READING AND SPELLING ACQUISITION IN POLISH: EDUCATIONAL AND LINGUISTIC DETERMINANTS

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Abstract. The process of reading and spelling acquisition, especially at the initial stage, is determined by the linguistic features of a given language and differs in various orthographic systems. However, the fundamental stages are assumed to be the same in all languages. Linguistic awareness plays a crucial role in the early stage of this process. The aim of this paper is to propose a model of acquiring reading and spelling skills in Polish children. The model shows the course of the process and takes into account essential elements of language awareness.

The basis for this model are the authors' research results concerning reading and spelling acquisition by Polish children aged 5-8. In the discussion, the authors try to find out if the model of reading and spelling acquisition in Polish is different than in others languages, and if this is the case, what determines it.

The comparison studies on the acquisition of both skills in European languages, especially in English and Polish, prove that there are some differences conditioned mainly by the way in which script is introduced to Polish children, as well as the features of the Polish language system. The specificity of reading acquisition in Polish language consists in omitting the logographic phase, distinguished in English-language models (e.g. Frith 1985), and the specificity of spelling acquisition – in exceptions from the standard spelling which are generally similar, but differently conditioned. The research of linguistic conditions of reading in the early stage of life also shows interesting dependencies, slightly different than in English-speaking children, concerning cognitive predictors and reading correlates, as well as reading strategies used by children.

1. INTRODUCTION

Reading and writing constitute a linguistic form of communication and its substance is the script, i.e. a sequence of graphic signs governed by rules specific for a given language. Reading and writing may be discussed from multiple research per-

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spectives. From the scientific point of view, the approximation of two perspectives turned out to be very fruitful: the psychological and the linguistic perspective. Psychologists and linguists dealing with reading and writing have different objects of study: linguists – the language, the script or the text, whereas psychologists – psychical (cognitive) processes. The combination of linguistic investigation on the manner in which orthography reflects the structure of a given natural language and psychological investigation of the manner in which children learn to read and write allowed for a specification of new research problems. These include questions about the manner in which individual script systems and their orthographies influence the development of reading and writing skills and about the common fundamentals and specific features of acquiring such skills in various linguistic systems and their orthographies (Perfetti, Rieben, Fayol, 1997, eds.; Joshi, Leong, Kaczmarek, 2003, eds.; Leong, Joshi, 1997, eds.).

Reading and writing, as forms of linguistic communication, represent two contrary (to a certain degree), yet at the same time supplementary, directions of information flow. Reading consists in decoding graphic signs and their translation into the signs of the language, i.e. a transfer from a written word to the meaning. In this respect, writing is a reverse activity: signs of the language are encoded into graphic signs.

Convictions regarding dependence between reading and writing are located in an area between complete negation of mutual dependencies and acknowledgement of complete analogy. Followers of the opinion about close relations between reading and writing (Perfetti, 1997; Ehri, 2000) call reading and writing *two sides of a coin*. They point out the common basis of the two processes, i.e. knowledge about word forms of a given language (common lexicon) and knowledge about how speech is related to script. Both activities rely on the printed word; both use orthographic and phonological factors and in both of them skills are acquired along with experience. Reading and writing rely on the same cognitive processes, even though they go in different directions. Antagonists of the view on close relations between reading and writing (Bosman, Orden, 1997) emphasise differences between the cognitive processes involved in these two activities. They prove that writing is more difficult than reading, as many people are able to read something, but they cannot write it correctly. They claim that reading appears earlier than writing because perception skills are prior to expressive skills. Their conviction about the core of the two processes is manifested in the following statement: *spelling and reading are not quite opposite sides of a coin* (Shankweiler, Lundquist, 1992: 179). Undoubtedly, spelling requires greater orthographic and linguistic awareness than reading and the ability to write is more helpful for reading skills than reading is for writing. From the psycholinguistic perspective, the processes involved in both activities share some common knowledge-based strategies (Parodi, 2007).

Reading and writing, as forms of communication relying on the language, constitute a linguistic activity, but are, at the same time, metalinguistic, metacognitive and metapragmatic activities. Metalinguism means that both activities rely on an

awareness of the script (its functions and relations between the print and the word), the *grapheme-phoneme* relation and linguistic means used to formulate statements and their control. Metacognitive activity requires conscious control of the cognitive processes involved in this activity, for example related to control of the accomplished purpose. Reading and writing are also (meta)pragmatic activities, as they require the ability of purposeful use of written texts and control of their application from the point of view of personal and supra-individual objectives.

The purpose of this work is to present a model of the acquisition of reading and writing skills in Polish children. This model presents the course of the process and takes into account significant elements of linguistic awareness, and its basis is the analysis of research results of the authors on the acquisition of reading and writing by children aged 5-8 performed from the linguistic and psychological perspective (Awramiuk, 2006, 2007, 2011; Krasowicz-Kupis, 1999, 2004, 2008). It is not possible to present in this article all the detailed results and data from five different studies, but we decided to take advantage of the overall results and conclusions to build a model of reading and writing (spelling) acquisition based on a metaanalysis.

In the comparative remarks, the authors try to discover whether the model of reading and spelling acquisition in the Polish language is different than in other languages and if so, what are the determinants of such differences. The description of our own studies is preceded by a brief introduction to models of reading and writing in other languages, the features of the Polish language and the ways of introduction to the script core in Poland.

1.1 Models of Acquiring Reading and Writing Skills

There are many models and theories on the acquisition of reading and writing. Acquisition of reading skills has usually been described independently from writing. In this place, we will only sketch these, which constitute a reference to the proposed model of acquiring reading and writing skills in the Polish language.

Utha Frith (1985), in the model of acquisition of written communication, which she prepared and which assumes an individual nature of this process, states that a child, when acquiring the skill of efficient reading, goes through three subsequent stages: logographic, where access to meaning takes place without phonology, visually, whereas reading consists in guessing; alphabetic, where the child learns the *grapheme-phoneme* relation and starts to read via phonology, and orthographic when automation of the reading process takes place and the child analyses known words as graphic units, referring them to the mental lexicon. The first stage, logographic, ends when the child discovers that a word is not an accidental group of letters, but a planned sequence, and script encodes not only meaning, but individual sounds. The occurrence of this stage and its duration are conditioned by the individual experiences of a child. Bastien-Toniazzo and Jullien (2001) conducted studies of French speaking children. They confirmed the existence of this stage, but

also showed significant individual diversification. Researchers confirm that this stage is of key importance for building knowledge about the core of script.

