt- (kto 'who') and tk- (tknąć, 'touch') (cf. Browserslow & Finer, 1991 as discussed in Young-Scholten & Archibald, 2000). I am suggesting an abstract model of speech perception that has affinities to the Motor Theory. I would like to emphasise that I am *not* saying that Poles understand English reductions because the two languages have the same sounds and sound sequences, although I am assuming that there are broad similarities. What I am saying is that Poles have a mental model of what is easy and what is difficult for the vocal tract to achieve, and so they can predict more accurately than many others what kinds of shortcuts will be taken. They probably do not have the same shortcuts in their own language, but they have implicit knowledge of what is easy and what is hard. You could make a parallel with watching a sport, say swimming. If you are a swimmer, you know the different strokes, you know what is easy and what is difficult and you know when an athlete is making changes in the pattern in order to swim faster or to achieve some other goal. That is you see the shortcut, and you know why it is being done. If you are not a swimmer, you do not detect the subtleties: you have no mental model of canonical and non-canonical patterns. When it comes to the type of casual speech reduction found in English, Greeks are non-swimmers, because their syllable structures are simple, ending in vowel, nasal, or 's', while Poles are champion swimmers. This argument would be stronger if we could discover that Polish shows casual speech reductions, even if they are different from those in English. We could use this to bolster our notion that because Poles know what is easy and what is hard, they can recognise shortcuts. Following Natural Phonology, I assume that phonological simplifications are governed by the same principles that shape canonical phonological sequences in all languages.

A Preliminary Look at Casually Spoken Polish

With my aforementioned Polish colleague, Wiktor Gonet (WG) of UMCS Lublin, I have made a very small preliminary study in an attempt to discover whether there is phonological reduction in Polish. WG has sent recorded excerpts of relaxed casual Polish conversations, of which I have done a fairly narrow phonetic transcription without any idea of what was being said. One would expect this approach to yield a relatively unbiased transcription, as I have no preconceptions about which segments are supposed to occur.

Surprisingly, preliminary results throw up few cases of articulatory shortcuts or even of potential places for these shortcuts: consonant sequences so far captured have been remarkably tame. The word *tylko* ('only') shows a reduction to [tko], probably a lexically determined reduction rather than a general one. However, there has been one example of a sequence of sonorants which is, to my ear, reduced: what is heard and transcribed by WG as [ɔ^wujə] sounds like [ɔi] to me. Spectral displays also do not give strong evidence of the differences perceived by WG (sound file available on request): components are not stationary, but do not reflect as much variation as does WG's transcription. The fact that WG heard this as [ɔ^wujə] suggests that he is abstracting an interpretation, based to some degree on acoustic properties and to some degree on its context. Articulatory shortcuts are being taken by the speaker, but not noticed by the hearer, much as happens in English, which has similar processes that simplify sequences of sonorants:

gəu ¹ wɛɪ	'go away'
t.ɪaɪ ¹ ɡɛn	'try again'
wɪtʃəz	'which was'

More research is clearly called for, but the notion that processes in their own language (arguably called for because of phonological challenges similar to those in English) give Poles an advantage in interpreting overall acoustic shapes still deserves investigation. Brown argues that holistic interpretation is fundamental to the understanding of another language:

The foreign student, then, is going to have to learn to abstract the message from a fairly reduced acoustic signal. He will not hear a string of explicitly articulated sounds which he can build into words and then sentences. He will hear an overall sound envelope with moments of greater and lesser prominence and will have to learn to make intelligent guesses, from all the clues available to him, about what the probable content of the message was and to revise this interpretation if necessary as one sentence follows another – in short, he has to learn to listen like a native speaker. (Brown, 1977: 4)

References

- Bard, E.G., Shillcock, R.C. and Altmann, G.T.M. (1988) The recognition of words after their acoustic offsets in spontaneous speech: Effects of subsequent context. *Perception & Psychophysics* 44, 395–408.
- Browselow, E. and Finer, D. (1991) Parameter setting in second language phonology and syntax. *Second Language Research* 7, 35–59.
- Brown, G. (1977) *Listening to Spoken English* (2nd edn, 1990). London: Longman.
- Cyran, E. (2006) Polish and English syllable structures. How different are they? *Zeszyty Wszechnicy Świętokrzyskiej. Filologia Angielska* 1/23, 151–160.
- Foss, D.J. and Swinney, D.A. (1973) On the psychological reality of the phoneme: Perception, identification, and consciousness. *Journal of Verbal Learning and Verbal Behavior* 12, 246–257.
- Koster, C.J. (1987) *Word Recognition in Foreign and Native Language*. Dordrecht: Foris.
- Pelli, D.G. and Tillman, K.A. (2007) Parts, wholes, and contexts in reading: A triple dissociation. *PLoS ONE* 2, e680.
- Rayner, K. and Pollatsek, A. (1989) *The Psychology of Reading*. Englewood Cliffs, NJ: Prentice-Hall.
- Savin, H.B. and Bever, T.G. (1970) The nonperceptual reality of the phoneme. *Journal of Verbal Learning & Verbal Behavior* 9, 295–302.
- Shockey, L. (2003) *Sound Patterns of Spoken English*. Oxford: Blackwell. (Published online 2008.)
- Young-Scholten, M. and Archibald, J. (2000). Second language syllable structure. In J. Archibald (ed.) *Second Language Acquisition and Linguistic Theory* (pp. 64–101). Oxford: Blackwell.

Chapter 4

Perception of the English Voice Onset Time Continuum by Polish Learners

A. ROJCZYK

Voice Onset Time

The Voice Onset Time (VOT) introduced by Lisker and Abramson (1964) is defined as the single production dimension, the time interval between the release of a stop occlusion and the onset of vocal cord vibration, or in the authors' own words 'the time interval between the burst that marks release and the onset of periodicity that reflects laryngeal vibration' (Lisker & Abramson, 1964: 422). In a survey of 23 languages, they found that word-initial stops fall into three broad categories that show little cross-linguistic variation:

- (1) Voicing lead or negative VOT: voicing starts well before the release of the plosive (approximately -30 ms or more). It is present acoustically as 'low-frequency harmonics of a buzz source' (Keating *et al.*, 1981: 1264) or simply 'laryngeal buzz' (Lisker, 1986: 8) (see Figure 4.1).¹
- (2) A short lag or zero onset: voicing starts at or shortly after the stop release (approximately 0 to $+30$ ms, maximum $+35$ ms (Keating, 1984)) (see Figure 4.2).²
- (3) A long lag: voicing starts well after the release of the plosive (approximately $+50$ ms or more). It is accompanied by silence (Klatt, 1975; Lisker, 1986) or aspiration if 'the vocal tract resonates to turbulent air passing through the open glottis' (Lisker & Abramson, 1964: 416). Aspiration is acoustically registered as 'noise (i.e. random stippling), mostly at frequencies of the second and third formant' (Lisker & Abramson, 1964: 386), 'a large glottal abduction that peaks around the release of a stop' (Jansen, 2004: 41), 'turbulent excitation of the upper vocal tract' (Abramson, 1977: 296), 'turbulence formed aerodynamically [...] at the somewhat open glottis' (Abramson, 2000: 8), or 'friction noise generated at the still-open glottis by the flow of air

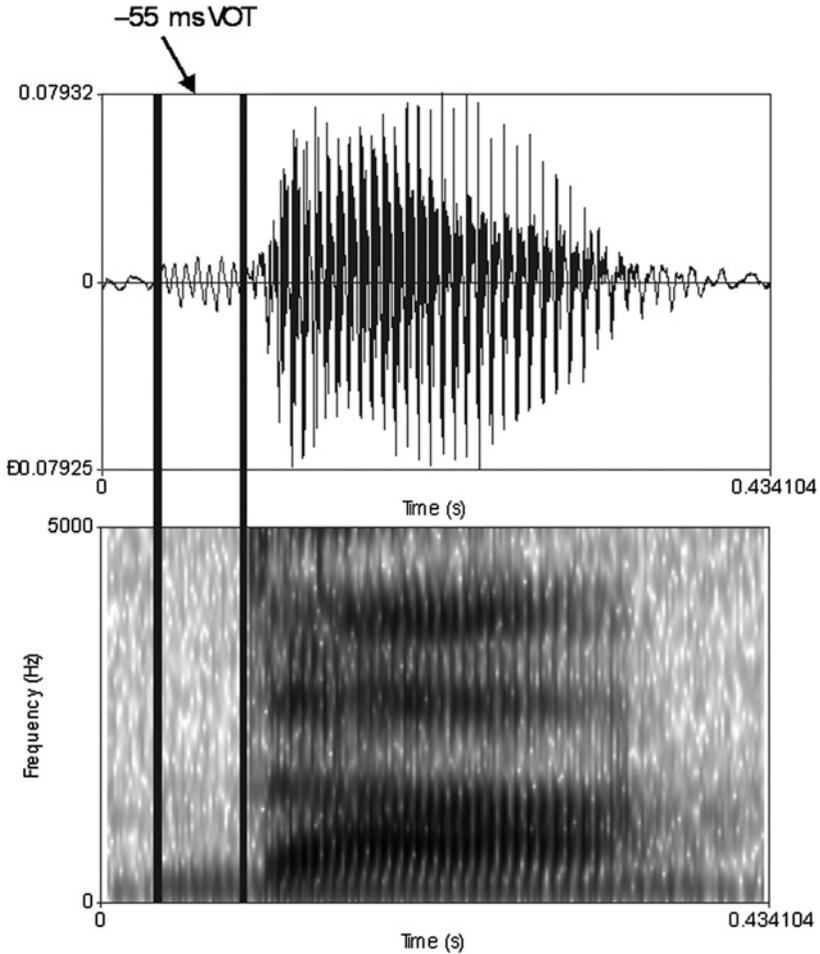


Figure 4.1 Waveform and spectrogram of the syllable *da*. Voicing lead -55 ms VOT

through the vocal tract after stop release' (Keating, 1984: 295) (see Figure 4.3).

Attempts to provide a unified phonetic conception of the voiced–voiceless distinction based on the VOT continuum (e.g. Keating, 1984; Kingston & Diehl, 1994, 1995; Kohler, 1984) proposed the division into voicing and aspirating languages. Voicing languages contrast prevoiced plosives with short-lag plosives. This type of languages dominates in eastern and southern Europe, comprising virtually all varieties of Romance and Slavonic as well as the Baltic languages and Hungarian (Jansen, 2004). If a language has a single series of stops, these belong almost always to this

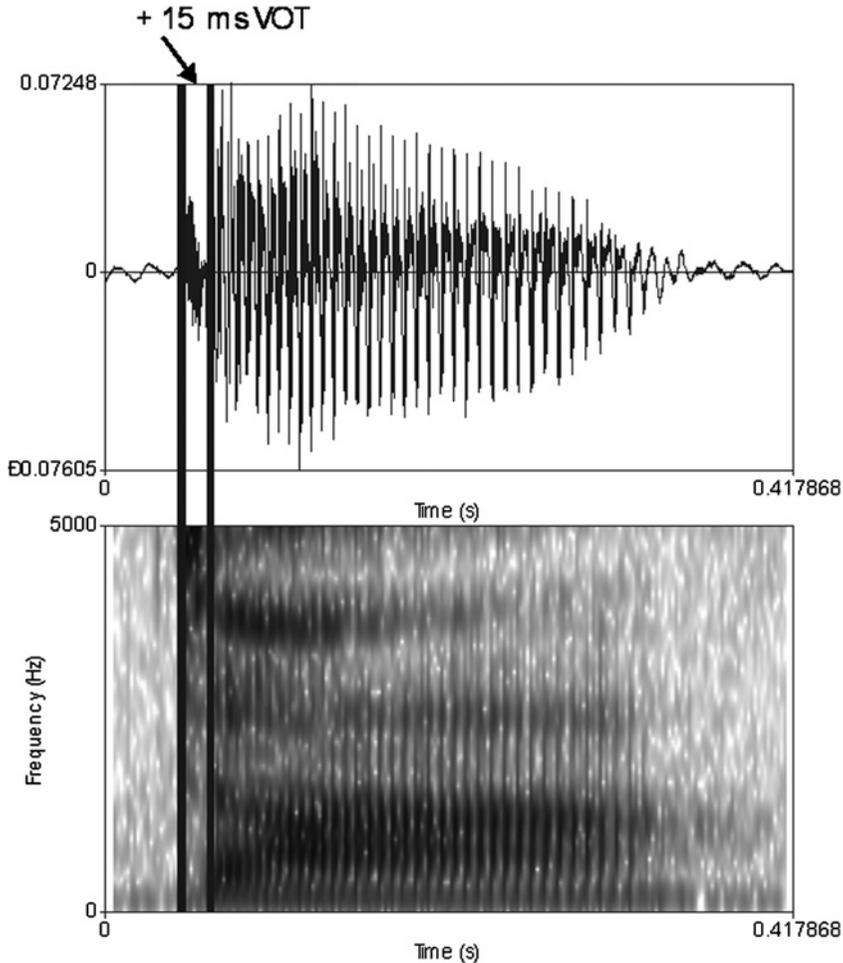


Figure 4.2 Waveform and spectrogram of the syllable *da*. Short lag +15 ms VOT

category. In all, 49 out of 50 languages with a single series of oral stops sampled by Maddieson (1984) have a short-lag VOT.³ Aspirating languages, on the other hand, contrast short-lag with long-lag stops. Languages belonging to this category are Danish, Faroese, Icelandic, Norwegian, Swedish (Jansen, 2004; Jessen, 1998) and standard varieties of English and German (for dialects see Docherty, 1992; Hughes *et al.*, 2005; Wells, 1982).

In general, the three above-mentioned VOT categories are sufficient for the description of contrasts used in languages and even for their allophonic variation. The 51 languages surveyed by Keating and colleagues (1983) all use at least some kind of short-lag stops in virtually

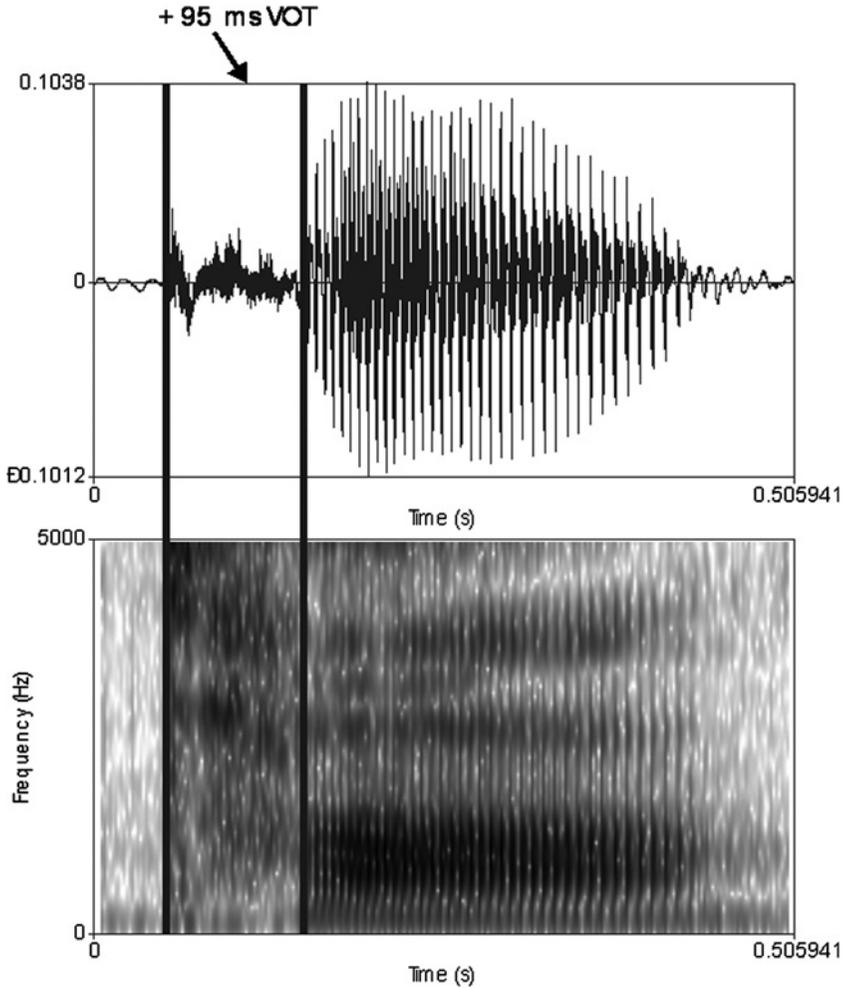


Figure 4.3 Waveform and spectrogram of the syllable *ta*. Long lag +95 ms VOT

every position. Voicing lead–short-lag contrasts and short-lag–long-lag contrasts are equally common across the surveyed languages. There are, however, languages that cannot be satisfied with only two contrasts, that is voicing lead–short lag or short lag–long lag. They include Thai and Eastern Armenian (Lisker & Abramson, 1964), which have three contrasts. Most recently, Riney *et al.* (2007) signalled that Japanese might need another category between short lag and long lag (see also Shimizu, 1996). The same has been reported for Hebrew (Raphael *et al.*, 1995). There are even languages that are claimed to exploit all three categories plus voiced

aspirates such as Hindi or other languages of India (Keating, 1984). In the light of all this evidence, Raphael *et al.* (1995) propose that Lisker and Abramson's (1964) original short-lag class should be divided into two categories, one for the voiced stops of aspirating languages and one for the voiceless stops of voicing languages. Cho and Ladefoged (1999) (see also Cho & Ladefoged, 1997; Ladefoged & Cho, 2000) even identify four degrees of positive VOT.

VOT values differ across the place of articulation. Labial stops are consistently shorter than alveolar and velar stops. There appears, however, some speaker variation as to whether alveolar stops have shorter VOT than velars (Lisker & Abramson, 1967; Nearey & Rochet, 1994; Weismer, 1979; Zue, 1976) or whether they are the same (Crystal & House, 1988; Cooper, 1991 reported in Whalen *et al.*, 2007). Docherty (1992), in his study of VOT in British English, finds a distinction between labials and non-labials but does not find a robust difference between alveolars and velars. A similar pattern is found in Cho and Ladefoged (1999), who report significant differences in mean VOT values between velars and coronals (dental and alveolars) but labials and coronals are not significantly different. Most recently Whalen *et al.* (2007) found the labial < alveolar < velar pattern in babbling infants learning English and French, and Cole *et al.* (2007) found the same pattern in American radio announcers. The explanation of VOT differences depending on the place of articulation lies in articulatory principles (discussion in Cho & Ladefoged, 1999) which say that the further back the closure, the longer the VOT values (Fischer-Jørgensen, 1954; Peterson & Lehiste, 1960), the more extended the contact area, the longer the VOT values (Stevens *et al.*, 1986), and the faster the movement of the articulator, the shorter the VOT (Hardcastle, 1973).

Vowel quality has been found to influence VOT values (Klatt, 1975; Summerfield, 1975; Waniek-Klimczak, 2005). High-tense vowels increase the VOT duration – Klatt (1975: 691) reports that the average VOT of long-lag stops before /i, u/ is about 15% greater than before /ε, æ/. At the same time, VOT categories can influence the voice quality of the vowel. A laryngographic study by Abberton (1972) showed that the onset of vowels after long-lag stops has some characteristics of creaky voice with a long closed phase and a slow opening phase. On the other hand, Han (1998 reported in Cho *et al.*, 2002) showed that vowels after prevoiced stops have a breathy voice. Moreover, changes in speech rate affect the range of VOT values, particularly for voiceless stops (Miller *et al.*, 1986; Miller & Volaitis, 1989; Kessinger & Blumstein, 1997, 1998; Lim *et al.*, 2001; Waniek-Klimczak, 2005; Volaitis & Miller, 1992). VOT values decrease as the speech tempo increases and the perceptual boundary between voiced and voiceless stop consonants shifts accordingly towards shorter VOT values (Miller *et al.*, 1986; Miller & Volaitis, 1989; Summerfield, 1981; Volaitis & Miller, 1992).

Categorisation of VOT in Perception

The continuum of VOT with the three-category distinction identified by Lisker and Abramson (1964) shows a strong categorisation pattern in perceptual labelling of voiced and voiceless stops (Abramson & Lisker, 1965, 1967, 1970, 1973; Lisker & Abramson, 1967, 1970). They used a parallel-resonance synthesiser to obtain synthetic stimuli varying in small steps of VOT from -150 ms through 0 to +150 ms for labial, alveolar and velar stops. Identification function was flat within categories appropriate for a given language but became very steep at the boundary between voiced and voiceless categories. This led to the conclusion that VOT is perceived categorically, that is the discrimination performance is discontinuous. Categorical boundaries depended on the place of articulation – they moved back in the vocal tract from labial through alveolar to velar with the boundaries for English from about 25 ms VOT through about 35 ms VOT to approximately 42 ms, respectively. What is more, VOT categorisation depends on the rate of production and syllable structure. Miller and Volaitis (1989) generated VOT continua ranging from /bi/ to /pi/ and asked subjects to rate the goodness of the consonants as /p/. The results showed that the VOT boundaries had a dynamical character regarding the tempo of presentation. The same effect was obtained by Summerfield (1981), who demonstrated shifts in the perception of VOT cues for stop voicing with changes in the speaking rate of a preceding carrier sentence. When the preceding carrier sentence rate was slow, the phonetic boundary was located at longer VOT values than when the sentence was fast.

Interesting and surprising results have been obtained with VOT perception tests administered to animals, which demonstrated the same boundaries as adult English speakers on the same stimuli. For example, Kuhl and Miller (1975) tested chinchillas' discrimination between /da/ – /ta/ syllables that varied along the VOT continuum (0 to +80 ms). They found the boundary values of 33 ms for the chinchillas and 35 ms for the humans. Later, Kuhl and Miller (1978) showed that chinchillas' VOT categories change with place of articulation just as they do for adult humans. The boundary for /ba/ – /pa/ was at about 25 ms for animals and humans and for /ga/ – /ka/ it was located at 42 ms for both groups. Similar experiments replicated with budgerigars showed parallel results (Dooling *et al.*, 1989 reported in Hawkins, 1999) – the birds not only showed evidence for categorical sensitivity to VOT but also their boundaries were shortest for labials and longest for velars. A less detailed study with rhesus monkeys (Waters & Wilson, 1976 reported in Keating, 1980) used large VOT steps (70 ms) from -140 to +140 ms. In the forced-choice format, the subjects showed the best discrimination in the 0–70 ms region. More recently, Holt *et al.* (2001) evidenced that Japanese quail can be taught to categorise VOT with different fundamental frequency in a similar fashion obtained for

human listeners (Diehl, 1991; Diehl & Molis, 1995). Finally, both humans and birds experience the effect of varying F1 frequency on labelling VOT continuum (Kluender, 1991; Kluender & Lotto, 1994).

Investigations of infant perception show VOT categorisation abilities which are independent from linguistic experience. Eimas *et al.* (1971) tested whether four-week-old infants could discriminate a difference in voicing between stop consonants. They synthesised a set of syllables with VOT ranging from -20 ms to +80 ms in 10 ms steps. They obtained a category boundary at about +25 ms VOT, which was very similar to the boundary obtained for adult English speakers (see also Jusczyk *et al.*, 1989). Lasky *et al.* (1975) found that infants raised in a Spanish-speaking environment can discriminate differences of VOT of the English voice contrast without experience with this language, the same was reported for infants whose environment was a language such as Kikuyu (Streeter, 1976). Generally, up to about six months of age, infants discriminate three voicing categories, separated by two VOT boundaries (Aslin *et al.*, 1981, discussion in Serniclaes, 2005; Lasky *et al.*, 1975). After six months of age, only the positive VOT boundary remains active in languages with a single distinction between short and long positive VOT categories (Eilers *et al.*, 1979).

The aforementioned experiments with animals and infants point to a natural psycho-acoustic boundary located at around +35 ms (Keating, 1980). The short-lag-long-lag voicing distinction seems stronger and more salient than prevoiced-short-lag boundaries. Serniclaes (2005) argues that infants raised in an ambient language such as Spanish or French, where the perceptual boundary is located at around 0 ms (Serniclaes, 1987), must learn this boundary in the course of development, while the natural psycho-acoustic positive boundary must be deactivated. Werker and Tees (1984) argue that language experience tends to maintain or even enhance natural boundaries that coincide with phonemic boundaries (e.g. in English) and to downgrade natural boundaries that are linguistically not functional (e.g. in Spanish or French). To date there has been no convincing argument why so many languages do not take advantage of the 'English' boundary if it is so natural and why they divide the VOT continuum at different places (Cho & Ladefoged, 1999; Ladefoged & Maddieson, 1996; Lisker & Abramson, 1964).⁴

VOT in English and Polish

English is known to partition the VOT continuum into two categories: short lag for voiced and long lag for voiceless; however, prevoiced values may also occur for a voiced category⁵ and short-lag values for a voiceless category depending on positions and speakers (Keating, 1984). Original measurements obtained by Lisker and Abramson (1964) for initial stops show a definite boundary for short-lag and long-lag stops (see Table 4.1).

Table 4.1 Mean VOT values for English initial stops

	<i>Voiced</i>	<i>Voiceless</i>
Labial /b, p/	+1 ms	+58 ms
Alveolar /d, t/	+5 ms	+70 ms
Velar /g, k/	+21 ms	+80 ms

Source: Lisker and Abramson (1964: 394)

Kopczyński (1977) noted higher values for American English stops but still they show a clear division into short-lag and long-lag categories (see Table 4.2).

Polish, on the other hand, contrasts voicing lead and short-lag categories for voiced and voiceless stops, respectively (Keating, 1980, 1984; Keating *et al.*, 1981). Voiced stops are located in negative VOT values while voiceless stops are produced with moderate positive VOT values (see Tables 4.3 and 4.4).

While in English a fair amount of overlap is found for voiced and voiceless stops in running speech, especially in casual conversation (e.g. Lisker & Abramson, 1967; Moslin, 1978 reported in Keating, 1980), Polish shows remarkably little overlap in VOT values even in running speech (Keating, 1980).

Polish learners of English face the task of learning to produce long-lag values for English stops. It is therefore fully justified that English

Table 4.2 Mean VOT values for English initial stops

	<i>Voiced</i>	<i>Voiceless</i>
Labial /b, p/	+18 ms	+82.5 ms
Alveolar /d, t/	+14 ms	+84 ms
Velar /g, k/	+31 ms	+71 ms

Source: Kopczyński (1977: 72).

Table 4.3 Mean VOT values for Polish initial stops

	<i>Voiced</i>	<i>Voiceless</i>
Labial /b, p/	-88.2 ms	+21.5 ms
Alveolar /d, t/	-89.9 ms	+27.9 ms
Velar /g, k/	-66.1 ms	+52.7 ms

Source: Keating *et al.* (1981: 1262)

Table 4.4 Mean VOT values for Polish initial stops

	<i>Voiced</i>	<i>Voiceless</i>
Labial /b, p/	-78 ms	+37.5 ms
Alveolar /d, t/	-72 ms	+33 ms
Velar /g, k/	-61 ms	+49 ms

Source: Kopczyński (1977: 72)

pronunciation coursebooks tailored for Polish learners (e.g. Arabski, 1987; Bałutowa, 1974; Jassem, 1973, 1974; Reszkiewicz, 1981; Sobkowiak, 2001) encourage the learners to produce English voiceless stops with a puff of air ensuing plosion. It is aimed at moving VOT to higher values by imposing intervening aspiration noise. That Polish learners have problems with mastering English long-lag values has been demonstrated by Waniek-Klimczak (2005). Polish speakers of English were reported to produce intermediate values higher than Polish short lag but not high enough to match native speakers.⁶

Perception experiments in English showed that perceptual categories match the production categories. They accurately divide the English VOT continuum into short-lag and long-lag regions (see Tables 4.5 through 4.7).

Experiments with Polish point to the fact that VOT is not such a stable perceptual dimension as it is for English, being subject to strong range effects (Keating, 1980). Mikoś *et al.* (1978) used VOT stimuli with ranges covering Polish VOT in production and found boundaries near the

Table 4.5 Labelling VOT boundaries for English initial stops

Labial	+22 ms
Alveolar	+37 ms
Velar	+40 ms

Source: Lisker and Abramson (1970: 565)

Table 4.6 Labelling VOT boundaries for English initial stops

Labial	+27 ms
Alveolar	+35 ms
Velar	+42 ms

Source: Kuhl and Miller (1978: 910)

Table 4.7 Labelling VOT boundaries for English initial stops

Labial	+32 ms
Alveolar	+27 ms
Velar	+66 ms

Source: Zlatin (1974: 989)

production categories typical for Polish. However, as the authors admit, they used Polish speakers who either spoke English or were exposed to it constantly. As a result, the effect of bilingualism or language contact could not be precluded. In another perception experiment with Polish monolinguals, Keating *et al.* (1981) observed that English boundaries are uniformly higher than any of the Polish boundaries, reflecting the fact that Polish and English use different VOT contrasts. Because in Polish the voicing contrast is between voicing lead and voicing lag, the only information that Polish subjects needed to identify a stop as voiced or voiceless was the negative or positive VOT and not its numerical values. The fact that Poles are sensitive to differences in VOT around 0 ms means that they will have difficulties with categorising English short-lag versus long-lag stop categories. Indeed, Kopczyński (1977) reports a strong confusion rate between American English /b, d, g/ and Polish /p, t, k/. Keating *et al.* (1981) conclude that the Polish type of VOT boundary around 0 ms is not due to predispositions of the auditory system – which is claimed to be set default to contrast short-lag with long-lag values (e.g. Eimas, 1975; Eimas *et al.*, 1971; Lasky *et al.*, 1975) – but rather Polish listeners must acquire a set of discrimination functions typical for Polish. The problem for Polish learners of English lies in the fact that they ‘may never need to establish a precise VOT category boundary’ (Keating *et al.*, 1981: 1268), which causes a cross-linguistic perceptual obstacle.

Experiment

Subjects

Native speakers

We invited 11 Native Speakers (referred to hereafter as NS) to participate in the study, six speakers of American English and five speakers of British English. They ranged in age from 23 to 56 years (mean: 32, std. dev.: 9.05). All subjects volunteered and were not paid for their participation. They were all naive to the object of the study. A preliminary interview revealed that they were all monolinguals and did not speak fluently any second language. None of the subjects had any reported history of a speech disorder or hearing loss. Neither did they report any current hearing disorders.

Advanced learners of English

A total of 24 Polish Advanced Learners of English (referred to hereafter as AL) participated in the study. They were all 3rd-year students of English Philology, University of Silesia. Their skills had been repeatedly confirmed by annual practical examinations. Additionally, we had had a brief interview in English with each subject to confirm their proficiency. They ranged in age from 21 to 25 years (mean: 22, std. dev.: 1.2). They had all had long experience with learning English (mean: 12.4 years, min: 8 years, max: 16 years, std. dev.: 2.48 years). All subjects volunteered and were not paid for their participation. They were all naive to the object of the study. None of the subjects had any reported history of a speech disorder or a hearing loss. Neither did they report any current hearing disorders.

Beginner learners of English

The group comprised 26 Polish Beginner Learners of English (referred to hereafter as BL). They were all students in beginner groups in a language school and had six-month experience with learning English. A preliminary interview revealed that they did not speak any other foreign languages fluently. All subjects were participants of an English course sponsored by the European Social Fund. This programme provided a new opportunity for people who had never learnt English. They ranged in age from 26 to 47 years (mean: 39, std. dev.: 6.51). All subjects volunteered and were not paid for their participation. They were all naive to the object of the study. None of the subjects had any reported history of speech disorder or a hearing loss. Neither did they report any current hearing disorders.

Recording and manipulation criteria

Speech signals were recorded without distortions with the signal-to-noise ratio over 20 dB. The stimuli for manipulation were read and recorded by an educated male speaker of American English. The speaker was instructed to read the syllable with a flat intonation.

A Media Tech MT385 microphone with a flat response between 100 and 16,000 Hz was positioned 20 cm from a speaker's mouth. The speech input was processed and recorded by an external Sound Blaster X-Fi X-MOD sound card with a 24-bit sampling rate, frequency range 140–20,000 Hz and sensitivity 112 dB \pm 3 dB. The recording was sampled at 22.05 kHz (16-bit resolution). All samples were subsequently stored in a notebook hard drive memory as WAV files ready for manipulation.

By means of a spectrographic display and waveforms provided by a Praat 4.6.18 speech-analysis software package (Boersma, 2001; Boersma & Weenink, 2007), VOT was measured as a temporal span between the release burst and the beginning of regular vertical striations corresponding to the quasi-periodic voice pulses, that is from the first peak of the stop

release burst up to the zero crossing nearest to the onset of the second formant of the following vowel (e.g. Abramson, 1977; Cho *et al.*, 2002; Cole *et al.*, 2007; Keating, 1980; Keating *et al.*, 1981; Lisker, 1978).

Stimuli

From a recorded syllable *keef* /ki:f/ (+70 ms VOT in initial /k/), we created eight stimuli with partitioned VOT continuum. The syllable in which a velar stop is followed by a high vowel was motivated by the fact that a velar followed by a high vowel obtains the longest VOT continuum (Chang *et al.*, 2001; Cho & Ladefoged, 1999). We modified the syllable to obtain 10 ms-step stimuli across the VOT continuum (for 10 ms steps see Abramson & Lisker, 1967; Clarke & Luce, 2005; Keating *et al.*, 1981; Lisker, 1978). /k/ with 0 ms VOT was obtained by removing an /s/ segment from syllable *skeef* /ski:f/ (Lotz *et al.*, 1960; Reeds & Wang, 1961). As a result, we obtained the following stimuli:

- (1) *keef* /ki:f/, /k/ +70 ms VOT
- (2) *keef* /ki:f/, /k/ +60 ms VOT
- (3) *keef* /ki:f/, /k/ +50 ms VOT
- (4) *keef* /ki:f/, /k/ +40 ms VOT
- (5) *keef* /ki:f/, /k/ +30 ms VOT
- (6) *keef* /ki:f/, /k/ +20 ms VOT
- (7) *keef* /ki:f/, /k/ +10 ms VOT
- (8) *keef* /ki:f/, /k/ 0 ms VOT

Procedure

The experiment was carried out in a quiet room. The stimuli were presented via high-quality-powered loudspeakers at a comfortable level. Special care was taken to provide the same acoustics for all subjects. Each stimulus was presented twice and each presentation was followed by a two-second pause.

Prior to the presentation, the subjects were instructed in a target language about the methodology of the study. Even BLs were instructed in English, in simplified language with a following brief summary in Polish. In order to activate a desired language mode, the presentation of the stimuli was preceded by a short conversation in English. Each session took approximately 20 minutes.

The subjects were asked to circle the sound they heard in each syllable in a forced-choice identification format (e.g. Fowler, 1992; Keating *et al.*, 1981; Liberman *et al.*, 1980), that is the subjects were given two alternatives, voiced and voiceless, in each syllable.

Prior to the experiment, the subjects were encouraged to ask questions to elucidate any uncertainties. Before the experiment proper, they were presented with five unrelated trials in a training session. They were strongly urged to make an identification in each syllable heard, even though in some cases the judgment might represent no more than a guess (Liberman *et al.*, 1952).

Results and analysis

Beginner learners: Results

The results show that Beginner Learners reported a gradual change from /k/ to /g/ along the decreasing VOT values with a highly statistically significant effect ($Q = 85.997, p = 0.000^{**}$). However, there is no sudden categorisation peak typical for Native Speakers. Moreover, the BLs were not consistent in judging VOT values – not all subjects reported extreme +70 ms VOT as voiceless and there is a slight and unexpected rise in voiceless judgements for the 0 ms VOT stimulus. A steady decrease in voiceless responses begins at +50 ms VOT and stops at +10 ms VOT (see Figures 4.4 and 4.5).

Advanced learners: Results

An effect of the VOT continuum was highly significant ($Q = 84.620, p = 0.000^{**}$) in the AL group. Advanced Learners demonstrated a categorisation peak at around +20 VOT. It is interesting to note, however, that values at +10 ms VOT and 0 ms VOT were not categorised as voiced by all the subjects. A second slight peak can be observed at +50 ms VOT with subsequent levelling at +40 ms VOT and +30 ms VOT (see Figures 4.6 and 4.7).

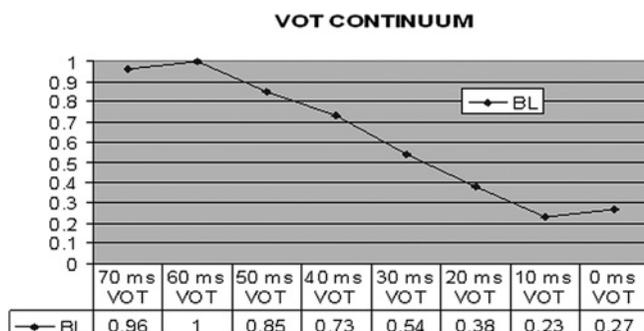


Figure 4.4 Recognition of an initial sound in keef as /k/ across the VOT continuum by Beginner Learners

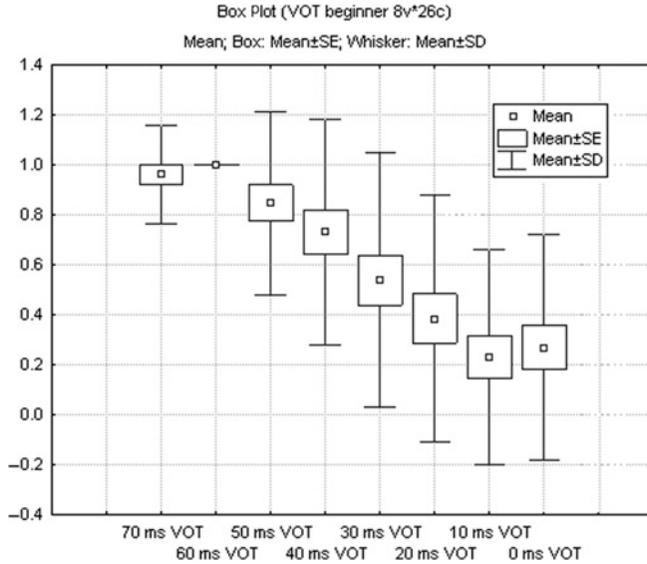


Figure 4.5 Box plot: Recognition of an initial sound in keef as /k/ across the VOT continuum by Beginner Learners

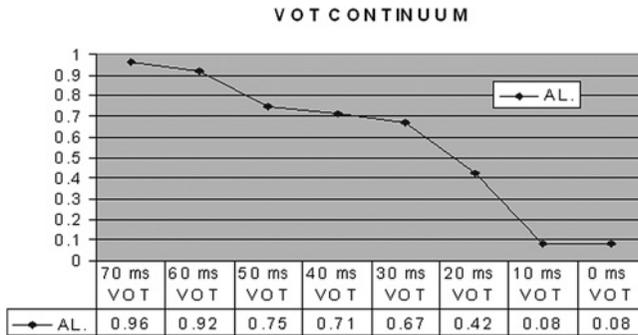


Figure 4.6 Recognition of an initial sound in keef as /k/ across the VOT continuum by Advanced Learners

Native speakers: Results

As in the case of the BL and AL groups, the stimulus effect was highly significant ($Q = 60.221$, $p = 0.000^{**}$) for the NSs. However, unlike the Polish groups, Native Speakers of English showed a strong partitioning peak of the VOT continuum. Strong categorisation from /k/ to /g/ judgments commences at high VOT values, that is at +50 ms VOT. It is completed by a gradual decrease down to +30 ms VOT. All stimuli ranging from +20 ms VOT to 0 ms VOT were consistently reported as voiced (see Figures 4.8 and 4.9).