This model is frequently analysed in studies conducted on various languages and is not always confirmed (extensive literature quoted by Bastien-Toniazzo M., Jullien S. 2001). Verification of this model on the Polish population (Sochacka 2004; Sochacka, K. & Krasowicz-Kupis G. 2003; Krasowicz-Kupis 1999) was also provided, which will be described in detail in the part 4. Polish results did not confirm the presence of the logographic phase and indicated the stronger influence of phoneme skills on the very early stage of reading acquisition.

The majority of older English-language models regarding the acquisition of writing skills, in spite of differences in nomenclature, similarly characterise its course as a process of going through subsequent stages. First, children rely on phonological information and in the course of time they start using orthographic and morphological information (Henderson, 1985; Gentry, 1982; Ehri, 2000).

It is worth mentioning that stage models were criticised for the fact that when describing the process of acquiring reading and writing skills as subsequent stages of using information of various types, they do not account for the skills and potential of children. Children who learn to read may, similarly to adults, select a strategy that is more appropriate on account of style (more synthetic or analytic) of information processing (Treiman and Baron, 1981). Significant quality differences in children's reading testify to the selection of such strategies individually. Also, Goswami and Bryant (1990) suggest that on account of individual differences, children acquire a distinctive reading style (individual, differing from others) at their own pace. On the other hand, children learning to write may use various strategies and types of information at the same time (Bourassa & Treiman, 2001; Treiman and Cassar, 1996, 1997).

1.2 Characteristics of the Polish Language vs. Reading and Writing Acquisition

The process of learning to read and write, especially at the initial stage, is determined by the characteristics of a given language and differs in individual orthographies (Bourassa, Treiman, 2001; Sprenger-Charolles, 2004; Titos et al., 2003; Spencer & Hanley, 2003). Differences among linguistic systems result in the fact that in every language the pre-literate phonemic sensitivity of children commencing education is different. In the course of time, the sensitivity changes, depending on the script system that a child is getting to know, as the orthographic system has an essential impact on the shaping of awareness of the basic units of a language. Comparative studies on the acquisition of reading skills in thirteen European languages (Seymour, Aro, Erskine, 2003) confirm that differences in the acquisition process depend primarily on the characteristics of the spoken language and type of orthog-

raphy. In opaque orthographies[1], reading and writing acquisition poses definitely more difficulties than in shallow orthographies and linguistic awareness also develops differently.

Morphological alternations are numerous and systemic in Polish. This property has significant consequences for reading and writing acquisition: it causes changes of words in a given context (cf. *ręka*, but *rąk*, *ręce*). The inflectional nature of Polish, which is related to changes in graphic representation of forms of one lexeme in a written text, results in the fact that the global method becomes of little efficiency. On the other hand, the consonantal character of the Polish language and the variety of syllable structures, especially the presence of consonantal confluences, cause difficulties in phonological segmentation. The properties of syllables and their number in a word result in the fact that a syllable in initial reading and writing acquisition may only play an auxiliary role.

The properties of the Polish accent result in the fact that division of a sentence into words in speech is not as easy as in script. Automatic segmentation in speech is impossible due to consonance, which, being identical on the phonic level, may offer several interpretation possibilities and therefore – several orthographic transcriptions (cf. *skóry* or *z kury*). Polish spelling may be called phonetic/morphological. The Polish alphabet has 32 letters, out of which 9 have diacritics (e.g. Ś, Ę). The Polish language, to mark its approx. 40 phonemes, uses 44 graphemes, due to the fact that apart from individual letters, it also uses 12 compound graphemes (e.g. SZ, NI, DZI). Among Polish graphemes, there are pairs referring to the same phonetic unit (e.g. Ó – U, Ś - SI) and such graphemes shall be called equivalent. Bilateral exceptionless conformity (both for the *grapheme–phoneme* relation, as well as for the *phoneme–grapheme* relation) refers to just two units: /a/ ↔ A, /l/ ↔ L. The majority of remaining graphemes are consistent in reading, even though correct reading requires an analysis of the closest graphic context. In writing, inconsistent units constitute a large group, whose notation is not always predictable (e.g. Ą-ON-OM-OŃ, SZ-Ż-RZ). This means that knowing the basic principles of the Polish language (similarly to other alphabetic scripts), it is easier to read a given word than to write it down. A specific function in Polish notation is played by the letter 'I', which signals modification of the preceding sound. Due to the fact that the same character denotes a vowel, children tend to have difficulties with understanding its multifunctionality and separating the letter 'I' from its original function. Summing up, it may be stated that the Polish script system is not as shallow as Italian or Finnish, but it is also not as opaque as English or French.

[1] *'Shallow' or 'transparent' orthography means orthography with consistent grapheme–phoneme correspondences, deep or 'opaque' orthography – orthography containing more inconsistent correspondences, where individual graphemes represent a number of different phonemes in different words, and there are many exceptions to grapheme–phoneme correspondence rules.*

A linguistic unit represented most regularly in script is a word. The reliance of script on morphological principles results in the fact that the relation between a grapheme and a phoneme acquires consistency when a semantic unit is taken into account – a morpheme, which sometimes may constitute a one-syllable word. The core of a transparent alphabetic script results in the fact that in the course of reading and writing acquisition, the simultaneity of analysis and synthesis processes (decoding and encoding) is important, along with visual and auditory information.

1.3 Introduction to the Script Core in Poland

The features of a linguistic system influence linguistic awareness and determine perception, yet, apart from linguistic conditions, the ways of introducing children to the core of script are definitely important for initial reading and writing acquisition (Pasa & Morin, 2007; Martins, 2007; Vasconcelos Horta & Alves Martins, 2011). In Poland, learning to read and write is dominated by the analytical and synthetic method in its lexical variety. This means that the basis of analysis (visual or auditory) and, subsequently, synthesis, is a word containing the introduced letter or sound. Phonemic analysis exercises consist in the auditory separation of sounds in a word.