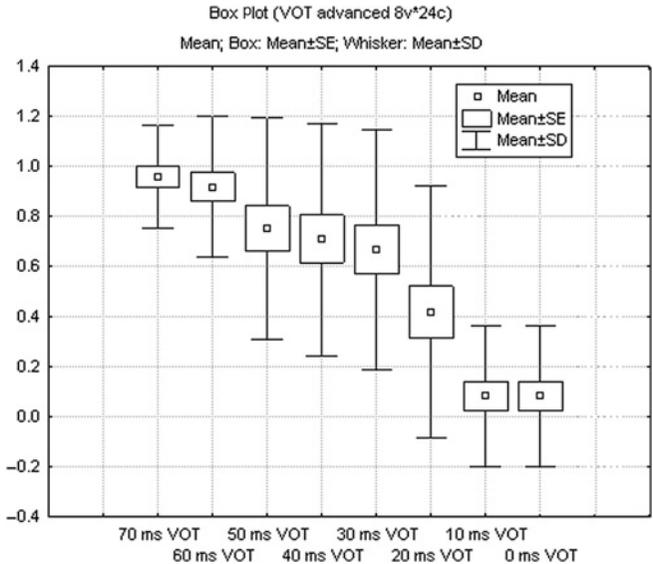


Figure 4.7 Box Plot: Recognition of an initial sound in keef as /k/ across the VOT continuum by Advanced Learners

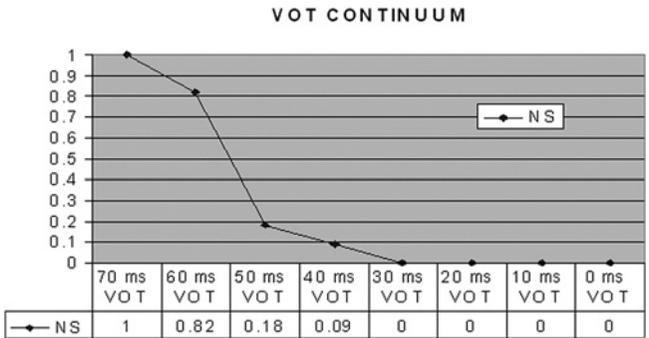


Figure 4.8 Recognition of an initial sound in keef as /k/ across the VOT continuum by Native Speakers

General Discussion

The analysis of perception of the VOT continuum reveals different patterns in the Polish groups and Native Speakers. Figure 4.10 shows the VOT perception patterns for all the three groups.

As expected, the NSs had a strong categorisation effect along the decreasing VOT values. The 50 ms VOT point brought about the most drastic shift from voiceless to voiced judgements. Values lower than 30 ms

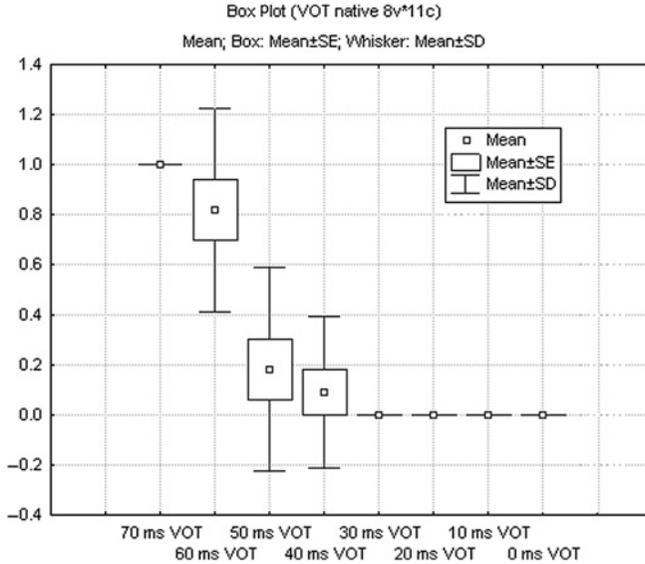


Figure 4.9 Box plot: Recognition of an initial sound in keef as /k/ across the VOT continuum by Native Speakers

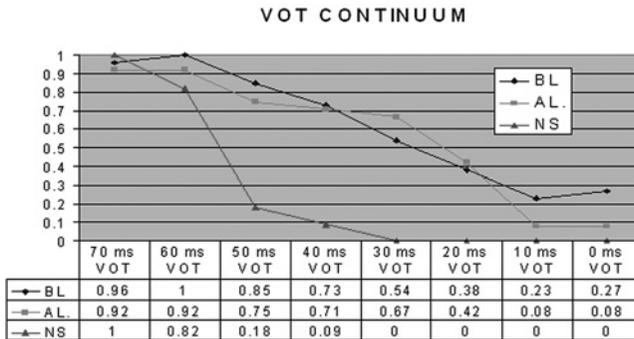


Figure 4.10 Recognition of an initial sound in keef as /k/ across the VOT continuum by Beginner Learners, Advanced Learners and Native Speakers

VOT were consistently categorised as voiced. The observed pattern reflects the division between short-lag and long-lag values typical for English.

The group of the BLs reported hearing gradually more voiced percepts along the decreasing VOT. Starting with the 60 ms VOT point, the identification line falls steadily down to the 10 ms VOT point, where only 23% of the BL subjects reported hearing a voiceless segment. There was no categorisation peak – voiceless judgments decreased proportionally along

the reduced VOT continuum. Unexpectedly, at the 0 ms VOT point, the BL subjects increased their voiceless judgements and reported hearing a voiceless percept 27% of the time.

The pattern observed for the ALs appears to be an intermediary between the ones found for the NSs and BLs. Around high VOT values (from 70 to 50 ms), it levels and falls slowly towards a voiced category. The values from 40 to 30 ms show a short levelling tendency. The points at 20 and 10 ms seem to be a categorisation point for this group. However, the 0 ms point, as in the case of the BLs, shows another levelling and, unlike the NSs, the ALs do not attain a complete perceptual shift into a voiced category.

As predicted by the interlanguage hypothesis, the ALs have a perceptual pattern that mingles the patterns typical for their L1 and L2. It is interesting to note that the ALs do not reach a complete shift into a voiced percept, even at very low VOT values, which is the case for the NSs. However, unlike the BLs, they have a certain categorisation peak, even though it is 30 ms lower than the one observed for the NSs and is not so rapid; it straggles two VOT values (20 and 10 ms).

A fairly consistent decrease in the voiceless judgements along the reduced VOT values reported by the BLs may mean that this perceptual feature is learnt fairly rapidly. The fact that almost 80% of the BL subjects recognised the 10 ms VOT point as voiced cannot be disregarded, taking into consideration the fact that this VOT value lies in the voiceless region in Polish. Although the BLs do not have a sharp category boundary, they might have learnt, to a certain degree, to recognise low VOT values as belonging to the voiced category.

Notes

1. Measurement criteria originally defined by Lisker and Abramson (1964: 389); 'the point of voicing onset was determined by locating the first of the regularly spaced vertical striations which indicate glottal pulsing, while the instant of release was found by fixing the point where the pattern shows an abrupt change in overall spectrum. Oral closure is marked spectrographically by the total or almost total absence of acoustic energy in the formant frequency range; oral release is marked by the abrupt onset of energy in the formant frequency range'.
2. We use English phonemic labelling of VOT categories. Short-lag category will have different labels in English and Polish.
3. Language *Aleut* seems to be an exception. It has a single series of long-lag stops (Cho & Ladefoged, 1999).
4. An interesting and critical, albeit a bit outdated, discussion in Ehret (1987).
5. Prevoiced values in English have been found to be conditioned by the place of articulation, vowel context and speaker's sex. Other studies have shown that prevoicing is realised mainly in hyperspeech and that with increased speaking tempo-voiced categories attain short-lag values (Kessinger & Blumstein, 1997; Magloire & Green, 1999; Miller *et al.*, 1986).

6. It is interesting to note that short-lag voiceless stops are considered to be articulatorily simpler than long-lag stops (Westbury & Keating, 1980 reported in Keating 1984) and easier to acquire (Kewley-Port & Preston, 1974; Scobbie *et al.*, 1996). However, the prevoiced category is acquired relatively late (Allen, 1985; Eilers *et al.*, 1984; Gandour *et al.*, 1986; Macken & Barton, 1980).

References

- Abberton, E. (1972) Some laryngographic data for Korean stops. *Journal of the International Phonetic Association* 2, 67–78.
- Abramson, A.S. (1977) Laryngeal timing in consonant distinctions. *Phonetica* 34, 295–303.
- Abramson, A.S. (2000) The perception of voicing distinctions. In D. Burnham, S. Luksaneeyanawin, C. Davis and M. Lafourcade (eds) *Interdisciplinary Approaches to Language Processing* (pp. 25–31). Bangkok: NECTEC.
- Abramson, A.S. and Lisker, L. (1965) Voice onset time in stop consonants: Acoustic analysis and synthesis. *Proceedings of the 5th International Congress of Acoustics*, Vol. A51. Liege: Thone.
- Abramson, A.S. and Lisker, L. (1967) Discrimination along the voicing continuum: Cross-language tests. *Status Report on Speech Research* SR-34, 17–22.
- Abramson, A.S. and Lisker, L. (1970) Discriminability along the voicing continuum: Cross language tests. *Proceedings of the Sixth International Congress of Phonetic Sciences*, Prague, 1967 (pp. 569–573). Prague: Academia.
- Abramson, A.S. and Lisker, L. (1973) Voice-timing perception in Spanish word-initial stops. *Journal of Phonetics* 1, 1–8.
- Allen, G.D. (1985) How the young French child avoids the pre-voicing problem for word-initial voiced stops. *Journal of Child Language* 12, 37–46.
- Arabski, J. (1987) *Wymowa Amerykańska*. Warszawa: Państwowe Wydawnictwo Naukowe.
- Aslin, R.N., Pisoni, D.B., Hennessy, B.L. and Perrey, A.V. (1981) Discrimination of voice onset time by human infants: New findings and implications for the effect of early experience. *Child Development* 52, 1135–1145.
- Bałutowa, S. (1974). *Wymowa Angielska dla Wszystkich*. Warszawa: Wiedza Powszechna.
- Boersma, P. (2001) Praat, a system for doing phonetics by computer. *Glott International* 10, 341–345.
- Boersma, P. and Weenink, D. (2007) Praat: Doing phonetics by computer (version 4.6.18) [Computer program]. On WWW at <http://www.praat.org>. Accessed 31.8.07.
- Chang, S.S., Plauché, M.C. and Ohala, J.J. (2001) Markedness and consonant confusion asymmetries. In E. Hume and K. Johnson (eds) *The Role of Speech Perception in Phonology* (pp. 79–10). New York: Academic Press.
- Cho, T., Jun, S.A. and Ladefoged, P. (2002) Acoustic and aerodynamic correlates to Korean stops and fricatives. *Journal of Phonetics* 30, 193–229.
- Cho, T. and Ladefoged, P. (1997) Variations and universals in VOT: Evidence from 17 endangered languages. *UCLA Working Papers in Phonetics* 94, 18–40.
- Cho, T. and Ladefoged, P. (1999) Variations and universals in VOT: Evidence from 18 languages. *Journal of Phonetics* 27, 207–222.
- Clarke, C.M. and Luce, P.A. (2005) Perceptual adaptation to speaker characteristics: VOT boundaries in stop voicing categorisation. *Proceedings of the ISCA Workshop on Plasticity in Speech Perception* 23–26.

- Cole, J., Kim, H., Choi, H. and Hasegawa-Johnson, M. (2007) Prosodic effects on acoustic cues to stop voicing and place of articulation. Evidence from Radio News speech. *Journal of Phonetics* 35, 180–209.
- Cooper, A. (1991) An articulatory account of aspiration in English. PhD thesis, Yale University.
- Crystal, T. and House, A. (1988) Segmental durations in connected-speech signals: Current results. *Journal of the Acoustical Society of America* 83, 1553–1573.
- Diehl, R.L. (1991) The role of phonetics within the study of language. *Phonetica* 48, 120–134.
- Diehl, R.L. and Molis, M.R. (1995) Effects of fundamental frequency on medial [voice] judgements. *Phonetica* 52, 188–195.
- Docherty, G. (1992) *The Timing of Voicing in British English Obstruents*. Dordrecht: Foris.
- Dooling, R.J., Okanoya, K. and Brown, S.D. (1989) Speech perception by budgerigars (*Melopsittacus undulatus*): The voiced–voiceless distinction. *Perception and Psychophysics* 46, 65–71.
- Ehret, G. (1987) Categorical perception of sound signals: Facts and hypotheses from animal studies. In S. Harnad (ed.) *Categorical Perception: The Groundwork of Perception* (pp. 301–331). Cambridge: Cambridge University Press.
- Eilers, R.E., Wilson, W.R. and Moore, J.M. (1979) Speech discrimination in the language-innocent and the language-wise: A study in the perception of voice onset time. *Journal of Child Language* 6, 1–18.
- Eilers, R.E., Oller, D.K. and Benito-Garcia, C.R. (1984) The acquisition of voicing contrasts in Spanish and English learning infants and children: A longitudinal study. *Journal of Child Language* 11, 313–336.
- Eimas, P.D. (1975) Speech perception in early infancy. In L.B. Cohen and P. Salapatek (eds) *Infant Perception: From Sensation to Cognition* (Vol. II) (pp. 193–231). New York: Academic Press.
- Eimas, P.D., Siqueland, E.R., Juszczyk, P. and Vigorito, J. (1971) Speech perception in infants. *Science* 171, 303–306.
- Fischer-Jørgensen, E. (1954) Acoustic analysis of stop consonants. *Miscellanea Phonetica* 2, 42–59.
- Fowler, C.A. (1992) Vowel duration and closure duration in voiced and unvoiced stops: There are no contrast effects here. *Journal of Phonetics* 20, 143–165.
- Gandour, J., Pett, S.H., Dardarananda, R., Dechongkit, S. and Mukngoan, S. (1986) The acquisition of the voicing contrast in Thai: A study of voice onset time in word-initial stop consonants. *Journal of Child Language* 13, 561–572.
- Han, N. (1998) A comparative acoustic study of Korean by native Korean children and Korean-American children. MA thesis, UCLA.
- Hardcastle, W.J. (1973) Some observations on the Tense-Lax distinction in initial stops in Korean. *Journal of Phonetics* 1, 263–271.
- Hawkins, S. (1999) Looking for invariant correlates of linguistic units: Two classical theories of speech perception. In J.M. Pickett (ed.) *The Acoustics of Speech Communication: Fundamentals, Speech Perception Theory, and Technology* (pp. 198–231). Boston: Allyn and Bacon.
- Holt, L.L., Lotto, A.J. and Kluender, K.R. (2001) Influence of fundamental frequency on stop-consonant voicing perception: A case of learned covariation or auditory enhancement? *Journal of the Acoustical Society of America* 109, 764–774.
- Hughes, A., Trudgill, P. and Watt, D. (2005) *English Accents and Dialects: An Introduction to Social and Regional Varieties of English in the British Isles* (4th edn). London: Hodder Arnold.

- Jansen, W. (2004) Laryngeal contrast and phonetic voicing: A laboratory phonology approach to English, Hungarian, and Dutch. PhD thesis, University of Groningen.
- Jassem, W. (1973) *Podręcznik Wymowy Anielskiej*. Warszawa: Państwowe Wydawnictwo Naukowe.
- Jassem, W. (1974) *Fonetyka Języka Angielskiego*. Warszawa: Państwowe Wydawnictwo Naukowe.
- Jessen, M. (1998) *Phonetics and Phonology of Tense and Lax Obstruents in German*. Amsterdam: John Benjamins.
- Juszyk, P.W., Rosner, B.S., Reed, M.A. and Kennedy, L.J. (1989) Could temporal order differences underlie 2-month-olds' discrimination of English voicing contrasts? *Journal of the Acoustical Society of America* 90, 83–96.
- Keating, P.A. (1980) A phonetic study of a voicing contrast in Polish. PhD thesis, Brown University.
- Keating, P.A. (1984) Phonetic and phonological representation of stop consonant voicing. *Language* 60, 286–319.
- Keating, P.A., Linker, W. and Huffman, M. (1983) Patterns in allophone distribution for voiced and voiceless stops. *Journal of Phonetics* 11, 277–290.
- Keating, P.A., Mikoś, M.J. and Ganong III, W.F. (1981) A cross-language study of range of voice onset time in the perception of initial stop voicing. *Journal of the Acoustical Society of America* 70, 1261–1271.
- Kessinger, R.H. and Blumstein, S.E. (1997) Effects of speaking rate on voice-onset time in Thai, French, and English. *Journal of Phonetics* 25, 143–168.
- Kessinger, R.H. and Blumstein, S.E. (1998) Effects of speaking rate on voice-onset and vowel production: Some implications for perception studies. *Journal of Phonetics* 26, 117–128.
- Kewley-Port, D.K. and Preston, M.S. (1974) Early apical stop production: A voice onset time analysis. *Journal of Phonetics* 2, 195–210.
- Kingston, J. and Diehl, R.L. (1994) Phonetic knowledge. *Language* 70, 419–454.
- Kingston, J. and Diehl, R.L. (1995) Intermediate properties in the perception of distinctive feature values. In B. Connell and A. Arvaniti (eds) *Phonology and Phonetics: Papers in Laboratory Phonology IV* (pp. 7–27). Cambridge: Cambridge University Press.
- Klatt, D.H. (1975) Voice-onset time, frication, and aspiration in word-initial consonant clusters. *Journal of Speech and Hearing Research* 18, 687–703.
- Kluender, K.R. (1991) Effects of first formant onset properties on voicing judgments result from processes not specific to humans. *Journal of the Acoustical Society of America* 90, 83–96.
- Kluender, K.R. and Lotto, A.J. (1994) Effects of first formant onset frequency on [-voice] judgments result from auditory processes not specific to humans. *Journal of the Acoustical Society of America* 95, 1044–1052.
- Kohler, K.J. (1984) Phonetic explanation in phonology. The feature fortis lenis. *Phonetica* 41, 150–174.
- Kopczyński, A. (1977) *Polish and American English Consonant Phonemes: A Contrastive Study*. Warszawa: Państwowe Wydawnictwo Naukowe.
- Kuhl, P.K. and Miller, J.D. (1975) Speech perception by the chinchilla: Voiced–voiceless distinction in alveolar plosive consonants. *Science* 190, 69–72.
- Kuhl, P.K. and Miller, J.D. (1978) Speech perception by the chinchilla: Identification functions for synthetic VOT stimuli. *Journal of the Acoustical Society of America* 63, 905–917.
- Ladefoged, P. and Cho, T. (2000) Linking linguistic contrasts to reality: The case of VOT. *UCLA Working Papers on Phonetics* 98, 1–9.

- Ladefoged, P. and Maddieson, I. (1996) *Sounds of the World's Languages*. London: Blackwell.
- Lasky, R.E., Syrdal-Lasky, A. and Klein, R.E. (1975). VOT discrimination by four to six and a half month old infants from Spanish environments. *Journal of Experimental Child Psychology* 20, 215–225.
- Lieberman, A.M., Delattre, P.C. and Cooper, F.S. (1952) The role of selected stimulus – variables in the perception of the unvoiced stop consonants. *The American Journal of Psychology* 65, 497–516.
- Lieberman, A.M., Fitch, H.L., Halwes, T. and Erickson, D.M. (1980) Perceptual equivalence of two acoustic cues for stop-consonant manner. *Perception and Psychophysics* 27, 343–350.
- Lim, B.J., Jong, K.D. and Nagao, K. (2001) Cross-language perception of syllable affiliation: Effects of voicing and language background. *Berkley Linguistic Society* 27, 43–67.
- Lisker, L. (1978) In qualified defense of VOT. *Language and Speech* 21, 375–383.
- Lisker, L. (1986) 'Voicing' in English: A catalogue of acoustic features signalling /b/ versus /p/ in trochees. *Language and Speech* 29, 3–11.
- Lisker, L. and Abramson, A.S. (1964) A cross language study of voicing in initial stops: Acoustic measurements. *Word* 20, 384–422.
- Lisker, L. and Abramson, A.S. (1967) Some effects of context on voice onset time in English stops. *Language and Speech* 10, 1–28.
- Lisker, L. and Abramson, A.S. (1970) The voicing dimension: Some experiments in comparative phonetics. *Proceedings of the Sixth International Congress of Phonetic Sciences*, Prague, 1967 (pp. 563–567). Prague: Academia.
- Lotz, J., Abramson, A.S., Gerstman, L.J., Ingemann, F. and Nemser, W.J. (1960) The perception of English stops by speakers of English, Spanish, Hungarian and Thai: A tape-cutting experiment. *Language and Speech* 3, 71–77.
- Macken, M.A. and Barton, D. (1980) The acquisition of the voicing contrast in Spanish: A phonetic and phonological study of word-initial stop consonants. *Journal of Child Language* 7, 433–458.
- Maddieson, I. (1984) *Patterns of Sounds*. Cambridge: Cambridge University Press.
- Magloire, J. and Green, K. (1999) A cross-language comparison of speaking rate effects on the production of voice onset time in English and Spanish. *Phonetica* 56, 158–185.
- Mikoś, M.J., Keating, P.A. and Moslin, B.J. (1978) The perception of voice onset time in Polish. *Journal of the Acoustical Society of America* (S1), 63, S19.
- Miller, J.L., Green, K.P. and Reeves, A. (1986) Speaking rate and segments: A look at the relation between speech production and speech perception for the voicing contrast. *Phonetica* 43, 104–115.
- Miller, J.L. and Volaitis, L.E. (1989) Effects of speaking rate on the perceptual structure of a phonetic category. *Perception and Psychophysics* 46, 505–512.
- Moslin, B.J. (1978) The role of phonetic input in the child's acquisition of the voiced-voiceless contrast in English stops: A voice onset time analysis. PhD thesis, Brown University.
- Nearey, T.M. and Rochet, B.I. (1994) Effects of place of articulation and vowel context on VOT production and perception in French and English stops. *Journal of the International Phonetic Association* 24, 1–19.
- Peterson, G.E. and Lehiste, I. (1960) Duration of syllable nuclei in English. *Journal of the Acoustical Society of America* 32, 693–703.
- Raphael, L.J., Tobin, Y., Faber, A., Most, T., Kollia, H.B. and Milstein, D. (1995) Intermediate values of voice onset time. In F. Bell-Berti and L.J. Raphael (eds) *Producing Speech: Contemporary Issues. For Katherine Safford Harris* (pp. 117–127). New York: AIP Press.

- Reeds, J.A. and Wang, W.S.W. (1961) The perception of stops after s. *Phonetica* 6, 78–81.
- Reszkiewicz, A. (1981) *Correct your English Pronunciation*. Warszawa: Państwowe Wydawnictwo Naukowe.
- Riney, T.J., Takagi, N., Ota, K. and Uchida, Y. (2007) The intermediate degree of VOT in Japanese initial voiceless stops. *Journal of Phonetics* 35, 439–443.
- Scobbie, J.M., Gibbon, F., Hardcastle, W.J. and Fletcher, P. (1996) Covert contrast as a stage in the acquisition of phonetics and phonology. *QMC Working Papers in Speech and Language Sciences* 1, 43–62.
- Serniclaes, W. (1987) Etude experimentale de la perception du trait de voisement des occlusives du Francais. PhD thesis, Universite Libre de Bruxelles.
- Serniclaes, W. (2005) On the invariance of speech percepts. *ZAS Papers in Linguistics* 40, 177–194.
- Shimizu, K. (1996) *A Cross-language Study of Voicing Contrasts of Stop Consonants in Six Asian Languages*. Tokyo: Seibido.
- Sobkowiak, W. (2001) *English Phonetics for Poles: A Resource Book for Learners and Teachers*. Poznań: Wydawnictwo Poznańskie.
- Stevens, K.N., Keyser, S.J. and Kawasaki, H. (1986) Toward a phonetic and phonological theory of redundant features. In J.S. Perkell and D.H. Klatt (eds) *Invariance and Variability in Speech Processes* (pp. 426–429). Hillsdale: Erlbaum.
- Streeter, L.A. (1976) Language perception of two-month old infants shows effects of both innate mechanisms and experience. *Nature* 259, 39–41.
- Summerfield, A.Q. (1975) Aerodynamics vs. mechanics in the control of voicing onset in consonant–vowel syllables. *Speech Perception* 4, 61–72.
- Summerfield, A.Q. (1981) Articulatory rate and perceptual constancy in phonetic perception. *Journal of Experimental Psychology: Human Perception and Performance* 7, 1074–1095.
- Volaitis, L.E. and Miller, J.L. (1992) Phonetic prototypes: Influence of place of articulation and speaking rate on the internal structure of voicing categories. *Journal of the Acoustical Society of America* 92, 723–735.
- Waniek-Klimczak, E. (2005) *Temporal Parameters in Second Language Speech: An Applied Linguistic Phonetics Approach*. Łódź: Wydawnictwo Uniwersytetu Łódzkiego.
- Waters, R. and Wilson, W. (1976) Speech perception by rhesus monkeys: The voicing distinction in synthesised labial and velar stops consonants. *Perception and Psychophysics* 19, 285–289.
- Weismer, G. (1979) Sensitivity of voice onset measures to certain segmental features in speech production. *Journal of Phonetics* 7, 194–204.
- Wells, J. (1982) *Accents of English Vol. 2: The British Isles*. Cambridge: Cambridge University Press.
- Werker, J.F. and Tees, R.C. (1984) Cross-language speech perception: Evidence for perceptual reorganisation during the first year of life. *Infant Behavior and Development* 7, 49–63.
- Westbury, J.R. and Keating, P.A. (1980) A model of stop consonant voicing and a theory of markedness. Paper presented at the Linguistic Society of America, San Antonio.
- Whalen, D.H., Levitt, A.G. and Goldstein, L.M. (2007) VOT in the babbling of French- and English-learning infants. *Journal of Phonetics* 35, 341–352.
- Zlatin, M.A. (1974) Voicing contrast: Perceptual and productive voice onset time characteristics of adults. *Journal of the Acoustical Society of America* 56, 981–994.
- Zue, V.W. (1976) *Acoustic Characteristics of Stop Consonants: A Controlled Study (Technical Report 523)*. Lexington: Lincoln Laboratory, MIT.

Chapter 5

The Productive and Receptive Acquisition of Consonants and Connected Speech by Polish Students of English

M. NOWACKA

Introduction: The Overview of Research on the Relationship between Production and Perception

To begin with, we briefly review the widely discussed research on the relationship between production and perception of second and foreign language sounds and examine what factors take part in this interaction. We make an attempt at summarizing the major experimental results that describe this complex relation (for a comprehensive review of research until the 1990s see Leather & James, 1991; Llisterri, 1995).

Jones (1948: 129, as quoted in Ashby, 2006: 376), emphasizes the need for practice in receptive skills in the English phonetics classroom if students are to become competent language users, “[e]ar training” (or more accurately “cultivation of auditory memory”) constitutes a very important part of the teaching ... It is found that skill in pronunciation cannot be acquired without skill in HEARING, i.e. skill in the correct recognition of sounds and a good memory for sound qualities ...’. Though it is generally assumed that a second-language learner’s perceptive ability is related to his/her productive ability and thus that training in perception will have a positive effect on pronunciation in the second language, the findings of different studies vary considerably.

An overwhelming part of the available evidence supports the claim that perception precedes production (Baker & Trofimovich, 2006; Bent, 2005; Bettoni-Techio *et al.*, 2007; Bion *et al.*, 2005; Bradlow *et al.*, 1997, 1999; De Bot & Mailfert, 1982; Flege, 1991, 1995; Flege *et al.*, 1997; Højen, 2003; Kluge *et al.*, 2007; Lambacher *et al.*, 2005; Neufeld, 1978, 1979, 1980; Podlipský, nd; Rauber *et al.*, 2005; Schneiderman *et al.*, 1988; Smiljanić & Bradlow, 2005; Wang *et al.*, 2003). This view seems to be dominant.

Other researchers give arguments for the precedence of production over perception (Baptista & Bion, 2005; Bohn & Flege, 1997; Brière, 1968 after Leather & James, 1991; Catford & Pisoni, 1970 after Leather & James, 1991; Dupoux, 2003 after Moyer, 2004; Gómez-Lacabex & García-Lecumberri, 2007; Goto, 1971 after Leather & James, 1991; Sheldon, 1985; Sheldon & Strange, 1982).

In yet another approach, the relationship between speech perception and production is seen as a facilitating one, that is, that training in either of the skills results in an improvement in the other (Gómez-Lacabex *et al.*, 2005; Hirata, 2004; Leather, 1986, 1987, 1988, 1990 after Leather & James, 1991; Mathews, 1997; McAllister, 1997).

Finally, some earlier studies propose that perception and production can be independent of each other (Lane & Schneider, 1963 after Leather & James, 1991; Lee, 1996).

Llisterri (1995) and Leather and James (1991) agree that the studies examining native and non-native speech production and perception, respectively, are abundant, but the nature of the relationship between these two aspects of speech is far from well understood. Besides, little can be concluded from the studies collectively since they frequently obtain divergent outcomes. Although the link between perception and production is undeniable, there is no consensus over the precedence of one over the other.

To conclude, while some researchers argue that perception leads production, others point to the reverse relationship. There are also voices which suggest that improvement in one modality affects the other in a positive way and opinions which imply the lack of such interplay. The detailed examination of the above-mentioned research indicates that the mechanisms of perception and production form an integrated rather than independent system. In most authors' views learning speech involves the mastery in both these dimensions. It has been proved that adult learners' auditory and articulatory abilities are not incapable of assimilating second-language sounds into their first-language-based linguistic competence. These abilities, however, are restricted by many factors, of which the type of subjects' first language and experience in the second language, and the amount of exposure to the second language are particularly important.

Since the learners' mother tongue and experience in the L2 are regarded as crucial for the second-language acquisition we find it appropriate to recall that phonetic acquisition of Polish students of English is not an undiscovered area. It needs to be emphasized that within the past several years the development of English phonetics in an advanced group of Polish learners has attracted the attention of several researchers. Many valuable studies devoted to this issue have appeared, to mention a few, works by Dziubalska-Kořaczyk (1990), Porzuczek (1998), Scheuer (1998), Zborowska

(2002), Baran (2003), Levin (2004), Janicka (2005), Wrembel (2005), Rojczyk (2008) and Nowacka (2008b) as well as several volumes of conference papers on teaching English phonetics to Poles, edited by Sobkowiak and Waniek-Klimczak (2002, 2003a, 2003b, 2004, 2006a, 2006b). The role of these annual conferences, being an excellent forum for exchanging new ideas on pronunciation pedagogy, should also be emphasized here. However, not even one of the works mentioned aims to investigate the relationship between the production and perception of English as a foreign language.

That is why, in this chapter at first we discuss the findings of our research that examines productive and receptive phonetic attainment in advanced Polish learners of English and then we make an effort to analyse the link between the two pronunciation skills.

Experimental Design, Results and Discussion

Aims

The primary aim of this chapter is to examine both perception and production of six phonetic features, three of which are consonantal, that is velar nasal, dental fricatives and word final voicing of lenis obstruents (henceforth final voicing), and the other three which belong to connected speech elements, that is weak forms, linking and yod-coalescence. Results are based on four studies that were conducted with 300 subjects of tertiary schools, university and college students of English Departments in Poland.

There is also a secondary aim, namely to check the relationship between articulation and perception of these aspects so as to see if there is any degree of correlation between the two speech modalities.

Experiment 1: The productive acquisition: Three-year development of pronunciation

This longitudinal experiment concerned the development of pronunciation over the period of three years and was conducted with 25 college students in four stages, that is at the beginning of their studies and three times running after each academic year. In this study, we analysed the students' pronunciation of 41 phonetic aspects (for a detailed description see Nowacka, 2003a, 2006, 2008b). For the purpose of this analysis, we focus on six features, three consonants and three connected speech elements, the omission of the vocalic features is our deliberate choice.

Out of 12 consonants included in the whole study we have chosen velar nasal, dental fricatives and final voicing. When it comes to suprasegments they comprise two obligatory elements such as weak forms and linking r and one facultative feature which is yod-coalescence. The most common mispronunciations of these aspects are presented in Table 5.1.

Table 5.1 Examples of the analysed aspects, their erroneous renditions and the contexts

No.	Phonetic aspect	Erroneous rendition	Examples
1.	/ŋ/	/ŋk/, /n/	<i>feelings, wrongs, morning, long, strong, waiting, suffering, calling, surprising, stroking, singing, relaxing, paying, working, liking and burning</i>
2.	/θ/	/f/, /t/, /s/	<i>anything, theories, think, thousand, north, mouth, thought, ether, bath and cloth</i>
3.	/ð/	/d/, /v/, /z/	<i>another, the, this, that, those, then, there, with and either</i>
4.	Word final voicing of lenis obstruents	/d/ → /t/, /v/ → /f/, /z/ → /s/, /dʒ/ → /tʃ/	<i>afraid, applied, changed or mastered; believe, native; appears, speakers, individuals and theories; change, language and manage</i>
5.	Weak forms	Strong forms	<i>have in may have noticed or have mastered, that in many people believe that only young people can ... and for in for example</i>
6.	Linking r	Lack of a feature	<i>older individuals, for example, or Arabic, the letter implied, a dog or a goat, for a name and for a cure</i>
7.	Yod-coalescence	Lack of a feature	<i>isn't your and that your</i>

The pronunciation of the velar nasal was found to be most difficult mainly in a morpheme and word-final position. In such cases, it was accompanied by the voiceless velar plosive /k/ or was replaced by the dental nasal /ŋ/, for example in *singing* pronounced as /sɪnɪŋk/ or /sɪnɪn/ and *feelings* realized as /fi:lɪŋks/.

As regards the dental fricatives, the voiceless fricative /θ/ was most frequently substituted by /f/, sometimes by /t/ and less often by /s/, for example in *anything* rendered as /enɪtɪŋ/ or /'enɪfɪŋ/ while in place of the voiced /ð/ sounds such as /d/, /v/ and /z/ were used, for example in *another, the* or *with*.

The incorrect renditions of word-final lenis obstruents concerned three groups of sounds, that is plosives, in which /d/ was wrongly substituted with /t/, for example in *afraid*; fricatives, where /v/ was replaced by /f/, for example in *believe* and /z/ was substituted with /s/, for example in *appears*; and finally affricates in which /tʃ/ was used as a replacement for /dʒ/, for example, in *change*. The erroneous realizations of the plural forms of nouns, the third-person singular of the simple present tense and the regular past tense verb forms were also recurrent, for example *individuals* pronounced

as /,ɪndɪ'vɪdʒʊəls/ or *applied* as /ə'plait/ – such mistakes were a result of the Polish tendency to devoice final obstruents.

The realization of suprasegmental elements was not always correct. Weak forms were rarely employed by the students, which means that they mainly made use of strong forms, for example *have* in *may have noticed* spoken as /hæv/. Linking r which should have been inserted in *older individuals* or *for example* was not there. The implementation of a feature yod-coalescence which is non-obligatory in English was our conscious choice. We wanted to examine whether the students would make an attempt to pronounce this optional element, for example, in *isn't your* as /ɪzntʃɔ:/.

ANOVA test (analysis of variance) was used to compare the data. What was of interest to us was the difference in the pronunciation of a particular feature between the initial and the final year of the students' study. The test revealed that the changes in three, that is, half of the selected items, were significant since their respective *p*-value was lower than α . It referred to the rendition of the velar nasal, final voicing and weak forms. It means that the progress in students' pronunciation of these aspects has been vital. However, the students' articulation of dental fricatives, yod-coalescence and linking r has not improved to a satisfying, noticeable degree because their *p*-value is greater than α . The above-mentioned data are presented in Table 5.2.

To provide an example of a statistically significant change, which stands for a phonetic improvement, we will examine the productive development

Table 5.2 Mean values of the phonetic aspects for the respective experimental years and *p*-values together with the difference in mean between the last and the first stage

No.	Phonetic aspects	Year of pronunciation checkup				Difference in mean	p
		2001	2002	2003	2004		
I.	Significant changes ($p < \alpha$, $\alpha = 0.05$)					Between 2004 and 2001	
1.	Velar nasal	0.12	0.56	0.40	0.72	0.60	0.000
2.	Word final voicing of lenis obstruents	0	0.24	0.28	0.44	0.44	0.000
3.	Weak forms	0.24	0.28	0.52	0.60	0.36	0.000
II.	Insignificant changes ($p > \alpha$, $\alpha = 0.05$)						
4.	Yod-coalescence	0.08	0.16	–	0.24	0.16	0.313
5.	Linking r	0.12	0.20	0.40	0.28	0.16	0.129
6.	Dental fricatives	0.12	0.16	0.24	0.12	0	0.628

of the velar nasal, the feature with the greatest overall rise in mean (by 0.60) during the period of three years. It is represented by a continuous line in Figure 5.1 which illustrates all the significant changes. In detail, since the mean for the beginning of the first year of the students' education, that is 2001, equals 0.12, and is approximately five times higher (0.56), at the end of that same academic year substantial improvement may be concluded. Then, at the end of the subjects' second year of study (2003), the mean falls to 0.4, which indicates a slight slump and return to the initial erroneous pronunciation by some subjects. In the final year, 2004, the mean reaches the highest value 0.72, which proves that the pronunciation of this phonetic aspect improved, which possibly implies that formal phonetic instruction was fruitful, though not for everybody. Summing up, the sharp rise between the years 2001 and 2002 denotes the subjects' progress, a moderate fall between the years 2002 and 2003 suggests the respondents' decline and, eventually, a further increase between the years 2003 and 2004, and a peak in the year 2004 is a sign of the students' upgrading.

Insignificant changes concerning yod-coalescence, linking r and dental fricatives are illustrated in Figure 5.2. For brevity reasons, we only discuss the progress in the rendition of the dental fricatives, which turn out to be resistant to improvement although they belong to the group of phonetic priorities, that is the most frequently practised consonants. These sounds are represented by a continuous line in Figure 5.2.

As shown in Figure 5.2, there is a minor rise in mean during the first two years, from 0.12 through 16 to 0.24, then followed by a drop to 0.12, which indicates that both the final and the initial pronunciation are the

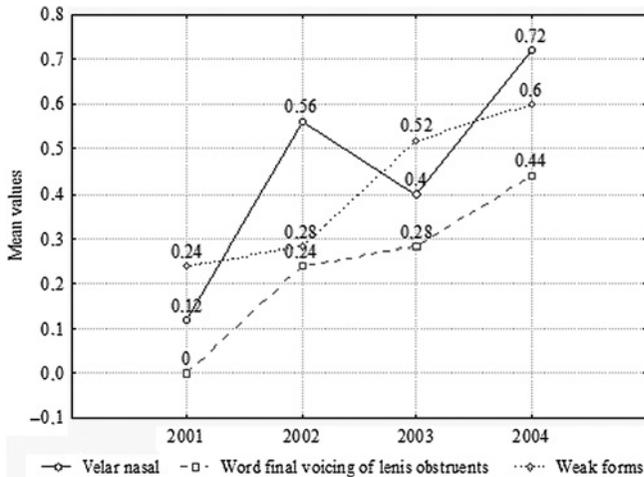


Figure 5.1 Means for the significant changes

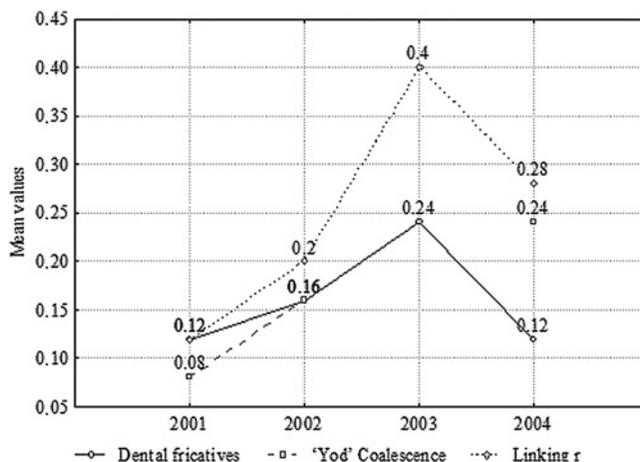


Figure 5.2 Means for the insignificant changes

same. As the values are rather low, erroneous pronunciations are in the majority. What this result shows is that the subjects' initial and final pronunciations of these sounds were the same and, in general, that training has proven unsuccessful. Lack of progress in the dental fricatives refers mainly to the instability of this feature in the respondents' speech, that is their correct rendition in reading but incorrect in speaking, which was penalized and treated as erroneous.

Experiment 2: The productive acquisition: The ultimate phonetic attainment

Experiment 2 on ultimate phonetic attainment was a short-term study carried out with 87 tertiary school students from six cities in central and southern Poland, including 25 third-year subjects from the Teacher Training College in Rzeszów and 62 fifth-year students of English Departments from the following five higher education institutions: the Jagiellonian University in Cracow, Maria Curie-Skłodowska University in Lublin, the University of Łódź, the University of Silesia in Sosnowiec and Adam Mickiewicz University in Poznań.

In this study, the graduates' 'final' pronunciation was at focus. The results presented in Table 5.3 point to the following hierarchy of articulatory difficulty of the analysed features, namely the velar nasal (83%)¹ as the easiest, followed by weak forms (52.5%) and final voicing (43%), yod-coalescence (21.5%), linking r (23%) and the dental fricatives (13.5%). The given order of 'phonetic ease' agrees with the one obtained in Experiment 1 and could, therefore, be treated as a suggestion where the emphasis should be placed during practical phonetic classes.