During the studies conducted by the authors of the text, children used to start learning to read and write in Poland at the age of 6[2]. At the preparatory stage during kindergarten, in the so-called zero grade (in a kindergarten or at school), readiness to read and write was shaped by development of basic psycho-physical functions. Phonematic listening was taught, articulation was improved, along with the skill of performing visual and auditory analysis and synthesis. In the zero grade, children were acquainted with 22 printed letters, small and capital, and the introduction of the letter material relied on basic words. The kindergarten education programme did not foresee teaching of the script. At this stage, children only performed exercises improving their hand skills.

In the first grade, at the primer stage, all letters are reminded. Independently from the name of the educational stage, methodology of introducing script has not been changed. The process of getting to know letters usually commences with the introduction of letters denoting vowels (e.g. A, O and Ę), which facilitates the process of sound analysis and synthesis of words due to the fact that vowels are sylla-

[2] *In 2009, the school age was lowered in the Polish educational system. 5-year-olds attend one-year kindergarten preparation courses, whereas 6-year-olds go to school (1st grade), where they commence formal education with respect to letters, reading and writing. This means that in the current education system, learning in the 1st grade is equivalent (on account of age and the introduction of reading acquisition) to the former zero grade. The change also refers to the introduction of writing acquisition already in the 1st grade, i.e. in children whose age corresponds to the former zero grade. Readers interested in a broader context of the Polish educational system may refer to Awramiuk's work (2002).*

ble-forming elements; subsequently, single letters denoting consonants are introduced (e.g. M, T, B). Finally, children become acquainted with compound graphemes, i.e. several letters denoting one sound (e.g. SZ, CZ) and soft consonants which have dual marking (e.g. Ś – SI). Reading acquisition commences with short texts containing words with a simple phonetic structure compliant with the script; later, more natural texts are introduced.

At the post-primer stage, automation of the reading technique takes place. Technical aspects of reading are abandoned for the sake of reading with understanding. At this stage, the importance of working with the text is increased. At the subsequent stage of education, learning to read and write is systematically improved.

2. STUDIES ON ACQUISITION OF WRITTEN COMMUNICATION IN POLISH

The results of several studies conducted by the authors in recent years were used for formulating the acquisition model of written communication in Polish. There were many studies provided from different methodological perspectives. Studies on reading, including one cross-sectional study and one longitudinal project, encompassed children aged 6- 8, were conducted by Krasowicz-Kupis (1999, 2004, 2008). Studies on writing, including one longitudinal case study and two cross-sectional study projects, encompassed children aged 5-8, were conducted by Awramiuk (2006; 2011). A breakdown and the characteristics of such projects are presented in Table 1.

In all the described studies, all the children were native Polish speakers. The children came from a wide range of backgrounds. In the both reading studies and in the both cross sectional spelling studies, the groups were representative for the population of children of the chosen age. The socioeconomic background did not have a significant influence on the level of analysed variables (Krasowicz-Kupis 1999, 2006; Awramiuk 2006).

The projects of both authors referred to the acquisition of written communication by Polish children in a similar age – from the pre-literacy phase to relative proficiency. In both studies, the importance of factors related to the language and the specific character of spelling were taken into account. What is more, interpretations referred to comparisons with studies conducted on English-speaking children. The aspect that distinguished both projects was a more linguistic orientation in Awramiuk's studies, and a psychological orientation in the studies of Krasowicz-Kupis in methodology and analyses. Due to the reasons mentioned, a comparative analysis of the detailed data received in all these studies is not possible, but the metaanalysis of the results and qualitative conclusions of all these projects is very useful to formulate more general conclusions and models.

Irrespective of the above-mentioned differences, in summary the objectives of both projects may be described as:

- a description of development changes with respect to reading and writing acquisition in the period preceding formal writing and reading instruction, at the end of the second school year;
- a description of the ways of acquiring the fundamentals of spelling and the script system from the perspective of reading and writing;
- showing the cognitive and primarily linguistic determinants for the success of reading and writing acquisition, mainly linguistic awareness.

Table 1. Characteristics of studies on acquisition of reading and writing in Polish language

	Procedure	Age of the participants	N	Educational level	Main aim
1st reading study	Cross - sectional study	Mean age 6;9	485	After a few months of formal reading instruction	Description of reading functions on this age level
2nd reading study	Longitudinal study	Age from 6;6 to 8;0	120	Start: before formal instruction Final: after two years of learning to read	Description of development of reading skills and its determinants
1st spelling study	Longitudinal case study	Age from 5;2 to 7;3	Case study	Before formal instruction	Description of development of writing skills and their determinants
2nd spelling study	Cross - sectional study	Mean age 6;8	66	Before formal instruction	Description of development of writing skills and its determinants
3rd spelling study	Cross-sectional study	Mean age 7;8	103	After few months of formal spelling instruction	Description of errors in scripts and their determinants

Reading was evaluated on the basis of standardised tools, whereas writing on the basis of analysis of the materials like free and oriented children's spelling examples. Both approaches allowed for the conduct of qualitative and quantitative analysis of the obtained results. Data from studies regarding reading and writing were collected in various manners, yet their breakdown allows for the formulation of consistent conclusions and a proposal of a model for acquiring written communication.

2.1 Reading Studies: brief description

Reading study 1 – the cross sectional one – encompassed a group of children attending a kindergarten class preparing them for school education. At the moment the study was conducted, the children had been learning to read for a few months. The study encompasses an evaluation of familiarity with letters, reading of single words, reading of texts and an evaluation of comprehension, as well as reading of pseudowords and naming speed. Additionally, IQ and the level of visual perception were controlled (Krasowicz-Kupis, 2006).

Reading study 2 – the longitudinal one – starts when children had not begun to learn to read. At that time, the linguistic awareness tasks were administered. The project lasted for three years. The children were seen in four sessions. The children were 6 years 6 months and 7 years old, respectively, in the first two sessions. In the first session a phonological assessment was conducted, while in the second and the next three sessions reading tests were given. A multiple regression analysis was conducted. So – we had one set of predictive measures (phonological awareness skills) and three sets of outcome measures (reading on three educational levels – from the first to the third grade). IQ and phonological memory were controlled.

The children's phonological skills were assessed on three levels – syllabic, intrasyllabic and phonemic. *On the syllabic level,* syllable analysis, syllable blending and syllable deletion tasks were used. *On the intrasyllabic level,* four tasks were used: rhyme oddity, alliteration oddity, rhyme production, and alliteration production. *On the phonemic level,* children were assessed by using phoneme discrimination task, phoneme analysis and blending, and phoneme deletion. Most of them were Polish standardised tests. Assessment of reading was based on decoding tasks, for example a standardised Polish test (Konopnicki, 1961), in which children are given a list of words to read aloud in one minute. The score represents the speed and accuracy in decoding words or a test of pseudo-word reading Latysz (Bogdanowicz et al., 2009).

The results of **reading study 1** (reading ability at the start of formal instruction) show that the majority of children, at the threshold of learning to read and write, recognise most letters and that after several months of learning to read, the level of reading is very varied. In the group, there were children who were able – within one minute – to read approx. 30 words, as well as children who were not able to perform a synthesis of letters/sounds at all (Krasowicz-Kupis, 2006). This indicates significant inter-individual variation of reading skills at this early stage and confirms that reading ability is at the shaping stage. On this level, an analytical strategy is dominant – naming letters in a given word without synthesis of them into the word.

Analyses of results regarding reading in **reading study 2** show: significant differences between results in children prior to the commencement of formal instruction. At subsequent stages of education, gradual changes take place towards global strategies, which become dominant in the third year of education. Also, important

changes in reading strategy were observed at the initial stage, the analytical strategy of "letter-by-letter" is dominant; there are some attempts at global reading, yet rarely successful – combining letters into a word. Important confirmation for dominant reading strategies at individual stages was the varied measure of predictiveness of phonological awareness for reading.

To explore patterns of correlation between all measures of phonological abilities that were used in the study, a Varimax rotated factor analysis was conducted and four factors emerged. The first one, the PHONEME FACTOR, was most strongly connected with most of the phoneme tasks and the second one, the RHYME AND INTENTIONAL MANIPULATION FACTOR, was connected with all rhyme tasks, syllable deletion tasks and phoneme discrimination in pseudo-words. The third SYLLABLE FACTOR was most strongly connected with syllable analysis tasks and the fourth LEXICAL FACTOR with syllable blending and phoneme discrimination in words.

To describe the predictivity of early linguistic abilities in reading, a regression analysis was conducted in which the outcome measures were reading in the first, second and third year. In all regressions, the first four steps were phonological memory, IQ, the children's gender and socioeconomic background: the final step was one of initial linguistic (phonological) tasks. Taking into account the predictivity of linguistic measures of reading, it should be said that only the phoneme and syllable factors were significant predictors. The rhyme and lexical factors were not significant predictors of reading success during first two years at school, but the lexical factor was the significant one in the third year. The above results show the links between early phonological abilities and success in reading in the first three years of schooling.

The next important result of reading study 2 was the detailed description and characteristics of reading ability on different levels of education, especially the differences in the strategy used by children and the effectiveness of reading. On the basis of the results mentioned above, a part of the model of reading and spelling acquisition was created. This model is presented in part 3 of this paper.

2.2 Spelling Study: brief description

Spelling study 1 (longitudinal case study) consisted of a two-year observation of a girl who, at the moment of commencement of the study was 5 years and 2 months old and attending kindergarten. The study ended during the summer holiday preceding commencement of instruction in the first grade when the child was 7 and 3 months old. The proper objects of analysis are 24 pieces of work of the examined girl (e.g. hand-made greeting cards, a summer holiday diary, individual notes, self-written poems and songs). Such texts were created spontaneously, even though the girl was encouraged to write independently and showed a strong need to express herself in writing. The materials derived from the child were analysed with respect to developmental aspects.

Spelling study 2 encompassed children before the commencement of writing instruction and consisted in initiating children's activity and encouraging them to spontaneous written statements (e.g. the children 'wrote' their first fairy tale and signed their pictures), and the performance of two experiments.

The purpose of experiment A was to analyse the manner of writing and determine the reasons for which children who commerce to write in Polish omit vowel letters. The children's task was to write, with the use of an alphabet with detachable letters, 12 words with a simple phonological structure and a consistent relation between the grapheme and the phoneme. Such words created four series examining the notation manner of sounds [c], [d], [r] and [k] in various phonological contexts. Each series consisted of three words belonging to one of the following groups:

- group I – words containing a sequence corresponding to the name of the letter;
- group II – words containing the *Cy* sequence, most difficult to divide on account of the manner of teaching (so-called unofficial name of the letter);
- group III – words with a neutral phonological context.

The purpose of experiment B was to diagnose the level of graphotactic awareness, i.e. specifically checking whether children who have not yet commenced to learn to read and write at schools show intuition regarding potential combinations of letters in the Polish language. The experiment consisted in an evaluation of four pairs of pseudo-words which created two groups: group I contained a sequence of letters possible in the Polish language (e.g. TAB, AMA, whereas group II – a sequence of letters improbable in the Polish language (e.g. YDK, AOA).

Spelling study 3 encompassed children in the first grade. The analysed linguistic material primarily consisted of the free answers of children to a subject suggested by the teacher, as well as work created when writing from memory and dictation. The subject of the answers referred to the manner of spending free time (e.g. favourite games in the snow), made-up stories (e.g. writing own fairy tale). Writing samples collected in the course of three months from children from four first grade classes were subject to observation. Mistakes made by children were analysed statistically.

The results of **spelling study 1**, i.e. two-year observation of a child, allowed for a closer look at the stage of shaping the awareness regarding the core of script. At the beginning, the notes of the child were dominated by a phonetic strategy, incomplete transcription and the number of omitted letters showed a relation to the length of a word. Compound graphemes posed a significant difficulty for the child; they often featured omissions, e.g. SKOŁY 'szkoły' – *schools* or an incorrect sequence of elements, e.g. DIZADEK 'dziadek' – *grandfather*. The child had greatest problems in determining the relation between the sound and a letter with respect to the separation of the letter Y in sequences rendering combination CV (e.g. BĆ 'być' – *to be*) and the multi-functionality of the letter I (e.g. KOŃEC 'koniec' – *the end*).