Table 5.3 The rendition of selected aspects in the college and university subjects' pronunciation

No.	Phonetic aspects	Total (%)	College (%)	University (%)
1.	Velar nasal	83	72	94
2.	Weak forms	52.5	60	45
3.	Word final voicing of lenis obstruents	43	44	42
4.	Yod-coalescence	21.5	24	19
5.	Linking r	23	28	18
6.	Dental fricatives	13.5	12	15

If we translate the percentage into a grade, using the marking scale that is most commonly applied in tertiary schools in Poland, that is in which 60% draws the line between success and failure, we receive only one well-attained feature which is the velar nasal, with the remaining aspects falling into the unattained category.²

Experiment 3: The receptive acquisition: Perception of consonants

The study was conducted among 181 university and college students of English Departments in Rzeszów (127 students of the first, second and third year and 54 respondents, secondary school graduates and fresh first-year students).

In general, it has been carried out with a view to establishing which consonantal contrasts, out of nine included in the research, are problematic for recognition by Polish students. Each time two parallel tests were run from two perspectives, namely, from the comprehension and auditory discrimination point of view, to reveal the ranking of difficulty of consonantal contrasts, individual consonants in minimal pairs and specific contexts (cluster initial, medial and final) for a given consonant – for a detailed description see Nowacka (2008a, 2008b).

The experimental material comprised nine minimal pairs of phonetic similarity, listed in Table 5.4, six of which contained the following sounds: dental fricatives contrasted with /f/, /s/ and /t/ in case of /θ/ and /d/, /z/ and /v/ in case of /ð/; two minimal pairs with fortis/lenis opposition (/t/ vs. /d/ and /s/ vs. /z/) and one nasal distinction between alveolar and velar sound, that is /n/ vs. /ŋ/.

Here, the results are quite optimistic since all four features scored above 80% of correct responses. In more detail, as shown in Table 5.4, dental fricatives with the value of 83.63% are the easiest auditorily, final voicing and the velar nasal come next with approximately the same value

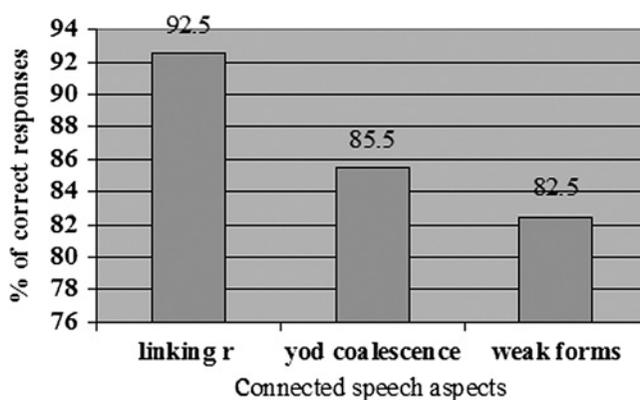
Table 5.4 Hierarchy of perceptive difficulty of four consonantal features most receptively problematic for Poles

No.	Consonants (4)	Consonantal contrasts (9)	Percentage of correct responses	
1.	/θ/	(θ/f)	85.25	83.63
		(θ/s)		
		(θ/t)		
2.	/ð/	(ð/v)	82.02	
		(ð/z)		
		(ð/d)		
3.	Fortis/lenis opposition	(t/d)	80.56	
		(s/z)		
4.	/ŋ/	(n/ŋ)	80.15	

(approximately 80%). This means that the selected consonants are correctly recognized by the majority of Polish tertiary school students of English.

Experiment 4: The receptive acquisition: Perception of connected speech elements

Experiment 4 with the focus on the perception of connected speech elements with 60 college students of all years, from one to three, examined the students' recognition of linking r as in *for_ a while*; weak forms as in *as Sharon* or *could catch you* and yod-coalescence in *told you* (/d/ + /j/ → /dʒ/),

**Figure 5.3** Hierarchy of a perceptive difficulty of three suprasegmental elements

bet you, what you're (/t/ + /j/ → /tʃ/) and *guess you, miss your* (/s/ + /j/ → /ʃ/) – for a detailed description see Nowacka (2003b, 2008b) (see Figure 5.3).

As in the case of the perception studies regarding consonants, all the connected speech results are positive because they exceed 80%. Linking r very rarely causes receptive problems (92.5%), the same refers to the other two aspects, that is yod-coalescence (85.5%) and weak forms (82.5%). Moreover, these features are of little receptive difficulty to the subjects in the study.

Conclusion

One of the observations concerning the productive studies (Experiments 1 and 2) is that formal phonetic training affects the subjects' pronunciation of at least some aspects. In addition, the order of the improvement in the phonetic features results from the structure of the syllabus – as was the case with the velar nasal, weak forms and final voicing, except for the dental fricatives – and is connected with the degree of their articulatory difficulty. Therefore, more time should be devoted to practising the aspects that turned out difficult for students to master, that is dental fricatives, linking r or yod-coalescence.

When it comes to receptive studies (Experiments 3 and 4) the results are hopeful since they reveal that none of the features is difficult in perception for Polish students of English.

What do these findings inform us about the correspondence between productive and receptive skills? Are there any links between the way we hear and render these specific features? This analysis points to some degrees of correspondence between perception and production since firstly, we can see a positive relationship in two speech modalities for the velar nasal, final voicing and weak forms (which scored high in both skills) and secondly, a negative correlation for dental fricatives, yod-coalescence and linking r (for which perception was good since they cause little strain on the students' understanding of speech, but production was insufficient because fluctuating).

It is worth adding that the differences in experimental design or in sound category might be the reason for the lack of straightforward relationship between perception and production. It is undeniable that further research in that matter is indispensable if we are to understand a complex relationship between perception and production of foreign-language sounds and in general, the phonetic acquisition of a foreign language.

Notes

1. Each time the percentage refers to correct renditions of the said item.
2. Weak forms and final voicing with the value of approximately 50% could equally be treated as weakly attained.

References

- Ashby, P. (2006) Phonetic pedagogy. In K. Brown (ed.) *Encyclopedia of Language and Linguistics* (pp. 372–378). Amsterdam: Elsevier Ltd.
- Baker, W. and Trofimovich, P. (2006) Perceptual paths to accurate production of L2 vowels: The role of individual differences. *International Review of Applied Linguistics* 44, 231–250.
- Baptista, B.O. and Bion, R.A.H. (2005) The discrimination and production of English vowels by Brazilian learners. *First ASA Workshop on Second Language Speech Learning*, Vancouver, Canada, 14 and 15 May, 2005. On WWW at http://www.nupffale.ufsc.br/bion/b_vancouver. Accessed 21.4.10.
- Baran, M. (2003) Field independence as a predictor of success in foreign language pronunciation acquisition and learning. Unpublished PhD thesis, University of Wrocław.
- Bent, T. (2005) Perception and production of non-native prosodic categories. PhD thesis, Northwestern University Evanston, Illinois. On WWW at http://www.linguistics.northwestern.edu/students_and_faculty/student_profiles/bentDissertation.pdf. Accessed 29.8.07.
- Bettoni-Techio, M., Rauber, A.S. and Koerich, R.D. (2007) Perception and production of alveolar stops by Brazilian Portuguese learners of English. In *Proceedings of INTERSPEECH'2007 ICSLP* (pp. 2293–2296). On WWW at http://www.nupffale.ufsc.br/rauber/Interspeech_official_Bettoni-Techio%20et%20al.pdf. Accessed 2.9.07.
- Bion, R.A.H., Escudero, P., Baptista, B.O. and Rauber, A.S. (2005) A comparison between the production and perception of English vowels by Brazilian EFL learners. *First ASA Workshop on Second Language Speech Learning*, Vancouver, Canada, 14 and 15 May, 2005. On WWW at http://www.nupffale.ufsc.br/bion/rb_vancouver. Accessed 21.4.10.
- Bohn, O-S. and Flege, J.E. (1997) Perception and production of a new vowel category by adult second language learners. In A. James and J. Leather (eds) *Second-Language Speech* (pp. 53–73). Berlin: Mouton de Gruyter. On WWW at http://www.hum.au.dk/engelsk/engosb/pdf/Bohn_Flege_1997_in_Leather_James.pdf. Accessed 21.4.10.
- Bradlow, A.R., Pisoni, D.B., Akahane-Yamada, R. and Tohkura, Y. (1997) Training Japanese listeners to identify English /r/ and /l/: IV. Some effects of perceptual learning on speech production. *Journal of the Acoustical Society of America* 101, 2299–2310. On WWW at <http://babel.ling.northwestern.edu/~abradlow/Bradlow-et-al-JASA97.pdf>. Accessed 27.8.07.
- Bradlow, A.R., Akahane-Yamada, R., Pisoni, D.B. and Tohkura, Y. (1999) Training Japanese listeners to identify English /r/ and /l/: Long-term retention of learning in perception and production. *Perception & Psychophysics* 61, 977–985. On WWW at <http://babel.ling.northwestern.edu/~abradlow/bradlow-et-al-r15-p&p99.pdf>. Accessed 29.8.07.
- Brière, E. (1968) *A Psycholinguistic Study of Phonological Interference*. The Hague: Mouton.
- Catford, J.C. and Pisoni, D.B. (1970) Auditory vs. articulatory training in exotic sounds. *Modern Language Journal* 54, 477–481.
- De Bot, K. and Mailfert, K. (1982) The teaching of intonation: Fundamental research and classroom applications. *TESOL Quarterly* 16, 71–77.
- Dupoux, E. (2003) Plasticity and non-plasticity in speech processing: Late learners and early forgetting. Paper presented to Linguistic Department, University of Maryland, 27 October.
- Dziubalska-Kończak, K. (1990) *A Theory of Second Language Acquisition within the Framework of Natural Phonology: A Polish–English Contrastive Study*. Poznań: Adam Mickiewicz University Press, Seria Językoznawstwo nr 12.

- Flege, J.E. (1991) Perception and production: The relevance of phonetic input to L2 phonological learning. In Th. Huebner and ChA. Ferguson (eds) *Crosscurrents in Second Language Acquisition and Linguistic Theories* (pp. 249–289). Philadelphia: John Benjamins.
- Flege, J.E. (1995) Second language speech learning: Theory, findings and problems. In W. Strange (ed.) *Speech Perception and Linguistic Experience, Issues in Cross-Linguistic Research* (pp. 233–277). Timonium, MD: York Press.
- Flege, J.E., Bohn, O.S. and Sunyoung, J. (1997) Effects of experience on non-native speakers' production and perception of English vowels. *Journal of Phonetics* 4, 437–470.
- Gómez-Lacabex, E. and García-Lecumberri, M.L. (2007) Perception of English vowel reduction at the word/sentence level by trained Spanish learners on perception and production. On WWW at http://www.zas.gwz-berlin.de/sommer_org/abstract/lac.pdf. Accessed 29.8.07.
- Gómez-Lacabex, E., García-Lecumberri, M.L. and Cooke, M. (2005) English vowel reduction by untrained Spanish learners: Perception and production. On WWW at <http://www.phon.ucl.ac.uk/home/johnm/ptlc2005/pdf/ptlcp45.pdf>. Accessed 21.4.10.
- Goto, H. (1971) Auditory perception by normal Japanese subjects of the sounds 'L' and 'R'. *Neuropsychologia* 9, 317–323.
- Hirata, Y. (2004) Computer assisted pronunciation training for native English speakers learning Japanese pitch and durational contrasts. *Computer Assisted Language Learning* 3–4, 357–376.
- Højen, A.D. (2003) Second language speech perception and production in adult learners before and after short term immersion. Summary of PhD thesis, University of Aarhus (pp. 1–10). On WWW at <http://www.andershojen.dk/papers/PhDsummary.pdf>. Accessed 26.3.07.
- Janicka, K. (2005) Pronunciation standards of English for non-native speakers of English: A case against Lingua Franca Core. Unpublished PhD thesis, Adam Mickiewicz University, Poznań.
- Jones, D. (1948) The London School of phonetics. *Zeitschrift fürPhonetik* 3/4, 127–135.
- Kluge, D.C., Rauber, A.Sch., Reis, M.S. and Bion, R.A.H. (2007) The relationship between the perception and production of English nasal codas by Brazilian learners of English. In *Proceedings of INTERSPEECH'2007 ICSLP* (pp. 2297–2300). On WWW at http://www.nupffale.ufsc.br/rauber/Interspeech_official_Kluge%20et%20al.pdf. Accessed 21.4.10.
- Lambacher, S.G., Martens, W.L., Kakehi, K., Marasinghe, Ch.A. and Molholt, G. (2005) The effects of identification training on the identification and production of American English vowels by native speakers of Japanese. *Applied Psycholinguistics* 26, 227–247.
- Lane, H.L. and Schneider, B. (1963) Methods for self-shaping echoic behaviour. *Modern Language Journal* 46, 154–160.
- Leather, J. (1986) An interactive speech training system for Chinese tone. *Speech Input/Output: Techniques and Applications* (pp. 248–251). IEE Conference Publication No. 258.
- Leather, J. (1987) F0 pattern inference in the perceptual acquisition of second-language tone. In A. James and J. Leather (eds) *Sound Patterns in Second Language Acquisition* (pp. 59–80). Dordrecht: Foris.
- Leather, J. (1988) Speech pattern elements in second language acquisition. Unpublished PhD thesis, University College, London.
- Leather, J. (1990) Perceptual and productive learning of Chinese lexical tones by Dutch and English speakers. In J. Leather and A. James (eds) *New Sounds* 90:

- Proceedings of the Amsterdam Symposium on the Acquisition of Second-Language Speech* (pp. 72–89). Amsterdam: University of Amsterdam.
- Leather, J. and James, A. (1991) The acquisition of second language speech. *Studies in Second Language Acquisition* 13, 305–341.
- Lee, S.K. (1996) Child–adult differences in the auditory perception and pronunciation of foreign sounds (second language). University of Southern California, Volume 57-07A of Dissertation Abstracts International (p. 2918).
- Levin, M. (2004) The perception of English affricates and fricatives by Polish learners of English. Unpublished PhD thesis, University of Łódź.
- Llisterri, J. (1995) Relationship between speech production and speech perception in a second language. In E. Kjell and P. Branderud (eds) *Proceedings of the XIIIth International Congress of Phonetic Sciences ICPhS*, 95 (1) (pp. 92–99). Stockholm: Stockholm University. On WWW at http://liceu.uab.es/~joaquim/publicacions/Prod_Percep.html. Accessed 26.3.07.
- Mathews, J. (1997) The influence of pronunciation training on the perception of second language contrasts. *International Review of Applied Linguistics* 35, 223–229.
- McAllister, R. (1997) Perception and production of a second language and the concept of foreign accent. In J. Leather and A. James (eds) *Proceedings of the Third International Symposium on the Acquisition of Second-Language Speech 'New Sounds' 97'* (pp. 206–214). Klagenfurt: University of Klagenfurt.
- Moyer, A. (2004) *Age, Accent and Experience in Second Language Acquisition: An Integrated Approach to Critical Period Inquiry*. Clevedon: Multilingual Matters.
- Neufeld, G.G. (1978) On the acquisition of prosodic and articulatory features in adult language learning. *Canadian Modern Language Review* 34, 164–174.
- Neufeld, G.G. (1979) Toward a theory of language learning ability. *Language Learning* 29, 227–241.
- Neufeld, G.G. (1980) On the adult's ability to acquire phonology. *TESOL Quarterly* 14, 285–298.
- Nowacka, M. (2003a) Analiza i ocena wymowy słuchaczy NKJO w Rzeszowie (The analysis and evaluation of college students' pronunciation). In W. Sobkowiak and E. Waniek-Klimczak (eds) *Dydaktyka fonetyki języka obcego II. Konferencja w Wąsoszach, 10–12.5.2002* (Phonetics in FLT 2, Wąsosze 10–12.5.02), (=Zeszyty Naukowe Państwowej Wyższej Szkoły Zawodowej w Koninie) (pp. 46–55). Konin: Wydawnictwo PWSZ.
- Nowacka, M. (2003b) 'Hot bits' or 'hobbits' – English speech in Polish 'ears'. In W. Sobkowiak and E. Waniek-Klimczak (eds) *Dydaktyka fonetyki języka obcego III. Konferencja w Soczewce, 5–7.5.2003* (Phonetics in FLT 3, Soczewka 5–7.5.03), (=Zeszyty Naukowe Państwowej Wyższej Szkoły Zawodowej w Płocku) (pp. 97–113). Płock: Wydawnictwo PWSZ.
- Nowacka, M. (2006) Progress in pronunciation: Mission (im)possible?: A longitudinal study of college students' phonetic performance. In W. Sobkowiak and E. Waniek-Klimczak (eds) *Dydaktyka fonetyki języka obcego w Polsce. Referaty z szóstej konferencji naukowej Mikorzyn, 8–10.5.2006* (Phonetics in FLT 6, Mikorzyn 8–10.5.06) (pp. 101–120). Konin: Wydawnictwo PWSZ.
- Nowacka, M. (2008a) How far is 'Hannover' from 'hangover'? Perception of English consonants by Polish students of English Departments. In E. Waniek-Klimczak (ed.) *Issues of Accents in English* (pp. 272–303). Newcastle upon Tyne: Cambridge Scholars Publishing.
- Nowacka, M. (2008b) Phonetic attainment in Polish University and College students of English: A study in the productive and receptive pronunciation skills. Unpublished PhD thesis, Maria Curie-Skłodowska University, Lublin.

- Podlipský, V.J. (no date) The relationship between perception and production of English high front vowels by Czech learners of English. On WWW at <http://www.sfu.ca/~spchlab/A48.pdf>. Accessed 28.8.07.
- Porzuczek, A. (1998) The acquisition of the vocalic component of English by advanced Polish learners. Unpublished PhD thesis, University of Silesia, Sosnowiec.
- Rauber, A.S., Escudero, P., Bion, R.A.H. and Baptista, B.O. (2005) The interrelation between the perception and production of English vowels by native speakers of Brazilian Portuguese. *INTERSPEECH 2005 – LISBOA*. On WWW at <http://www.nupffale.ufsc.br/bion/lisbonp.pdf>, http://www.nupffale.ufsc.br/rauber/Interspeech%20article_2005.pdf. Accessed 29.8.07.
- Rojczyk, A. (2008) The perception of English and Polish obstruents. The voicing contrast. Unpublished PhD thesis, University of Silesia, Sosnowiec.
- Scheuer, S. (1998) Interference-motivated pronunciation errors in Polish students of English. A corpus-based study. Unpublished PhD thesis, Adam Mickiewicz University, Poznań.
- Schneiderman, E., Bourdages, J. and Champagne, C. (1988) Second-language accent: The relationship between discrimination and perception in acquisition. *Language Learning* 38, 1–19.
- Sheldon, A. (1985) The relationship between production and perception of the /r-/ /l/ contrast in Korean adults learning English: A reply to Borden, Gerber, and Milsark. *Language Learning* 35, 107–113.
- Sheldon, A. and Strange, W. (1982) The acquisition of /r/ and /l/ by Japanese learners of English: Evidence that speech production can precede speech perception. *Applied Psycholinguistics* 3, 234–261.
- Smiljanić, R. and Bradlow, A.R. (2005) Production and perception of clear speech in Croatian and English. *Journal of the Acoustical Society of America* 118, 1677–1688. On WWW at <http://babel.ling.northwestern.edu/~abradlow/smiljanic&bradlow05.pdf>. Accessed 29.8.07.
- Sobkowiak, W. and Waniek-Klimczak, E. (eds) (2002) *Dydaktyka fonetyki języka obcego I. Konferencja w Soczewce, 11–13.5.2001* [Phonetics in Foreign Language Teaching 1 (henceforth FLT), Soczewka 11–13.5.2001], (=Zeszyty Naukowe Państwowej Wyższej Szkoły Zawodowej w Płocku). Płock: Wydawnictwo PWSZ.
- Sobkowiak, W. and Waniek-Klimczak, E. (eds) (2003a) *Dydaktyka fonetyki języka obcego II. Konferencja w Wąsoszach, 10–12.5.2002* (Phonetics in FLT 2, Wąsosze 10–12.5.2002), (=Zeszyty Naukowe Państwowej Wyższej Szkoły Zawodowej w Koninie). Konin: Wydawnictwo PWSZ.
- Sobkowiak, W. and Waniek-Klimczak, E. (eds) (2003b) *Dydaktyka fonetyki języka obcego III. Konferencja w Soczewce, 5–7.5.2003* (Phonetics in FLT 3, Soczewka 5–7.5.2003), (=Zeszyty Naukowe Państwowej Wyższej Szkoły Zawodowej w Płocku). Płock: Wydawnictwo PWSZ.
- Sobkowiak, W. and Waniek-Klimczak, E. (eds) (2004) *Dydaktyka fonetyki języka obcego IV. Konferencja w Mikorzynie, 10–12.5.2004* (Phonetics in FLT 4, Mikorzyn 10–12.5.2004), (=Zeszyty Naukowe Państwowej Wyższej Szkoły Zawodowej w Koninie). Konin: Wydawnictwo PWSZ.
- Sobkowiak, W. and Waniek-Klimczak, E. (eds) (2006a) *Dydaktyka fonetyki języka obcego V. Konferencja w Soczewce, 25–27.4.2005* (Phonetics in FLT 5, Soczewka 25–27.4.2005), (=Zeszyty Naukowe Państwowej Wyższej Szkoły Zawodowej w Płocku). Płock: Wydawnictwo PWSZ.
- Sobkowiak, W. and Waniek-Klimczak, E. (eds) (2006b) *Dydaktyka fonetyki języka obcego w Polsce. Referaty z szóstej konferencji naukowej Mikorzyn, 8–10.5.2006* (Phonetics in FLT 6, Mikorzyn 8–10.5.2006). Konin: Wydawnictwo PWSZ.

- Wang, Y., Jongman, A. and Sereno, J.A. (2003) Acoustic and perceptual evaluation of Mandarin tone productions before and after perceptual training. *Journal of the Acoustical Society of America* 113, 1033–1043. On WWW at <http://www2.ku.edu/~kuppl/sereno/JASA%202003.pdf>. Accessed 2.9.07.
- Wrembel, M. (2005) The role of metacompetence in the acquisition of foreign language pronunciation. Unpublished PhD thesis, Adam Mickiewicz University, Poznań.
- Zborowska, J. (2002) Rhythmic of language: A Polish–English contrastive study. Unpublished PhD thesis, Adam Mickiewicz University, Poznań.

Part 2

Phonological Analysis

Chapter 6

The Role of Phonological Awareness in Beginning Reading: A Cross-Linguistic Perspective

M. KUSIAK

The chapter discusses phonological awareness at the decoding stage in reading in a first and foreign language. First, the discussion deals with reading in English as a first language. It looks at Baron and Strawson's (1976) division of readers in English into 'Chinese' (recognizing words as whole units) and 'Phoenician' (following 'sound-to-spelling' rules). This leads to looking at the Orthographic Depth Hypothesis, which claims that phonologically regular languages, for example Polish, are processed in a different way than phonologically irregular languages, for example English. The next part of the chapter focuses on a Polish study by Sochacka (2004) who investigated strategies used by L1 Polish children while reading Polish. The results of this study are discussed to explain differences between reading in English as an L1 and reading in Polish as an L1.

Then the chapter presents the results of the analysis of three coursebooks of English for Polish young learners. The aims of this comparison are to look at how these coursebooks teach phonological awareness to beginner learners and to evaluate how effective their philosophies and techniques can be. The study investigates: the explicitness of phonological instruction, level of focus (sounds, individual words or connected speech), types of reading tasks, a sequence of tasks, presentation of letter-sound correspondences and the development of other reading-related abilities. The study raises several questions of both didactic and theoretical nature, which are discussed at the end of the chapter.

Phonological and Phonemic Awareness: Definitions

Research conducted in a variety of disciplines unequivocally points to the critical role of phonological processes in reading acquisition (e.g. Adams, 1990; Bryant *et al.*, 1989; Share, 1995; Stanovich, 1992).

Within phonological processes psycholinguists distinguish two areas: phonological awareness and phonemic awareness. Phonologic or phonological awareness is defined as the ability to manipulate mentally the sounds that make up words (Torgesen *et al.*, 2007). This ability is demonstrated in the tasks that require, for example, grouping spoken words on the basis of shared sounds (e.g. *bet* and *bid* go together because they both start with /b/) or deleting phonemes (e.g. say *big* without the /b/). Many researchers (e.g. Harrison, 1996) agree that phonological awareness seems to be related to familiarity with rhymes. It is worth stressing that in phonological awareness tasks learners focus on the underlying phonological structure of the spoken word, not the word's meaning and that this ability does not involve print. Studies indicate that success on the aforementioned types of tasks goes with the ability to read and spell words. For example, research by Bryant *et al.* (1989) point to a causal link between awareness of rhyme and later success in reading. Similarly, in Poland, Krasowicz-Kupis (1999) observed the impact of the ability to manipulate sounds on early reading development.

Phonemic awareness can be named a subset of phonological awareness. It is the ability to recognize and manipulate the smallest chunks of sounds that make up words. It is best developed when children learn to establish explicit links between letters and sounds. That is when they begin to read. Children develop some phonological awareness before phonemic awareness.

The Role of Phonological Decoding in L1 and FL Reading

In this discussion, reading is viewed as a cognitive process consisting of three operations: decoding (linguistic information extracted from print), text-meaning construction and assimilation of text-based information with prior knowledge. Word recognition and decoding are often used interchangeably. In this chapter word recognition, following Koda (2005), is understood as two major processes that obtain words' sounds and meanings. Decoding deals with extracting phonological information from words.

Phonological decoding has been found a factor facilitating both L1 and L2 reading. In L1 phonological decoding enhances information storage in working memory; changing print into its phonological form enables effective access to oral vocabulary, which is stored in phonological forms. In fact, competence in pronouncing printed words was found as a reliable predictor of early reading success (e.g. Share & Stanovich, 1995). Interestingly, the undeniable importance of phonological decoding was found in both alphabetic languages, for example English and nonalphabetic ones, such as Chinese and Japanese (e.g. Perfetti & Zhang, 1995). Working-memory experiments among native Chinese readers (e.g. Zhang

& Simon, 1985) investigating the role of phonological competence and visual encoding in retaining visually presented material point to phonological transformation as a more helpful factor.

Let us discuss different writing systems and their impact on reading. Writing systems can be divided into two categories: shallow and deep orthographies. A factor distinguishing the two types of orthography is orthographic depth, which refers to the degree of regularity in symbol–sound correspondences. In shallow orthographies, such as Spanish, Serbo-Croatian and Polish, the symbol–sound correspondences are very regular, transparent; readers learn a phonologically regular system with a highly consistent set of grapheme-to-phoneme correspondences. Deep orthographies, such as English, have a phonologically deep system, that is ‘while governed by phonemic constraints’ they tend ‘to preserve morphological information at the expense of phonological transparency’ (Koda 2005: 36). An example of the past tense morpheme *-ed* illustrates this tendency well. The morpheme is pronounced in three different ways, as in *cooked*, *visited* and *played*. The grapheme *-ed*, while violating one-to-one symbol–sound correspondences, reflects its underlying morphological information.

Katz and Frost (1992) proposed the Orthographic Depth Hypothesis, which argues that phonological decoding in reading depends on letter–sound relationships. Phonologically regular languages, for example Polish, are processed in a different way than phonologically irregular languages, for example English. In shallow orthographies (e.g. Polish) phonological decoding involves letter-by-letter, letter-to-sound translation. By contrast, in deep orthographies, phonological decoding takes place only after a word has been identified. In other words, in shallow orthographies transparent sound–letter correspondences allow the reader to follow rule-based, thus predictable, procedures; whereas in deep orthographies the reader depends on the knowledge concerning particular words retrieved from lexical memory. This hypothesis was confirmed by Frost *et al.* (1987) in their experiments involving Hebrew (deepest), English (deep) and Serbo-Croatian (shallow) writing systems.

Interesting results were produced in reference to the role of L1 print-processing experience in L2 reading. Research in this field seems to show that L2 readers bring to L2 reading a set of language skill processes specific to their L1. Koda (1989) investigated L2 learners of Japanese with logographic and alphabetic L1 background and the effect of L1–L2 orthographic distance on word-recognition development and their relation to text comprehension. The results showed that the logographic group performed better at all word-recognition tasks and all word-recognition results correlated positively with reading comprehension scores. The longitudinal data indicated a difference in performance between the two groups and over time this gap increased. In another study Suarez and Meara (1989) found out that their Spanish subjects used

a phonological 'sound-to-spelling' system when attempting to read irregular words in English, the approach appropriate to Spanish but inappropriate to English. Interestingly, research seems to imply that L1 reading proficiency may have an advantageous impact on performance of reading in an L2. For example, Koda (1988) noticed that Japanese readers' performance, unlike that of the Arabic and Spanish subjects, was similar to that of the English-speaking readers. The researcher concluded that processes used by Japanese readers may be similar to that of English readers, and this similarity seems to help Japanese readers in reading in English.

The studies of young learners point to transfer between two languages, for example Verhoeven (1994) investigated Turkish children learning Dutch as an L2 and observed transfer between two languages in two directions. Similarly, Chang and Watson (1988) found out that Chinese bilingual kindergarten learners transferred what they know about reading in English to their Chinese. In Poland, Dlugosz (2000) taught English to beginning second-language kindergarten children while simultaneously teaching them to read in English. These children were not yet reading in their first language, Polish. The young members of the experimental group, who had been taught the graphic forms of words used in the storybook series, not only learned to read in English but also developed better speaking and comprehension skills. I think it would be interesting to continue this study and examine the influence of young learners' L2 literacy skills on their L1 reading.

To sum up, cross-linguistic studies of L2 word recognition clearly indicate unequivocal long-lasting impacts of L1 orthographic background on L2/FL reading. The more dissimilar the orthographies of the two languages are, the more modifications one's L1 processes undergo to accommodate the new demands of the L2 writing system. Thus, Polish adult learners while reading English will approach words in the way they process words in their native language. All EFL teachers are familiar with the situation in which beginner Polish students will pronounce English words using a phonological 'sound-to-spelling' system and it will take some time before they adjust their processing skills to a new system.

Reading in English as an L1

Baron and Strawson (1976) divide readers in English into two groups which they call 'Chinese' and 'Phoenician'. The first group, that is a 'Chinese' one, relies on lexical decoding and recognizes words as whole units. Readers using this logographic approach are good at lexical reading and transforming symbols into words (e.g. transforming \$2 into *two dollars*), but poor at orthographic processing. The other group, that is a 'Phoenician' one, uses orthographic processing, that is follows 'sound-to-spelling' rules, a strategy useful for a language with regular orthography, but not helpful

in reading words that do not follow the expected 'sound-to-spelling' rules. The researchers claim that to read English, an orthographically irregular language, readers must employ a combination system, which will enable them to read both regular and irregular words.

Reading in Polish as an L1

Let us now look at a Polish study conducted by Sochacka (2004). The aim of the research was to observe a development of reading of L1 Polish children and check whether the stages identified in the study would reflect the stages suggested in Frith's model of reading development.

Frith's model (1985) is very well known in reading psychology and serves as a universal model characterizing a development of reading in various languages. The model suggests three stages: logographic, alphabetic and orthographic. At the logographic stage the reader recognizes words in print by looking for features of the words that are somehow 'salient'; it may be the last letter of the word or a cluster of letters that help the child to remember and recognize the word. The word once recognized is connected with the visual semantic system and then with the verbal semantic system – the process that in consequence leads to sounding out the word.

At the alphabetic stage, the child begins to decode a word by sounding it out to him/herself. Due to the development of phonological awareness mapping letters to sounds is possible. Research (e.g. Bradley & Bryant, 1979) shows that English children use logographic strategies when they begin to read and alphabetic strategies when they begin to write (Frith does not explain, however, what happens to logographic strategies when an English child beginning to write employs phonological strategies). At the alphabetic stage letter-to-sound strategies become dominant and theoretically the child is able to 'attack' unknown and artificial words. However, because of a deep phonological system of English, letter-to-sound strategies do not allow beginner readers to understand irregular words.

At the last orthographic stage the child can recognize words by using features of orthography of his/her language. The child does not need to convert graphemes into phonemes; his/her morphosyntactic awareness enables the reader to recognize cluster of letters and without sounding out letters to read words. At this stage the reader's competence is more mature and the reader can select phonological or logographic strategies depending on the situation. Frith (1985) argues that only after successful completion of the first two stages can the reader enter the last orthographic stage.

Sochacka (2004) aimed to find whether Polish children at the beginning of their reading development go through the stages specified in Frith's model. The study lasted two years. The researcher observed the effectiveness of reading by miscue analysis and measuring reading rate.

Understanding of words and sentences and reading comprehension of texts were examined as well. Reading material used in the study contained lists of real words and short texts as well as pseudo-words and pseudo-texts.

The results of the study showed that Frith's model does not reflect the development of Polish children's reading. The most dominant strategy observed throughout the two-year study was the alphabetic strategy, that is decoding words letter by letter. Over time, the children developed the holistic way of reading, that is they synthesized all letters in words and read the whole words. The development proceeded from the phonological strategy to the lexical one. It was interesting to observe that the holistic strategy did not involve only the implementation of visual semantic mechanisms, as suggested by Frith's logographic stage. The holistic strategy was supported by the already acquired ability to connect letters with sounds. Connecting letters with sounds facilitated the process of memorizing words as a combination of elements. In other words, the children drew on both their visual abilities and phonological awareness.

Phonological Instruction in English as an L1

Most researchers agree that phonological skills are not spontaneously acquired by all children, and what is important for education can be taught. Educational studies focusing on English as an L1 have attempted to find features of phonological instruction that could prepare young learners for early reading. Ball and Blachman (1991) observed that developing pre-school learners' awareness of the phonological structures of speech facilitate early reading and spelling acquisition. This type of teaching proved even more successful when combined with instruction that connects the phonological segments to letters (thus aiming to raise phonemic awareness, as defined in section Phonological and Phonemic Awareness: Definitions in this chapter). Similar results were obtained by Byrne and Fielding-Barnsley (1991, 1993, 1995) who also emphasize the role of print-related practice in enlarging learners' phonological skills. Researchers have explored the question: which level of instruction can be the most effective – phoneme, syllable or rhyme. According to Cary and Verhaegle (1994), it is the phoneme level that makes the greatest contribution to the prediction of reading. Tasks involving recognizing and producing rhyming words did not prove sufficient to prepare children to read and spell. Also Nation and Hulme (1997) found that phoneme segmentation was more helpful than segmentation of onset-rime units as a predictor of both reading and spelling. In conclusion, studies imply that the most effective method is a combination of phonological awareness training, for example recognizing and producing rhyming words, with phonics awareness training, that is understanding the sound structure of spoken words and developing alphabetic skills to learn letter–sound correspondences.

Let us now look at tasks that are used in phonological instruction. Phonological skills (as defined in section Phonological and Phonemic Awareness: Definitions) can be developed by means of the following activities:

- Sound categorization, that is deciding which words start or end with the same or different sounds.
- Blending sounds, that is combining a string of sounds into a recognizable word.
- Segmenting, that is breaking apart words into constituent sounds, for example syllables.
- Manipulation, for example deleting a particular sound or substituting one sound with another.
- Identification, that is identifying the sounds (phonemes) in spoken words, identifying relationships between letters and sounds they represent in words.
- Rhyming, that is recognizing or creating rhyming words.

Torgesen *et al.* (2007: 7) divide phonological activities into pre-print and print-related tasks. Pre-print tasks involve children in activities that include playing with spoken words, for example rhyming, singing, tapping, clapping, segmenting sentences into words and making judgements about words and word length. They also suggest games, such as rhyming speech ('speak in rhyme all the time') or speaking like 'Dalek' (one-syllable-at-a-time). Identification of onset, rime and phonemes (without using the terms) is also recommended. As an example of print-related activities the researchers suggest using plastic letters to show children how changing one letter can make an analogous word; it is advised to begin with a word with which children are familiar. Torgesen *et al.* (2007: 7) emphasize the importance of introducing onset-rime segmentation practice before teaching children letter-phoneme relationships; this sequence of instruction enables young learners to link 'spelling patterns to sounds which the child is able to discriminate'. It becomes clear that print-related activities should draw on the awareness that learners develop at the pre-print stage.

Phonological Decoding in EFL Coursebooks for Polish Young Learners: Analysis

The main aim of the study was to analyze a sample of coursebooks used in Polish primary schools to teach English as a foreign language to beginner young learners (seven-year-old children). The analysis explores how the coursebooks develop phonological skills, and thereby prepare children to read English. The following books were analyzed: *Letterfun* by Elizabeth Gray and Evans (2001a), *Stardust 1* by Kathryn Harper *et al.* (2006a) and *New Sparks 1* by Szpotowicz and Szulc-Kurpaska (2007a). To obtain more reliable

analysis of the coursebooks, teacher's books (Gray & Evans, 2001b; Harper *et al.*, 2006b; Szpotowicz & Szulc-Kurpaska, 2007b) have been consulted. It is important to stress that all the books are available at Polish bookshops and it is very likely that Polish teachers use them in their classrooms.

In the analysis, the following criteria were applied for each coursebook:

- (1) Explicitness of phonological instruction – answering the following questions: How explicit is phonological instruction? Are there separate activities focused on phonology? Is phonological instruction integrated with activities developing other language skills?
- (2) Level(s) of focus – deciding whether phonological instruction focuses on sounds, individual words or connected speech.
- (3) Types of reading tasks – identifying what tasks are used in the coursebook to teach reading and naming their types.
- (4) Sequence of tasks – investigating whether there is any order in which phonological tasks are introduced.
- (5) Presentation of letter–sound correspondences – analyzing how literacy skills are taught.
- (6) Development of other reading-related abilities – identifying knowledge and abilities that can be of value to the beginning reader, different than the ones of phonological character.

The analysis of *Letterfun* (2001) indicates the following:

- (1) *Explicitness of phonological instruction*
Phonological instruction is very explicit throughout the book. Most of the activities focus on introducing letter sounds and individual words. All the exercises involve listening and repetition. This phonological instruction is integrated with teaching simple vocabulary and basic speaking skills (mostly by means of nursery rhymes).
- (2) *Level(s) of focus*
Phonological teaching focuses mainly on sounds, words and connected speech.
- (3) *Types of tasks*
There are no pre-print tasks in the book. Most of the tasks are print-related activities and focus on developing phonemic awareness (i.e. the ability to establish explicit links between letters and sounds). There is no explicit pre-print practice developing phonological awareness, that is the ability to manipulate mentally sounds that make up words. This awareness is developed as if indirectly by listening to and singing nursery rhymes (and following the texts of the songs in the coursebook). The most frequent activities that enhance FL literacy are:
 - Pronouncing letters alphabetically, for example A /æ/, B /b/, P /p/, R /r/.
 - Repeating words which learners associate with the letters and their sounds, for example *ant* for A /æ/, *dog* for D /d/.

- Learning blends of letters, for example *sh*, *ch*, *th*, *ph* and their sounds.
- Listening to words and completing their written forms with appropriate vowels, for example *j_g* (*u* is missing), *ch_ck* (*i* is missing).
- Distinguishing sounds corresponding to the same letter blend, for example /θ/ and /ð/ for *th*.
- Distinguishing letter blends corresponding to the same sound, for example *ph* and *f* for /f/.
- Completing words with appropriate letter blends, for example *_ _ umb* (*th* is missing), *_ _ eep* (*sh* is missing).
- Repeating rhyming words and grouping them according to their rhyme, for example *cake – snake, mole – hole*.

(4) *Sequence of tasks*

The sequence of tasks is very clear. First, learners are introduced to the sounds of individual letters. Each letter is reinforced with a word associated with the letter and its sound, for example *d* /d/ with *dog*. Then children are presented with letter blends, that is *sh*, *ch*, *th* and *ph*. The last stage of instruction focuses on rhyming words.

(5) *Presentation of letter–sound correspondences*

The analysis presented above clearly indicates that the coursebook follows the principles of the Phonics Method. Grapheme–phoneme associations are taught by introducing children to the names of letters and the sounds they make, e.g. *A – /æ/*, *B – /b/*. Then children are taught letter blends and encouraged to read simple ‘regular’ words.

(6) *Development of other reading-related abilities*

The course begins with pre-writing activities; children draw or complete various line patterns to develop motor skills. Reading and writing are taught alongside from the beginning; learners practice reading simple words and work on writing skills by tracing over words. At the last stage of instruction children listen to nursery rhymes, following the lyrics of the songs. This enables them to recognize in longer texts words which they know. Throughout the course, children learn that print carries the verbal message; all print-related activities are accompanied by full-color illustrations, which enhance associating written words with meaning.

The analysis of *Stardust 1* (2006) shows the following:

(1) *Explicitness of phonological instruction*

There is no explicit phonological teaching in this book. The main aim of the coursebook is to develop learners’ listening and speaking skills. Teaching reading and writing is postponed and begins in *Stardust 2*. The authors explain that seven-year-old children are not competent readers of their L1 and introducing FL literacy would not be very effective.

(2) *Level(s) of focus*

Teaching focuses on individual words and connected speech, i.e. short dialogues of picture stories presented in bubbles.

(3) *Types of tasks*

Most of the tasks are pre-print activities. Print-related tasks are not obligatory, as *The Teacher's Book* (Harper *et al.*, 2006b: 12) explains. Print appears in the second half of the course in the form of bubbles (short sentences that make up dialogues conducted between the characters of the stories). The most frequent pre-print tasks are:

- Listening to short picture stories and pointing to appropriate elements in the picture.
- Listening to chants and singing them.
- Listening to individual words, repeating them and pointing to the objects in the picture corresponding to the words.
- Recognizing the mood of the speaker in the recording; repeating dialogues, imitating this mood.

Pre-print practice does not aim at enhancing phonemic awareness (i.e. ability to establish explicit links between letters and sounds), neither at developing other phonological skills, such as developing sensitivity to units within spoken words. Their goal is to teach learners basic vocabulary and speaking skills. Surprisingly, there are very few rhymes that could enhance learners' sensitivity to rhyme. The most frequent print-related tasks entail listening to short dialogues of picture stories, presented in bubbles. However, to understand the stories learners are not obliged to follow the text in bubbles. The main aim of these tasks is to develop print awareness, that is making learners aware of the fact that printed words carry meaning.

(4) *Sequence of tasks*

Tasks based on individual words alternate with those including connected speech (i.e. short dialogues and chants). Print-related tasks (which are not obligatory) follow pre-print tasks.

(5) *Presentation of letter–sound correspondences*

The coursebook does not offer any practice developing awareness of links between letters and sounds in spoken words. Reading skills are not meant to be taught in an explicit way.

(6) *Development of other reading-related abilities*

It seems that although the book does not teach reading, it develops certain skills that may be helpful in developing literacy skills. Knowing basic vocabulary, that is the ability to use words communicatively, will undoubtedly prepare young learners to recognize their written forms. They will begin their literacy learning with a store of words which they will associate with games and songs.

The results of the analysis of *New Sparks 1* are the following:

(1) *Explicitness of phonological instruction*

There is no explicit phonological training. The coursebook aims at teaching basic vocabulary and speaking as well as developing basic reading and writing skills. Phonological tasks are integrated with teaching those skills.

(2) *Level(s) of focus*

Tasks focus on word level and connected speech (i.e. chants and dialogues in picture stories).

(3) *Types of tasks*

The book offers both pre-print and print-related activities. Most of the tasks in the first two units (there are six units in the book) contain pre-print practice. The aim of pre-print tasks is to present basic vocabulary and speaking skills. There are two tasks in this part of the book, which contain print; however, the authors do not encourage teachers to use them to teach reading. The goal of the tasks is to familiarize young learners with English print without asking them to do any obligatory exercises. The most frequent pre-print tasks are:

- Listening to chants and rhymes, and singing them.
- Listening to individual words, repeating them and pointing to the objects in the picture corresponding to the words.
- Print-related activities dominate in the coursebook. The following types are used.
- Listening to words and associating them with their written forms and the pictures.
- Listening to and learning rhymes by heart.
- Listening to picture stories, following texts in bubbles and 'reading' them; the authors suggest that teachers first describe the pictures in Polish and then encourage learners to find in the texts words that they know. They also recommend asking children to 'understand' sentences, that is to associate the texts in bubbles with the pictures.

Both pre-print and print-related activities do not teach either letter-sound relationships or manipulating spoken units within spoken words. Short poems will certainly sensitize learners to rhymes. However, in several cases the choice of rhymes is not very likely to facilitate learners' phonological sensitivity to the rhyme in words (the ability which enables beginner readers to phonologically 'attack' new words by finding analogies between words that children know and those that are new). For example, it seems that *sun* and *fun* would be more 'helpful' rhymes in teaching this reading skill than *grey* and *OK*.

(4) *Sequence of tasks*

Pre-print activities are introduced before print-related tasks. Learning rhyming chants takes place from the beginning of the course. Word-based practice and tasks based on connected speech (i.e. rhymes and short dialogues) are presented side by side.

(5) *Presentation of letter–sound correspondences*

The book does not teach awareness of letter–phoneme correspondences. Activities in the coursebook are typical of the Whole Language Approach; they teach beginner readers to recognize and understand whole words and sentences.

(6) *Development of other reading-related abilities*

As *The Teacher's Book* (Szpotowicz & Szulc-Kurpaska, 2007b) says, the coursebook follows the requirements of the core curriculum approved by the Minister of Education (MEN, 2007), which recommends integrating teaching English with teaching other school subjects. The coursebook systematically develops skills which children need in their general education, for example it develops children's motor skills by asking young learners to match pictures with words, trace over words and color pictures. Reading is introduced slowly after a short period of developing print awareness. Word recognition skills are reinforced by a variety of exercises, for example recognizing in longer texts words that children know. Reading and writing are taught together from the beginning.

The three coursebooks differ in the way they prepare young learners for reading as shown in Table 6.1. *Stardust 1* does not teach reading, focusing on listening and speaking instead. *Letterfun* follows the principles of the Phonics Method and from the very beginning teaches letter–sound relationships. It is the only coursebook that offers sound-level instruction. *New Sparks 1* teaches reading according to the Whole Language Approach. None of the three coursebooks offers any pre-print phoneme-level instruction that would develop learners' ability to manipulate sound units within spoken words. It is worth emphasizing that this type of training has proved helpful for 'at risk' readers (e.g. Nijakowska, 2007). It seems that sound-based activities could be valuable in all the coursebooks described above. There would be place for sound-level pre-print games in *Stardust* (which does not aim at teaching reading at all). *Letterfun* could begin its print-related letter–sound training with activities encouraging learners to manipulate sounds. *New Sparks* in its present form does not seem complete, either. Phonological research (e.g. Gough *et al.*, 1992) clearly indicates that the Whole Language Approach (which *New Sparks* adopts) is based more on developing links between sounds and letters (or letter strings) than between sounds and whole words. The linguists argue (e.g. Torgesen *et al.*, 2007: 5) that in English 'it is inaccurate and misleading to assume that

Table 6.1 Comparison of how *Letterfun*, *Stardust 1* and *New Sparks 1* teach basic reading skills

	Letterfun	Stardust I	New Sparks 1
Explicitness of phonological instruction	Very explicit instruction	No explicit instruction	No explicit instruction
Level(s) of focus	Sound, word and connected speech	Word and connected speech	Word and connected speech
Types of tasks	Print-related	Pre-print	Both pre-print and print-related
Sequence of tasks	Introducing sounds of individual letters, then letter blends and simple words, at the end rhyming tasks	Word-based and speech-based tasks introduced side by side	Pre-print activities precede print-related tasks, word-based and speech-based tasks introduced side by side
Method of teaching reading	The Phonics Method	Reading is not taught in the book	The Whole Language Approach
Development of other reading-related abilities	Pre-writing motor skills, print awareness, word recognition	Chants learnt by heart	Pre-writing motor skills, print awareness, word recognition

words are ever processed and stored as wholes without attention to letters or letter strings'. Thus, adding phoneme-level activities would make this course more comprehensive.

To sum up, the analysis brings up an important question directed to both the coursebook authors and editors: why do these EFL coursebooks lack explicit phonological instruction, especially of a pre-print character?

Conclusions

This chapter attempts to explore the role of phonological awareness in beginning reading by comparing reading in English and reading in Polish. The study presented here aims to show how different EFL coursebooks teach basic reading and what phonological instruction they provide. The study raises several questions of both didactic and theoretical nature. In Poland, primary school teachers are expected to integrate English instruction with teaching other subjects. Unfortunately, no guidelines are given to teachers how to integrate development of L1 literacy with FL

literacy. Teachers complain that very often they have to teach FL reading before children acquire sufficient L1 literacy. This issue calls for more research attention.

As the analysis presented above demonstrates, different coursebooks offer different methods to teach basic reading skills. As a follow-up of this analysis, it may be useful to investigate the effectiveness of the three approaches. Since cross-linguistic studies clearly indicate unequivocal long-lasting impacts of L1 orthographic background on FL reading, we could explore a relationship between L1 literacy (reading strategies) and FL literacy (reading strategies). Two contexts could be looked at: when children learn to read in both languages at the same time or when one language precedes the other. It would be interesting to observe the impact of early development of FL reading (e.g. English) on phonological awareness in an L1 (Polish). This could be a continuation of the pilot study by Dlugosz (2000), which was discussed above.

References

- Adams, M.J. (1990) *Beginning to Read: Thinking and Learning about Print*. Cambridge, Massachusetts: MIT Press.
- Ball, E.W. and Blachman, B.A. (1991) Does phoneme awareness training in kindergarten make a difference in early word recognition and developmental spelling? *Reading Research Quarterly* 26, 49–66.
- Baron, J. and Strawson, C. (1976) Use of orthographic and word-specific knowledge in reading words aloud. *Journal of Experimental Psychology: Human Perception and Performance* 2, 386–393.
- Bradley, L. and Bryant, P.E. (1979) The independence of reading and spelling in backward and normal readers. *Developmental Medicine and Child Neurology* 21, 504–514.
- Bryant, P.E., Bradley, L., MacLean, M. and Crossland, J. (1989) Nursery rhymes, phonological skills and reading. *Journal of Child Language* 16, 407–428.
- Byrne, B. and Fielding-Barnsley, R. (1991) Evaluation of a program to teach phonemic awareness to young children. *Journal of Educational Psychology* 83, 451–455.
- Byrne, B. and Fielding-Barnsley, R. (1993) Evaluation of a program to teach phonemic awareness to young children: A 1-year follow-up. *Journal of Educational Psychology* 85, 104–111.
- Byrne, B. and Fielding-Barnsley, R. (1995) Evaluation of a program to teach phonemic awareness to young children: A 2- and 3-year follow-up and a new preschool trial. *Journal of Educational Psychology* 87, 488–503.
- Cary, L. and Verhaeghe, A. (1994) Promoting phonemic analysis ability among kindergartners: Effects of different training programs. *Reading and Writing: An Interdisciplinary Journal* 6, 251–278.
- Chang, Y. and Watson, D.J. (1988) Adaptation of prediction strategies and materials in a Chinese/English bilingual classroom. *Reading Teacher* 42, 36–44.
- Dlugosz, D.W. (2000) Rethinking the role of reading in teaching a foreign language to young learners. *ELT Journal* 54, 284–290.
- Frith, U. (1985) Beneath the surface of developmental dyslexia. In K. Patterson, J. Marshall and M. Calthart (eds) *Surface Dyslexia, Neuropsychological and Cognitive Studies of Phonological Reading* (pp. 303–330). London: Erlbaum.

- Frost, R., Katz, L. and Bentin, S. (1987) Strategies for visual word recognition and orthographic depth: A multilingual comparison. *Journal of Experimental Psychology: Human Perception and Performance* 13, 104–115.
- Gough, P.B., Juel, C. and Griffith, P.L. (1992) Reading, spelling, and the orthographic cipher. In P.B. Gough, L.C. Ehri and R. Treiman (eds) *Reading Acquisition* (pp. 35–48). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Gray, E. and Evans, V. (2001a) *Letterfun*. Berkshire: Express Publishing.
- Gray, E. and Evans, V. (2001b) *Letterfun. Teacher's Book*. Berkshire: Express Publishing.
- Harper, K., Blair, A. and Cadwallader, J. (2006a) *Stardust 1. Class Book*. Oxford: Oxford University Press.
- Harper, K., Blair, A. and Cadwallader, J. (2006b) *Stardust 1. Książka Nauczyciela*. Oxford: Oxford University Press.
- Harrison, C. (1996) *Interchange 39. Methods of Teaching Reading: Key Issues in Research and Implications for Practice*. Glasgow: The Scottish Office Education and Industry Department.
- Katz, L. and Frost, R. (1992) Reading in different orthographies: The orthographic depth hypothesis. In R. Frost and L. Katz (eds) *Orthography, Phonology, Morphology, and Meaning* (pp. 67–84). Amsterdam: Elsevier.
- Koda, K. (1988) Cognitive process in second language reading: transfer of L1 reading skills and strategies. *Second Language Research* 4, 133–156.
- Koda, K. (1989) The effect of transferred vocabulary knowledge on the development of L2 reading proficiency. *Foreign Language Annals* 22, 529–542.
- Koda, K. (2005) *Insights into Second Language Reading. A Cross-Linguistic Approach*. Cambridge: Cambridge University Press.
- Krasowicz-Kupis, G. (1999) *Rozwój Metajęzykowy a Osiągnięcia w Czytaniu u Dzieci 6-9 letnich*. Lublin: Wydawnictwo UMCS.
- Minister of Education (MEN) (2007) *The Decree of the Minister of National Education of the 23d of August 2007 on the educational standards in primary school and junior secondary school*. (Podstawa programowa kształcenia ogólnego dla szkół podstawowych i gimnazjum – Rozporządzenie Ministra Edukacji Narodowej z 23.08.2007). On WWW at bip.men.gov.pl/akty_prawne/rozporzadzenie_20070823_2.pdf. Accessed 2.11.08
- Nation, K. and Hulme, C. (1997) Phonemic segmentation, not onset-rime segmentation, predicts early reading and spelling skills. *Reading Research Quarterly* 32, 154–167.
- Nijakowska, J. (2007) *Understanding Developmental Dyslexia*. Łódź: Łódź University Press.
- Perfetti, C.A. and Zhang, S. (1995) Very early phonological activation in Chinese reading. *Journal of Experimental Psychology: Learning, Memory, and Cognition* 21, 24–33.
- Share, D.L. (1995) Phonological recoding and self-teaching: Sine qua non of reading acquisition. *Cognition* 55, 151–218.
- Share, D. and Stanovich, K.E. (1995) Cognitive processes in early reading development: Accommodating individual differences into a model of acquisition. In J.S. Carlson (ed.) *Issues in Education: Contributions from Psychology* (Vol. 1) (pp. 1–57). Greenwich, CT: JAI Press.
- Sochacka, K. (2004) *Rozwój Umiejętności Czytania*. Białystok: Trans Humana.
- Stanovich, K.E. (1992) Speculations on the causes and consequences of individual differences in early reading acquisition. In P.B. Gough, L.C. Ehri and R. Treiman (eds) *Reading Acquisition* (pp. 307–342). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Suarez, A. and Meara, P. (1989) The effects of irregular orthography on the processing of words in a foreign language. *Reading in a Foreign Language* 6, 349–356.

- Szpotowicz, M. and Szulc-Kurpaska, M. (2007a) *New Sparks 1. Podręcznik dla Szkoły Podstawowej*. Oxford: Oxford University Press.
- Szpotowicz, M. and Szulc-Kurpaska, M. (2007b) *New Sparks 1. Książka Nauczyciela*. Oxford: Oxford University Press.
- Torgesen, J., Houston, D., Rissman, L. and Kosanovich, M. (2007) *Teaching All Students to Read in Elementary School. A Guide for Principals*. Florida: Florida State University.
- Verhoeven, L.T. (1994) Transfer in bilingual development: The linguistic interdependence hypothesis revisited. *Language Learning* 44, 381–415.
- Zhang, S. and Simon, H.A. (1985) STM capacity for Chinese words and idioms: Chunking and acoustic loop hypothesis. *Memory and Cognition* 13, 193–201.

Chapter 7

Aspects of Phonological Strength: Evidence from Language Acquisition

A. BLOCH-ROZMEJ

Introduction

In evaluating the phonological strength of melodies, two important criteria need to be taken into account: the internal complexity of segments and their organisation into the prosodic structure. This chapter focuses on the aspects of phonological strength as perceived through the optic of the non-derivational framework of *Government Phonology*. The model assumes that skeletal positions that belong to lexical representations are endowed with varying amounts of licensing potential that directly determines their capacity to support elemental material present in the melodic plane. Stronger positions, which perform the roles of licensers/governors, are capable of sustaining more phonological primes. The complexity of segments and organisation of elements in melodic structures make them either more prone to occupy prosodically stronger sites, or, conversely, doomed to reside in the recessive contexts within phonological domains.

In our search for the factors determining the phonological strength of segments within lexical structures, we examine some evidence on language acquisition provided by English and Polish. We shall argue that phonological primes themselves possess their inherent strength, which is reflected in the order of acquiring different sounds. It will be proposed that stronger elements are acquired first and are able to enjoy the dominant status within melodic structures – that of the segment's head.

Phonological Strength in the Theory of Government

The problem of segmental strength has been subject to extensive phonological research. Insightful studies on this issue include studies by, among others, Murray (1988), Harris (1990), Cyran and Nilsson (1998), Gussmann (1999) and Cyran (2003). In the theory of *Government Phonology* (henceforth

GP), the dimension of strength can be regarded from two fundamental perspectives. On the one hand, strength can be regarded as a property of individual elements and whole segments which are in fact complexes of primes (Gussmann, 1999). On the other hand, it is prosodic positions which perform the function of governors that are perceived as phonologically strong. GP is a representation-centred framework in which skeletal positions are involved in binary asymmetric relations of government. It is in terms of these relations that the syllabic constituents are constructed.

Segments are composed of elements that are autonomous units, each of them having unique phonetic interpretability. Elements are directly attached to skeletal slots and capable of undergoing phonological processing independently of the other primes. The direction of government within binary constituents is universally from left to right, whereas inter-constituent government is head final. Elements that are present in the melodic plane are manifested phonetically once they have been associated with the relevant skeletal positions. Put differently, they have to receive autosegmental licence. A list of primes recognised by the model is provided in (1):

(1) Elements in Government Phonology:

<i>Element</i>	<i>Property</i>
A	Non-high vowel, coronality in consonants
I	Frontness in vowels, palatality in consonants
U	Roundness in vowels, labiality in consonants
_ (empty head)	Velarity ¹
?	Occlusion (stopness)
h	Noise
L	Slack vocal cords (low tone)/voicing
H	Stiff vocal cords (high tone)/voicelessness
N	Nasality ²

In complex melodic expressions, one of the elements can enjoy the status of the head, thus defining its salient property, whereas the other primes are mere dependents. Segmental headedness is considered contributive to the overall strength of the melody. As mentioned above, prosodic strength of positions is manifested through their ability to perform governing functions with respect to the adjacent slots. Segments that are linked to governing positions have to abide by the *Complexity Condition* which requires that they may not be less complex than their potential governees (Harris, 1994).

Thus, segmental complexity, calculable in terms of the number of primes that a segment contains, emerges as a crucial 'strength-indicator'.

Furthermore, as advocated in Gussmann (1999), individual elements are endowed with inherent strength. Consequently, they will be more prone to reside in governing sites and more resistant to weakening processes that are expected to take place in the governed positions. In sum, then, we list the factors that condition melodic strength as follows:

(2) Strength determining factors:

- The number of primes a segment contains.
- Possessing an active prime in the head position.
- Being licensed by a filled nucleus (one with melodic content).
- Attachment to a prosodically strong position.
- Being ungoverned.

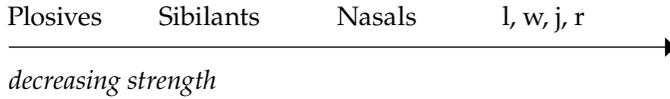
In what follows, we turn to the phonetic aspect of strength and, subsequently, the acquisition stages of the English consonants will be outlined.

The Phonetic Aspect of Strength and the Acquisition Process

The production of speech sounds incorporates two fundamental components: initiation and articulation. The former involves the movement of an organ 'changing the volume of the vocal tract adjacent to it, thus compressing or dilating the air contained there and consequently initiating an actual or potential flow of air' (Catford, 1977: 15). The other constituent can be identified with a movement interrupting or modifying the airflow, which results in a concrete kind of sound. In phonetic terms, one of the crucial strength-indicating features is connected with sonority. Thus, the most sonorous sounds will be characterised by the weakest 'consonantality', while the least sonorous will be treated as consonantally the strongest. Consequently, the *Sonority Scale* ranges from low vowels, through mid and high vowels, followed by flaps, laterals, nasals, voiced and voiceless fricatives, up to plosives. The strength of consonants appears to be one of the most significant factors affecting the process of language acquisition.³ In general, it is believed that the stronger consonants are acquired earlier. Furthermore, their phonetic fortitude allows them to affect other segments, enforcing changes such as assimilation, for instance. The study results of William Geiger discussed in Grunwell (1987) disclose that consonantal assimilations found in Middle Indic most heavily affected the [r] sound which would always totally assimilate to the neighbouring consonant. Plosives, on the other hand, would invariably impose their featural

specifications onto adjacent segments. These findings lead to the establishment of the following strength scale:

(3) Hierarchy of consonants (Grunwell, 1987)



The hierarchy proposed above assumes that the assimilata (the weakest segments) will be more likely to lose their identity in favour of the assimilata (the strongest units).⁴ According to Grunwell (1987), segmental strength is solely restricted to the gesture of articulation. Consequently, only obstruents will display different strength values, whereas sonorants are subject to syllable strength which, being a suprasegmental feature, seems to be irrelevant. It is worth mentioning that because of its dependency on stress, syllable and morphological position, segmental strength has not been unanimously recognised as an intrinsic quality of speech sounds by phoneticians and phonologists.

Returning to the assertion that the strongest segments have priority in the development of language, let us go through its consecutive stages and see the sequential ordering of consonant acquisition. The list in (4) also includes the processes characteristic of each stage, as indicated by Ingram (1981) and Stoel-Gammon (1985):

(4) Stages of speech development in the acquisition of English:

- **Age 0.9–1.6:** first words appear, individual variation in consonants occurs, all the simplifying processes are applicable.
- **Age 1.6–2.0:** consonants [m, n, p, b, t, d] are present now and the processes of reduplication, consonant harmony, final consonant deletion, cluster reduction, fronting of velars, stopping, gliding ([r] > [w]) and context-sensitive voicing are found.
- **Age 2.0–2.6:** the following inventory of consonants is used: [m, n, η, p, b, t, d, (k, g), w, h]. The processes at work are: final consonant deletion, cluster reduction, fronting of velars, stopping, gliding and context-sensitive voicing.
- **Age 2.6–3.0:** The consonants [m, n, η, p, b, t, d, k, g, f, s, w, j, l] occur. The processes of final consonant deletion, cluster reduction, fronting ([ʃ] > [s]), gliding and context-sensitive voicing are attested.
- **Age 3.0–3.6:** Consonants [m, n, η, p, b, t, d, k, g, f, s, h, w, j, l] and first clusters of the obstruent + approximant type, [s] + consonant clusters are present. The processes of stopping of [v, z], fronting of [ʃ, ʒ, tʃ] and gliding of [r] > [w] are found, while English [θ] is realised as [f].
- **Age 3.6–4.6:** The consonants used are [m, n, η, p, b, t, d, k, g, f, v, s, z, h, w, j, l, ʒ, tʃ, (r)]. Clusters are established, s-clusters are pronounced

properly; English [θ, ð, ɲ] begin to be pronounced correctly. Processes such as the palatalisation of [ʃ, ʧ, tʃ] and gliding [r] > [w] occur.

- **Age 4.6–5.0:** The consonant inventory includes [m, n, ɲ, p, b, t, d, k, g, f, v, s, z, θ, ð, h, w, j, l, ʧ, tʃ, r, ʃ, ʤ, tʃ].

Phonological Implications

Let us ponder over the conclusions that phonology can draw from the phonetic facts listed in (4). The data supplied above reveal that labial and coronal plosives are acquired first, whereas velars appear at a later stage. This might imply that plosives whose place of articulation is specified by means of some active element (i.e. **A** and **U**) will be recognised as stronger than headless back consonants. It also seems to be the case that the fricative segments are considered as weaker than plosives and, accordingly, the element of occlusion has more phonological significance than noise. Glides and liquids (except for [w]) are developed later, which seems to support the intuition that stronger segments are acquired before the weak ones. Viewed from the perspective of government relations, it should be observed that these segment types are inherently doomed to occupy the recessive positions of governees. As indicated above, affricates, which involve root node split,⁵ are pronounced correctly towards the end of the acquisition process. Notice that plosives, where the elements of noise and occlusion are combined under the same root node are treated as stronger and hence are acquired first. This might suggest that the separation of the two manner-defining primes is at the same time interpreted as a weakening operation. It is also interesting that the distinction between voiced and voiceless segments is developed along with the recognition of the difference between oral and nasal consonants. This fact could imply that there exists an intimate bond between the laryngeal element **L** (specifying voicing) and nasality. Indeed attempts have been made to unify the two primes and treat them as two sides of the same coin, as, for example, in Ploch (2003).

It also appears noteworthy that within the class of sonorants, the nasals which are phonologically complex structures are used before liquids and glides. Notice that almost all the primes important in the consonantal system of both English and Polish are acquired during the earliest stages. Thus, children are capable of manipulating the elements: **A**, **U**, **h**, **ʔ**, **L/H** and **N**. Interestingly, the element **I** appears later, while the process of gliding results in the realisation of [w]. This might indicate the preponderance of the **U** prime over **I**.

All the conclusions formulated above cannot obviously be taken as universally true generalisations. First of all, there exists considerable variation among individual language speakers, often contingent on biological

factors. The development of the speech organs to a large extent determines the speed and order of the acquisition of particular sounds. Nevertheless, the evidence provided by the examination of the acquisition process cannot be ignored. We believe that the facts just discussed throw significant light on the structure of the phonological system and the functioning and strength of individual primes. Consequently, we address further facts deriving from the investigation of children's speech in order to establish the role and strength of phonological elements in the systems of Polish and English.

Language Acquisition Evidence

Studies in language acquisition seem to supply us with interesting evidence concerning the strength of melodic primes. Some elements turn out to be relatively easy to acquire, while others are used by children at later stages of speech development. Since the language children speak constitutes a system of appropriately organised units, we believe that the relations that obtain between elements there reveal important aspects of prime use and functioning in the adult language as well. The focus of the present section will be instances of the so-called *substitution processes* occurring in children's speech substantiated by the operations of gliding and fronting. A characteristic feature of substitution processes is the ability to change the place and manner of articulation in the received output. In other words, one sound is replaced with another, a change often classified as depending on the retarded development of the speech organs. We hypothesise that the inability to pronounce certain sounds also has its phonological causes manifestable in the acquisition of particular primes. The argument will be grounded on the research carried out among a group of Polish children between 1, 5 and 5 years old over the period of two years. The Polish data will be compared with the research results described in Inkelas and Rose (2003).

Gliding

As far as gliding is concerned, the liquids [r] and [l] become substituted with the glides [w] and [j]. This process is exhibited by children, both Polish and English, when learning their first languages and additionally by adults who did not acquire the proper pronunciation of these sounds by the age of 5 or 6, which is considered to be the critical period for the development of laterals and rhotics. Let us substantiate this type of a modification with a number of examples:⁶

(5) Examples of gliding:

a. *Polish*

rok [jɔk] 'year'

królik	['kjuɫik]	'rabbit'
korek	['kɔɫek]	'traffic jam'
bar	[bal]	'pub'
lina	['(j)ina]	'a rope'
lalka	['jajka]	'doll'
król	[kɫul] / [kjuj]	'king'

b. *English*

rabbit	['wæbɪt]	or	['jæbɪt]
risk	[wɪsk]	or	[jɪsk]
rock	[wɒk]	or	[jɒk]
parent	['pæwənt]	or	['pæjənt]
ball	[bɔːj]		
doll	[dɔːw]	or	[dɔːj]
ballet	[bæ'jeɪ]		

Thus, in Polish the rhotic is replaced by either a lateral or a glide, whereas the lateral itself becomes substituted by a glide. In English, both [r] and [l] turn up as either [j] or [w]. The choice of a given glide appears to be child specific. There are also instances of complete [l]-deletion before [i], primarily in the word-initial position. Additionally, it has to be observed that [r] is replaced with the lateral only in the final phase of its acquisition, especially in intervocalic (or postvocalic) positions, as in *bordowy* [bɔɫ'dɔvɨ] 'deep-red, crimson'.

Seen in the light of the *Element Theory* of GP, the consonants affected by gliding as well as those used to substitute them would, in the adult system, be represented in the following manner:

(6) Consonants affected by gliding:

[r]	[l]	[w]	[j]
x	x	x	x
<u>A</u>	<u>A</u>	<u>U</u>	<u>I</u>
	?		

As depicted above, it is the lateral that possesses the greatest complexity. Yet, for Polish children, [l] is easier to pronounce than [r]. Therefore, it seems that what presents difficulty is not the number of primes but rather their nature. Apparently, the elements **I** and **U** are easier to acquire for children since they are used as substitutes for **A**-defined melodies. The more universal character of **I** and **U** as easily acquirable elements that are ready to replace other primes testifies to their phonological strength. **A**, on the other hand, presents itself as a recessive element. Its susceptibility to replacement reveals its phonological weakness.

From the phonetic perspective, [j] and [w], being semivowels, possess greater sonority than liquids, and, consequently, are acquired earlier. This may imply that perceptive dependency is reflected in the easiness of acquisition. Sonority, understood as loudness, will predispose glides to be acquired before the less sonorous sounds, such as [l] and [r]. Translated into phonological terms, the element **A** defining the place of articulation of liquids, and low, open vowels should in fact express greater sonority than **I** or **U**. It becomes associated with lesser sonority, when combined with occlusion. It has to be noted, however, that [r] also becomes replaced with the glides. Thus, **A** is readily substituted with **U** or **I** specifying the sounds that are less strenuous to articulate. It seems, therefore, that the primes **I** and **U** will be perceived as more universal and hence phonologically stronger in being capable of taking the place of other elements in melodic structures.

Fronting

In English, the process of fronting (PVF) consists in the replacement of velar consonants with alveolars, while in Polish, with dentals or palatals. More precisely, [k] and [g] undergo substitution by [t], [d] or [tʃ]. The examples illustrating fronting in Polish and English are provided in (7a) and (7b), respectively.⁷

(7) Examples of fronting:

a. *Polish (age 1,11)*

królik	[tulik]	or	[tɕulik]	‘rabbit’
góra	[dula]	or	[dzula]	‘mountain’
kaczka	[tačka]	or	[tɕatečka]	‘duck’
garnek	[dalnek]	or	[dzalnek]	‘pot’

b. *English (age 2,2)*

gold	[dəuld]
cold	[təuld]

call	[tɔ:l]
get	[det]

As far as the Polish data are concerned, the two alternative forms are speaker dependent. In English, the substitution pattern is quite predictable, that is velars invariably change into alveolars. In English, PVF applies in a positionally determined manner. Velar consonants are subject to fronting in onsets of prosodically strong positions: word initially and before stressed vowels, for example [kɪs] > [tɪs] or [ə'dʒen] > [ə'dʒen]. Interestingly, these segments resist any change in all other prosodically weaker positions, as in *back* [bæk] or *bagel* ['beɪɡl]. What is interesting about this modification is that the process finds no correlation in the adult system. Moreover, the positional effects of the prosodically conditioned version of *velar fronting* run counter to the cross-linguistic observation that prosodically prominent positions are privileged in allowing greater prosodic complexity and being the least likely to obscure segmental contrasts. Thus, PVF appears to contradict all existing theories of positional neutralisation, which predict neutralisation in weak, rather than strong positions (Beckman, 1997; Smith, 2002). The following data illustrate the operation of PVF both in strong and weak contexts (Inkelas & Rose, 2003):

(8) Prosodically strong positions:

a. *Word-initial primary stressed syllable onset*

cup	[tʌp]	(1,09)
get	[det]	(1,10)
cool	[tuwə]	(1,11)

b. *Word-internal primary stressed syllable onset*

again	[ə'den]	(1,10)
together	[tə'derə]	(2,01)

c. *Word-internal secondary stressed syllable onset*

helicopter	['hew,tɒptə]	(2,00)
aligator	['æwə,derə]	(2,01)
hexagon	['heksə,dɒn]	(2,02)

d. *Word-internal unstressed syllable onset*

conductor	[tʌn'dʌktə]	(2,02)
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As will be exemplified in (9), velar consonants freely turn up in onsets of non-initial unstressed syllables, word-internal codas and in word-final positions.

(9) Weak contexts:

a. *Onsets of unstressed syllables*

monkey	['mʌŋkɪ]	(1,08)
bagel	['beɪgʊ]	(1,09)
bucket	['bʌkɪt]	(2,01)

Word-internal codas

actually	['æktʃuwɪ]	(1,11)
octopus	['ɔktəpəs]	(2,01)
octagon	['ɔktəgən]	(2,01)

b. *Word-final consonants*

big	[bɪg]	(1,0)
book	[bʊk]	(1,07)
padlock	['pædʒɒk]	(2,04)

PVF exhibits its non-assimilatory character in being independent of the nature of the neighbouring vowel or inter-consonantal relations. In other words, the change into coronals is not strictly contingent on the specific feature of the vocalic licenser, or the place of articulation of either the preceding or the following consonantal segment. The data representatives provided above support the findings of Stoel-Gammon (1996), where a corpus of 67 children displaying PVF effects was described. Given a high number of children documented for *Positional Velar Fronting*, we have to conclude that the process should reflect some general aspect of the acquisition of consonants, rather than some exceptional pronunciation failure. However, as pointed out in Inkelas and Rose (2003), none of the existing grammatical accounts of PFV explains the crucial fact that the process attested to in children's speech is absent from the adult version of the system. Nor will the available analyses account for the context of prosodically strong positions where this kind of neutralisation takes place.

A Government Account

In the present analysis, based on the *Element Theory* (ET), the process of PVF will be perceived as tightly connected with the aspect of phonological strength of segments. When seen through the optic of the GP model, PVF does not operate in the counterintuitive manner. We submit that the

process is not that of neutralisation in strong positions, but rather represents segmental strengthening. In order to see that clearly, we need to recall that within ET, there is no special prime representing velarity. More precisely, the phonetic effect of the velar place of articulation of consonants is represented lexically as the absence of the place-defining element in the structure of the consonantal segment. Thus, an empty head in a non-nuclear expression will be interpreted phonetically as velarity. Thus, in terms of the number of elements, coronal plosives will be certainly stronger since their place of articulation is specified by means of the active element **A**. Compare the structures in (10):

(10) The structures of velars and alveolars:

[k]	[g]	[t]	[d]
x	x	x	x
–	–	<u>A</u>	<u>A</u>
?	?	?	?
h	h	h	h
H		H	

As indicated above, the coronal plosives outrun the velar segments with respect to the number of primes. The phonological strength of melodies seems to be dependent on a number of factors, elemental complexity being one of them. We recall that in any governing relation, the potential governor may not be less complex than its potential governee. Thus, evidently, to perform governing and licensing functions, segments need to be equipped with a sufficient number of primes. Another factor determining the strength of melodies is connected with the dimension of headedness. On the whole, headed expressions are phonologically more powerful than headless ones. Moreover, the association with prosodically strong positions will increase the capabilities of the relevant segments. What is also important is the existence of language-specific licensing constraints that delimit the autosegmental power of primes, either imposing or forbidding particular inter-element relations.

In the case of PVF, the addition of the **A** element should be perceived as a form of segmental strengthening since it increases the complexity of the

melodies affected. It is not surprising that this operation takes place in the prosodically strong positions that carry the burden of greater licensing responsibilities in the phonological representation. The sites that are representationally weak, such as the coda position or the word-final context, are likely to undergo segmental weakening. Hence, the addition of the element **A** to their make-up will be perceived by children as logically unacceptable. As the evidence reveals, this does not take place.

It also seems plausible that the need to 'fill in' the empty head site in the structure of the velar consonants is connected with the ability to associate the dimension of segmental headedness with another property, that is velarity. In the adult system, an empty head of a non-nuclear melody is invariably manifested as velarity. We hypothesise that the developmental stage at which PVF occurs is characterised by a more radical cut-boundary between segments whose heads are occupied by active primes and those without elements functioning as heads. This means that children showing the effects of PVF have not yet acquired the additional function of segmental headedness unassociated with an active prime. As a result, they would need to fill that position with some prime. In the adult system, the property of empty headedness in non-nuclear segments is automatically interpreted as the velar place of articulation. The need to increase the complexity of velar segments with an active element is also bound up with their role in the prosodic hierarchy. More specifically, since the strengthening takes place in the prosodically powerful positions, this operation indicates that melodic complexity calculable in terms of the number of primes is recognised as a significant marker of phonological strength.

The PVF effects can also be interpreted as indicating that in the language acquisition process, the need to mark the phonological strength of prosodic positions and segments has priority over the manifestation of segmental contrasts. Consequently, the distinctions between velars and coronals can become blurred in favour of signalling the prosodic strength of specific sites in the lexical structure of forms.

The last issue for us to address in the context of PVF is the choice of the element with which to support velars in the prosodically strong positions. As pointed out earlier in this discussion, the realisation of coronal stops instead of velars appears to be independent of the quality of the neighbouring vowel and unrelated to any possible consonant harmony operation. It seems, therefore, that, apart from phonological causes described above, PVF is evoked by the physiological difficulty of producing the velar consonants.⁸ Thus, the phonetic strengthening of velars conspires with the differently proportioned vocal tract of young children that potentiates the PVF pattern. This effect is absent from the adult speech exactly due to the different physiological features of the vocal tract. Based on the comparative measurements, Crelin (1987)

observes that within the vocal tract of a two-year-old child, the tongue almost entirely fills the supralaryngeal cavity. At around the age of two, the vocal tract begins its progressive evolution towards the adult shape which is generally not attained before the age of six. Furthermore, the study of adult articulatory phonetics reveals that consonants in prosodically strong positions when stressed or in the word-initial onsets display larger amplitude in their articulatory gestures than those in weaker sites. This discrepancy as to the gesture magnitude appears to disproportionately affect velars, yielding a greater, more forward linguo-palatal contact for velar consonants in stronger contexts (Ferguson & Farewell, 1975). The phonetic examination results combined with children's phonological faithfulness to target stressed syllables seem to throw new light on the choice of the element **A** as a means of velar fortition in strong positions. Greater size of the tongue coupled with a relatively shorter palate implies that even a slight increase in vertical tongue movement required in the articulations in prosodically strong positions will have direct consequences for the child's pronunciation of target velars. The greater emphasis on the dorsal articulator expands tongue contact into the coronal region, which ultimately results in coronal release. Hence, the choice of the element added is restricted to **A**.

Conclusion

The explanation of PVF purely on the basis of phonetic factors, which one might be tempted to offer, runs into the problem of selective replacement of velars only in prosodically strong contexts. From a phonetic perspective, the assimilation of velars to coronals, in, for example, coda-onset sequences would be a very natural and indeed expected result. This, however, does not happen because of the recessive nature of the coda context. The weakness of the coda context hinges directly on the phonological organisation of the lexical structure. It seems that the sensitivity to phonological structure associating segments with positions of varying degrees of prosodic strength prevails during the acquisition process over articulatory difficulties induced by physiological factors.

The conclusions that we have arrived at during the foregoing discussion can be summarised as follows:

- More complex melodic structures are considered as phonologically stronger and are acquired earlier.
- **I** and **U** elements are stronger than **A**.
- Phonological weakness manifests itself as susceptibility to replacement.
- Empty-headed segments are weaker than those headed by active primes.

- PVF can be interpreted as a strengthening operation in prosodically strong positions.
- Segmental strengthening is effected through element addition.

The problem of segmental strength certainly calls for further research. Nevertheless, it is hoped that the language acquisition evidence evoked in this chapter has shed new light on this phonological aspect of segmental structure.

Notes

1. Some analyses use the neutral element @ to represent central vowels and velar consonants (e.g. Harris, 1994). We follow Cyran (2003) in representing velarity as empty-headedness of phonological expressions, thus eliminating the neutral element from the representations of melodies.
2. In recent phonological studies, attempts are being made to replace the nasal element with the low-tone element L, or rather fuse the two elements, for example Ploch (2003).
3. As argued in Keating (2003), the strength of consonants derives not only from their articulatory characteristics but is also bound up with a prominence marking function of prosody. Dogil (2007: 91) maintains that ‘articulatorily strong segments are more resistant to coarticulation (...) and speakers implement much more fine detail into their articulatory gestures to “strengthen” them and thus to increase their coarticulatory resistance than is presupposed by a uni-dimensional strength/sonority scale’. For more detailed explorations into the domain of phonetic strength, see Stevens (1999) and Johnson (2003).
4. More on the categorising of speech sounds can be found in Lass (1984) and Brockhaus (1995).
5. As argued in Harris (1994), elements are organised under three class nodes: Root, dominating manner-defining primes **h**, **ʔ** and **N**, Place, which organises **A**, **U** and **I**, and Laryngeal subsuming the source elements **L** and **H**. In this model, affricates involve two Root nodes, each dominating a separate manner element, residing on a single autosegmental line.
6. The children whose speech was examined were aged 1.7–2.5.
7. Apart from the examples cited in (7b), see Inkelas and Rose (2003) for further items illustrating PVF (i.e. positional velar fronting).
8. For a grammatical account of PVE, see Inkelas and Rose (2003).