Awareness of the existence of equivalent graphemes used to denote sounds [u], [ž], [χ] was shaped over a long time. Initially, the child wrote down all words in an identical manner, choosing the easier variant, i.e. individual letters and not digraphs, e.g. MARHEWKA 'marchewka' – *carrot*. For a short interim period, the girl 'superimposed' two manners of transcription, e.g. RŻEBY 'żeby' – *that*, and later used two forms of notation (obviously, not always correctly), in order to finally ask questions in case of doubts: *How do you spell that?* By asking such a question, she showed the beginnings of orthographic awareness. Emergence of such awareness was also evidenced by a co-existence, in one text, of several graphic variants of a single word, one of which proved the application of the phonetic strategy (e.g. FSZTKO 'wszystko' – *all*), and the second taking orthographic and morphological aspects into account (WSZTKO).

The growth process of morphological awareness was also observed in the writing of individual endings. The first correct attempt at spelling the letters Ą and Ę by the observed child referred to morphologically motivated nasality, i.e. denoting the first person singular form of verbs in the present tense (e.g. BAWI**Ę** 'bawię' – *I play*). In speech, the word-final sound is pronounced as [e], so the use of the letter Ę does not take place as a result of hearing it. On the other hand, the word-final grammatical morpheme *-ów* (plural Genitive) was first transcribed phonetically as *-uf*; in the course of time, it started to appear in two written versions: -ÓW and -UW, e.g. POMIDOR**ÓW** – *tomatoes*, OGÓRK**UW** 'ogórków' – *cucumbers*. Attention is drawn to the fact that in spite of hearing [f] in the word-final position, in the morpheme *-ów,* the child consistently started to transcribe this sound in line with the standard, i.e. with the use of W.

In **spelling study 2**, divergences in the level of preparation for reading and writing in children were striking. Among six-year-olds, there were children dealing excellently with sound analysis and synthesis, making independent attempts at reading and writing and children who completely failed to cope with such tasks.

In experiment A, slightly over 21% of children were not able to render the phonological structure of even the simplest words. Deformities in the graphic form of words most frequently consisted of omission of a letter (almost 80% of all mistakes); among such mistakes, the vowel letter from group II, i.e. Y, was omitted most frequently (e.g. MOTL 'motyl' – *butterfly*). The frequency of individual vowel letters in the examined words did not justify the disproportion between omission of the letter Y and omission of other vowel letters.

In experiment B, the number of indications of pseudo-words, whose letter structure is probable in the Polish language was clearly higher than indications of pseudo-words whose structure is not consistent with the Polish spelling system. Most children noticed the improbability of a sequence consisting of three vowel letters (e.g. AOA) or three consonant letters (e.g. DGB); slightly fewer noticed the improbability of a sequence starting with Y (e.g. YDK). The most difficult task was evaluation of three-element sequences containing a vowel (e.g. TAB – probable sequence, BTA – improbable sequence).

In **spelling study 3**, mistakes regarding the manner of reflecting the phonological structure of a word were analysed. Mistakes consisting of an absence of representation of a phoneme constituted approx. 13% of all errors, whereas among them, single vowel phonemes were omitted most often.

The most numerous group of mistakes consisted of erroneous representation of a phoneme (e.g. *ro**si**nie* 'rośnie' – *it grows*), which means that a child correctly determined the number of distinctive units in a given word, but spelled some of them incorrectly. In this group, most problems were posed by errors not showing phonetic motivation within the scope of equivalent graphemes (e.g. *by**ci*** 'być' – *to be*) and phonetically motivated errors regarding letters Ę, Ą (e.g. *lubi**e*** 'lubie' – *I like*), as well as divergences between speech and script resulting from devoicing (e.g. *k**sz**ak* 'krzak' – *bush*). These last errors are a result of a correct, from phonetic point of view, but non-standard from the point of view of spelling, notation of a phonological structure of a word by children. Problems with over-representation of a phoneme (e.g. ***si**wój* 'swój' – *its*) were marginal.

Furthermore, the collected material featured graphic errors not motivated by the linguistic system and errors in segmentation. Graphic errors are deformities not related to the ability of phonological processing, caused by the unstable image of a letter and lack of automation in writing individual shapes. They consist of the incorrect reproduction of a shape, distortion or omission of elements of a letter, mixing of hand-written and printed letters in one word or in a single letter. Errors in segmentation consisted of joint transcription of two graphic signs most frequently constituting a single consonance.

3. MODEL OF READING AND SPELLING ACQUISITION IN POLISH

On the basis of:

- the obtained results of the two studies on reading acquisition and its linguistic determinants,
- the obtained results from three studies of spelling acquisition,
- on the basis of an analysis of Polish and English language literature regarding reading and spelling acquisition,

a model for acquiring written communication was formulated. It shows that acquisition of written communication goes through three main stages: initial (before acquisition of script), key (related to acquisition of script) and proficiency (related to automation in the use of script).

The initial stage *(before script*) refers to the period preceding formal reading and writing instruction, when children do not acquire writing as such, but already have contact with it. Basic linguistic skills are developed; moreover, development of script awareness takes place – children acquire knowledge about functions of script, conventions and principles governing it. The bases of linguistic awareness are shaped and motivation to read and write is developed, which is a very im-

portant psychological element in the readiness to read and write (Krasowicz-Kupis, 2004). The initial stadium encompasses a period from the start of formal reading instruction which, in Polish schools, concerns children aged 6.

From the perspective of reading, it may be stated that at this stage children sometimes read well known and remembered words, for example proper names, as the first reading study showed. A child may also separate individual letters in the script, but does not yet understand the functioning of the code for replacing a grapheme with a phoneme, as both the reading studies presented.