References

- Beckman, J. (1997) Positional faithfulness, positional neutralisation and Shona vowel harmony. *Phonology* 14, 1–46.
- Brockhaus, W. (1995) Final devoicing in the phonology of German. *Linguistische Arbeiten* (Vol. 336). Tübingen: Niemeyer.
- Catford, I. (1977) *Fundamental Problems in Phonetics*. Edinburgh: Edinburgh University Press.
- Crelin, E.S. (1987) *The Human Vocal Tract*. New York: Vantage.
- Cyran, E. (2003) *Complexity Scales and Licensing Strength in Phonology*. Lublin: Wydawnictwo KUL.

- Cyran, E. and Nilsson, M. (1998) The Slavic [w>v] shift: A case for phonological strength. In E. Cyran (ed.) *Structure and Interpretation. Studies in Phonology* (pp. 89–100). Lublin: Folium.
- Dogil, G. (2007) Phonetic dimensions of segmental strength. Paper presented at the 16th ICPHS Conference, August 2007. Saarbrücken, Germany.
- Ferguson, C.A. and Farewell, C. (1975) Words and sounds in early language acquisition. *Language* 51, 419–439.
- Grunwell, P. (1987) *Clinical Phonology* (2nd edn). London: Croom Helm.
- Gussmann, E. (1999) Complexity, consonantal strength, and palatal assimilation in Polish. In W. Banyś, L. Bednarczuk and S. Karolak (eds) *Studia lingwistyczne ofiarowane Profesorowi Kazimierzowi Polańskiemu na 70-lecie Jego urodzin* (pp. 386–397). Katowice: Wydawnictwo Uniwersytetu Śląskiego.
- Harris, J. (1990) Segmental complexity and phonological government. *Phonology* 7, 255–300.
- Harris, J. (1994) *English Sound Structure*. Oxford: Blackwell.
- Ingram, D. (1981) *Procedures for the Phonological Analysis of Children's Language*. Baltimore, MD: University Park Press.
- Inkelas, S. and Rose, Y. (2003) Velar fronting revisited. In B. Beachley, A. Brown and F. Conlin (eds) *BUCLD 27: Proceedings of the 27th Annual Boston University Conference on Language Development* (pp. 334–345). Somerville, MA: Cascadilla Press.
- Johnson, K. (2003) *Acoustic & Auditory Phonetics*. Oxford: Blackwell.
- Keating, P. (2003) Phonetic encoding of prosodic structure. In S. Palethorpe and M. Tabain (eds) *Proceedings of the 6th International Seminar on Speech Production*. Sydney.
- Lass, R. (1984) *Phonology: An Introduction to Basic Concepts*. Cambridge: Cambridge University Press.
- Murray, R.W. (1988) *Phonological Strength and Early Germanic Syllable Structure*. München: Wilhelm Fink Verlag.
- Ploch, S. (2003) Can 'phonological' nasality be derived from phonetic nasality? In J. van de Weijer, V.J. van Heuven and H. van der Hulst (eds) *The Phonological Spectrum. Segmental Structure* (Vol. I) (pp. 73–116). Amsterdam: John Benjamins.
- Smith, J. (2002) Phonological augmentation in prominent positions. PhD thesis, Amherst: University of Massachusetts.
- Stevens, K. (1999) Articulatory–acoustic–auditory relationships. In W. Hardcastle and J. Laver (eds) *The Handbook of Phonetic Science* (pp. 462–506). Oxford: Blackwell.
- Stoel-Gammon, C. (1985) Phonetic inventories, 15–24 months: A longitudinal study. *Journal of Speech and Hearing Research* 28, 505–512.
- Stoel-Gammon, C. (1996) On the acquisition of velars in English. *Proceedings of the UBC International Conference on Phonological Acquisition* (pp. 201–214). Somerville: Cascadilla Press.

Chapter 8

The Role of Phonemic Awareness in the Development of L1 and L2 Reading

L. PIASECKA

The key to understanding how reading skill develops is understanding how beginners learn to recognize written words accurately and automatically
(Ehri, 2005: 168)

Phonological decoding is perhaps the most indispensable competence for reading acquisition in all languages
(Koda, 2005: 34)

Reading in any language involves the recognition of printed form and thus it requires from the reader a conscious analysis of the relationship between graphemes and phonemes. Much research on the acquisition of reading by pre-school and early-school children has focused on phonological awareness and its role at the initial stages of learning to read. To read effectively, children need to establish and practise correspondences between letters and sounds as this allows them to read not only the words that they had stored in their mental lexicon, but also the new ones. Practice, in turn, makes the process automatic and effective. Since languages vary in the graphic representation of sounds, this may account for differences in the early stages of reading development across languages. The aim of this chapter, then, is to discuss the concept of phonological awareness, its development across various orthographic systems and the effects of the first-language phonemic awareness on second-/foreign-language reading. Special emphasis is put on Polish readers of English. Activities that may be used to develop L2 phonemic awareness are also suggested.

Introduction

The reading process is conditioned by many factors, most important of them being visual perception, language skills, memory processes and the

intellectual development of the child (Sochacka, 2004). Rayner and Pollatsek (1989) agree that letter recognition, the ability to discriminate the left side from the right, cognitively controlling eye movements, realising that the word is a unit, and developing phonemic/phonological awareness are crucial skills for the development of reading. Cognitive models of reading include the visual perception component which is indispensable for the recognition of written/printed messages. Moreover, children with sight problems experience difficulties in reading, which is shown by the mistakes they make. The visual recognition of print initiates comprehension processes that involve both linguistic and world knowledge. Successful decoding involves phonological awareness and knowledge of the alphabetic principle, which is the knowledge that letters and their combinations represent sounds of the spoken language (Reading & Van Deuren, 2007). Fluent reading, in turn, depends on how fast and how accurately the reader can decode words in the text, access their meaning and build the mental representation of the text that reflects the reader's comprehension.

Ehri (2005, 2007) insists that for skilled reading to develop, sight word reading is necessary as 'it allows readers to focus their attention on constructing the meaning of the text while their eyes recognize individual words automatically' (Ehri, 2007: 135). She proposes four stages through which sight word reading develops, namely the pre-alphabetic stage, the partial alphabetic stage, full alphabetic stage and the consolidated alphabetic stage. Children at the pre-alphabetic stage read words on the basis of visual or contextual clues and pay attention to the relationship between print and meaning. This results from the fact that they are not familiar with the alphabetic system and so they rely on other visual or contextual clues. They may remember individual words because of their characteristic visual features; for example, they remember that the word 'look' has two circles that remind them of eyeballs. Some pretend to read stories that have been read to them many times so they had memorised them. The subsequent stages, however, require that children start paying more and more attention to letter-sound correspondences and thus develop their phonemic awareness.

Phonemic Awareness

Since reading refers to graphic signs organised according to the rules of a given language and representing a message, it requires from the reader a conscious analysis of the relationship between graphemes and phonemes. Indeed, many researchers (e.g. Goswami, 1994; Johnston & Watson, 2004; Krasowicz-Kupis, 1999) stress the importance of language awareness for the development of reading. Sochacka (2004) observes that recent research on the acquisition of reading by pre-school and

early-school children has focused mostly on the phonological awareness that is a prerequisite for reading.

Phonological (or phonemic) awareness (henceforth PA) also referred to as metaphonological awareness (Seymour, 2007) – a subtype of language awareness – is defined as the ability to discriminate and manipulate the components of the word and as such it plays a crucial role at the initial stages of learning to read. Pressley explains that it ‘is awareness that words are composed of separable sounds (i.e. phonemes) that are blended to produce words’ (Pressley, 2002: 106). Two separate levels of phonological ability have been distinguished (Gombert, 1992), namely:

- (1) Epilinguistic ability – spontaneous, intuitive, automatic ability to discriminate and manipulate the parts of the word; basic, early developmental ability.
- (2) Metalinguistic ability – develops on the basis of epilinguistic abilities, and refers to the intentional, reflective and conscious discrimination and manipulation of the parts of the word.

There is an agreement among researchers that PA is best understood as a combination of abilities. Analysing various tasks used for assessing PA, Adams (1990: 80) came to the conclusion that ‘at least’ five levels of PA can be identified, that is:

- (1) ‘The most primitive level’ represents sensitivity to sounds of words and is measured by the knowledge of nursery rhymes. Koda (1998: 195) calls it a ‘basic perceptual ability’.
- (2) The second level is associated with oddity tasks in which children are presented with a group of three or four words and asked to decide which of them does not belong to the group. They compare and contrast the sounds of the words for rhyme or alliteration and thus they show sensitivity to sounds on which they focus attention. Adams observes that children’s rhyming abilities indicate their reading readiness. With respect to this level Koda (1998: 195) uses the term ‘analytical perceptual ability’.
- (3) The third level involves blending and syllable-splitting tasks. In blending tasks, the data collector pronounces sounds of the word (e.g. /d/ ... /o/ ... /g/) and the child has to put them together (*dog*). In syllable-splitting tasks the child says the first sound of a word/syllable (e.g. *p* in *pin*) and may be asked to pronounce this sound in isolation. The child may also be asked to say what is left after the first sound has been taken away (*-in* in *pin*). According to Koda (1998: 195), this way intra-syllabic awareness and analysis skills are developed.
- (4) The level of phonemic segmentation concerns breaking a word/syllable into phonemes. It is measured by the tapping task. The child

- listens to a word/syllable containing up to three phonemes and, using a stick/ruler, taps out the number of phonemes in each word/syllable (e.g. if the test word is *cat*, the child should tap three times). In Koda's opinion, phonemic analysis skills are addressed at this level.
- (5) The level of phoneme manipulation refers to the child's ability to manipulate the phonemes in the words tested. The children are asked to say a word after the first, the middle or the last phoneme has been removed; for example, they may be asked to pronounce *hill* without the /h/, *monkey* without the /k/, *nest* without the /s/, *pink* without the /k/ (examples taken from Adams, 1990: 71). By deleting, inserting or relocating phonemes, phonemic manipulation skills are developed (Koda, 1998: 195).

As can be seen, the tasks used at individual levels differ in terms of difficulty. Phoneme manipulation and phonemic segmentation tasks are most difficult but at the same time they predict and correlate with reading achievement. However, they may be used only after children have received some formal reading instruction. At this point, it seems justified to ask where the PA comes from. According to Maclean, Bradley and Bryant (Adams, 1990), PA is rooted in nursery rhymes that children know. Maclean *et al.* found that early knowledge of nursery rhymes (measured when the children were three years and three months old) 'was strongly and specifically related to development of more abstract phonological skills and of emergent reading abilities' (Adams, 1990: 80).

Yopp (1988), on the basis of her empirical study, proposed two types of PA, that is simple PA which is the ability to recognise and produce intra-syllabic speech units, and compound PA, which is the ability to manipulate multiple phonemes (Koda, 1998). Longitudinal studies on the relationship between PA and alphabetic literacy have shown that simple PA is a precondition for the development of the alphabetic principle, that is, the principle that 'letters represent phonemes' (Rayner & Pollatsek, 1989: 327). However, compound PA develops through reading experience that enhances phonemic manipulation skills which, in turn, contribute to more effective reading.

Numerous studies have shown that PA is 'the single most important phonological factor underlying efficient reading acquisition [...] and skill in phonemic awareness in preschool children can successfully predict later reading achievement' (Sprugevica & Høien, 2004: 115). Sprugevica and Høien carried out a longitudinal study of Latvian children that investigated relationship between phonological skills (PA, rapid naming and verbal short-term memory) and reading comprehension. The results confirmed the strong predictive power of PA for successful reading. The researchers also found a significant relationship between fluent reading and rapid serial naming. They argue that although both PA and rapid serial naming explain a lot of variance in reading, the former ability is

related to early stages of learning to read, whereas the latter is more important at the later stages of reading.

Wood *et al.* (2005) report similar findings. They found that PA, measured in the first grade, predicted almost half of the variance in a reading comprehension test administered in the eighth grade. They also observed that although the predictive power of PA was high, it diminished as learners progressed in their education. Thus they concluded that PA is a powerful predictor of early-reading achievement rather than late-reading achievement.

It also appeared that not only children gain from training in PA. American adolescents who had problems ('struggled') with reading and writing were offered a training programme teaching explicitly PA, spelling patterns and morphology. They followed the programme called Words Their Way (WTW). According to WTW, orthographic development goes through five stages (emergent spelling, letter-name alphabetic stage, within-word stage, syllables and affixes stage and derivational relations stage) corresponding to educational levels (from pre-school through elementary school to middle school). Spelling instruction, based on the stages of orthographic knowledge development, allowed the participants to discover what words are made of (sounds, patterns and meanings). The training proved beneficial to them because after one semester they improved their spelling and writing skills (Harris, 2007).

Although researchers agree that PA plays a role in the development of reading, they cannot agree as to whether this awareness develops because children learn to read or whether learning to read depends on the PA. An extensive discussion of this issue can be found in Sochacka (2004). Referring to empirical evidence, Pressley convincingly argues that 'phonemic awareness seems to contribute more to learning to read than learning to read contributes to phonemic awareness' (Pressley, 2002: 114).

Moreover, as Goswami suggests (Sochacka, 2004), the relationship between the PA of the components of the word and the development of reading is variable and depends on the phonology of a given language. She maintains that phonological and orthographic processes are connected and dependent on each other since reading begins. To read, children have to identify phonological and orthographic elements and to clearly establish their relationship as this allows them to read many words that they have already stored in their mental lexicon. The way of connecting phonological and orthographic elements is different in different languages, and this may account for differences in the early stages of reading development across languages.

PA across Different Orthographies

Generally, writing systems differ in terms of orthographic representation and orthographic depth. Orthographic representation refers to the

fact that graphic symbols represent linguistic units; however, there are differences in the relationship between the graphic symbols and the units represented. In alphabetic languages (e.g. Polish, English and Spanish), each letter represents a phoneme, although in the alphabetic Korean Hangul, individual symbols are combined into syllables that are basic graphic elements for making words. In logographic writing systems (Chinese and Japanese Kanji), graphic symbols represent morphemes.

Orthographic depth, on the other hand, shows how regular the correspondence between sounds and symbols is. Thus, in the so-called shallow orthographies (e.g. Polish, Spanish and Serbo-Croatian), this correspondence is highly regular and usually one letter represents one phoneme. In deep orthographies (e.g. English or Hebrew), the relationships between letters and sounds are complex, irregular and inconsistent. In English words *both* – *moth*, the *-oth* letter cluster is inconsistent in terms of its phonemic realisation. The same applies to *heal* – *health*. The *-ed* ending can be pronounced as [ɪd], [t] or [d] (Frost, 2007; Koda, 2005).

Krasowicz-Kupis (1999) argues that the early development of reading will be slightly different in languages with transparent and regular orthographies (e.g. Polish) and in languages with non-transparent and irregular orthographies (e.g. English). Differences between European languages in terms of orthographic depth and syllable structure are shown in Table 8.1.

Researchers found differences in the ways in which children from languages of different syllable structure (open syllable structure in Romance languages, e.g. French, against closed syllable structure in Germanic languages, e.g. English) develop phonological representation. Whereas French children segment language into clearly defined syllables, English children do not follow this pattern (Seymour, 2007).

Table 8.1 Hypothetical classification of European languages by syllabic complexity (simple to complex) and orthographic depth (shallow to deep)

<i>Orthographic depth</i>						
Syllable structure	<i>Shallow</i>			<i>Deep</i>		
	Simple	Finnish	Greek	Portuguese	French	
			Italian			
			Spanish			
	Complex		German	Dutch	Danish	English
			Norwegian	Swedish		
		Icelandic				

Source: Seymour *et al.* (2003)

Seymour (2007) analysed the development of early literacy in European languages within his model of literacy acquisition, basing on the results of COST A8 project. The project itself aimed to make a comparative, cross-linguistic study of the normal course of literacy acquisition and the nature of reading difficulty in a range of European languages (http://www.esf.org/fileadmin/be_user/research_areas/social_sciences/documents/Seymourshortweb.doc). Thus, the model of literacy acquisition posits four phases, that is:

- Phase 0: Letter–sound knowledge, basic and indispensable for further development of literacy; relationships between letters and sounds are established.
- Phase 1: Foundation literacy. Logographic and alphabetic processes are involved in establishing ‘familiar sight word recognition and storage’ and ‘sequential processing’ (Seymour, 2007: 307).
- Phase 2: Orthographic literacy. Legitimate spellings of syllables are established and related to elements of a syllable (as a linguistic unit), that is onset–peak–coda, or onset–rime.
- Phase 3: Morphographic literacy. This phase is characterised by ‘the formation of representations of complex words in which syllables are combined, stress is assigned, and free and bound morphemes are identified and combined’ (Seymour, 2007: 307).

It appeared that in Phase 0, neither the syllable structure nor orthographic depth had any effect on establishing letter–sound correspondences across languages, although starting age, teaching methods (whole-word or phonic) and social factors might have influenced this phase. However, the subsequent developmental phases appeared to be related to both the syllable structure and the orthographic depth. Foundation, orthographic and morphographic literacies develop more slowly in languages with complex syllable structure and deep orthography than in languages with simple syllable structure and shallow orthography. Unfortunately, no Slavonic language was included in the study. According to the assumptions behind the model of literacy acquisition it may be speculated that Polish children whose native language is classified as ‘shallow orthography’ develop PA more rapidly than children from deep orthography languages.

Transfer of L1 Phonemic Awareness to L2 Contexts

In 1979, Cummins formulated the hypothesis that the level of L1 competence would affect the level of L2 competence, thus implying that metalinguistic abilities that are crucial for language development, transfer from L1 to L2. Obviously, if the transfer has to take place, these abilities have to be developed in L1. Studies on the cross-linguistic transfer of PA

are not very numerous but their results clearly show that PA transfers from one language to another and that it is a predictor of variance in word reading (e.g. Durgunoglu *et al.* 1993). Atwill *et al.* (2007) were concerned about the effects of a mismatch between L1 speaking and listening vocabulary and L2 classroom instruction vocabulary of Hispanic children attending public schools in the United States. Educational researchers (e.g. Durgunoglu *et al.*, 1993) assumed that metalinguistic abilities (including PA) transfer from L1 Spanish into L2 English and this way the mismatch is less acute. Atwill *et al.* were interested in the relationship between the level of L1 ability (measured by a receptive vocabulary test) and cross-linguistic transfer of PA. They studied 68 Spanish-speaking kindergarten children and found that transfer of PA occurred; however, it was observed in the case of children with high proficiency in their native language (measured by their receptive vocabulary), but not in the case of children whose L1 skills were below average.

Koda investigated how L2 PA (English) is affected by the L1 reading experience of readers whose native languages are alphabetic (Korean Hangul) and non-alphabetic (Chinese). She found that diverse L1 orthographies are not directly related to L2 PA, but the participants' experience with processing logographic or alphabetic languages may lead to their use of 'diverse phonological processing procedures, and, thus account for qualitative differences in processing behaviours' (Koda, 1998: 210).

The Case of Polish Learners of English

Let us now turn our attention to Polish learners of English. When they start learning English, frequently around the age of 10, they have an extensive L1 oral vocabulary, they know the alphabetic principle, they have already developed PA in their L1 and they can read. Yet, they vary in terms of the size of oral vocabulary, sensitivity to word structure and reading ability in their native language. During English lessons, they learn to speak, read and write simultaneously, and so they lack the advantage of L1 learners who start reading with a sizeable oral vocabulary. The situation becomes even more complicated by the fact that they transfer their L1 PA to the L2 context, in which the correspondences between letters and sounds are not as clear-cut as in their native language, because the two languages differ in orthographic depth. Polish, in contrast to English, has a shallow, regular orthography. The learners, aware of the relationship between letters and sounds, may apply their L1 phonological processing procedures to L2 reading. In consequence, this may result in the so-called 'orthographic reading' ('you read what you see').

Hypothetical Polish learners of English may become confused when they find that the words familiar from their L1, for example, *sale*, *bale*, *pale*, *gale*, *baby*, *knot*, *idea*, *mew* and *brew*, also appear in L2, but they are

read/pronounced differently and have a different meaning. In addition, they transfer their orthographic reading principle to English and therefore may have problems, especially at the initial stages of learning, with reading words such as 'know, knife, knight and write' and many others. Their reliance on L1 letter-sound correspondences may result in inappropriate pronunciation, which may have a detrimental effect on the learners' motivation for learning English. Actually, six-graders declare that the pronunciation of English words is the most serious problem when they read in English (Alczyńska, 2008).

Another complicating factor refers to the orthographic depth of English. One phoneme may be represented by various combinations of letters, for example, /u:/ may be represented by *-ough* (as in *through*), *-ew* (as in *drew*), *-ue* (as in *blue*) or *-oo-* (as in *tool*). In addition, the same letter may be pronounced in different ways, for example, 'e' may be pronounced as /i/ (e.g. *event*), /i:/ (e.g. *evil*), /e/ (e.g. *set*) or /ə/ (e.g. *meter*).

This suggests that in the process of teaching, due attention should be given to establishing relationship between letters and sounds that are characteristic of English, and different from Polish. Learners need to discover that letter-sound correspondences in English differ from those in their L1 as soon as they are introduced to the written form of the L2. The recognition of differences and the development of L2 phonemic analysis and manipulation skills are indispensable for further development of fluent reading in the target language.

There are many possible ways in which PA in English as L2 can be trained. The teacher may use flash cards with the written form of words, putting special emphasis on the letter strings that are common to both languages but are pronounced differently (e.g. *knot*). Using rhymes, tongue-twisters or jazz chants may also be beneficial, provided the learners see the written form after they have practised the rhyme, tongue-twister or chant orally. Rhymes are particularly relevant because they are memorable due to their rhythm and rhyming pattern. For children who know various rhymes from their L1, L2 rhymes may become a strong motivating factor for learning a foreign language. Besides, they may be practised by means of various game-like activities that young learners enjoy so much. The internet provides the teacher with many sources of nursery rhymes, some accompanied by animations, some with music, some with illustrations ready to print and use in the teaching process. A useful link is <http://www.nurseryrhymes4u.com>.

Phonemic manipulation tasks used to assess PA in English as the first language may also be used in the L2 context. Language learners enjoy activities that involve language play, for example, removing or adding sounds to the words to see what happens.

Another option to work on L2 PA is by reading aloud. Although reading aloud had a bad press for many years, especially since the advent of

communicative language teaching, recently it has been claimed 'a useful learning tool' (Gibson, 2008: 30). Gibson believes that the main reason for which reading aloud was an unwelcome activity in the language classroom was 'the practice of unprepared reading around the class – commonly perceived as an unimaginative and easy time filler for the teacher' (Gibson, 2008: 29). It was also criticised for being boring and anxiety-breeding, for slowing down the reading rate, and for focusing on the recognition of every word at the expense of comprehension. However, reading aloud can be a useful learning activity, provided the teacher uses it with clear objectives and according to learners' needs.

Gibson (2008) argues that the most important advantage of reading aloud is making readers practise connections between graphemes and phonemes, thus developing their L2 PA. As already noted, learners tend to rely on their L1 reading skills when processing the L2 text but the L1 reading skills, especially the ones for decoding, would not be an effective way of reading in the L2, particularly when the languages differ in orthographic depth. When the learners read aloud during a foreign language lesson, they practise the relationship between the graphic form of the text and its sound realisation and they may receive immediate feedback from the teacher about the accuracy of the connections. To use reading aloud for this purpose, the learners need appropriate texts which should be interesting and motivating. The text should allow many learners to read sections of it, as in the activity that I call 'role-reading'. It can be used when learners have been working on a narrative with a number of characters (e.g. a story about three little pigs). After they have comprehended the text, they may be invited to read it aloud, with individual learners reading various characters' lines. Apart from practising letter–sound correspondences, the learners also focus on appropriate intonation that would express the characters' mood or attitudes. Listening to learners reading aloud, the teacher can identify their problems with pronunciation and intonation and take steps to solve them.

As regards learners' anxiety, which is strongly associated with reading aloud, it can be reduced when they are given an opportunity to prepare and practise read-aloud passages in the group, which may also be beneficial for shy learners. The teacher's assistance with problematic letter strings, an unobtrusive manner of error correction, supportive and friendly classroom atmosphere, and enough time left for preparation may also lower the level of anxiety.

By reading aloud familiar passages, especially at the early stages of learning an L2, the learners practise graphemic–phonemic relationship, improve their word recognition skills, work on pronunciation, intonation and segmentation of phrases, clauses, sentences and passages. This may contribute to the development of automaticity in word recognition and the learners' enhanced self-confidence as readers and as language users in

general. Practising read-aloud passages may lead to memorising useful phrases and expressions that can be successfully used in oral and written communication.

More advanced learners may be encouraged to analyse English spelling and pronunciation more closely by working with texts containing words that cause both pronunciation and spelling problems. A sample text is included in Appendix 8.1. Grammar school students with whom I worked on this text found it challenging and motivating. Most interestingly, subsequent language lessons showed that they remembered spelling and pronunciation of many of the words included in the text.

Conclusions

Since fluent reading is so strongly conditioned by accurate and automatic word recognition which, in turn, involves phonological decoding, providing L2 learners with activities oriented towards the development of PA since the early stages of L2 instruction may prove helpful, beneficial and motivating for further growth in their language proficiency and for the improvement of their reading skills.

Throughout this chapter, I have stressed the importance of phonemic training in the L2 since the early stages of learning because various research findings that I also referred to above suggest that this awareness is critical to the acquisition of reading and predictive of further reading and, consequently, learning achievement. Although the findings relate to L1 reading development, their significance may be extended to L2 learning, especially in the formal educational context in which learning a second/foreign language starts at the age when children have acquired the basic grammar of their L1, have an extensive L1 oral vocabulary and basic L1 letter–sound knowledge. Their developing L1 literacy may interfere with L2 reading due to the level of L2 knowledge and also due to differences between spelling systems. Thus, they may approach decoding L2 text through L1 decoding skills. This may work in some cases, but most frequently such an approach would not be effective and result in making inappropriate connections between letters and sounds. PA accounts for accurate and automatic word recognition. The sooner the L2 learner can decode the L2 text rapidly and effectively, the more cognitive resources will be left for text comprehension and interpretation. Therefore, L2 teachers should sensitise their learners to differences between the languages in contact and carry out activities that would explicitly show graphophonemic correspondences characteristic of the L2. Learners should also have ample opportunities to practise these correspondences to become confident and successful L2 readers and users.

Appendix 8.1

Our queer language

I think you already know
Of *though* and *bough* and *cough* and *dough*.
Others may stumble, but not you
On *hiccough*, *thorough*, *though* and *through*.
Well done! And now you wish perhaps,
To learn of less familiar traps?
Beware of *heard*, a dreadful word
That looks like *beard* and sounds like **bird**.
And *dead*; it's said like *bed* not *bead* –
For goodness' sake don't call it *deed*!
Watch out for *meat* and *great* and *threat* –
They rhyme with *suite* and *straight* and *debt*.
A moth is not a *moth* in *mother*
Or *both* in *bother* or in *brother*.
And *here* is not a match for *there*.
Nor *dear* and *fear* for *bear* and *pear*.
And there's *dose* and *rose* and *lose* –
Just look them up – and *goose* and *choose*,
And *cork* and *work* and *card* and *ward*,
And *font* and *front* and *word* and *sword*.
And *do* and *go* and *thwart* and *cart* –
Come, come, I've hardly made a start!
A dreadful language? Man alive,
I'd mastered it when I was five!

—Author unknown
(From Bouchard, 1978: 2)

References

- Adams, M.J. (1990) *Beginning to Read. Thinking and Learning about Print*. Cambridge: MIT Press.
- Alczyńska, S. (2008) Recognizing and solving reading problems among six-graders. Unpublished MA thesis, Opole University.
- Atwill, K., Planchard, J., Gorin, J. and Burstein, K. (2007) Receptive vocabulary and cross-language transfer of phonemic awareness in kindergarten children. *The Journal of Educational Research* 100, 336–345.
- Bouchard, D. (1978) *Options: I*. Washington, DC: English Teaching Division.
- Cummins, J. (1979) Linguistic interdependence and the educational development of bilingual children. *Review of Educational Research* 49, 222–251.
- COST A8. On WWW at http://www.esf.org/fileadmin/be_user/research_areas/social_sciences/documents/Seymourshortweb.doc. Accessed 11.5.08.
- Durgunoglu, A., Nagy, W. and Hancin-Bhatt, B. (1993) Cross-language transfer of phonological awareness. *Journal of Educational Psychology* 85, 453–465.

- Ehri, L.C. (2005) Learning to read words: Theory, findings, and issues. *Scientific Studies of Reading* 9, 167–188.
- Ehri, L.C. (2007) Development of sight word reading: Phases and findings. In M.J. Snowling and C. Hulme (eds) *The Science of Reading: A Handbook* (pp. 135–154). Oxford: Blackwell Publishing.
- Frost, R. (2007) Orthographic systems and skilled word recognition processes in reading. In M.J. Snowling and C. Hulme (eds) *The Science of Reading: A Handbook* (pp. 272–295). Oxford: Blackwell Publishing.
- Gibson, S. (2008) Reading aloud: A useful learning tool? *ELT Journal* 62, 29–36.
- Gombert, J.E. (1992) *Metalinguistic Development*. London: Harvester Wheatsheaf.
- Goswami, U. (1994) The role of analogies in reading development. *Support for Learning* 9, 22–26.
- Harris, L.A. (2007) Adolescent literacy: Word study with middle and high school students. *Teaching Exceptional Children Plus* 3 Article 4. On WWW at <http://escholarship.bc.edu/education/tecplus/vol3/iss4/art4>. Accessed 16.4.08.
- <http://www.nurseryrhymes4u.com>. Accessed 10.04.08.
- Johnston, R.S. and Watson, J.E. (2004) Accelerating the development of reading, spelling and phonemic awareness skills in initial readers. *Reading and Writing: An Interdisciplinary Journal* 17, 327–357.
- Koda, K. (1998) The role of phonemic awareness in second language reading. *Second Language Research* 14, 194–215.
- Koda, K. (2005) *Insights into Second Language Reading. A Cross-Linguistic Approach*. Cambridge: Cambridge University Press.
- Krasowicz-Kupis, G. (1999) *Rozwój metajęzykowy a osiągnięcia w czytaniu dzieci 6–9 letnich*. Lublin: Wydawnictwo UMCS.
- Pressley, M. (2002) *Reading Instruction that Works* (2nd edn). New York: The Guilford Press.
- Rayner, K. and Pollatsek, A. (1989) *The Psychology of Reading*. Hillsdale, NJ: Lawrence Erlbaum Associates.
- Reading, S. and Van Deuren, D. (2007) Phonemic awareness: When and how much to teach? *Reading Research and Instruction* 46, 267–286.
- Seymour, P.H.K. (2007) Early reading development in European orthographies. In M.J. Snowling and C. Hulme (eds) *The Science of Reading: A Handbook* (pp. 296–315). Oxford: Blackwell Publishing.
- Seymour, P.H.K., Aro, M. and Erskine, J.M. (2003) Foundation literacy acquisition in European orthographies. *British Journal of Psychology* 94, 143–174.
- Sochacka, K. (2004) *Rozwój umiejętności czytania*. Białystok: Trans Humana.
- Sprugevica, I. and Høien, T. (2004). Relations between enabling skills and reading comprehension: A follow-up study of Latvian students from first to second grade. *Scandinavian Journal of Psychology* 45, 115–122.
- Wood, F.B., Hill, D.F., Meyer, M.S. and Lynn Flowers, D. (2005) Predictive assessment of reading. *Annals of Dyslexia* 55, 193–216.
- Yopp, H.K. (1988) The validity and reliability of phonemic awareness tests. *Reading Research Quarterly* 23, 159–177.

Part 3

Pedagogical Perspectives

Chapter 9

Phonological Issues in Second Language Acquisition Studies: Focus Areas and Implications for FL Instructional Practices

D. GABRYŚ-BARKER

Introduction

The nature of this chapter is more 'statistical' than empirical. I would like to offer a brief quantitative overview of the studies published in relation to phonetics and phonology in SLA research journals to see to what extent this area of language description and consequently teaching and learning is significant compared to other aspects of language description and their application. Without any doubt this aspect of language competence must be seen as vital in the linguistic context of global communication and the need to be comprehensible and to comprehend others. This need for being bilingually functional (if not multilingually) is evidenced by the pure numbers of people who need to operate in multilingual contexts, both at professional and personal levels. The position taken by scholars such as, for example, Jennifer Jenkins, who assumes a very liberal attitude to the development of NNS (non-native speaker) spoken ability in terms of pronunciation, needs to be challenged. If no model is offered at the level of instructional practices in FL development (and EFL contexts are still dominant in some parts of the world), we will never arrive at intelligible and comprehensible speakers of a given language.

In this chapter I will try to single out different areas of research in phonetics and phonology, and in the prosodic elements of language: their focus and relevance to existing contexts and types of learners and teaching tendencies the modern world of immersion and FL instruction faces. The aim of this overview of a very extensive field of study is to highlight the areas which require more scholarly attention because they have not been very well documented by the research carried out so far. My position here is not that of a theoretical linguist but more of an

applied practitioner interested in the acquisition and learning processes characteristic of this aspect of language competence.

Linguistic Research on Phonology

Linguistic descriptions of language at the level of phonetics, phonology and prosody are very extensive. They are most often very technical and academically oriented, aiming at a detailed linguistic characterization. There are also those publications that introduce FL learners to the language system as a background to their language development at the applied level. One of them is Roach's *Phonetics* (2000). It assumes that this type of publication serves the purpose of providing

(...) a broad map of the terrain sketched out before one considers its more specific features on a smaller scale, a general context in reference to which the detail makes sense. (Roach, 2000: vii)

In his annotated bibliography (Roach, 2000), however, Roach points out the need to supplement the general discussion by other references, related with the classification of the field into separate areas (Table 9.1).

Many more sources have appeared than are mentioned above, a lot of them having been published recently. The ones mentioned here have already become classic references for linguists and practitioners alike. Polish contributions in the field include works by Szpyra-Kozłowska (2005), Dziubalska-Kończak and Przedlecka (2005) or Sobkowiak (2001). However, it is not the purpose of this chapter to make an extensive overview of the general and perhaps, more theoretical publications but to look at more focused and more recent empirical research on a smaller scale, reflecting the interests of applied linguists and classroom practitioners as published in various journals.

The Contexts and the Learners in Need of Pronunciation Development

It was already in the nineties that Morley (1991) observed that there are two distinctive bilingual contexts in which special attention needs to be paid to pronunciation development. It is the case of FL users functioning in the TL (target language) country in ESL (English as a second language) settings and those functioning in FL (foreign language) contexts. These language users/learners have different profiles and thus will require different types of procedures/practices/instruction to be developed on the basis of the research findings precisely addressing those needs. The need for development in this area becomes even more urgent in the 21st century, when the trends of globalisation and mobility – vocational and educational – are even more intensive.

Table 9.1 Selected sources of the annotated bibliography

<i>Chapter</i>	<i>Author</i>	<i>Focus (selected)</i>
The science of speech	– V. Cook (1997) <i>Inside Language</i> , Arnold – P.B. Denes & E. Pinson (1993) <i>The Speech Chain</i> , W.H. Freeman	An introduction to phonetics and phonology Physics, anatomy and physiology of speech
Making speech sounds	– P. Roach (2000) <i>English Phonetics and Phonology</i> , CUP – P. Ladefoged (2001) <i>A Course in Phonetic</i> , Harcourt	Description of the main speech sounds and their production. Introduction to phonetics
Classifying speech sounds	– International Phonetic Association (1999), CUP – P. Ladefoged and I. Maddieson (1996) <i>The Sounds of the World's Languages</i> , Blackwell	The official categorization of sounds A range of sounds across languages described in detail
Tone and tone languages	– J. Laver (1994) <i>Principles in Phonetics</i> , CUP	The survey of the phonetics of tone languages
Suprasegmentals	– A. Cruttenden (1997) <i>Intonation</i> , CUP – D.R. Ladd (1996) <i>Intonational Phonology</i> , CUP	Stress, accent and rhythm in English Definition and discussion of the phonological status of intonation
Acoustics of speech sounds	– P. Ladefoged (2001) <i>Vowels and Consonants</i> , Blackwell – K. Johnson (1997) <i>Acoustic and Auditory Phonetics</i> , Blackwell	Acoustic characteristics of sounds Introduction to speech acoustics
Sounds in systems	– F. Katamba (1989) <i>An Introduction to Phonology</i> , Longman – J. Clark and C. Yallop (1995) <i>An Introduction to Phonetics and Phonology</i> , Blackwell	Introduction to fundamental concepts of the phoneme, contrast, symmetry. The theory of phoneme
Connected speech and coarticulation	– M. Ball and J. Rahilly (1999) <i>Phonetics: The Science of Speech</i> , Arnold – W.J. Hardcastle and N. Hewlett (eds) (1999) <i>Coarticulation: Theory, Data and Techniques</i> , CUP	Various topics, for example consonant articulations, constrictions, etc. An overview of research and theory
Variation in speech	– J. Jenkins (2000) <i>The Phonology of English as an International Language</i> , OUP	Innovative ideas about standards of teaching English phonology

Source: Roach (2000: 99–103)

In an ESL context the following groups in need of attention (as Morley calls them) can be distinguished:

- (a) Immigrants be they professional and/or educational, often adult learners in a continued need for education and work.
- (b) Permanent residents in the TL country in need of social integration and professional promotion.
- (c) Professionals functioning in large international businesses and companies based in ESL country.
- (d) College, faculty members and scholars functioning abroad, across different fields.
- (e) Undergraduate students and EU mobility program participants continuing/completing their education abroad.

In each of the above cases communicative competence and hence the ability to develop comprehensible and intelligible speech are indispensable for functioning, promotion and being well set in life in an ESL environment.

In an EFL context, the major groups of English learners/users are those that are:

- (a) Professionals for whom English is used as *a lingua franca* in the countries of minority languages (such as Poland).
- (b) Scholars in various fields of study at higher-educational institutions and at academic events at different levels when English is the language of communication.
- (c) Students wishing to make use of educational opportunities for studying abroad in need of academic types of language competence in English.
- (d) EFL teachers at various training institutions.

Each of these groups will require a special type of language instruction to develop the ability to function in English and take active part as intelligible users (and instructors) of the language. Deprived of the advantages that immersion in language in an ESL setting offers through constant exposure to a variety of contexts of spoken language, EFL learners will have to develop tools autonomously. The theoretical models and even some degree of explicit phonetic/phonological/prosodic awareness of English will facilitate their language development.

The Changed Patterns in Language Instruction

Also, changed patterns of FL instruction have a significant impact on language research and instructional approaches and methods. Communicative language teaching has long been established as an accepted approach in EFL instruction. It has undergone a lot of changes

over the past 30 years, but its value seen in developing communicative ability and fluent interaction in native and non-native contexts represents the trends widely followed in teaching contexts.

These changed patterns are reflected in significant modifications and shifts in theoretical paradigms used in linguistic, learning and instructional models followed in research and classroom practices (Morley, 1991: 483). Morley highlights the main principles:

- learners seen as active creators, not as passive recipients, in a process which is cognitively driven;
- a movement from a focus on the group, to an increasing focus on individual learner differences and individual learning styles and strategies;
- a focus on language as both a formal system and a functional system (...) to satisfy the communicative needs of its users;
- widening interest in semantics, pragmatics, discourse, and speech act theory;
- from an orientation of linguistic competence to one of communicative competence.

This changed understanding has to be reflected in research paradigm and focus if research is to serve learning models description and in consequence, instructional practices.

Research and its Influence on Teaching

Jenkins (2004) in her overview of theory and teaching practices of pronunciation and intonation delineates three periods of focus in linguistic literature. First, she goes back to the beginnings of the century to stress the importance of linguistic studies in contrastive analysis, mostly at the segmental level, aiming at demonstrating sound differences between languages to eliminate language transfer in NNs' production. These studies were clearly influential in the methodology of teaching at that time, not only in relation to the phonological system of a given foreign language, but more holistically. Hence, over-learning and drilling appeared to dominate FL classrooms and was treated as an isolated area of focus.

The second period is marked by a more universal interest in pronunciation, not only seen as the result of language transfer (and as such to be eradicated) but also considered as a developmental feature in language progress in an individual (Jenkins, 2004: 109). Also suprasegmental features of speech come more to the fore with the development of communicative approaches to language instruction but research as well, as a consequence of pragmatic studies due to the role of pragmatic studies.

The present-day period is marked by the multidisciplinary approach to teaching pronunciation and intonation as important variables in how people are understood socially and culturally. It is evident from the extensive research carried out on socio-psychological factors: context and motivation, new uses of technology, discourse analysis; intonation patterns and chunking, and at the level of teaching it expresses the main assumption behind CLT: communicative competence: speakers'/listeners' comprehensibility and intelligibility.

Among numerous examples of the publications in this area there are:

- On intonation in discourse: Brazil *et al.* (1980), Brazil (1997), Hewings (1990), Wennerstrom (2001)
- On context (ESL/EFL/EIL): Derwing and Munro (2001), Shockey (2003), Swan and Smith (2002), Jenkins (2002)
- On computer technology: Roach (2002), Kaltenboeck (2002). (After Jenkins, 2004)

Most of these publications not only offer models but also show their application in immediate teaching/learning contexts.

Recent Research

Source

The overview presented here relates directly to a learning and instructional context and not a purely linguistic description of English at the level of phonetics, phonology and prosody. It looks at the period between 2005 and 2007. Its main source is the journal *Language Teaching* (CUP) that is an abstracting journal of all the main research studies done in different areas of language study in relation to learning and teaching. It contains abstracts published in over 150 journals, mostly well-known and easily accessible ones such as *English Today*, *The Canadian Modern Language Review*, *Applied Psycholinguistics*, *TESOL Quarterly*, *Journal of Pragmatics*, *Studies in SLA*, *Bilingualism: Language and Cognition*, *ELT Journal*, *The Modern Language Journal* or *Second Language Research* but also in less known and less available publications such as *English in Australia*, *The Language Teacher*, *ReCALL* or *Journal of French Language Studies*.

The issues covering the years 2005–2007 contain in total over 2500 articles written in the period of 2005–2006, reviewed and abstracted in the individual issues of *Language Teaching* in different focus sections, such as: *Applied linguistics*, *Bilingualism and bilingual education*, *Skills; reading and writing*, *Pragmatics*, *Language teaching*, *Language learning*, *Neurolinguistics* and *Sociolinguistics*. The journal also includes a thematically focused lead article and more recently surveys on research on language teaching and learning in different countries. The overview of articles in

this journal has to be a selection of those which are considered to be the most relevant and of value to the teaching/learning context.

This selection of abstracted articles may be to a certain extent subjective as it will reflect the individual preferences of the abstractors. However, these individual preferences also reflect the perceptions of importance of certain areas and so they also constitute a variable in the present discussion: focus and/or neglect of the specific area and different aspects seen as important/unimportant within it.

In *Language Teaching* (volumes 38–40/12 issues, 2005–2006 publications) there is a total of 2678 articles reviewed in the form of abstracts, out of which one may be surprised to learn that there are only 60 articles on phonetics, phonology and prosody.

Research focus of phonetic studies (in journals)

The articles reviewed can be looked at from the perspectives of:

- Choice of language (languages described): mostly English as L2/FL/EIL (English as an International Language/ELF) (English as *Lingua Franca*).
- L1 backgrounds of the subjects of studies: non-European (Asian, e.g. Chinese and Korean), and occasionally minority languages (Slavonic).
- Individual differences discussed: age (early and late bilingualism), coordinate and compound acquisition/learning.
- Different aspects: segmentals versus suprasegmentals (Tables 9.2 and 9.3).

The main focus of my comments here however is on the research areas in the studies overviewed. Tables 9.2 and 9.3 present examples of these, together with a selection of the more interesting studies included in the journal reviews.

Abbreviations used for journals

AP	(<i>Applied Psycholinguistics</i>)
BLC	(<i>Bilingualism; Language and Cognition</i>)
ET	(<i>English Today</i>)
IJB	(<i>International Journal of Bilingualism</i>)
IRAL in LT	(<i>International Review of Applied Linguistics in Language Teaching</i>)
JCN	(<i>Journal of Cognitive Neuroscience</i>)
JEP	(<i>Journal of Educational Psychology</i>)
JFLS	(<i>Journal of French Language Studies</i>)
JIPA	(<i>Journal of International Phonetic Association</i>)
JP	(<i>Journal of Pragmatics</i>)
JRR	(<i>Journal of Research in Reading</i>)

Table 9.2 Articles related to phonetics/phonology

Area	Segmentals	Suprasegmentals (<i>prosody</i>)	Examples of studies (*)
Applied linguistics	(1) Consonants clusters, syllable structure (2) Dialects of English	(1) Prosodic phrases (rhythm and pitch)	(1) Watson, K. (2006) <i>Phonological Resistance and Innovation in the North-west of England</i> (ET, 55–61) (2) Nuria, S.G. et al. (2006) <i>First- and Second Language Phonological Representations in the Mental Lexicon</i> (JCN 1277–1291)
Bilingual education and bilingualism	(1) Sound in simultaneous bilinguals and monolinguals (2) Unstressed vowels in early and late bilinguals	(1) Beliefs and attitudes (EIL) (2) Word stress (early and late Korean-English bilinguals) (3) Phonological encoding in bilinguals	(1) Sifakis, N. and Sougari, A.M. (2005) <i>Pronunciation Issues and EIL Pedagogy in the Periphery: A Survey of Greek State School Teachers' Beliefs</i> (TESOL, 467–488) (2) Scott Shenk, P. (2006) <i>The Interactional and Syntactic Importance of Prosody in Spanish-English Bilingual Discourse</i> (JIB, 179–205) (3) Roelofs, A. and Verhoeft, K. (2006) <i>Modeling the Control of Phonological Encoding in Bilingual Speakers</i> (BLC, 167–176)
Skills: reading and writing	(1) Orthography (alphabetic decoding) (2) Phonics programs (CALL) (3) Phonological awareness in reading (pre-school level)	(1) Phonological processing in reading (2) Stress in bilingual reading (3) Stress sensitivity and awareness in reading	(1) Goetry, V. et al. (2006) <i>The Role of Stress Processing Abilities in the Development of Bilingual Reading</i> (JRR, 349–362) (2) Gutierrez-Palma, N. and Reyes, A.P. (2006) <i>Stress Sensitivity and Reading Performance in Spanish: A Study with Children</i> (JRR, 157–168) (3) Weber, R.M. (2006) <i>Function Words in the Prosody of Fluent Reading</i> (JRR, 258–269)

<i>Pragmatics</i>	<p>(1) Pitch accents in Russian interpreting spoken utterances</p> <p>(2) Role of intonation in interpreting spoken utterances</p> <p>(3) Prosodic features of idioms (processing of ambiguous sentences)</p> <p>(4) Open and closed intonation patterns (list learning)</p>	<p>(1) Pitch accents in Russian interpreting spoken utterances</p> <p>(2) Role of intonation in interpreting spoken utterances</p> <p>(3) Prosodic features of idioms (processing of ambiguous sentences)</p> <p>(4) Open and closed intonation patterns (list learning)</p>	<p>(1) House, J. (2006) <i>Constructing a Context with Intonation</i> (JP, 1542–1558)</p> <p>(2) Ashby, M. (2006) <i>Prosody and Idioms in English</i> (JP, 1580–1597)</p> <p>(3) Baltazani, M. (2006) <i>Intonation and Pragmatic Interpretation of Negation in Greek</i> (JP, 1658–1676)</p> <p>(4) Curl, T.S. and Local, J. (2006) <i>Repetition and the Prosody-Pragmatics Interface</i> (JP, 1721–1751)</p>
<i>Language teaching</i>	<p>(1) Didactics of the blind (Braille International Phonetic Alphabet)</p>	<p>(1) Intelligibility of ELF and identity question</p> <p>(2) Intonation in teaching English to Cameroonian learners</p>	<p>(1) Wells-Jensen, S. (2005) <i>The Braille International Phonetic Alphabet and Other Options; The Blind Student in the Phonetic Classroom</i> (IIPA, 221–230)</p> <p>(2) Jenkins, J. (2005) <i>Implementing an International Approach to English Pronunciation: The Role of Teacher Attitudes and Identity</i> (TESOL Quarterly, 535–543)</p>
<i>Neurolinguistics</i>	<p>(1) Bilingual phonological responses in L2 learners</p> <p>(2) Vowel discrimination in NS vs NNS</p> <p>(3) Responses to vowel contrasts in L2 learners</p> <p>(4) Phonetic processing (MEG)</p> <p>(5) The role of early exposure</p>	<p>(1) Foreign accents</p> <p>(2) Pleasure and prosody</p>	<p>(1) Peltola, M. et al. (2005) <i>Early Exposure to Non-native Language Alters Preattentive Vowel Discrimination</i> (NL, 121–125)</p> <p>(2) Zhang, Y. et al. (2005) <i>Effects of Language Experience: Neural Commitment to Language-Specific Auditory Patterns</i> (NI, 703–720)</p> <p>(3) Tham, W.P. et al. (2005) <i>Phonological Processing in Chinese-English Bilinguals: An fMRI Study</i> (NI, 579–587)</p> <p>(4) Frenck, Ch. et al. (2005) <i>Articulation in Early and Late Bilinguals' Two Languages: Evidence from Functional Magnetic Resonance Imaging</i></p>

(Continued)

Table 9.2 Continued

Area	Segmentals	Suprasegmentals (prosody)	Examples of studies (*)
	(6) Phonological processing and brain activation (Chinese-English, fMRI) (7) Early <i>versus</i> late bilinguals-brain activation (segmentals)		(5) Wilson, D. (2006) <i>Relevance and Prosody</i> (JP, 1559–1579)
Sociolinguistics		(1) Attention and beliefs (ELF) (2) English as International Language (3) Prosodic differences in dialects	(1) Boughton, Z. (2005) <i>Accent Levelling and Accent Localisation in Northern French: Comparing Nancy and Rennes</i> (JFLS, 235–256) (2) Gooskens, Ch. and Herringa, W. (2006) <i>The Relative Contribution of Pronunciation, Lexical, and Prosodic Differences to the Perceived Distances between Norwegian Dialects</i> (LLC, 477–492)

Table 9.3 Articles related to learning

Area	Segmentals	Suprasegmentals	Examples
Language learning	<p>(1) L2 word identification (perceptual training, visual clues)</p> <p>(2) Pronunciation accuracy</p> <p>(3) Identification of L2 vowels and the role of training</p> <p>(4) Effects of accuracy on L2 vocabulary learning</p> <p>(5) Articulation accuracy, phonemic awareness, vocabulary and reading</p> <p>(6) French as L2: /l/ deletion</p> <p>(7) Pronunciation fluency of Chinese L2 learners</p> <p>(8) Initial consonant clusters (Cantonese learners of English)</p> <p>(9) Phonetic transfer</p> <p>(10) Vowel reduction in Nigerian</p>	<p>(1) Intelligibility of L2 speech (diverse L1s)</p> <p>(2) Age of arrival versus accents</p> <p>(3) Musical ability and phonology</p> <p>(4) Gesture and phonology (kinetics in SLA)</p> <p>(5) L2 experience and its effects on prosody and fluency of L2 speech</p> <p>(6) Judgement on accents (perceptions)</p>	<p>(1) Riney, T., Naoyuki Takagi and Kumiko Inutsu (2005) <i>Phonetic Parameters and Perceptual Judgements of Accent in English by American and Japanese Listeners</i> (TESOL Quarterly, 441–466)</p> <p>(2) LaFrance, A. and Gottardo, A. (2005) <i>A Longitudinal Study of Phonological Processing Skills and Reading in Bilingual Children</i> (AP, 559–578)</p> <p>(3) Hardison, D.M. (2005) <i>Second-Language Spoken Word Identification: Effects of Perceptual Training, Visual Cues, and Phonetic Environment</i> (AP, 579–596)</p> <p>(4) Barcroft, J. and Sommers, M.S. (2005) <i>Effects of Acoustic Variability on Second Language Vocabulary Learning</i> (SSLA, 387–414)</p> <p>(5) Munro, M. and Derwing, T. (2006) <i>The Mutual Intelligibility of L2 Speech</i> (SSLA, 111–131)</p> <p>(6) Roberts, T. (2006) <i>Articulation Accuracy and Vocabulary Size Contributions to Phonemic Awareness and Word Reading in English Language Learners</i> (JEP, 601–616)</p> <p>(7) Slevc, L.R. (2006) <i>Individual Differences in Second Language Proficiency: Does Musical Ability Matter?</i> (PS, 675–681)</p> <p>(8) McCafferty, S. (2006) <i>Gesture and the Materialization of Second Language Prosody</i> (IRAL in LT, 197–209)</p>

NI	(<i>Neuroimage</i>)
NL	(<i>Neuroscience Letters</i>)
PS	(<i>Psychological Science</i>)
SSLA	(<i>Studies in Second Language Acquisition</i>)

Comments on the Studies Overviewed

Research focus

Study of the English phonological subsystem can be viewed from the two different perspectives of theoretical linguistics and psycholinguistics. Both perspectives contribute to the creation of appropriate approaches to FL didactics in phonetics, by offering a sound description of language on the one hand and awareness of learning processes on the other, as the basis for teaching methods, and as a practical consequence the didactic procedures to be implemented in instruction. A theoretical linguist will aim at presenting a given language as a system of segmental features characteristic of it and perhaps contrasting it with other languages in this respect. He/she will also aim at describing the specificity and significance of prosodic features. This more theoretical and descriptive area of research becomes significant in developing syllabuses for ESL/EFL language users with specific L1 backgrounds and is well covered in the literature published. It also has its place in the articles under scrutiny here.

However, in other areas, it seems that there is a gap. Not much is available in the area of ESP, especially the prosodic features important in this context, where intelligibility of a speaker is very significant in a variety of situations of language use, where a well-defined purpose for example the language of negotiation on the level of prosodic features may determine their outcome. The same applies to discourse description in EAP, for example on prosody in the academic context of oral discourse, just to mention one of the areas of the research needing to be developed. New studies and projects developed at the University of Silesia (Polish academic research context, work in progress) constitute a very promising start. This research will become especially important at the level of tertiary education with changing programs of studies at university departments of the so-called old-fashioned neo-philologies, where courses more pragmatic in nature are starting to take over (e.g. conference translation, ESP for various professional groups).

Another perspective of the applied linguist and psycholinguist shows research focused on the description of acquisition/learning processes involved and here also there is a growing tendency in terms of research projects undertaken. However, when compared with other areas of language, it is still minute (only 60 out of 2678 articles in my data overview). This may be the result of the dominance of EIL/ELF ideology of

simplification, of core features where segmental and prosodic features of English do not seem very prominent (see Jenkins, 2002, 2004).

This attitude is also demonstrated at the practitioners' level in the study carried out by Macaro (2003), who surveyed a group of 250 teachers of EFL in England to find out in which research areas in language (be they theoretical or applied) they would need and find most benefit. In the responses received, the top scores were given to vocabulary learning processes, learning of rules (grammar) and development of motivation. Although speaking skills were also highlighted, they were not on the level of pronunciation and prosody. These do not figure at all as areas of interest of the subjects questioned. From my own observation, this seems to be true. EFL teachers pay less and less attention to this area of language competence in their learners. What is even more visible, they themselves are far from ideal language models either. Perhaps it is so because the concept of the model has been questioned with the widespread promotion of EIL, and as a consequence, it features neither in the teaching programs nor in our EFL training modules too prominently.

Also a relatively modest 60 studies reviewed in *Language Teaching* journal show that the dominant number of studies relate to the discussion of segmental aspects of language proficiency and near-native-like production despite the practice of creating and promoting EIL/ELF models of language description and use. In the studies listed, prosody is mostly looked upon as a mere perception phenomenon (e.g. the predominance of studies on perceptions of foreign accents in TL production), whereas it is prosody that is significant both in an ESL environment with growing personal mobility as the main factor in integration or ultimately intended assimilation with the TL group and also professional and educational mobility. It has to be seen as significant in EFL contexts, where being able to perform adequately in academic and professional contexts in one's own country and interacting successfully with NS and also NNS of English are the principal goals (instrumental rather than integrative) of language learning, especially in the case of adult/late acquirers/learners.

The dominant feature of the not very numerous prosodic studies is their focus on the issues of stress and accent. These studies refer either to development and training practices that are effective or to perceptions of accent as an important aspect of being perceived as member of the target group (as mentioned earlier). This seems to happen at the expense of, for example, intonation studies that should undoubtedly be seen as much more significant in the development of communicative abilities, of being intelligible and comprehensible. This gap needs to be bridged and speaking from the stand-point of a teacher trainer here, I would like to emphasize the role of the training we offer to our pre-service teachers in reaching this goal (discussed at length in Piasecka, 2007). The need to make them aware of this area of study first as language learners,

then as future teachers seems to be fundamental. Perhaps one of the ideas, apart from including prosody and especially intonation training in language and teaching programmes, is to turn pre-service teachers into small-scale researchers who by designing and implementing projects in their own classrooms would become more aware of this language area of language study and language competence.

Pedagogical Practice

What stems from the theoretical and applied research, and also the didactic materials used in EFL/ESL contexts, is a visible need to create language curricula that would integrate broadly understood pronunciation practice with a significant focus on prosody as an important part of development of communicative competence at the level of intelligibility and comprehensibility, eliminating the almost obsessive need to practise native-like quality of speech at the level of sounds. This is still being demonstrated by the over-use of drill-like activities concerning sound articulation, often out of context. With this in mind, the priority should be given to prosodic (suprasegmental) features of language as enabling language users/learners to function in a variety of contexts: from real-life situations of daily interactions to academic and professional environments.

Also the important role of theoretical studies in this field needs to be emphasized. These studies should assist language learners (especially adults who constitute a significant and growing numbers of learners) in the development of explicit awareness of language functioning at the level of phonology and prosody. It would allow them to monitor their own progress as effective FL interlocutors and thus greatly facilitate their autonomous language development beyond the classroom.

References

- Brazil, D. (1997) *The Communicative Value of Intonation in English*. Cambridge: Cambridge University Press.
- Brazil, D., Coulthard, M. and Johns, C. (1980) *Discourse Intonation and Language Teaching*. London: Longman.
- Derwing, T. and Munro, M. (2001) What speaking rates do nonnative listeners prefer? *Applied Linguistics* 22, 324–337.
- Dziubalska-Kolaczyk, K. and Przedlecka, J. (eds) (2005) *English Pronunciation Models: A Changing Scene*. Frankfurt: Peter Lang.
- Hewings, M. (1990) *Papers in Discourse Intonation*. Cambridge: Cambridge University Press.
- Jenkins, J. (2002) A sociolinguistically-based, empirically-researched pronunciation syllabus for French as an International Language. *Applied Linguistics* 23, 83–103.
- Jenkins, J. (2004) Research in teaching: Pronunciation and intonation. *Annual Review of Applied Linguistics* 24, 109–125.

- Kaltenboeck, G. (2002) Computer-based intonation teaching: Problems and potential. In D. Teeler (ed.) *Talking Computers* (pp. 11–17). Kent: IATEFL.
- Macaro, E. (2003) *Teaching and Learning a Second Language*. London: Continuum.
- Morley, J. (1991) The pronunciation component in teaching English to speakers of other languages. *TESOL Quarterly* 25, 481–520.
- Piasecka, L. (2007) Pronunciation module in teacher training courses—insights from the teacher trainer. In J. Arabski, D. Gabryś-Barker and A. Lyda (eds) *PASE Papers 2007: Studies in Linguistics and Methodology of Teaching Foreign Languages* (pp. 456–466). Katowice: PARA.
- Roach, P. (2000) *Phonetics*. Oxford: Oxford University Press.
- Roach, P. (2002) SPECO: Computer-based training for children. In D. Teeler (ed.) *Talking Computers* (pp. 25–27). Whitstable, Kent: IATEFL.
- Shockey, L. (2003) *Sound Patterns of Spoken English*. Oxford: Blackwell.
- Sobkowiak, W. (2001) *English Phonetics for Poles*. Poznań: Wyd. Poznańskie.
- Szpyra-Kozłowska, J. (2005) Lingua franca core, phonetic universals and the Polish context. In K. Dziubalska-Kołodziej and J. Przedlacka (eds) *English Pronunciation Models: A Changing Scene* (pp. 151–176). Frankfurt Am Main: Peter Lang.
- Swan, M. and Smith, B. (eds) (2002) *Learner English* (2nd edn). Cambridge: Cambridge University Press.
- Wennerstrom, A. (2001) *The Music of Everyday Speech: Prosody and Discourse*. Oxford: Oxford University Press.

Chapter 10

PDI as a Tool of Phonetic Enhancements to Graded E-Readers

W. FERLACKA and W. SOBKOWIAK

Electronic Graded Readers

Now that English has become *the lingua franca*, one might expect acquisition of this language to be a trivial matter. The market has been literally flooded with full-colour English teaching materials and one could hardly want more. However, the abundance and variety of didactic materials does not – in itself – ensure progress in language. The designers of reading materials often follow intuition rather than research-based principles; either by choice or by lack of such well-established principles. Materials designers more often than not seem to forget that the needs of modern language learners have changed just as much as the reality in which they live; and yet, little research has been carried out to investigate these needs and establish the criteria by which they might be met. First, however, a thorough analysis of the properties of children’s literature is required. Such analyses need to relate to both content (e.g. the implications of texts for children, concept load and values) and form (i.e. the mechanics of reading itself, text difficulty and linguistic structure) if e-literature is to become more reader friendly.

Pedagogical issues

Ferlacka in her doctoral analyses takes into account the child’s age, its reading and language-learning needs, as well as the intrinsic properties of a text, usually unknown to the child, which shape his/her understanding of the world through the language employed in the book. Children’s books seen in this light, that is as tools of cognitive development (Ferlacka, 2007: 175, 185, 200, 295; Tomasello, 2003: 209), are to assist the reader in his/her endeavour to comprehend and critically analyse what is being read. Yet, one must not forget that the needs of an EFL reader are much more difficult

to satisfy than the native reader's. The EFL learner would normally have a more limited command of the English language, less exposure to input (Critchley, 1998) and, consequently, fewer opportunities to get feedback in case of difficulty while reading.

Unfortunately, the needs of EFL readers are still the fallow ground in research. In view of the above-mentioned limitations that the EFL learner has to overcome, the properties of the electronic text are crucial. A thorough examination of the properties of an English electronic book holds promise of pedagogical success in EFL language education (Ferlacka, 2007: 191, 261). Properly customized e-books may offer assistance to the reader when it is most needed, at points of difficulty and at moments when the information is particularly vital for the learner, regardless of whether she/he realizes that or not (Ferlacka, 2007: 228). Such comprehensive research will allow the designer to effectively manipulate the content by shaping the form in which it is presented (Ferlacka, 2007: 42, 107–108; Hartmann, 2001: 75; Larson, 2004; Lund & Waterworth, n.d.; Schouten, 1989; Wepner & Cotter, 2002). An interactive text may, at least to some extent, take over the role of the tutor and, in the absence of the instructor, become one instead (Ferlacka, 2007: 2, 95–112, 167, 379).

The principal goal of this chapter, then, is to discuss ways in which the language forms which the reader encounters can be made to transform their content in order to become more comprehensible and easier to acquire. Another aim is to utilize the content of the book in such a way that the easier items pave the way for more difficult items (Ferlacka, 2007: 156; Mayer, 1993: 569–576). In our research, we are limiting ourselves to one area only. This area is the educational aspect of phonetics of the language used in American books for native children with the aim of making them useful for EFL learners (Ferlacka, 2007: 14, 192, 196, 257, 271).

Reading A-Z

A major concern of a language educator, who desires to make the learners interested in reading, is how to provide learners with reading matter which may arouse their interest in reading but also make reading an effective, pleasurable experience. A book that meets these conditions may surely be commendable and worth promoting. In this chapter, we present books that are capable of providing the means for both pleasurable reading and effective learning. Yet, as will be shown, these books need some amendments to meet the particular needs of EFL readers.

Learning Page is an unprecedented example of research-driven pedagogy in the realm of literature and learning (<http://www.learningpage.com/>). Since 2002, this company has been offering educators a rich variety of didactic online materials for native children, ranging from *Reading-Tutors*, *Vocabulary A-Z*, *Writing A-Z*, *Science A-Z* to *Reading A-Z* and

RAZ-Kids (<http://www.learninga-z.com/help/aboutus.htm>). At present, *Reading A–Z* books cover more than two thousand books in three languages: English (US, UK), French and Spanish. *Reading A–Z* website offers graded readers, decodable books and read alouds (to name just a few), available as printouts or e-readers of which 30 are available for a 30-day trial. These books are categorized into levels of difficulty coded with letters of the alphabet from A–Z, of which we selected 317 books from level G to X. These levels of learning to read, decoding and fluent reading cover the ages from about 7 to 11.

Electronic books (Richmond, 1999: 306), and ‘interactive books’ in particular (Chen *et al.*, 2003; Reinking & Bridwell-Bowles, 1998), can be very useful for instruction as they outdistance traditional storybooks by relating the written word to its spoken representation (Brown, 1993; Haynes, 1993: 48; Meskill, 1999: 151; Richmond, 1999; Wood, 2001) and may support the reader with persuasive multimodal (Aist, 1999: 169; Cole *et al.*, 2003) language assistance (i.e. interactive multimedia dictionary definitions, clickables, language games, etc.). Interactive electronic books are vital for EFL learners because they create a connection between the spoken and written language, and support oral language development so important for non-native learners (Ferlacka, 2005a, b, 2006; TEA, 2002).

Reading A–Z and *RAZ-Kids* books (hence *RA-Z*) are being informed by in-depth reading, child development research and user feedback (http://www.readinga-z.com/about_us/updated_materials.html), and, regardless of their few shortcomings, may be appreciated for rich graphics, varied subjects and learner friendliness. One main disadvantage, however, is the insufficiency of the above-mentioned multimedia support limited to a small selection of words with pronunciation and glosses (cf. Ferlacka, 2007; Sobkowiak, 1997: 335). The question whether EFL readers should or should not use native graded books for language instruction was undertaken by Ferlacka (2007: 21–26, 191), which is why it will not be repeated here.

EFL reader’s needs

Among crucial reader needs (Ferlacka, 2007: 57–62) to be met by a didactically appropriate e-book are:

- Helping the learner to ‘notice’ useful/key pieces of information (Channel, 1990; Critchley, 1998; Laufer & Hill, 2000: 1; Nation, 2001: 34; Plass *et al.*, 1998: 30; Proverbio *et al.*, 2004) both in audio and graphic form (by inferencing or explicit provision of the necessary feedback).
- Allowing him/her to process the ‘noticed’ information on many levels of sophistication (Ferlacka, 2007: 269–271; Gough & Wren, 1999: 73; Hulstijn *et al.*, 1996).

- Providing multiple, repeated exposure to 'key' words and their elements (Critchley, 1998; Ferlacka, 2007: 254–332; Nation, 2001).
- Providing an opportunity to 'learn by doing' (e.g. interaction, negotiation, concordancing, etc.; see Ferlacka, 2007: 259, 288, 313, 321–322; Flowerdew, 1993; Hulstijn *et al.*, 1996; Nation, 2001: 175).

For this support to be effective, both text and feedback presentation are crucial (Ellis, 1986: 323; Ferlacka, 2007). From the learner-friendly and research-oriented publisher's perspective, the information that has to be brought to the learner's attention needs to be categorized into:

- 'Useful' for language acquisition, that is items that 'should be learnt' (Ferlacka, 2007: 267–276; Nation, 2001: 12).
- 'Difficult' (whatever the reason), that is the items that 'might be learnt' and which are 'key' for comprehension (Aebersold & Field, 1997: 14; Nation, 2001; Scott, 2000).

These two types of information constitute a group of 'target items', that is the items that from the perspective of the book designer/pedagogy require feedback to make their acquisition and book reading easier and more engrossing. The word 'item' is by no means coincidental (Ferlacka, 2007: 270ff). The item may be as insignificant as a letter-to-sound correspondence to be noticed and learnt or as large as whole words or formulaic expressions (Dąbrowska & Kubiński, 2003: 17; Rey & Schiller, 2005: 83).

'Intelligent' Graded Books

The above requirements bring one close to the idea of 'intelligent' books, especially in the context of statements that designers, and, in particular, the designers of graded books 'need to be aware of what the child already knows, and is able effortlessly to do, so they can identify, by subtraction as it were, what remains to be taught (...) what has to be learned and why that might be hard' (Byrne & Liberman, 1999: 170). Such an 'intelligent' learner-supportive 'reading system' ought to trace the reader's encounters with the text and adjust feedback accordingly. It needs to develop the four skills central to reading: decoding, reading familiar words from memory or sight, analogizing (Ferlacka, 2007: 315; Rivers, 1983: 35–37; Stuart *et al.*, 1999: 121; Wylie & Durrell, 1970), predicting unknown words and making them sight words (Ehri, 1999: 80). These skills are vital in reading instruction because if children are taught how to discover underlying productive (e.g. linguistic or cultural) patterns and how to make opaque or confusing words less burdensome to acquire (Rundblad & Kronenfeld, 1998: 21; Oakhill & Beard, 1999: 23, 26), this may teach them autonomy and augment their memory. The same statements apply to opaque and confusing phonetic elements that impede the child in the process of reading and language learning.

PDI of RA-Z: Macroanalysis

PDI: A short introduction

Sobkowiak's Phonetic Difficulty Index (PDI) is a quantitative/qualitative measure of word pronouncing difficulty to L1 learners of a given L2. Specifically, in its current implementation, it algorithmically assigns numerical (0–10 range) and difficulty (57 pronouncing problems) Polish-sensitive tags to an English word-list or text. The range of applications of the current version of PDI extends from evaluation of pedagogical materials (such as texts, word lists, dictionaries, etc.), in terms of phonetic difficulty, to generation of word lists meeting user-specified phonetic criteria for teaching, learning, testing and materials preparation. The rationale and design of the index were presented in Sobkowiak's 2006 book and in a number of papers (listed at <http://ifa.amu.edu.pl/~swlodek/public.htm>), specifically in Sobkowiak (2004) and in Sobkowiak and Ferlacka (2006).

Processing the corpus

In order to allow for textual editing and analysis, even if unavoidably stripping the resulting corpus from complete authenticity, the RA-Z texts obtained for study were first normalized to be further processed as alphanumeric strings. This involved, among others: (a) removing non-textual elements, such as picture legends, lexicon hotspots and all extraneous text material, (b) stripping them of all punctuation, (c) converting accented characters to their lower-ASCII equivalents, and (d) cutting certain run-on strings into sentence-size chunks. Such manipulations are, of course, a corpus-linguistic standard, but they should be kept in mind when interpreting the results of our study.

At that stage, the raw textual data submitted to analysis was in a form of 329,461 word tokens, in 29,959 records (sentences) coming from 317 texts on 18 levels. Each record was tagged with a three-symbol text identifier holding the RA-Z level letter and the text number. Record #10,000, for example, looked like this: <P03> <If you get a dog be sure to choose one that will get along well with your family>. The corpus was now PDI processed in the same way as it was done in the PDI-related studies mentioned above. Briefly, the text was: (a) transcribed phonetically by consecutive lookups in the lexicon ultimately derived from the third edition of the *Oxford Advanced Learner's Dictionary of Current English* (OALDCE), (b) PDI tagged from the same source, and (c) equipped with basic statistics for each record: number of word tokens, total number of PDI difficulties identified, mean word-weighted PDI. Thus, a complete RA-Z sentence record used in further analysis looked like in Table 10.1.

The full set of PDI codes with their meaning and justification is presented in Sobkowiak (2004), and will not be reproduced here. For ease of

Table 10.1 Record 134 in the RA-Z corpus (a sentence from text on food)

Level text identifier	G06
sentence	Wheat grows from the seeds of a wheat plant
IPASCII transcription	wit gr5z from D@ sidz Ov @ wit plant
PDI difficulty codes	* eN 1 JL N N1 J * 1
Word-weighted PDI mean	1.1
Number of word tokens	9
Total PDI value	10.0

Table 10.2 Common RA-Z PDI codes with likely Polish errors, ordered by RA-Z frequency

<i>PDI code</i>	<i>PDI problem</i>	<i>likely Polish error</i>	<i>RA-Z freq</i>
N	Final voiced obstruent	devoicing	84,820
1	British#American	accent confusion	83,857
J	Short schwa /ə/	schwa quality	75,946
L	Voiced apico-dental /ð/	Polish /d, z, v/	38,179
V	Glottal fricative /h/	Polish velar fricative /x/	19,269
E	/ʌ/	Polish /a/	19,149
g	<i>ou</i> spelling	Many phonetic realizations	14,380

reference, however, Table 10.2 holds some of the PDI codes, most common in RA-Z, with their associated symbols, likely phonetic problems and Polish errors.

The PDI code (*) was used to tag words that, from the point of view of the current version of the algorithm, are free of all phonetic difficulty. Altogether there were 63,986 such word tokens in the whole RA-Z corpus, or 19.4% of all. In the example above, one word type (two tokens) is identified with PDI(*): *wheat*. This does not mean, of course, that some Polish learners of English might not have a phonetic problem with this word. Rather, at the current proficiency level addressed by the PDI, few learners are expected to (still) mispronounce this word.

Global PDI RA-Z statistics

The raw results of our PDI analysis of RA-Z has the form of a 317×59 matrix, for the total number of data cells of 18,703, plus some additional

data series. This comes from 317 RA-Z texts and 59 PDI difficulty codes (i.e. the original PDI 57 codes plus two: PDI(*) and PDI(?), for RA-Z words not found in the dictionary). With this size and complexity, it is of course impossible to visualize it here. Only the global statistics and the most frequent PDI codes will be treated in some detail. Table 10.3 holds the former, with RA-Z level G bolded, to be treated in more detail later.

The overall phonolapsological profile of RA-Z-graded readers comes out quite sharply in this table. First, look at the global statistics: 475,808 PDI difficulties over 329,461 words yield a grand word-weighted PDI mean of 1.44. That many PDI-identified problems each RA-Z word holds, on average. The two rightmost columns in Table 10.3 inform us that there are on average 15.88 PDI problems in each RA-Z sentence, spread over 11 words.

Table 10.3 Main PDI figures across RA-Z levels

<i>Level</i>	<i>Sentences</i>	<i>Words</i>	<i>PDI difs</i>	<i>Diff/ word</i>	<i>Diff/ sentence</i>	<i>Word/ sentence</i>
G	548	3726	4481.0	1.20	8.18	6.80
H	772	5349	6931.0	1.30	8.98	6.93
I	780	5502	7408.5	1.35	9.50	7.05
J	827	6275	8239.0	1.31	9.96	7.59
K	1047	8891	11648.5	1.31	11.13	8.49
L	1274	11,536	15943.5	1.38	12.51	9.05
M	1487	13,893	19400.0	1.40	13.05	9.34
N	1476	14,920	21314.5	1.43	14.44	10.11
O	1458	15,098	21580.0	1.43	14.80	10.36
P	1355	13,960	19716.0	1.41	14.55	10.30
Q	1901	21,296	30962.5	1.45	16.29	11.20
R	1974	24,233	34398.0	1.42	17.43	12.28
S	2551	29,517	43645.0	1.48	17.11	11.57
T	2476	31,110	46267.5	1.49	18.69	12.56
U	2632	30,094	44291.5	1.47	16.83	11.43
V	2688	32,288	47520.5	1.47	17.68	12.01
W	2336	29,092	43578.5	1.50	18.66	12.45
X	2377	32,681	48482.5	1.48	20.40	13.75
Global	29,959	329,461	475,808	1.44	15.88	11.00

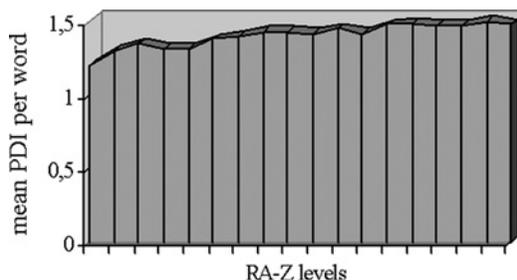


Figure 10.1 Mean PDI per word over RA-Z levels

RA-Z texts being graded, however, one would expect these statistics to vary systematically with the targeted reading-proficiency level, and this is exactly what we find in Table 10.3. A casual glance is enough to discover that all sums and means in Table 10.3 grow with RA-Z level. This growth is statistically significant, which is dramatically illustrated in Figure 10.1, where mean word-weighted PDI is plotted against the 18 RA-Z levels.

To close this section, let us list some of the phonetically hardest lexical items found in RA-Z. The PDI range for RA-Z is between 0 and 8. There are exactly five words with PDI = 8 in the total of 317 RA-Z books selected for analyses: *congratulations*, *discouraged*, *encouraged*, *hypothermia*, *multi-coloured*. These local maxima of PDI difficulty can be located in the books and sentences from which they come and remedial treatment can be offered. Notice that the numerical difficulty rating done by the PDI algorithm does not by itself inform the analyst, the writer or the learner *what* particular phonetic problems occur in such hard nuts, which is why the following sections will reflect on the 57 PDI codes, as well as on the numerical values.

PDI codes in RA-Z

Because the PDI algorithm does not only tag each word and sentence with their (numerical) difficulty levels, but also assigns specific difficulty type flags to each word, it is possible to draw a precise phonolapsological profile of the text. This profile can then be used for a variety of purposes, such as arranging texts according to their specific phonetic problems, enhancing texts phonetically with specifically targeted phonetic information or designing new texts. We will now briefly discuss the more general affordances of the PDI code tagging.

The most obvious question, which comes to the pedagogical mind in this connection, is 'Which of the phonetic problems identified by PDI in these texts are the most common, and how are they distributed'? It is easy enough to supply this kind of information once a text has been PDI tagged. The answer to the above question takes the form of Table 10.4.

Table 10.4 The frequency distribution of word-final devoicing (PDI(N)) across RA-Z levels

<i>Level</i>	<i>Words</i>	<i>PDI diffs</i>	<i>word-final devoicing = PDI(N)</i>		
			<i>Freq</i>	<i>% words</i>	<i>% diffs</i>
G	3726	4481.0	966	25.9	21.6
H	5349	6931.0	1377	25.7	19.9
I	5502	7408.5	1419	25.8	19.2
J	6275	8239.0	1592	25.4	19.3
K	8891	11648.5	2217	24.9	19.0
L	11,536	15943.5	3001	26.0	18.8
M	13,893	19400.0	3584	25.8	18.5
N	14,920	21314.5	4174	28.0	19.6
O	15,098	21580.0	3843	25.5	17.8
P	13,960	19716.0	3729	26.7	18.9
Q	21,296	30962.5	5276	24.8	17.0
R	24,233	34398.0	6102	25.2	17.7
S	29,517	43645.0	7486	25.4	17.2
T	31,110	46267.5	8070	25.9	17.4
U	30,094	44291.5	7837	26.0	17.7
V	32,288	47520.5	8512	26.4	17.9
W	29,092	43578.5	7445	25.6	17.1
X	32,681	48482.5	8190	25.1	16.9
Global	329,461	475,853	84,820	25.7	17.8

Word-final devoicing is a common Polish phonetic problem reaching far beyond the intermediate proficiency level (Gonet & Pietron, 2004; Nowacka, 2008: 101, 351ff; Szpyra-Kozłowska *et al.*, 2002). As seen in Table 10.2, it is also the most common one in RA-Z books. An analysis of Table 10.4 reveals facts about final devoicing of immediate interest to RA-Z creators and users – teachers and learners. As can be seen in the raw frequency column, the incidence of this problem tends to grow with each next e-reader level. This, however, is obviously an artefact of the growing length of the level-defined subsections of the corpus, both in terms of the number of sentences and words. Normalizing for this growth in the two rightmost columns of the table reveals a more realistic picture of the

distribution of this PDI code across RA-Z levels. Word-weighted, final devoicing has its peak on level N, potentially appearing in 28% of words, and the low on level Q, with the number of words reaching only 24.8%. The rightmost column in the table shows the relative proportion of all PDI-identified problems taken by word-final devoicing on each level. It will be seen that, while the global average is 17.8% (i.e. final devoicing occurs as one in six running phonetic problems in RA-Z), the proportion drops with the growing e-reader proficiency level. This means that other phonetic problems appear to take over on more advanced levels. This finding shows an intriguing phonolapsological profile of the English language used in books for native children written by native authors.

From the perspective of individual RA-Z texts and sentences, rather than levels, it is possible to locate local maxima for a given PDI code. There are, for example, 46 sentences in the RA-Z corpus, longer than one word, where each word ends in a voiced obstruent, thus getting the PDI(N) tag. Six of these sentences contain more than three words, thus constituting local word-final-devoicing maxima. These sentences are listed for exemplification in Table 10.5.

This kind of analysis can be carried out for all PDI codes, of course, but this would be beyond the confines of this chapter. In the next section, the most common phonetic problems (including final devoicing) will be investigated in one RA-Z text taken from level G. It will be shown that the so-far intuitive sense of ‘local maximum’ of a phonetic difficulty can undergo quite strict statistical calibration and can be used to precisely pinpoint texts earmarked for PDI-code-specific phonetic enhancement.