According to spelling, studies 1 and 2 conducted by Awramiuk, described above, let it be stated that at this stage a child usually knows that what is heard may be written down, but he/she does not yet notice the dependence between the spoken and the written characters. Even if children know certain letters (most often forming a part of their name), they cannot refer them to speech. They write them down as if they were reproducing known graphic models. If they are able to reproduce a word correctly, it is due to the fact that they treat it globally as a drawing. Such script may be called logographic. The strategy of transcript relies on accidental selection of characters similar to letters, but not used functionally. At this stage, a child often makes use of a drawing instead of a signature. In general, it may be stated that small children treat writing a bit like drawing, e.g. they write down (draw) new letters everywhere. It is difficult to consider this stage the beginning of writing and reading skills, yet it undoubtedly plays an important preparatory role.

The key stage (*acquisition of script)* commences with formal instruction and it may be said that it requires leadership, making references to the concept of Bruner (1983) or Wygotski (1971), i.e. the assistance of more competent persons. The task of such persons is explanation of the principles of the letter code and correspondence between a sound and a letter. The core of this stadium is 'working out of the code' used in the script and becoming proficient in the use of the script. The end of the key stage is acquisition of technical proficiency in reading and writing.

The key stage has its specific nature in reference to reading and is slightly different in reference to writing. Reading has three stages: the analytical and phonological stage (initial months of reading instruction), the interim stage between phonological and global word-based reading (after about one year of instruction) and the stage of domination of global strategies – word and phrase-based (after about 2 years of instruction), which is what was exactly described in reading study 2 (Krasowicz-Kupis, 1999).

Substage I in Reading: Dominance of Analytical and Phonological Strategies
As we can say on the basis of reading study 2, at this substage there is a clear dominance of a strategy relying on phonological processing using the letter/sound relation. The use of sounding with a dominance of temporal errors is typical (repetition of sounds and numerous pauses) and a slight number of distortion-type errors. The impact of skills requiring conscious phonological processing is clearly visible, along with the control of such processes. At substage I, efficient reading requires the par-

ticipation of phonemic awareness combined with an awareness of letters and script.

Substage II in Reading: Interim Stage between Analytical Phonological Reading and Global Word-based Reading
This stage appears in the second year of reading instruction. The analytical strategy is still dominant; however, it is based on units larger than individual phonemes. The place for analytical phonological strategy on the basis of a phoneme is replaced by a phonological strategy on the basis of a syllable and greater lexical units, sometimes transforming into word strategy which, at this stage, is not yet efficient. This description was present as the result of the reading study 2 (Krasowicz-Kupis 1999).

Substage III in Reading: Dominance of Global Strategies (Word and Phrase-based)
At this stage of reading, as can be seen in the results of the reading study 2, a full strategy becomes dominant, word or phrase-based. In reading a text, a child to a greater extent relies on phrases, corresponding to syntactic and semantic structures (Krasowicz-Kupis 1999).

In writing, three stages may also be distinguished, yet the borders between them are quite liquid, whereas the time of occurrence is more individualised. These are: partial and erroneous transcription, stage of phonetic transcription dominance and stage of increased spelling and morphological awareness.

Substage I in Writing: Partial and Incorrect Transcription
At this stage, a child perceives a relation between a written sign and a spoken sign, but has significant difficulties with phonetic analysis. As we can see on the basis of spelling study 1 and 2, the phonological structure of words has partial representation; frequently, only a beginning of a word is written (e.g. OGU 'ogórek' – *cucumber*). Omission of letters depends on the length of a transcribed word: the longer the word, the more prone it is to various deformations. The most characteristic effort in writing consists of the omission of the letter Y after consonantal letters. Among the applied strategies, i.e. the manner of graphic representation of units of speech, the strategy of assigning syllable values to letters (e.g. NA RBY 'na ryby' – *fishing*) and the phonetic strategy (e.g. KSZAK 'krzak' – *bush*) are dominant.

Substage II in Writing: Domination of Phonetic Strategy
At this stage, a child does not yet understand that writing is not a direct conversion of sounds into letters. Children are able to write down the words they know, as well as simple sentences; when transcribing unknown words, the strategy of assigning syllable values to letters is still visible. Phonetic strategy is dominant, which means that children's notes are a result of orthographic rendition of a phonological structure of a word, correct from the phonetic point of view, but non-standard

from the orthographic point of view. It may be said that children apply newly-acquired knowledge regarding the *grapheme-phoneme* relation without exceptions, disregarding the phonetic and grammatical context. Children correctly reproduce the relations between a sound and a letter, yet they do not have sufficient knowledge on the specifics of the Polish transcription system, and when using graphemes they only assign the basic phonological value to them. For example, they know that the letter B denotes the sound [b] (as in the word *baba – woman*), but they do not know that it may also denote the sound [p] (as in *rybka – fish*). At this stage, the hyper-correctness strategy starts to appear, which testifies to the growing orthographic awareness. Its first manifestation is noticing various manners in which a single phoneme may be represented in the script (e.g. depending on its position in a word).

Substage III in Writing: Growth of Orthographic and Morphological Awareness
As all spelling studies show, the growth of morphological and orthographic awareness is manifested by a gradual departure from the phonetic strategy and a taking into account of orthographic and morphological information (e.g. SŁOIKUW 'słoików' – *jars*). If a child uses known words that he/she has seen many times, he/she does not make mistakes.

Orthographic awareness constitutes knowledge about the alphabet system (correspondences between a grapheme and a phoneme) and knowledge about the transcription of individual words. Reading and writing instruction commences with an understanding of the graphic convention, i.e. it requires familiarity with letters and knowledge about their functions as symbols of phonemes. Along with the development of both skills, knowledge in the area of graphotactics develops, i.e. knowledge about which combinations of letters are typical in a given language and which are not permitted, the manner in which functionally identical units (morphemes) are denoted graphically. Development of orthographic awareness in the Polish language is closely related to development of morphological awareness.

Proficiency stage *(automation of writing)* commences at the moment when children read in an advanced manner, without the necessity of a conscious analysis of the letter material. Reading becomes quick and smooth, similarly to writing, even though proficiency in writing is acquired slightly later than in reading. A child is able to communicate via script, even if non-standard transcription is applied. A child transcribes texts that he/she has heard relatively correctly and builds texts independently. The technical aspects become important only in difficult situations. Therefore, use of code in ordinary conditions, without being aware of it and focus on the content takes place here. At this moment, written communication is fully subjected to its main function and its application has a clearly pragmatic nature (communication, procurement of information).