PDI of RA-Z: Microanalysis

While so far the discussion was mostly concerned with the analysis of particular PDI codes and their complexes across RA-Z levels and books, that is a ‘vertically’ organized primary data layout, the perspective

Table 10.5 Local sentence maxima of PDI(N) – word-final devoicing

<i>Book ID</i>	<i>RA-Z sentence</i>
H01	<i>Males have large antlers</i>
H07	<i>Snag sneezes and sneezes</i>
K16	<i>Reptiles and amphibians have backbones</i>
N14	<i>Kinds snails and slugs</i>
Q06	<i>Buildings and bridges destroyed</i>
W04	<i>Camels, cactuses and sand dunes</i>

henceforth will be 'horizontal' and 'applied'. That is a specific book, tagged G06 (*Emergent Reader* level), and its sentences will be looked into with the aim of showing how PDI information can be implemented in semi-automatic design of phonetic enhancement provided for the benefit of the reader.

PDI of books

One way in which PDI data can be used to assist the designers and writers of graded texts, as well as their readers, is by providing information on the relative phonetic difficulty of the book in relation to the level mean. Table 10.3 and Figure 10.1 show this technique applied on a macro scale to the various levels of the RA-Z books. Nonetheless, mean PDI values can also be used to arrange specific books according to their phonetic difficulty within a level, and thus make them more learner-friendly didactic materials. This procedure would result in a phonetically differentiated order of reading, which suggests moving book G06 from its position within level G and placing it among the phonetically difficult books on this level (even though semantically and syntactically they are on the same level) (Table 10.6).

Phonetic ordering of graded literature is believed to have a serious impact on the development of skills related to decoding and autonomy in reading. This will be exemplified on the basis of book G06 in various areas of PDI expertise: PDI values, phonograms, maxima of specific codes/difficulties ('go to this book if you have this problem ...') and PDI-related feedback.

PDI of words

The usefulness of PDI extends beyond general statements about difficulties per level made so far. PDI may also pinpoint difficulty peaks in specific books. These peaks identify the maximum values of a given

Table 10.6 A new arrangement of level G books according to word-weighted mean PDI values

<i>Book position</i>	1	2	3	4	5	6	7	8	9	10
Book ID	G16	G09	G12	G02	G18	G10	G19	G03	G14	G04
Word PDI	0.82	0.85	0.99	1.03	1.10	1.11	1.17	1.18	1.22	1.23
Book position	11	12	13	14	15	16	17	18	19	Level G
Book ID	G17	G01	G15	G06	G13	G08	G11	G07	G05	
Word PDI	1.23	1.26	1.26	1.33	1.35	1.35	1.40	1.41	1.46	1.20

difficulty across the whole level. They are the values exceeding the given PDI code RAZ-level mean + two standard deviations, thus giving us (roughly) the books whose overrepresentation of the given PDI code could be due to accidental fluctuation with probability $p < 0.05$. A sliver of this extensive data is given in Table 10.7. This matrix presents the number of occurrences of the phonetic difficulties inherent in the level G books. The mean values at the bottom identify the difficulties that require particular attention on this level. The shaded fields indicate the values that exceed the level means. These above-the-level-mean values point out the books requiring more feedback relating to specific difficulties. Furthermore, the values (bolded) beyond two standard deviations from the level mean specify the peaks of the given PDI code (the points of particularly high concentration of a difficulty) and may be treated as indicators of when the learner may be expected to have mastered the phonetic problem in question due to most intensive exposure.

From the macro perspective, according to the data in Table 10.7, the most common difficulties on level G are, respectively:

- (1) N = word-final voiced obstruent (level PDI mean = 50.8)
- (2) 1 = British ≠ American accent confusion (level PDI mean = 48.8)
- (3) J = short schwa (level PDI mean = 34.7)
- (4) L = voiced apico-dental fricative (level PDI mean = 20.9)
- (5) V = glottal fricative (level PDI mean = 11.5)
- (6) E = the vowel /ʌ/ (level PDI mean = 11.2)

The list changes when PDI is discussed book-specifically. In book G06, the phonetic difficulties are PDI(N), (E), (J), (I), (U), (L) and (B). Interestingly, only from this micro-perspective, difficulty peaks can be identified. In book G06, the peaks are as follows (see Table 10.8).

This means that at the point in reading when the learner reaches a difficulty peak, the difficult item should have been acquired by way of exposure and/or feedback, and is ripe for testing. We must admit that the number of occurrences adequate for the acquisition of a given language item is still hard to establish. Research does not provide any undisputed number. Some scholars place the numbers between 4 and 16 (Nation, 2001) while others suggest as many as 100 occurrences (<http://tesl-ej.org/ej26/a4.html>; also cf. Laufer & Hill, 2000: 59). For this reason, harvesting learner reading logs, combining the data with text properties (e.g. frequencies of occurrence of particular words in the running text and the words which have been looked up) as well as the type of feedback so far received would help establish the learner profile and the prospective progress pattern.

PDI may identify 'target' words and their component parts and make them more salient (e.g. by bolding), which may turn the reader's attention to this particular language difficulty. Moreover, PDI may automatically assign it with a number of activities that facilitate committing the target items to memory (Ferlacka, 2007: 61, 177, 264, 290; Rivers, 1983: 58).

Table 10.7 Level G books with their global PDI values and some PDI difficulty peaks

Book ID	Total PDI	Sentence PDI	Word PDI	N	I	J	L	V	E	U	e	B
G01	171.0	10.06	1.26	38	30	42	31	2	5	0	10	0
G02	167.0	7.26	1.03	46	50	25	18	8	9	3	2	1
G03	213.0	8.19	1.18	46	60	25	19	7	8	9	2	5
G04	263.5	8.80	1.23	65	58	32	30	5	5	1	2	8
G05	301.5	12.08	1.46	42	34	62	39	14	11	9	6	3
G06	264.0	7.54	1.33	67	18	25	12	2	28	13	7	11
G07	258.0	9.56	1.41	32	39	36	23	21	6	4	4	6
G08	244.0	9.76	1.35	58	45	49	19	17	14	0	5	4
G09	183.0	7.32	0.85	85	71	35	5	19	2	5	11	0
G10	184.0	7.36	1.11	19	49	41	26	8	8	7	2	12
G11	358.0	8.33	1.40	56	52	66	38	14	32	3	4	0
G12	212.0	9.64	0.99	44	83	16	2	9	14	3	0	3
G13	313.5	8.05	1.35	51	46	45	18	18	8	5	5	0
G14	324.0	6.11	1.22	60	54	31	16	28	10	4	5	4
G15	250.0	9.62	1.26	36	52	48	21	14	10	6	0	1
G16	146.5	6.08	0.82	36	76	27	16	4	11	4	2	1
G17	217.0	8.04	1.23	67	35	14	16	17	14	3	4	4
G18	176.0	7.33	1.10	43	34	20	13	3	14	1	4	5
G19	235.0	7.34	1.17	75	41	20	35	8	3	4	2	4
Level mean	235.8	8.34	1.20	50.8	48.8	34.7	20.9	11.5	11.2	4.4	4.1	3.8

Table 10.8 Difficulty peaks for book G06

<i>Book ID</i>	<i>PDI code</i>	<i>Frequency</i>	<i>PDI difficulty</i>	<i>Word examples</i>
G06	E	28	/ʌ/	<i>come, comes, crust</i>
	U	13	Post-alveolar affricates	<i>Juice, French, cheese, chickens</i>
	B	11	/eə/	<i>where</i>

After sufficient exposure, the reader no longer needs highlighting (cf. Miller's ± 7 items; Miller, 1956) but rather an opportunity to learn by doing, and this means exercises verifying whether this particular phonetic item has been mastered. If it has not, then more in-depth processing should be involved. If mastered, in subsequent activities this item should be involved in contrasting with odd – less regular – examples of pronunciation. In this way, the postulates of 'noticing', 'multiple exposure', 'various levels of processing' and 'learning by doing' will have been met.

PDI of sentences

As has already been mentioned, PDI may be applied to units larger than individual sounds or words; that is – it may be applied to whole sentences. Even though sentence-weighted PDI mean for book G06 (PDI = 7.54) is lower than level G mean (see Table 10.7, PDI = 8.34), some sentences in this book exceed the PDI value for level G. For this reason, they may be said to belong to the most difficult sentences in book G06 and on level G. Likewise, the sentences which exceed the mean sentence-weighted value for all RA-Z books (PDI = 15.1), belong to the phonetically most difficult sentences in the whole 317-book collection, and therefore require particular feedback.

In the whole book *The Food We Eat* (G06), which contains 35 sentences, there are as many as 11 challenging sentences (above the level-G PDI mean of 8.34) and only one top hard sentence among them (i.e. above the RA-Z PDI mean of 15.1). However, as has already been said, sentence PDI is not a fully reliable indicator of difficulty, and therefore it is suggested that only the sentences with both sentence-weighted PDI (>8.6) and word-weighted PDI (>1.2) high values be taken into account when extensive feedback is offered. This narrows the list of these sentences down to nine (see Table 10.9).

The PDI difficulties located in these nine hard sentences are rather varied and the decision as to how to support the reader is crucial. The most frequent, and by virtue of that, 'useful' items for instruction (cf. Table 10.7 and the list that follows) in these hard sentences are: PDI(I) – British vs. American pronunciation, PDI(J) – short schwa, PDI(L) – voiced apico-dentals, PDI(N) – final voiced obstruents and PDI(U) – post-alveolar

Table 10.9 The sentences with highest sentence- and word-PDI values in book G06

	Sentence	Sentence PDI codes	Most frequent 'useful' codes	Word PDI	Sentence PDI
1.	<i>There are many kinds of food</i>	ABL1 1 * N N1 N	N1	1.5	9
2.	<i>Where does orange juice come from</i>	B1 EN NU1 UE 1	NIUE	1.7	10
3.	Orange juice comes from oranges	NU1 U EN 1 NU1	NUI	2.0	10
4.	Oranges grow on orange trees	NU1 e1 NU1 N	N1	1.8	9
5.	Most people think potatoes are part of the potato plant's root	* dX HM JN 11 N 1 JL J 1*	1J	1.3	14
6.	They are really part of the stem that grows below the ground	L1 C1 N1 JL * L e N e JL gN	1LN	1.3	16
7.	Where does hamburger meat come from	BI EN bJKV1*EI	EI	1.8	11
8.	The sauce is made from tomatoes	JL fl N N1 JN1	N1J	1.7	10
9.	The pepperoni comes from a pig	JL J3 EN 1 JN	JN	1.5	9

affricates. Depending on their occurrences in the materials read so far, they may no longer need highlighting, but rather a set of exercises for varied levels of phonological processing: from recognition of and differentiation between specific phonetic difficulty points identified by the PDI to production exercises (e.g. by way of providing the pronunciation of the PDI-focus grapheme). The decision as to which part of the sentence to highlight should be taken on the basis of individual token PDI (see the bolded words in the table), word/phonetic item frequency and the learner's encounters with it.

PDI application

Time has now come to sketch some of the methods in which PDI-generated phonetic difficulty data can be actually applied to provide learners with on-demand phonetic enhancement to their reading. A sample

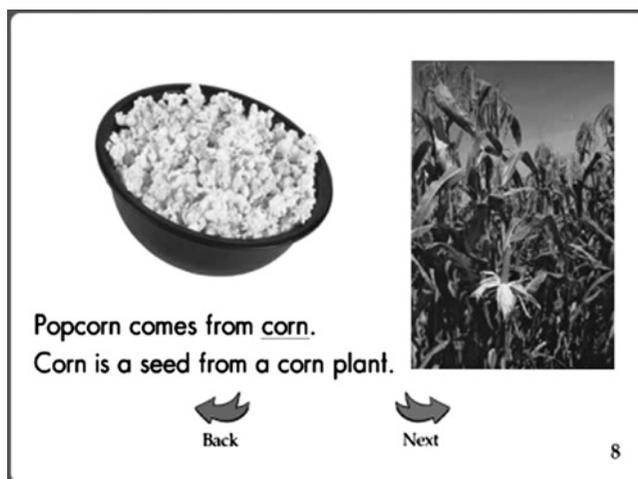


Figure 10.2 A page from ‘The food we eat’ by RA-Z (target PDI words: popcorn, corn, corn plant)

page (Figure 10.2) from the book *The Food We Eat* consists of two sentences: *Popcorn comes from **corn**.* *Corn is a seed from a corn plant.* The target word selected for feedback by RA-Z designers (*corn*) corresponds with the difficulties identified by PDI. On word level, only *popcorn* meets the established criteria for extensive phonetic feedback (high PDI and low lexical frequency of occurrence in RA-Z, hence low exposure). Other words have either low-PDI or high-frequency values. This is why the sentence might read: ***Popcorn** comes from **corn**,* with the two words graphically enhanced by bolding, colour, font size, animation or otherwise.

The forms of feedback on this level might be varied, for example:

- Pointing to the pictures of *popcorn* (also *corn* and *corn plant*) accompanied by both audio and writing (which is currently done by RA-Z but the choice of words seems arbitrary and the feedback is insufficient).
- Highlighting PDI(1): the pre-consonantal <r> in (*pop*)*corn* and/or the <a> in *plant* (to draw attention to cross-Atlantic differences).
- ‘Doable definitions’ (Ferlacka, 2007) with phonetic elements that require the learner to cooperate with the computer to arrive at the solution.
- Concordancing, quizzing, gaming and so on.

Now consider the potential of phonetically sensitive KWIC (Key-Word In Context) concordancing in drawing the reader’s attention to specific phonetic patterns and affording him/her immediate well-focused practice (Figure 10.3).

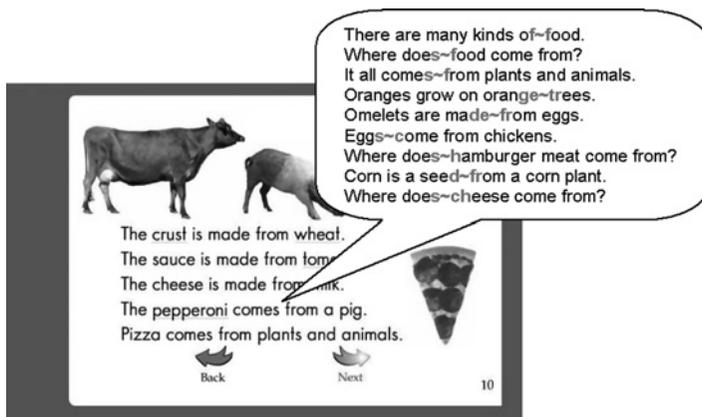


Figure 10.3 Concordancing as a type of phonetic enhancement

Here, a book-internal concordance is made of the sentences that contain the phonetically challenging cluster of word-final voiced obstruent (PDI(N)) followed by a word with a voiceless onset consonant. In such a context the urge to devoice the first obstruent is the strongest, due to the universal tendency to regressively assimilate voice value. The concordanced text can of course be human recorded, but it could also be synthesized ad-hoc. It could further be enhanced with a variety of animations and interactive exercises and games.

Conclusion

PDI can be a very useful design tool since with its implementation the most important aspects of learner autonomy development and electronic text enhancement that ease the task of reading are becoming feasible. And this means that PDI has the potential of being an effective pedagogical tool, provided it is further calibrated and judiciously implemented. This process has already begun.

There are many questions that we have been attempting to answer. Many of them have not been fully resolved and the answers are at times partial:

- How best to calibrate the PDI algorithm to capture most relevant problems on various levels of learner proficiency and in various learner activities?
- How many and which sentences, words, phonograms and PDI difficulties should be targeted per page/book?
- What type of feedback, support and enhancement should be supplied?

- How can it be automatically generated from the results of PDI analysis?
- How should it be delivered to maximize its effectiveness?

These, and many others, are research questions pending further analysis. It has been shown, however, that PDI applied to graded e-readers answers some of these questions and others of immediate relevance to the field. While contributing in this way to the development of theory in these specific areas of EFL pedagogy, it is also eminently viable as a tool of direct application to e-reader design and use. By combining theory and practice, and stimulating both, it shows a promise of continuous usefulness in this ever more violently developing interdisciplinary area of glottodidactics.

References

- Aebersold, J.A. and Field, M.L. (1997) *From Reader to Reading Teacher*. Cambridge: Cambridge University Press.
- Aist, G. (1999) Speech recognition in computer assisted language learning. In K. Cameron (ed.) *Computer Assisted Language Learning (CALL): Media, Design, and Applications* (pp. 165–182). Amsterdam: Swets and Zeitlinger.
- Brown, C. (1993) Factors affecting the acquisition of vocabulary: Frequency and saliency of words. In T. Huckin, M. Haynes and J. Coady (eds) *Second Language Reading and Vocabulary Learning* (pp. 263–286). Norwood: Ablex Publishing Corporation.
- Byrne, B. and Liberman, A.M. (1999) The relation between the alphabet and speech. In J. Oakhill and R. Beard (eds) *Reading Development and the Teaching of Reading: A Psychological Perspective* (pp. 157–174). Oxford: Blackwell.
- Channel, J.M. (1990) Vocabulary acquisition and the mental lexicon. In J. Tomaszczyk and B. Lewandowska-Tomaszczyk (eds) *Meaning and Lexicography* (pp. 21–30). Amsterdam: John Benjamins.
- Chen, M., Ferdig, R. and Wood, A. (2003) Understanding technology-enhanced storybooks and their roles in teaching and learning: An investigation of electronic storybooks in education. *The Journal of Literacy and Technology* 3, 1. On WWW at <http://www.literacyandtechnology.org/volume3/chenferdigwood.pdf>. Accessed 27.7.08.
- Cole, R., van Vuuren, S., Pellom, B., Hacıoglu, K., Jiyong, M., Movellan, J., Schwartz, S., Wade-Stein, D. and Ward, W. (2003) Perceptive animated interfaces: First steps toward a new paradigm for human computer interaction. In *Proceedings of the IEEE: Special Issue on Multimodal Human Computer Interface*. CSLR. On WWW at http://www.science.oas.org/ministerial/ingles/documentos/cole_perceptive_animated_interface.pdf. Accessed 27.7.08.
- Critchley, M.P. (1998) Reading to learn: Pedagogical implications of vocabulary research. On WWW at <http://encounters.jp/mike/professional/publications/vocabulary.html>. Accessed 27.7.08.
- Dąbrowska, E. and Kubiński, W. (eds) (2003) *Akwizycja języka w świetle językoznawstwa kognitywnego*. Kraków: Universitas.
- Ehri, L.C. (1999) Phases of development in learning to read words. In J. Oakhill and R. Beard (eds) *Reading Development and the Teaching of Reading: A Psychological Perspective* (pp. 79–108). Oxford: Blackwell.

- Ellis, R. (1986) *Understanding Second Language Acquisition*. Oxford: Oxford University Press.
- Ferlacka, W. (2005a) The place of dictionaries in interactive CALL. In *Proceedings of 36th Poznań Linguistic Meeting, PLM 2005*. On WWW at http://ifa.amu.edu.pl/plm_old/2005/2005abstracts/plm2005_ferlacka.pdf. Accessed 27.7.08.
- Ferlacka, W. (2005b) How can e-readers stimulate phonological development? In W. Sobkowiak and E. Waniek-Klimczak (eds) 2006. *Dydaktyka fonetyki języka obcego. Zeszyty Naukowe PWSZ w Płocku* (pp. 61–72). Płock: PWSZ. On WWW at <http://ifa.amu.edu.pl/~swlodek/Soczewka05/Ferlacka.ppt.>, Accessed 27.7.08.
- Ferlacka, W. (2006) Towards a model of an interactive dictionary for children. In: E. Corino, C. Marelo and C. Onesti (eds) *Proceedings of XII Euralex International Congress* (pp. 265–272). Alessandria: Edizioni dell'Orso.
- Ferlacka, W. (2007) Towards a model of a pedagogical e-dictionary for children. Unpublished doctoral dissertation. Poznań: School of English, Adam Mickiewicz University.
- Flowerdew, J. (1993) Concordancing in language learning. *Perspectives* 5, 87–101. (Also in M. Pennington (ed.) (1996) *The Power of CALL* (pp. 97–113). Houston, TX: Athelstan.
- Gonet, W. and Pietroń, G. (2004) The Polish tongue in the English ear. In W. Sobkowiak and E. Waniek-Klimczak (eds) *Dydaktyka fonetyki języka obcego. Zeszyt Naukowy Instytutu Neofilologii Państwowej Wyższej Szkoły Zawodowej w Koninie nr 3* (pp. 56–65). Konin: Wydawnictwo PWSZ w Koninie.
- Gough, P. and Wren, S. (1999) Constructing meaning: The role of decoding. In J. Oakhill and R. Beard (eds) *Reading Development and the Teaching of Reading: A Psychological Perspective* (pp. 59–78). Oxford: Blackwell.
- Hartmann, R.R.K. (2001) *Teaching and Researching Lexicography*. London: Pearson Education Ltd.
- Haynes, M. (1993) Patterns and perils of guessing in second language reading. In T. Huckin, M. Haynes and J. Coady (eds) *Second Language Reading and Vocabulary Learning* (pp. 46–64). Norwood: Ablex Publishing Corporation.
- Hulstijn, J.H., Hollander, M. and Greidanus, T. (1996) Incidental vocabulary learning by advanced foreign language students: The influence of marginal glosses, dictionary use, and recurrence of unknown words. *The Modern Language Journal* 80, 327–339.
- Larson, K. (2004) The science of word recognition or how I learned to stop worrying and love the bouma. On WWW at <http://www.microsoft.com/typography/ctfonts/WordRecognition.aspx>. Accessed 27.7.08.
- Laufer, B. and Hill, M.M. (2000) What lexical information do L2 learners select in a CALL dictionary and how does it affect retention? *Language Learning and Technology* 3, 58–76. On WWW at <http://llt.msu.edu/vol3num2/laufer-hill/index.html>. Accessed 27.7.08.
- Lund, A. and Waterworth, J.A. (n.d.) *Experiential Design: Reflecting Embodiment at the Human–Computer Interface*. Umeå, Sweden: Department of Informatics, Umeå University. On WWW at <http://www.informatik.umu.se/~jwworth/MetaDesign.html>. Accessed 27.7.08.
- Mayer, R.E. (1993) The instructive metaphor: Metaphoric aids to students' understanding of science. In A. Ortony (ed.) *Metaphor and Thought* (2nd edn) (pp. 561–578). Cambridge: Cambridge University Press.
- Meskill, C. (1999) Computers as tools for sociocollaborative learning. In K. Cameron (ed.) *Computer Assisted Language Learning (CALL): Media, Design, and Applications* (pp. 139–162). Amsterdam: Swets and Zeitlinger.

- Miller, G.A. (1956) The magical number seven, plus or minus two: Some limits on our capacity for processing information. *Psychological Review* 63, 81–97.
- Nation, I.S.P. (2001) *Learning Vocabulary in Another Language*. Cambridge: Cambridge University Press.
- Nowacka, M. (2008) Phonetic attainment in Polish university and college students of English. A study in the productive and receptive pronunciation skills. Unpublished PhD dissertation. Lublin: UMCS.
- Oakhill, J. and Beard, R. (eds) (1999) *Reading Development and the Teaching of Reading: A Psychological Perspective*. Oxford: Blackwell.
- Plass, J.L., Chun D.M., Mayer, R.E. and Leutner, D. (1998) Supporting visual and verbal learning preferences in a second-language multimedia learning environment. *Journal of Educational Psychology* 90, 25–36.
- Proverbio, A., Vecchi, L. and Zani, A. (2004) From orthography to phonetics: ERP measures of grapheme-to-phoneme conversion mechanism in reading. *Journal of Cognitive Neuroscience* 16, 301–317. On WWW at <http://jocn.mitpress.org/cgi/content/abstract/16/2/301>. Accessed 27.7.08.
- Reinking, D. and Bridwell-Bowles, L. (eds) (1998) *Computers in Reading and Writing* (Vol. 2.) Mahwah: Lawrence Erlbaum Associate Publishers.
- Rey, A. and Schiller, N.O. (2005) Graphemic complexity and multiple print-to-sound associations in visual word recognition. *Memory and Cognition* 33, 76–85.
- Richmond, I.M. (1999) Is your CALL connected? Dedicated software vs. integrated CALL. In K. Cameron (ed.) *Computer Assisted Language Learning (CALL): Media, Design, and Applications* (pp. 295–312). Amsterdam: Swets and Zeitlinger.
- Rivers, W. (1983) *Communicating Naturally in a Second Language: Theory and Practice in Language Teaching*. Cambridge: Cambridge University Press.
- Rundblad, G. and Kronenfeld, D. (1998) Folk-etymology: Haphazard perversion or shrewd analogy? In J. Coleman and C.J. Kay (eds) *Lexicology, Semantics and Lexicography: Selected Papers from the Fourth G. L. Brook Symposium* (pp. 19–34). Amsterdam: John Benjamins Publishing Company.
- Schouten, van Panderen, C. (1989) Vocabulary learning through reading: Which conditions should be met when presenting words in texts? *AILA Review* 6, 66–67.
- Scott, M. (2000) Focusing on the text and its key words. In L. Bournard and T. McEnery (eds) *Rethinking Language Pedagogy from a Corpus Perspective* (Vol. 2.) (pp. 103–121). Frankfurt am Main: Peter Lang GmbH.
- Sobkowiak, W. (1997) Speech in EFL CALL. In W. Strykowski (ed.) *Media a Edukacja* (pp. 329–339). Poznań: eMPI². (A revised version in K. Cameron (ed.) (1998) *Multimedia CALL: Theory and Practice*. Exeter: Elm Bank Publications. 23–34).
- Sobkowiak, W. (2004) Phonetic difficulty index. In W. Sobkowiak and E. Waniek-Klimczak (eds) *Dydaktyka fonetyki języka obcego. Zeszyt Naukowy Instytutu Neofilologii Państwowej Wyższej Szkoły Zawodowej w Koninie nr 3* (pp. 102–107). Konin: Wydawnictwo PWSZ w Koninie.
- Sobkowiak, W. (2006) *Phonetics of EFL Dictionary Definitions*. Poznań: Wydawnictwo Poznańskie.
- Sobkowiak, W. and Ferlacka, W. (2006) Calibrating the phonetic difficulty index. In W. Sobkowiak and E. Waniek-Klimczak (eds) *Dydaktyka fonetyki języka obcego w Polsce* (pp. 173–187). Konin: Wydawnictwo PWSZ w Koninie.
- Szpyra-Kozłowska, J., Frankiewicz, J. and Gonet, W. (2002) Aspekty fonetyki angielskiej nauczane w polskich szkołach średnich. In W. Sobkowiak and E. Waniek-Klimczak (eds) *Dydaktyka fonetyki języka obcego na poziomie licencjackim. Zeszyt Naukowy Państwowej Wyższej Szkoły Zawodowej w Płocku* (pp. 9–27). Płock: PWSZ.

- Stuart, M., Masterson, J. and Dixon, M. (1999) Learning to read words turns listeners into readers. In J. Oakhill and R. Beard (eds) *Reading Development and the Teaching of Reading: A Psychological Perspective* (pp. 109–130). Oxford: Blackwell.
- TEA. (2002) *Beginning Reading Instruction: Components and Features of a Research-based Reading Program* (Revised Edition). Texas Education Agency. Original Publication Number GE01 105 05.
- Tomasello, M. (2003) Czy małe dzieci posiadają składniową kompetencję osób dorosłych?. In E. Dąbrowska and W. Kubiński (eds) *Akwizycja języka w świetle językoznawstwa kognitywnego* (pp. 144–222). Kraków: Universitas.
- Wepner, S.B. and Cotter, M. (2002) When do computer graphics contribute to early literacy learning? *Reading Online*. On WWW at <http://www.readingonline.org/newliteracies/wepner/index.html>. Accessed 27.7.08.
- Wood, J. (2001) Can software support children's vocabulary development? *Language Learning and Technology* 5, 166–201. On WWW at <http://llt.msu.edu/vol5num1/wood/default.html>. Accessed 27.7.08.
- Wylie, R.E. and Durrell, D. (1970) Teaching vowels through phonograms. *Elementary English* 47, 787–779.

Chapter 11

Suprasegmentals: Tools for Increased Language Teacher Effectiveness

T. GREGERSEN

Applied linguists wear many hats. Most are language learners, language teachers, language researchers and presenters thereof, and some even have the privilege of being language teacher educators. In each of these roles, suprasegmental or prosodic features have the ability to communicate information that goes way beyond spoken words.

What linguists call suprasegmentals or prosodic features, researchers in other academic disciplines call 'paralanguage', 'vocalics', 'vocal cues' or 'vocal behavior'. Researchers in Communications define these somewhat synonymous areas as 'the study of the communicative value of vocal behavior, including all oral cues in the stream of spoken utterances except the words themselves' (Richmond & McCroskey, 2004: 98). Included in the wide array of paralinguistic behavior are issues of stress and intonation, tempo, resonance, rhythm, pitch and volume.

In the present study of the macro features of pronunciation, the intention is not to relegate the micro features of segmentals to a place of lesser value. Rather, what this chapter intends to do is move beyond the scope of individual sounds and ideas that are strictly linguistic in nature and reflect on what individuals do with their voices, particularly as language teachers and teacher educators. Although this chapter begins with a brief perusal of what paralinguistic cues can do for users of a language, that is wearing the hat of a language learner, the majority of this study examines the role of suprasegmentals as language is taught or future language educators are prepared. In particular, this study focuses on the effects of paralinguistic cues on the learning processes involving (1) teacher immediacy, (2) comprehension and retention and (3) recognition of affect.

Suprasegmentals for the Language Learner

First, how suprasegmentals or paralinguistic cues can make a language learner more functionally communicative is examined. According to Dalton and Seidlhofer (1994), there are six communicative abilities related to pronunciation:

- (1) Prominence: Making important points more salient.
- (2) Topic management: Signaling and recognizing where one topic ends and another begins.
- (3) Turn-taking: Understanding when to speak, when to be silent and how or how not to yield the floor to someone else.
- (4) Information status: Marking what we assume to be shared knowledge as opposed to something new.
- (5) Social meanings and roles: Positioning ourselves with regard to our interlocutor in terms of status, authority, politeness and solidarity.
- (6) Degree of involvement: Conveying our attitudes and emotions.

According to Goodwin (2001), if language learners can use pauses, pitch, stress and volume to achieve these aforementioned goals, they will be well on their way to being functionally communicative. How can this be achieved? One way is by examining the discourse students will need to use in real life and giving them the opportunities to observe and participate. Proper use of suprasegmentals makes more effective language learners.

Suprasegmentals and Teacher Immediacy

Removing the language learner hat and replacing it with the language teacher or language educator hat will allow an examination of how paralinguistic cues have the potential to make more effective teachers. To do this, the concept of immediacy needs to be addressed. Mehrabian (1971) defined it as communication, both verbal and nonverbal, which enhances closeness to another, and he posits that it reflects a positive attitude on the part of the sender toward the receiver. Some of the behaviors that indicate *verbal* immediacy in US classrooms are using personal examples, encouraging students to talk, discussing student topics, using humor, addressing students by name, having conversations outside of class, praising student work, soliciting viewpoints and discussing issues unrelated to class (Gorham, 1988). Visual *nonverbal* immediacy, on the other hand, includes maintaining eye contact, gesturing while lecturing, standing close to students, maintaining a relaxed, open-body position, moving around the classroom and smiling at students. For the purposes of this chapter, attention will be drawn to the auditory nonverbal cues that teachers can use to signal immediacy, and they are mainly found in the use of a variety of vocal tones and an elimination of a monotone or dull voice while talking

to the class. That is to say, research has demonstrated that a teacher who uses a variety of suprasegmentals when addressing students is better able to signal approachability.

In essence, immediacy behaviors signal availability for communication, increase sensory stimulation and communicate interpersonal warmth and closeness (Andersen, 1985). One need not ponder too deeply, then, on the positive connection that teacher immediacy behavior has on increased teacher effectiveness. In fact, previous investigations have shown that immediacy positively influenced student affect toward teacher communication, course content, the course in general and the course instructor (Andersen, 1979). Immediacy was also positively related to the probability of students engaging in similar communicative events and enrolling in another related course. Teachers who exhibited more immediacy also stimulated greater student state motivation (Christophel, 1990). And finally, students' perceptions of teachers' nonverbal immediacy were positively related to students' affective learning (Gorham, 1988). Thus, the non-verbally immediate teacher is likely to generate more positive feelings on the part of the student, and would hence seem likely to influence the development of favorable attitudes toward the learning situation (Plax *et al.*, 1986).

A necessary caveat to include at this point concerns the fact that most of the previous evidence cited was collected in a US context. Studies done with Chinese, Kenyan and German students show that expectations of classroom immediacy are different (Johnson & Miller, 2002; Myers *et al.*, 1998; Roach & Byrne, 2001), which suggests that culture plays an important role in the expectations that students hold concerning immediacy. The results of research done on cross-cultural immediacy suggest that when the violation is in favor of positive immediacy (i.e. those situations where students have low expectations of teacher immediacy but where the teacher is highly immediate), educational outcomes remain positive. This, however, is not the case when violations are negative (i.e. when students have high expectations of immediacy, but the teacher exhibits low immediacy).

While what constitutes immediate behavior in the United States is well documented, the critical question for teachers outside the United States is how these behaviors translate into the culture into which they are inserted. Discussions on 'teacher dispositions' are rampant among education faculties in the United States. The controversial factor of this nationwide conversation concerns how to 'teach' dispositions. Examples are characteristics such as empathy and enthusiasm. These are extremely difficult to teach and even more difficult to measure. 'Immediacy' is a characteristic that falls into this category. To be a good teacher does not mean that one must be funny and extroverted as some of the best teachers are serious and reflective. In the end, what one might want to consider as an important point to take away from this conversation about immediacy is that every teaching individual needs to understand his/her strengths and capitalize

on them in terms of developing the appropriate relationships with students defined within his/her cultural expectations of immediacy.

Suprasegmentals and Comprehension/Retention

Research also suggests that the effective use of suprasegmentals can increase comprehension and retention. According to Richmond and McCroskey (2004), there is probably no worse enemy to the classroom teacher than a monotone voice. Their research demonstrated that having a monotone voice is more closely related to negative evaluations of teachers by students than any other factor. They defined the monotone voice as incorporating little variety in vocal qualities during verbal utterances and having little or no inflectional variety or rate variety when speaking. Monotonous speech tends to thwart the attention of interested listeners, and if a learner's attention is not captured, no processing will follow. Furthermore, research suggests that vocal variety, vocal clarity and natural sounding voices contribute to the comprehension and later recall of presented material. Vocal variety in tempo, force and pitch contributes to a higher retention of material, and according to Markel (1965), a monotone voice actually reduces listeners' comprehension of orally delivered material. In essence, vocal behavior contributes to the clarity of words. Verbal utterances are clearer with the use of suprasegmentals in part because the speaker has used vocal qualities to emphasize, accent or point out certain parts of the message. Vocal cues can signal to the interlocutor which portions may be most important, and can highlight, underline, boldface or italicize words or phrases thus subsequently contributing to the listener's ability to retain the material (Richmond & McCroskey, 2004).

Suprasegmentals and Learner Affect

The last major point of this chapter involves how the awareness and recognition of the paralinguistic cues that language learners send to their teachers can positively influence a teacher's reaction to students' negative affect. I would like to give you a little history as to how I became interested in the nonverbal facet of communication. From the initiation of my career as a researcher in applied linguistics, I have been interested in the role that affective factors play in the learning or acquisition of a foreign language. I believe that humans most often react first emotionally and then MAYBE respond rationally. I am fascinated by how motivation, self-esteem and particularly anxiety impact an individual's quest for foreign-language competency, and have thus pursued this avenue.

Before moving on, however, it is important to define terms. Why is foreign language anxiety, for example, something important for language teachers to be aware of? First and foremost, while foreign language anxiety

will not necessarily be a variable that predicts language-learning success, it is one of the major variables in those learners who fail. Anxious learners avoid interaction and their language processing is effected at all stages: input, storage and retrieval. It usually evolves as language learners recognize that the authenticity with which they can present themselves in their L1 is not possible in their L2. Therefore, it does not take a rocket scientist (or even an applied linguist) to realize that in order for a language teacher to take positive action against foreign language anxiety, those learners who suffer from it must first be identified. It also does not take a highly intuitive person to realize that language learners, particularly those who suffer negative affect, are not really forthcoming with their feelings. In my 20 years of experience in the language teaching trenches, I have yet to encounter the student who overtly and without solicitation expresses, 'Dr. Gregersen, I have a horrible case of foreign language anxiety'. Understanding this, I began to look for evidence that went beyond what was said, and found that nonverbal behavior was quite a reliable indicator. In a 2005 *Foreign Language Annals* article, I cataloged those behaviors indicative of foreign language anxiety. In another piece (Gregersen, 2007: 219), I actually separate the auditory, or what I have called in this presentation 'paralinguistic cues' from the visual ones. This study examined whether nonverbal visual and/or auditory channels are more effective in detecting foreign language anxiety. Recent research (Gregersen, 2007) suggests that language teachers are often able to successfully decode the nonverbal behaviors indicative of foreign language anxiety; however, relatively little is known about whether visual and/or auditory channels are more effective. To this end, a group of 36 pre-service English language teachers were asked to view videotaped oral presentations of seven beginning English language learners under three conditions: visual only, audio only and a combination of visual and audio in order to judge their foreign language anxiety status. The evidence gathered through this study could not conclusively determine the channel through which foreign language anxiety could be most accurately decoded, but it did suggest indicators within the auditory and visual modes that could lead to more successful determination of behaviors indicative of negative affect. So you see, with an eye on visual cues and ears listening for paralinguistic cues, we can become more effective language educators by being aware of the role of suprasegmentals.

In conclusion, what I have attempted to do is to demonstrate that an examination of suprasegmentals from a language learner's perspective, while important to functional communication, is not where applied linguists who want to be more effective teachers should stop their reflection. Language teachers' paralinguistic cues are important signals to learners of our approachability. Properly used, vocal behavior can increase comprehension and retention. And finally, teachers who are aware of their

students' use of auditory cues indicative of foreign language anxiety will be much more effective in identifying those students who need extra attention. So, no matter what linguist hat you are wearing, there is no denying the importance of prosody.

References

- Andersen, J.F. (1979) Teacher immediacy as a predictor of teaching effectiveness. In D. Nimmo (ed.) *Communication Yearbook 3* (pp. 543–559). New Brunswick, NJ: Transaction Books.
- Andersen, J.F. (1985) Nonverbal immediacy in interpersonal communication. In A. Siegman and S. Feldstein (eds) *Multichannel Integrations of Nonverbal Behavior* (pp. 1–36). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Christophel, D.M. (1990) The relationship among teacher immediacy behaviors, student motivation, and learning. *Communication Education 39*, 323–340.
- Dalton, B. and Seidlhofer, C. (1994) *Pronunciation*. London: Oxford University Press.
- Gorham, J. (1988) The relationship between verbal teacher immediacy behaviors and student learning. *Communication Education 37*, 40–53.
- Goodwin, J. (2001) Teaching pronunciation. In M. Celce-Murcia (ed.) *Teaching English as a Second or Foreign Language* (3rd edn) (pp. 117–138). Boston, MA: Heinle & Heinle.
- Gregersen, T. (2005) Visual and auditory cues in the detection of foreign language anxiety. *Foreign Language Annals 38*, 388–400.
- Gregersen, T. (2007) Breaking the code of silence: A study of teachers' nonverbal decoding accuracy of foreign language anxiety. *Language Teaching Research 11*, 209–221.
- Johnson, S.D. and Miller, A.N. (2002) A cross-cultural study of immediacy, credibility, and learning in the U.S. and Kenya. *Communication Education 51*, 280–292.
- Markel, N. (1965) The reliability of coding paralanguage: Pitch, loudness and tempo. *Journal of Verbal Learning and Verbal Behavior 4*, 306–308.
- Mehrabian, A. (1971) *Silent Messages*. Belmont, CA: Wadsworth.
- Myers, S.A., Zhong, M. and Guan, S. (1998) Instructor immediacy in the Chinese college classroom. *Communication Studies 49*, 240–254.
- Plax, T.G., Kearney, P., McCroskey, J.P. and Richmond, V.P. (1986) Power in the classroom VI: Verbal control strategies, nonverbal immediacy, and affective learning. *Communication Education 35*, 43–55.
- Richmond, V.P. and McCroskey, J.C. (2004) *Nonverbal Behavior in Interpersonal Communications*. Boston, MA: Allyn & Bacon.
- Roach, K.D. and Byrne, P.R. (2001) A cross-cultural comparison of instructor communication in American and German classrooms. *Communication Education 50*, 1–14.