The proposed common model of reading and writing acquisition shows that, in principle, this process constitutes the acquisition of linguistic communication via

script. Both skills go through three basic stages. The moment of reaching the proficiency stage in the case of reading and writing may differ slightly, i.e. a child may become proficient in reading, but still be at a prior stage with respect to writing. Differences between both skills refer to the key stage and result from different directions of information flow from the graphic version to the phonetic version and vice versa and, therefore, slightly different cognitive and linguistic processes involved in reading and writing. The case is similar to differences resulting from the distinctness of language systems: differences between the acquisition of written communication among languages using alphabetic script will refer to the key stage, or, possibly, the time of succession of individual stages.

4. POLISH-SPEAKING VS. ENGLISH-SPEAKING CHILDREN – COMPARATIVE REMARKS

Verification of Utha Frith's model on the Polish population (Sochacka 2004; Sochacka & Krasowicz-Kupis 2003; Krasowicz-Kupis 1999) did not confirm the logographic stage that was distinguished. Polish children, when starting to read, use a clearly analytical strategy and in the first two years of instruction, they use both the analytical and the global strategy, whereas the former is dominant in the first year of reading instruction and the latter in the second. Changes of the dominant strategy take place in a direction from phonological to lexical, i.e. in the reverse direction to the one presented in Frith's model. Moreover, the lexical strategy is a clear effect of linguistic processing and not guessing on the basis of not necessarily linguistic features, as in Frith's logographic stage.

Undoubtedly, these results do not mean that Polish children do not go through the logographic stage. It is to be assumed that it refers to youngest children, who have not yet received any 'instruction' on how to read and do it intuitively. Recognition of words at this stage does not constitute reading, but guessing; these are associations between an image and its meaning, which is characteristic at the preliteracy stage. The above-quoted Polish studies concerned children in an age (6) when they make attempts at referring letters to sounds.

As it is was mentioned in part 1.1, stage models were often criticised because they do not account for the skills and potential of children. On the one hand, Polish studies confirm huge individual differences in the process of acquiring written communication by children and on the other, model presentation of various phenomena assumes a certain level of generalisation. This should not be an obstacle in the conduct of studies whose purpose is better understanding how children differ in the potential of using various types of information and on the manner in which this influences development of their writing skills.

4.1 Reading Acquisition by Polish and English Children

In the described longitudinal studies on reading acquisition (reading study 2) by Polish children, evaluation methods were used; they were modelled on the studies of Bryant et al. (Bryant et al. 1990; Goswami and Bryant, 1990; Goswami, 1997), where the development direction of phonological awareness was determined from an awareness of syllable, intra-syllabic *(onset, rimes)* and phonemic elements.

The majority of studies unanimously indicate that the emergence of an awareness of syllables and intrasyllabic segments precedes the start of alphabet and reading instruction and awareness of phonemes develops along with learning to read.

Goswami (1997) emphasises that development of awareness of intrasyllabic segments contains development of phonemic awareness or its prototype, as many words have single-phonemic intrasyllabic elements, mainly alliterations (onsets). The conclusion that awareness of intrasyllabic elements precedes phonemic awareness in the majority of English-speaking children refers more to the awareness of every constitutive phoneme in a word than to the awareness of individual elements, e.g. the initial phoneme.

In the studies of Goswami et al. (1997), it was shown that children who learn to read a transparent script develop orthographic representations differently from children reading in English. They are, from the very beginning of reading instruction, relying on phonemic elements to a much greater degree. In languages having more regular spelling, instruction in schools relies on the grapheme-phoneme relation, without the use of contextual information at the initial stage of word recognition. Therefore, at this stage only phonemic awareness and not, for example, syntactic awareness[3], is decisive for success in reading. In the course of time, syntactic awareness may become an important element in the process of learning to decode.

Due to the above reasons, it is possible to expect not only a slightly different forecasting model of early linguistic skills with respect to reading in children from various linguistic environments, but also a slightly different model of reading skills' development in more regular and transparent orthographies in comparison to the English one.

The results obtained in reading study 2 show slightly different dependencies between accomplishments in reading and early linguistic skills in comparison to studies of children (Bryant, P., Krasowicz-Kupis, G. 2004). It was shown in classic English studies that the better children distinguish syllables, rimes or phonemes, the quicker and more efficient is their progress in reading (Bryant and Bradley 1985; Bradley 1988; Bradley and Bryant 1983; Bryant et al. 1990). This relation is also clear when other variables, such as intelligence, social situation and memory skills are strictly

[3] *Syntactic awareness means knowledge about syntax elements, as well as intentional use of such elements.*

controlled. Moreover, studies on children with reading difficulties showed that they are significantly less sensitive to rimes and perception of links between letters and sounds. A special role was assigned to skills with respect to rimes. The ability of recognising rimes may accelerate the reading of new words which rhyme with previously known words. It may be said that the skill of recognising and creating rimes indirectly influences the child's success in learning to read by impacting the shape of phonemic awareness, as well as indirectly, by educating that words are divided into sound elements, such as the element *ight* in words *light, fight* etc. This awareness is the basis for learning that such words are usually written and pronounced identically.

Studies described in reading study 2 were the first studies in Polish regarding the significance of the skill with respect to rimes to reading in Polish. The results obtained in this project showed a slightly different model than in English studies. The major difference referred to a much slighter role of the skill with respect to rimes in accomplishments in reading, up to almost complete a disappearance of this impact. The second difference is related to the significance of phoneme awareness at the initial stage of reading instruction and the decrease of this role along with progress in reading.

The picture of dependencies between metalinguistic skills and reading in Polish children is also different than in German speaking children (Wimmer et al. 1994; Goswami, 1997 et al.), and the difference consists in a decrease of the strength of this relation along with progress in reading for all skills. The slight role of morphological and syntactic skills in the acquisition of reading, irrespective of the evaluated aspect of reading, as well as the stage of acquiring this skill is also puzzling.