Chapter 12

Students' Successes and Failures in Learning Foreign Language Pronunciation: Insights from Diary Data

M. PAWLAK

Introduction

As Setter and Jenkins write in their state-of-the-art overview of issues in pronunciation learning and teaching, 'Pronunciation (...) plays a vital role in successful communication, both productively and receptively' (Setter & Jenkins, 2005: 2). While it would be difficult to take issue with such a statement given the fact that inadequate intelligibility is in many cases the first cause of the failure to communicate, it is also undeniable that the status of pronunciation has been on the decline in the past few decades. Poland has certainly been no exception to this trend, with pronunciation instruction being relegated to the backseat of foreign language education in elementary, junior high schools and senior high schools as well as in universities, with visibly less importance being attached to this language subsystem even in foreign languages departments where attaining native-like proficiency used to be the primary concern (cf. Baran-Łucarz, 2006; Pawlak, 2003; Szpyra-Kozłowska *et al.*, 2002; Wrembel, 2002). Such developments can be ascribed to various factors, the most important of which appear to be the growing importance of learning foreign languages for international communication, the language policies of the Council of Europe with their emphasis on the development of plurilingualism, the widespread focus on fluency at the expense of accuracy as well as the corresponding modifications of curricula, coursebooks and examination requirements.

Even though native-like accent may not be a practicable and realistic goal for most learners, the attainment of good pronunciation skills which enable better production and comprehension obviously still remains a high priority. This, in turn, provides a rationale for conducting research projects seeking to identify the most effective instructional approaches.

The main problem of empirical investigations of this kind, however, is that they have mostly been concerned with what teachers can do to help their learners master various segmental and suprasegmental features by choosing the right instructional targets, techniques and materials. In fact, even when students are asked about their preferences and expectations in interviews or questionnaires, this is usually done with the purpose of improving teaching practice rather than offering suggestions on how they could handle the task of mastering TL pronunciation more effectively. Such a limited focus is unfortunate in view of the fact that success in learning foreign languages, including their phonological aspects, depends much more on the learner's ability and willingness to actively contribute to this process than the teacher's skill, dedication and application of cutting-edge educational resources (cf. Pawlak, 2006a, b).

The qualitative study reported in the present chapter sought to partly rectify the situation by using diary data to explore the problems faced by advanced learners of English in their efforts to master TL pronunciation, the ways in which they solve them and the outcomes of the actions and decisions they take. The first part of the chapter, intended as a theoretical background, will discuss the goals of pronunciation learning and teaching, overview the factors that influence the ultimate outcomes of the two processes, both such that are beyond learners' and teachers' control and those that are amenable to external manipulation, as well as evaluate the scope of research into pronunciation-related issues. The subsequent part will focus on the research project, providing a description of the participants, instruments of data collection and analytical procedures as well as presenting, discussing and interpreting the findings. These, in turn, will serve as a basis for emphasizing the need for developing among advanced learners an autonomous approach to learning TL pronunciation and making them cognizant of effective strategies which can facilitate this endeavor.

Goals, Variables and Research Priorities in Pronunciation Learning and Teaching

The key dilemma faced by language teachers with respect to pronunciation instruction is aptly summarized by Harmer when he writes: 'A question we need to answer is how good our students' pronunciation ought to be. Should they sound exactly like speakers of a prestige variety of English? (...) Or is this asking too much? Perhaps the teacher's pronunciation is the model they should aspire to? Perhaps we should be happy if they can at least make themselves understood?' (Harmer, 2007: 248–249). In other words, teachers have to decide at the very outset whether their students should strive after perfection, in accordance with the belief that '(...) any pronunciation that fell much short of the nativelike could be considered defective and would impair intelligibility' (Leather, 1999: 35) or, rather,

whether they should pursue the much more modest, but also much more realistic goal of being comprehended by listeners. Considering the inherent limitations of a typical foreign language context such as the one in Poland, it is reasonable to assume that in the vast majority of classrooms, the primary concern will be to ensure that learners' speech is intelligible rather than indistinguishable from that of native speakers. This is necessitated by the attitudes of learners themselves, many of whom are convinced that all they need is making themselves understood, the scarce in- and out-of-class exposure to the TL, as well as the marginal attention given to pronunciation in curricular guidelines and examination requirements (cf. Pawlak, 2003). As a consequence, pronunciation instruction is often neglected in favor of teaching other language subsystems, course-book writers pay little attention to aspects of phonetics and, even when they do, teachers become adept at omitting the relevant sections. This being the case, it seems only logical to argue, as Seidlhofer (2001) does, that the goals of pronunciation teaching should be achievable so as to avoid discouragement and adverse reactions on the part of learners. In Morley's (1999) view, such goals should include: (1) *intelligibility* (i.e. speaking in a way that is not distracting to listeners), (2) *functional communicability* (i.e. the ability to function successfully in the communicative situations encountered), (3) *increased self-confidence* (i.e. learners' belief that what they say will be understood) and (4) *speech monitoring abilities* (i.e. learners' capacity to attend to their own speech as well as that of others, and to modify their pronunciation). Obviously, given the multitude of reasons for which foreign languages are studied, there always remains the question of the compatibility of teachers' and learners' goals, with the effect that the instructional targets should be carefully negotiated in a specific context.

At first glance, the situation is very different in the case of foreign languages department students, such as the subjects of the diary study reported in the chapter. After all, it could easily be argued, for example, that the very fact that they have decided to take up English, French or German demonstrates that they aspire to the native-like model of pronunciation. What is more, since such students are expected to achieve expert levels of TL proficiency that will allow them to perform the jobs of teachers, translators or interpreters, the curricula include separate practical phonetics classes and mastery of pronunciation is an important assessment criterion on final examinations. Still, even here, the requirements have had to be diminished in the face of the declining numbers of students, their largely instrumental motivations, a more general tendency to teach languages for international communication and, most importantly perhaps, the much lower concern with accuracy manifested by the candidates. Apart from that, such changes have perhaps been inevitable since, as Tarone points out, 'The goal of "nativelike accent" has always been problematic, and is increasingly being questioned by researchers and

educators alike. The goal has been problematic because it has apparently been unattainable for virtually all adult second language learners' (Tarone, 2005: 494). In fact, such a stance finds support in research findings which demonstrate that although it is possible to acquire pronunciation skills almost indistinguishable from those of native speakers, they may not be fully available in spontaneous language use, there will always be subtle deviations from the TL, and even a very early start does not guarantee success in this respect (Han & Selinker, 2005; Hyltenstam & Abrahamson, 2003; Ioup, 2005; Long, 2007). To make matters even more complicated for students who wish to approximate the native-speaker model, many pronunciation features, particularly suprasegmentals, operate at the subconscious level (cf. Setter & Jenkins, 2005), which means that conscious study and intensive practice may be insufficient if they are not complemented with copious naturalistic exposure. All of this shows that even at advanced levels, the goals of pronunciation instruction should also be open to negotiation and that students have to be encouraged to become more autonomous in their efforts to master this language subsystem, a point that will be revisited in the concluding section of this chapter.

Irrespective of the nature of goals that are pursued in general foreign language lessons or separate practical phonetics classes, the specific instructional targets and practices chosen by teachers as well as the learning strategies selected by learners are likely to be more effective if they take into account the numerous factors which influence pronunciation learning. Some of these are indeed beyond the control of teachers or learners, but awareness of how they impact the learning process is still crucial as it enables the identification of realistic goals and greatly reduces the danger of disappointment and discouragement. Such variables include:

- *The operation of language universals and developmental sequences*, particularly at later stages of acquisition, as predicted by the *Ontogeny Model* (Major, 2001).
- *Transfer from the L1*, with learners, particularly beginners, relying on their native language sound system in using the TL, and the *Speech Learning Model* (Flege, 1995) predicting that similarity between L1 and L2 segments hinders acquisition.
- *Markedness*, with *unmarked phonological features* (i.e. the more frequent ones) being easier to acquire than *marked ones* (i.e. the less frequent ones), a phenomenon that has been explained by the *Markedness Differential Hypothesis* and *Structural Conformity Hypothesis* (Eckman, 1977, 1991).
- *Age*, with research evidence showing that the period from birth to 6–9 months may be critical for categorical perception whereas that from birth to the age of 6–7 years is crucial for segmental and suprasegmental phonology (Ioup, 2005; Long, 2007).

- *Language aptitude*, with some learners being endowed with superior *phonemic coding ability* (Carroll, 1981) or, in line with the latest developments in the field, possessing greater *working memory capacity* (Gathercole & Thorn, 1998).
- *Cognitive and learning styles*, which may determine whether phonological features are attended to, how they are processed and whether they are successfully acquired, as has been demonstrated for field dependence and field independence (Baran, 2004).
- *Group membership and identity* since learners may wish to retain their native accent as a marker of their identity and, in some cases, the reluctance to improve pronunciation skills may operate at the sub-conscious level (Setter & Jenkins, 2005).
- *Educational context*, with second-language settings which afford copious exposure to the TL being much more conducive to the acquisition of pronunciation than foreign language contexts, where such exposure is severely limited (Pawlak, 2006a).

On the other hand, however, there is also a range of factors affecting pronunciation learning which can be externally manipulated, either through skillful pedagogic intervention designed by teachers or through planned and systematic efforts undertaken by learners themselves. They could be summarized as follows:

- *Goals*, with attainable instructional targets that are consistent with learners' needs and expectations being more likely to result in successful acquisition than such that are perceived as unrealistic (see above).
- *Expectations, needs and preferences*, which can be modified to some extent if teachers explain the importance of good pronunciation for comprehension and production.
- *Motivation*, with teachers having at their disposal numerous motivational strategies that can encourage students to pay more attention to pronunciation and learners for whom mastering this subsystem is important being able to use various self-motivating strategies (Dörnyei, 2001).
- *The amount of in- and out-of-class exposure* since, although it is to a large extent a function of the educational context, teachers and learners can do a lot to increase the quantity and quality of access to the TL (using the L2 in class, extensive listening in students' own time, etc.).
- *Awareness of pronunciation issues*, which has been found to be an important predictor of success in learning pronunciation and can be easily raised in virtually any language classroom (Wrembel, 2003).
- *Selection of targeted pronunciation features*, which has to take into account learners' proficiency level, the problems they experience, L1 influence, curricular requirements and the amount of time available for instruction.

- *Choice of instructional techniques, materials and resources* because some of these are inherently more effective than others or they simply work better with a specific group of learners in a specific setting.
- *Application of effective learning strategies*, which can make learning pronunciation more effective and can be fostered by means of appropriate strategy training programs (Pawlak, 2006b).
- *Monitoring and self-evaluation skills*, which underpin the use of many metacognitive strategies, enhance the effectiveness of independent work on pronunciation and can be successfully developed in the classroom.
- *Adoption of an autonomous approach*, which is necessary for those students who wish to attain native-like pronunciation and can be promoted through strategy training and a number of other means (Pawlak, 2006a).

It is quite obvious that the knowledge of such variables as well as the ways in which they can be appropriately modified is of paramount importance to teachers who can take concrete steps with an eye for enhancing pronunciation instruction. Moreover, it could reasonably be argued that such awareness might be beneficial for learners, especially those representing advanced levels as well as such who place a premium on attaining native-like pronunciation skills.

Naturally, familiarity with both groups of factors is also indispensable for researchers since such variables constitute an important framework for empirical investigations of issues involved in learning and teaching pronunciation. If we examine the scope of such research, however, it becomes evident that most of the studies conducted to date have focused either on various aspects of teachers' instructional practices (e.g. instructional targets, techniques and procedures used for practicing aspects of phonetics, ways of providing corrective feedback, materials and resources, evaluation procedures, etc.) or factors over which learners have no control (e.g. age, interlanguage phonology, transfer, markedness, etc.) (see, e.g. the papers in Sobkowiak & Waniek-Klimczak, 2002, 2003a, b, 2004, 2006a, b as well as the review articles by Goodwin, 2001; Seidlhofer, 2001; Setter & Jenkins, 2005 or Tarone, 2005). In fact, even when students are asked to voice their opinions or express preferences with regard to different aspects of pronunciation instruction, this is typically done with a view to pinpointing the shortcomings of teaching practices and offering advice on how they could be improved to enhance learning. By contrast, even though huge strides have been taken in this area, there is still a paucity of research projects that adopt the perspective of learners, providing insights into how they handle the task of mastering foreign language pronunciation and offering viable guidelines on how they could do it more effectively. The few available studies of this kind have explored such issues as

the use of pronunciation learning strategies (e.g. Eckstein, 2007; Pawlak, 2006b, 2008a; Peterson, 2000; Wrembel, 2008), the effects of training students in the use of such devices (e.g. Bukowski, 2004; Varasarin, 2007), the development of learner autonomy by means of a phonetic portfolio (Szyszka, 2006) and the identification of learner-subjective factors that contribute to successful acquisition (Gonet, 2006). Since, as was emphasized above, the development of superior pronunciation skills is difficult, if not impossible, without learner independence, initiative and involvement, there is an urgent need to pursue this line of enquiry and this was the rationale behind the research project reported in the following sections.

Design of the Study

The present study used data collected for the purpose of a large-scale research project on the application of pronunciation learning strategies, with a view to obtaining insights into how advanced learners of English approach the task of mastering target language pronunciation. In particular, the research project aimed to identify the problems encountered by such learners in dealing with pronunciation features, explore the ways in which they went about solving them and evaluate the outcomes of the decisions they made. The researcher was also interested in the students' response to diary writing, which is not only a useful instrument of collecting data on the employment of learning strategies but also an important tool for promoting reflection and developing learner autonomy.

The subjects were 60 English Department students who were enrolled in the first year of a three-year BA program. Most of them were highly motivated learners who had considerable experience in learning English at prior educational levels, were willing to improve their target language skills and tried to make the most of their classes. This does not mean of course that they did not experience problems with accuracy of the various aspects of their TL production, including pronunciation, a woe which is the corollary of the tendencies referred to above. Although the subjects actively sought contact with the target language outside the classroom, its quality typically left much to be desired as few of them had the opportunity to interact with native speakers and most pointed to television or the Internet as the main sources of additional exposure. It should also be noted that there were a few students who seemed to have chosen English for lack of better alternatives and were not highly motivated either to study its formal aspects, broaden their knowledge about English-speaking countries or develop their TL skills.

The subjects were asked to keep a diary for the period of three months and instructed to record their experiences concerning their efforts to learn English pronunciation at least twice a week. Since it was clear that

insistence on exclusive use of the target language might preclude the less proficient participants from making candid and in-depth comments, thus reducing the validity and reliability of the data, they were allowed to use English or Polish for that purpose. In addition, in order to ensure that the entries provided the type of information the researcher was interested in, the subjects were provided with the following English prompts:

- What do you do to improve your pronunciation?
- What do you do to master various pronunciation features?
- Do you plan what, when and how to learn?
- How do you evaluate your progress?
- What problems do you encounter and how do you solve them?

The data collected in this way were subjected to qualitative analysis which was data driven and consisted in detecting recurrent themes, ascertaining they were representative of the entire corpus and supporting them with appropriate examples. It focused in particular on such areas as setting goals, planning, learning strategies, evaluation, affective states and awareness of pronunciation issues. Although diaries are not without their problems that include, among other things, reluctance on the part of the informants, a high degree of subjectivity, variable depth of entries and difficulties in data analysis (cf. Dörnyei, 2003; Gass & Mackey, 2007; McKay, 2006), they provide invaluable insights into learners' internal processes. As such, they appeared to be a perfect tool for investigating advanced students' successes and failures in their efforts to master various features of English pronunciation.

Research Findings

It has to be pointed out at the very beginning that there was considerable variation when it comes to the number and quality of entries made by the subjects over the three months during which they recorded their experiences. While approximately half of them provided extensive, insightful and candid information that was of undeniable value to the researcher, others made brief and rather superficial comments that did not contribute much to attaining the aims of the study. Moreover, in a few cases, the entries were very similar, which indicates that they could have been copied from other students or at the very least consulted with them, and there was one diary with a single comment, one sentence in length. It also turned out that the decision to give the participants a free hand as to the choice of language was fully warranted since only one informant included comments exclusively in English, several elected to use a combination of both languages, and the vast majority fell back upon Polish. Despite problems of this kind, the diaries provided a wealth of information about the ways in which the students approached the challenge of mastering English

pronunciation and enabled the researcher to more fully understand the causes of their successes and failures.

In the first place, the analysis demonstrated that the vast majority of students were aware of their strengths and weaknesses as well as the goals they wished to achieve with respect to pronunciation. When the relevant entries were carefully examined, it turned out that most of the comments concerned specific segments and L1/L2 contrasts but, what may come as a surprise given the fact that the participants were only beginning to familiarize themselves with pronunciation issues, prosodic features were also quite frequently mentioned. A particularly revealing finding, however, was that in most cases there seemed to exist a close fit between what the students were concerned about and what was taught and tested in phonetics classes. In other words, most of the participants failed to adopt a long-term perspective on learning pronunciation but, rather, chose to confine themselves to the immediate goals pursued during the course and the problems experienced in attaining them. The following excerpts illustrate some of these points:

- *I realized I had problems pronouncing /θ/ and /ð/ sounds.*
- *It is hard for me to remember which syllable is stressed and to use it in a sentence when I speak.*
- *Tomorrow we are having a mock exam. I am practicing the pronunciation of the words I might need.*
- *We are doing diphthongs and I have problems with them.*

Many students who identified their goals also included comments on how they wished to accomplish them, with the caveat that only some plans were sufficiently thought-out and detailed to provide a basis for concrete steps to be taken in the future. What is more, in most cases, the students did not plan far ahead and appeared to confine themselves to an immediate problem, which is consistent with the observation made above that their efforts were mostly guided by the current instructional targets in pronunciation classes and difficulties involved in attaining them. What is particularly disconcerting is that there were also students who did not mention any plan for dealing with the problematic issues and a few even explicitly stated that they did not have the time or intention to focus on specific segmental and suprasegmental features which caused them difficulty. Even though such negative responses were limited to learners who were generally unwilling to do any serious work in the program, the findings are disquieting as one would expect philology students to at least try to eliminate persistent errors from their speech even if pronunciation is not their top priority. Such issues are exemplified by the following entries excerpted from the diary data:

- *I decided to come up with a plan for the winter break in which I would devote at least an hour to learning pronunciation. I have to practice both words and*

whole sentences to be able to stress them in the right way and say them fluently.

- *The test is coming so I have to review all the sounds for it.*
- *I have to say I don't have special time for pronunciation practice. I just do it 'by the way' (original wording).*

The data also provided copious evidence about the strategies that the students utilized in trying to improve their pronunciation and overcoming the difficulties they encountered. While numerous strategic devices were reported in the diaries, most of the students drew upon quite traditional strategies of learning pronunciation such as repetition, formal practice, transcribing words or using a general-purpose or specialist dictionary. As evidenced by the comments that accompanied the description of such strategies, in employing them the students emulated the instructional techniques used by their practical phonetics teachers, thus confirming the pattern that emerged for the choice of learning goals. The results were equally unsatisfactory when it comes to the resources the subjects employ when practicing pronunciation, with most of them mentioning the set coursebooks and only a handful making references to authentic recordings, television programs, computer software or Internet-based materials. The examples below are representative of the strategies most frequently mentioned by the participants:

- *I repeat dialogs using as many words with a new sound as I can.*
- *I read 'King Lear' aloud and look up the pronunciation of some words in a dictionary.*
- *I listened to the recordings from 'Sounds English' and repeated after the texts for about 40 minutes.*
- *I read articles for class and transcribe the new words.*
- *Yesterday, as I always do after a pronunciation class, I practiced the minimal pairs from the book we use.*

On a more optimistic note, there were quite a few students who were aware of the fact that successful pronunciation learning calls for abundant exposure to the target language and opportunities for its spontaneous use, with the effect that they engaged in more naturalistic practice in the classroom and outside. In light of what was said in the theoretical part of this chapter, such realization is indispensable if genuine improvement in pronunciation is expected, learners aspire to gain greater control over suprasegmental features, and explicit knowledge of phonetics is to become available in the real-time processing that is necessary in spontaneous communication. Another promising finding was that some of the participants reported moving far beyond different forms of practice and resorting to more varied and innovative strategic devices. These included the metacognitive strategies of paying attention, self-monitoring and self-evaluation, the cognitive strategies of highlighting and analyzing

contrastively as well as the memory strategies of making associations, representing new sounds in memory and using physical response. Although many of these strategic behaviors may not be equally suitable for all cognitive or learning styles, they surely have a potential for enhancing the effectiveness of pronunciation learning or at the very least making this arduous and often monotonous task far more engaging. Examples of naturalistic practice and more unconventional strategies reported by the subjects follow:

- *I watch the news in English on BBC.*
- *I talk to my American friends using Skype.*
- *I try to use in discussions the words I have learnt to pronounce.*
- *I put cards with the phonetic transcription of sounds in my pockets and pick them at random.*
- *I listen to music in English paying attention to word and sentence stress, intonation and rhythm.*
- *My friend and I set one English day a week, which means that we speak only English.*
- *Recording one's own speech is not a bad idea. I can hear myself and correct the errors.*
- *I compare places of articulation in Polish and English.*
- *I put cards with transcription all over my room.*
- *I look up the pronunciation in an electronic dictionary.*
- *I tap out the rhythm of nursery rhymes as I walk to school.*

Equally promising was the finding that some of the students reported applying elaborate strategy chains and were aware of the need to match strategy use with the requirements posed by a specific task. This is because even an apparently useful strategy may not be very helpful when used in isolation or at a wrong time (e.g. looking up the pronunciation of a word in the course of a communicative task), whereas a seemingly ineffective one may aid the process of learning if it is skillfully incorporated into a logical sequence of strategic devices suitable for the learning challenge (e.g. repeating a word when watching a movie as part of a preplanned strategy chain) (cf. Chamot, 2004). What testifies to the maturity of the participants is also the fact that quite a few of them were cognizant of the need to attend to pronunciation issues not only in phonetics classes but also in practical English and content subjects. Such an approach is commendable as it enables students to make the most of the copious exposure to English in their regular program and to put into practice the metalinguistic information obtained in more theoretical classes. Such themes are illustrated by the following excerpts:

- *I listen to CNN radio. I try to catch words and phrases whose pronunciation and transcription I am not sure about. I repeat them as closely as possible and sometimes look them up in the pronunciation dictionary.*

- *I often go back to the things we did in descriptive grammar to see how particular sounds are articulated.*
- *I try to pay attention to pronunciation in other classes.*
- *Today I learnt for the grammar class irregular verb forms together with their pronunciation. Some sound so similar.*

Although some of the subjects were capable of identifying their immediate concerns and some were apparently adroit at employing the meta-cognitive strategies of self-monitoring and self-evaluation, many of them evidently had serious problems with holistic self-assessment of their pronunciation skills. Such a state of affairs is a cause for concern since it is impossible to set goals, plan the learning process or choose the most suitable strategies without the ability to objectively evaluate one's own skills, not to mention the fact that these are prerequisite for the development of autonomy. Despite the fact that there were certainly students who were able to take stock of what they had accomplished and discern the progress they made, many more openly admitted failure in this respect, with frustration becoming visible in some entries. The excerpts given below illustrate some of these points:

- *I can't hear myself as I read.*
- *I just cannot assess my pronunciation myself.*
- *I think I have definitely made progress in the pronunciation of dental fricatives; I almost always pronounce them correctly, not as /f/ and /d/ as I did before.*
- *I have noticed that I am not making enough progress with pronunciation. This is because I am not systematic enough.*
- *It is difficult for me to organize my time properly!*

The analysis also revealed that affective concerns played a key role for many students, which indicates that more attention should be given to such issues than is currently often the case. In fact, as some of the comments convincingly demonstrated, high levels of anxiety can have a debilitating effect on even quite proficient learners, who may be almost native like in out-of-class encounters but make basic pronunciation errors when performing in class. On the other hand, encouragement from the teacher, the feeling of success or skilful application of self-motivating strategies are likely to work wonders in boosting students' motivation and encouraging them to invest more time and effort in improving their pronunciation. The impact of the affective variable is evident in the entries quoted below:

- *Today I decided to overcome my fear of the sound of my own voice and made a recording of a speech.*
- *There is a problem when I have to speak in class. I forget everything I practiced because of stress.*
- *I was very surprised to find out how 'occur' is pronounced.*

Finally, the longitudinal nature of the study made it possible for the researcher to detect temporal changes in the way the subjects approached learning pronunciation, some of which were rather positive and others quite puzzling, if not alarming. As to the former, it was found that, in course of time, there was an increase in the number of comments which indicated growing awareness of pronunciation issues. Although this tendency could be observed only in some diaries, it is encouraging since awareness of this kind seems to be indispensable for the development of autonomy, it may translate into better learning outcomes and, arguably, it also testifies to the value of diaries as a tool for promoting reflection. As regards the latter, only two students commented on the role of their teachers in learning English pronunciation and these observations were included at the beginning of the three-month period roughly coinciding with the start of the course, which might indicate that the impact the lecturers had on their students' success or failure was much smaller than they would have probably wished for. On the one hand, it could be argued that such a situation testifies to the development of an autonomous approach of the participants as the course progressed. On the other hand, however, the paucity of references to teachers could also mean that what they did in class was of little relevance to the students who chose to look for their own ways of dealing with their problems. The fact that such solutions were often ineffective and fell short of the students' expectations leads one to believe that the latter interpretation is more plausible. This implies that the teacher plays a vital role in ensuring effective pronunciation learning and, in the long run, fostering autonomy with regard to this subsystem. Examples of relevant students' comments follow:

- *I write down pronunciation in Polish but I am not sure now if this technique is as useful as I thought.*
- *I have realized lately how important descriptive grammar is.*
- *Today I asked the teacher about this but I still have the same problem.*

Conclusions and Implications

The diary study described in this chapter addressed the issue of how advanced learners of English approach the task of improving their pronunciation, the problems they encounter, the strategies they employ to deal with them and the impact of their choices on success or failure in achieving instructional targets. The most important findings of the research project can be summarized as follows:

- Many subjects were able to identify their short-term goals but generally failed to come up with long-term plans for improving their pronunciation.

- The participants drew upon a range of pronunciation learning strategies but most of these were rather traditional and not very effective, particularly when used in isolation.
- Only some students were aware of the importance of naturalistic practice in learning pronunciation and reported using more varied strategies for this purpose.
- Only some informants reported using strategy chains and provided relevant examples.
- Some of the subjects pointed to the need to integrate pronunciation instruction with the teaching of other subjects in the program.
- Even though some subjects managed to trace their progress, many others experienced difficulty in accurately self-assessing their overall pronunciation skills.
- Affective factors seemed to play an important role in determining success and failure.
- Some subjects became more reflective with regard to pronunciation learning with time.
- There was a close relationship between what transpired in class and students' actions.
- The subjects apparently perceived the role of the teacher as marginal and sought their own ways of learning, often failing to do so effectively.

On the basis of such results, some of which are promising and others rather disconcerting, it is possible to advance a number of pedagogic proposals which can enhance the effectiveness of pronunciation learning and teaching in foreign languages departments. For one thing, given the interdependence between what happens in pronunciation classes and the decisions made by students with respect to goals, materials and strategies, there is a pressing need to employ more varied instructional techniques which would go far beyond decontextualized practice, encourage naturalistic TL exposure and use, and rely on a multiplicity of resources, including electronic ones. It would also be advisable to pay attention to pronunciation features not only in practical phonetics classes but also in the remaining components of the practical English module as well as content classes, a suggestion that applies in equal measure to the teaching of other subsystems, such as grammar (cf. Pawlak, 2008b). What also appears decisive is greater involvement on the part of pronunciation teachers so that they can effectively guide students, lay more emphasis on affective concerns that sometimes determine the difference between success and failure in a classroom setting, and create ample opportunities for individualizing pronunciation instruction.

The inadequacy of many of the choices and decisions made by the students, however, shows that the most crucial implication of the findings is

that steps should be taken to foster learner autonomy with respect to learning pronunciation. This is because, on the one hand, the mastery thereof requires a high degree of independent practice in the students' own time, but, on the other, their efforts can only be efficacious and successful if they are appropriately directed by the teacher. As Pawlak (2006a) writes, this aim could be achieved in a variety of ways which should be adjusted to the characteristics of a particular group and might include introducing and consistently using the phonetic script, encouraging the use of pronunciation dictionaries, raising students' awareness of pronunciation issues, enhancing self-monitoring and self-evaluation skills, promoting extensive listening and fostering the use of computer software and the Internet. What is of utmost importance with such advanced students is also comprehensive training in effective use of pronunciation learning strategies, the principles of which the present author has discussed in other publications (Pawlak, 2006b, 2008a). In view of the fact that keeping a diary may in itself contribute to stimulating reflection and provide teachers with invaluable information about learning challenges and ways of tackling them, it would also be a good idea to convince students that it is worthwhile to systematically record their experiences. Last but not least, more studies are needed which would explore the process of mastering foreign language pronunciation from the perspective of learners since it is their effort, involvement and overall orientation that ultimately determine their success or failure in gaining control over this subsystem.

References

- Baran, M. (2004) Field independence as a predictor of success in foreign language pronunciation acquisition and learning. In W. Sobkowiak and E. Waniek-Klimczak (eds) *Dydaktyka Fonetyki Języka Obcego w Polsce. Zeszyty Naukowe Państwowej Wyższej Szkoły Zawodowej w Koninie. Zeszyt Naukowy Instytutu Neofilologii* 3 (pp. 11–19). Konin: Wydawnictwo PWSZ w Koninie.
- Baran-Lucarz, M. (2006) Prosto w oczy – fonetyka jako 'Michałek' na studiach filologicznych? In W. Sobkowiak and E. Waniek-Klimczak (eds) *Dydaktyka Fonetyki Języka Obcego w Polsce* (pp. 7–17). Konin: Wydawnictwo PWSZ w Koninie.
- Bukowski, D. (2004) On the training of metacognitive and socioaffective strategies – Some implications for teaching and learning English phonetics. In W. Sobkowiak and E. Waniek-Klimczak (eds) *Dydaktyka Fonetyki Języka Obcego w Polsce. Zeszyty Naukowe Państwowej Wyższej Szkoły Zawodowej w Koninie. Zeszyt Naukowy Instytutu Neofilologii* 3 (pp. 20–27). Konin: Wydawnictwo PWSZ w Koninie.
- Carroll, J.B. (1981) Twenty five years of research in foreign language aptitude. In K.C. Diller (ed.) *Individual Differences and Universals in Language Learning Aptitude* (pp. 83–118). Rowley, MA: Newbury House.
- Chamot, A.U. (2004) Issues in language learning strategy research and teaching. *Electronic Journal of Foreign Language Teaching* 1, 12–25.
- Dörnyei, Z. (2001) *Motivational Strategies in the Language Classroom*. Cambridge: Cambridge University Press.

- Dörnyei, Z. (2003) *Research Methods in Applied Linguistics*. Oxford: Oxford University Press.
- Eckman, F. (1977) Markedness and the contrastive analysis hypothesis. *Language Learning* 27, 315–330.
- Eckman, F. (1991) The structural conformity hypothesis and the acquisition of consonant clusters in the interlanguage of ESL learners. *Studies in Second Language Acquisition* 13, 23–41.
- Eckstein, G.T. (2007) A correlation of pronunciation learning strategies with spontaneous English pronunciation of adult ESL learners. MA thesis, Brigham Young University On WWW at <http://contentdm.lib.byu.edu/ETD/image/etd1973.pdf>. Accessed 15.9.08.
- Flege, J.E. (1995) Second language speech learning: Theory, findings and problems. In E. Strange (ed.) *Speech Perception and Linguistic Experience: Theoretical and Methodological Issues* (pp. 233–277). Timonium, MD: York Press.
- Gass, S. and Mackey, A. (2007) *Data Collection for Second and Foreign Language Research*. Mahwah, NJ: Lawrence Erlbaum.
- Gathercole, S.E. and Thorn, A.S.C. (1998) Phonological short-term memory and foreign language learning. In A.F. Healy and L.E. Bourne (eds) *Foreign Language Learning: Psycholinguistic Studies on Training and Retention* (pp. 141–158). Mahwah, NJ: Lawrence Erlbaum.
- Gonet, W. (2006) Success in the acquisition of English phonetics by Poles (a pilot study). In W. Sobkowiak and E. Waniek-Klimczak (eds) *Dydaktyka Fonetyki Języka Obcego w Polsce* (pp. 70–88). Konin: Wydawnictwo PWSZ w Koninie.
- Goodwin, J. (2001) Teaching pronunciation. In M. Celce-Murcia (ed.) *Teaching English as a Second or Foreign Language* (pp. 117–138). Boston: Heinle & Heinle.
- Han, Z.-H. and Selinker, L. (2005) Fossilization in L2 learners. In E. Hinkel (ed.) *Handbook of Research in Second Language Teaching and Learning* (pp. 455–470). Mahwah, NJ: Lawrence Erlbaum.
- Harmer, J. (2007) *The Practice of English Language Teaching* (4th edn). Harlow: Pearson Education.
- Hyltenstam, K. and Abrahamson, N. (2003) Maturation constraints in SLA. In C.J. Doughty and M.H. Long (eds) *The Handbook of Second Language Acquisition* (pp. 539–588). Malden, MA: Blackwell.
- Ioup, G. (2005) Age in second language development. In E. Hinkel (ed.) *Handbook of Research in Second Language Teaching and Learning* (pp. 419–435). Mahwah, NJ: Lawrence Erlbaum.
- Leather, J. (1999) Second language speech research: An introduction. In J. Leather (ed.) *Phonological Issues in Language Learning (Language Learning 49, Supplement 1)* (pp. 1–58). Malden, MA: Blackwell.
- Long, M.H. (2007) *Problems in SLA*. Mahwah, NJ: Lawrence Erlbaum.
- Major, R.C. (2001) *Foreign Accent: The Ontogeny and Phylogeny of Second Language Phonology*. Mahwah, NJ: Lawrence Erlbaum.
- McKay, S. (2006) *Researching Second Language Classrooms*. Mahwah, NJ: Lawrence Erlbaum.
- Morley, J. (1999) New developments in speech/pronunciation instruction. *As we speak* 2, 1–5.
- Pawlak, M. (2003) Nauczanie wymowy na lekcjach języka obcego w szkole średniej z perspektywy nauczyciela. In W. Sobkowiak and E. Waniek-Klimczak (eds) *Dydaktyka Fonetyki – Teorie a Praktyka. Zeszyty Naukowe Państwowej Wyższej Szkoły Zawodowej w Koninie. Zeszyt Naukowy Instytutu Neofilologii 2* (pp. 60–67). Konin: Wydawnictwo PWSZ w Koninie.

- Pawlak, M. (2006a) The place of learner autonomy in pronunciation instruction. In W. Sobkowiak and E. Waniek-Klimczak (eds) *Dydaktyka Fonetyki Języka Obcego. Zeszyty Naukowe Państwowej Wyższej Szkoły Zawodowej w Płocku. Tom VII* (pp. 131–143). Płock: Wydawnictwo Naukowe PWSZ w Płocku.
- Pawlak, M. (2006b) On the use of pronunciation learning strategies by Polish foreign language learners. In W. Sobkowiak and E. Waniek-Klimczak (eds) *Dydaktyka Fonetyki Języka Obcego w Polsce* (pp. 121–135). Konin: Wydawnictwo PWSZ w Koninie.
- Pawlak, M. (2008a) Another look at pronunciation learning strategies: An advanced learner's perspective. In E. Waniek-Klimczak (ed.) *Issues in Accents of English* (pp. 304–322). Newcastle upon Tyne: Cambridge Scholars Publishing.
- Pawlak, M. (2008b) Advanced learners' use of strategies for learning grammar: A diary study. In M. Pawlak (ed.) *Investigating English Language Learning and Teaching* (pp. 109–125). Poznań – Kalisz: Adam Mickiewicz University Press.
- Peterson, S. (2000) Pronunciation learning strategies: A first look. Unpublished research report (ERIC Document Reproduction Service ED 450 599, FL 026 618).
- Seidlhofer, B. (2001) Pronunciation. In R. Carter and D. Nunan (eds) *The Cambridge Guide to Teaching English to Speakers of Other Languages* (pp. 56–65). Cambridge: Cambridge University Press.
- Setter, J. and Jenkins, J. (2005) Pronunciation. *Language Teaching* 38, 1–17.
- Sobkowiak, W. and Waniek-Klimczak, E. (eds) (2002) *Dydaktyka Fonetyki Języka Obcego. Zeszyty Naukowe Państwowej Wyższej Szkoły Zawodowej w Płocku. Tom III*. Płock: Wydawnictwo Naukowe PWSZ w Płocku.
- Sobkowiak, W. and Waniek-Klimczak, E. (eds) (2003a) *Dydaktyka Fonetyki – Teoria a Praktyka. Zeszyty Naukowe Państwowej Wyższej Szkoły Zawodowej w Koninie. Zeszyt Naukowy Instytutu Neofilologii 2*. Konin: Wydawnictwo PWSZ w Koninie.
- Sobkowiak, W. and Waniek-Klimczak, E. (eds) (2003b) *Dydaktyka Fonetyki Języka Obcego. Zeszyty Naukowe Państwowej Wyższej Szkoły Zawodowej w Płocku. Tom III*. Płock: Wydawnictwo Naukowe PWSZ w Płocku.
- Sobkowiak, W. and Waniek-Klimczak, E. (eds) 2004 *Dydaktyka Fonetyki Języka Obcego w Polsce. Zeszyty Naukowe Państwowej Wyższej Szkoły Zawodowej w Koninie. Zeszyt Naukowy Instytutu Neofilologii 3*. Konin: Wydawnictwo PWSZ w Koninie.
- Sobkowiak, W. and Waniek-Klimczak, E. (eds) (2006a) *Dydaktyka Fonetyki Języka Obcego. Zeszyty Naukowe Państwowej Wyższej Szkoły Zawodowej w Płocku. Tom VII*. Płock: Wydawnictwo Naukowe PWSZ w Płocku.
- Sobkowiak, W. and Waniek-Klimczak, E. (eds) (2006b) *Dydaktyka Fonetyki Języka Obcego w Polsce*. Konin: Wydawnictwo PWSZ w Koninie.
- Szpyra-Kozłowska, J., Frankiewicz, M. and Gonet, W. (2002) Aspekty fonetyki angielskiej nauczane w polskich szkołach średnich. In W. Sobkowiak and E. Waniek-Klimczak (eds) *Dydaktyka Fonetyki Języka Obcego. Zeszyty Naukowe Państwowej Wyższej Szkoły Zawodowej w Płocku. Tom III* (pp. 9–27). Płock: Wydawnictwo Naukowe PWSZ w Płocku.
- Szyszcza, M. (2006) Phonetic portfolio – Towards learner autonomy. In W. Sobkowiak and E. Waniek-Klimczak (eds) *Dydaktyka Fonetyki Języka Obcego w Polsce* (pp. 239–246). Konin: Wydawnictwo PWSZ w Koninie.
- Tarone, E. (2005) Speaking in a second language. In E. Hinkel (ed.) *Handbook of Research in Second Language Learning and Teaching* (pp. 485–502). Mahwah, NJ: Lawrence Erlbaum.
- Varasarin, P. (2007) An action research study of pronunciation training, language learning strategies and speaking confidence. PhD dissertation, Victoria

- University. On WWW at: <http://wallaby.vu.edu.au/adt-VVUT/uploads/approved/adt-VVUT20070911.162030/public/01front.pdf>. Accessed 15.9.08.
- Wrembel, M. (2002) Miejsce fonetyki języka angielskiego w szkole – implikacje dla kształcenia nauczycieli. In W. Sobkowiak and E. Waniek-Klimczak (eds) *Dydaktyka Fonetyki Języka Obcego. Zeszyty Naukowe Państwowej Wyższej Szkoły Zawodowej w Płocku. Tom III* (pp. 29–40). Płock: Wydawnictwo Naukowe PWSZ w Płocku.
- Wrembel, M. (2003) Rola metakompetencji w akwizycji fonologii języka obcego w świetle badań dotyczących efektywności procesu nauczania wymowy. In W. Sobkowiak and E. Waniek-Klimczak (eds) *Dydaktyka Fonetyki – Teorie a Praktyka. Zeszyty Naukowe Państwowej Wyższej Szkoły Zawodowej w Koninie. Zeszyt Naukowy Instytutu Neofilologii 2* (pp. 150–158). Konin: Wydawnictwo PWSZ w Koninie.
- Wrembel, M. (2008) In search of effective strategies for L2 pronunciation teaching and learning. In M. Pawlak (ed.) *Investigating English Language Learning and Teaching* (pp. 179–194). Poznań – Kalisz: Adam Mickiewicz University Press.