4.2 Spelling Acquisition by Polish and English Children

In studies on the acquisition of writing in English (Treiman and Cassar 1996, 1997; Nunes, Bryant and Bindman 1997; Byrne, 1998; Treiman, 1993, 2004; Ehri 2000; Bourassa & Treiman, 2001; Pelletier & Lasenby, 2007), it was shown that morphological and orthographic awareness develops along with reading and writing instruction, yet children are able to use the knowledge on orthographic models of their native language very early (they know which letters tend to be doubled, which letters never occur at the beginning, etc.), and also use morphological knowledge in order to support their spelling. Similar results were obtained in studies on children using different languages (Gombert, 2003; et al., 2003). It is known that familiarity with names of letters has crucial consequences in the process of acquiring writing skills. English speaking children write a letter assigning the phonetic value of its name to it, which is a testimony to difficulties with the phonological segmentation of words. A characteristic error at this stage consists in mistaking the 'phonetic value' of a letter with its name, e.g. children transcribe the word *you* as U, and the word *help* as HLP, due to the fact that letters U and L are interpreted in speech via the sound form of their names (U – *ju,* L – *el*). The *letter name spelling* strategy also appears in children who start to write in other alphabetic scripts (Hannouz, 2005;

Levin et al., 2002; Morin, 2007). Children go through a stage of phonetic writing, i.e. in a situation when a given phoneme may be represented typically (in compliance with the pronunciation) or untypically in a text, they choose the typical representation.

In general, the results obtained in studies on Polish speaking children show similar phenomena, even though they display their specific features conditioned by didactic and linguistic factors.

Children, before the commencement of formal reading and writing instruction, are able to use the knowledge about orthographic models of their native language. The examined 6-year-old children, even though they differed significantly within the scope of preparation for reading and writing, showed intuition regarding combinations of letters possible in the Polish language. Morphological knowledge also develops early. The examined child who, at the age of 5, was able to create a written communication, legible, even though not standard for the recipient (image 1, Appendix), showed the first signals of a growing orthographic and morphological awareness a year before the start of formal instruction, which is to be interpreted as testimony to the role of independent and non-institutionalised learning.

Familiarity with letter names has significant consequences for the process of acquiring writing skills, but Polish children learn letter names (a, be, ce etc.) only after a year of reading and writing instruction. Earlier, they are made familiar with the phonetic value of individual letters. This takes place during audio analysis of individual words, which consists of the pronunciation of individual sounds in isolation. In the case of vowels, this leads to the separation of the vocalic element [y]. When a Polish child asks the teacher: which letter is this? he/she often hears: [dy], [my] instead of [d] or [m]; without doubt, he/she does not hear [de] or [em]. Due to the fact that familiarity with letters is an introduction to reading and writing skills in an alphabetic script, it may be stated that for a Polish child the names of letters (the first, even though unofficial) are [dy] or [my]. The letters R, T or D for a Polish child have unofficial names, which sound as follows: [ry], [ty] oraz [dy]. Thence, Polish children apply the *letter name spelling* strategy, i.e. they write a letter ascribing the phonetic value of its name to it, yet in this case the "letter name" has a slightly different meaning. Mistakes such as HLP 'help' in English speaking children and RBA 'ryba' – *fish* in Polish speaking children consist in writing a letter with the idea that it corresponds to a syllable with the CV structure. An English speaking child, introduced to script by learning the alphabet, writes *war* as WR due to the fact that he/she refers the letter R not to the phoneme /r/, but to the letter name R. A Polish child writes MOTL 'motyl' – *butterfly*, due to the fact that he/she ascribes, to the consonantal letter T, the sound value of a syllable with the *Cy* structure, which corresponds to the unofficial name of the letter. The mechanism of mistakes made by children who start to write in English and in Polish is, therefore, similar. The difference consists in the fact that for Polish letters, there

are two name sets: official, introduced at the school relatively late and unofficial, resulting from the manner of teaching.

Polish children, similarly to English children, go through the stage of phonetic writing, i.e. in a situation when a given phoneme may be represented in a text in a typical manner (compliant with pronunciation) or untypical, they choose the typical representation. Differences between acquisition of writing skills by Polish and English-speaking children result from the specific nature of the Polish script system (e.g. numerous occurrences of equivalent and compound graphemes, multifunctionality of the letter I) and specifics of assimilative phonetic processes occurring in speech (e.g. in the final position, all consonants lose their sonority consonantal groups are uniform with respect to sonority).

5. SUMMARY

The initial reading and writing instruction requires, primarily, linguistic awareness regarding the phonological system and orthographic knowledge. Phonological awareness is indispensable for acquisition of orthographic knowledge, whereas phonological processing and phonemic awareness are considered to be decisive success factors in reading. Awareness of dependencies between reading and writing processes and a given language and the type of its orthography allows a better understanding of what, in a given language, facilitates and what hinders learning to read and write.

The specific nature of reading acquisition in Polish consists in the omission of the logographic phase, differentiated in English models, and earlier emphasis of phonemic and metalinguistic skills. Greater transparency of the Polish language in comparison to the English extorts, at the start of reading acquisition, reliance on analytical strategies and phonological skills indispensable for efficient use of the alphabetic code.

On the other hand, the specific nature of writing acquisition in Polish consists in slightly different reasons for a departure from standard orthography. Linguistic and didactic factors have impact on distinctness of both processes, similarly to the case of reading. Didactic determinants are related to later, than in other languages, institutional initiation of a child into the world of script (Polish children start to learn later than their peers in other countries) and the applied teaching method (analytical and synthetic method in the word variety; unofficial letter names). The most frequent reasons for departures from standard orthography in children's writing, such as omission of vowel letters, transcribing a word the way it is heard or incorrect selection of equivalent graphemes, show linguistic determinants regarding the Polish language system and specifics of its script system.

Similarities between the acquisition process of reading and writing skills in Polish and in other languages consist in passing through three basic stages, as well as on occurrence, in the key stage, of similar phenomena, such as difficulties with

phonological segmentation resulting in characteristic mistakes (children choose a single grapheme to represent a syllable) or phonetic script.

Understanding the dependencies between the reading and the writing process and linguistic determinants has didactic implications. It is not sufficient to teach children to recognise symbols, develop their perception skills and cognitive functions, but it is also necessary to emphasise development of awareness and linguistic proficiency.

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