



ASSESSMENT OF LITERACY DEVELOPMENT FROM CULTURAL-HISTORICAL PERSPECTIVE

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Current research on literacy reduces reading and writing to two separate cognitive processes. In the opinion of Vygotsky, along with progress in using script children develop new higher mental function called written speech. In the opinion of Vygotsky, the development of written speech starts not simultaneously with the beginning of reading and writing instruction but much earlier when children collect their first experiences with a script. It seems to be more complete view on literacy than presented in most research because it including not only cognitive but also emotional processes and communicative context. This approach is illustrated in the study of 944 children aged from 3 to 8 years examined with the use of Literacy Assessment Battery designed with respect of Vygotsky's theory. Results showed that the battery is a promising tool of literacy assessment especially during kindergarten ages.

Keywords: School readiness, Executive functions, Inhibitory control, Literacy development, Written Speech.

INTRODUCTION

Many researchers indicate that high level of literacy achieved in elementary steps of education allows with a high probability to predict high life quality in adulthood (Kwieciński, 2002; Beswick and Sloat, 2006). Monitoring the process of acquiring this competence seems to be necessity if we want to take care about good start in future adulthood of contemporary children in frames of general education. Unequalled model in this area is USA which in 2002 have started implementation extensive program *Reading First* including *inter alia* developing modern curriculum and diagnostic tools in the field of reading, writing and prevention methods and difficulties revalidation in acquiring these skills. Another worth-imitating example is UK where, for example since 2003 are conducted obligatory screenings in range of difficulties in acquiring literacy for all children which are graduating the first level of education including the age 3 to 5 (Snowling, 2013).

Following trends described above, in this paper is presented new approach to evaluation of literacy.

Current trends in research on literacy development

Most of current studies on literacy development focus mainly on searching for the development and disorders of reading skills' factors, but they are rarely undertaking the issue of design and verification of developmental model of the process of reading and writing.

However, according to the researchers experienced in reading and writing competence Hulme and Snowling (2014), understanding any competence development disorder highly depends on undertaken model of regular development of this competence. These models are not common (e.g. Chall, 1983; Ehri, 2005; Frith, 1986) and, according to Snowling (2000), they slightly differentiate separate stages, little report the mechanisms of moving one stage to the other, they do not include the role of the system of meanings in literacy acquisition, as well as they mainly focus on the course of developmental changes in reading only. The model of literacy acquisition described by Awramiuk and Krasowicz-Kupis (2014) is affected of these drawbacks as well, but it takes into account the changes in impressive and expressive form of writing.

Regardless of the fact whether the researches declare using particular model of literacy development or they undertake latent assumptions about this development, it is possible to indicate two disquieting trends in the manner of conceptualization the competences of literacy: reductionism and atomism.

The first trend mainly appears in identification reading with two cognitive processes which are involved: phonological decoding and comprehension. This kind of reading model, introduced by Philip Gough and William Tunmer (1986) and named Simple View of Reading seems to be simplification. It does not include the communication aspect (e.g. what does the author have on mind?) and the role of morphological awareness in the process of decoding (Nunes, Bryant, Barros, 2012). Moreover, it does not say anything about the emotional-motivational processes (Brzezińska, 1987). It is not the developmental model as well, but in the developmental studies based on this model it is assumed that on each stage of development in the basis of reading lies decoding and comprehension and potential differences refer to their efficiency. Doubts are also raised by identification of the process of comprehension of oral and writing statement as one and the same thing. Comparing only some features of oral and writing statements suggest that basing only on the linguistic system at the same time they base on various psychological mechanisms which are prerequisite of the perception and comprehension (Krasowicz, 1992). Indirect manifestation of reductionism in terms of the concept of literacy is also little interest in development of expressive form of this ability.

Reductionist approach to literacy has consequences not only in the research. It shows up that integrated instruction, focused on familiarizing the role of writing with the social functioning, through using papers referring to the cultural and social context (children's literature, texts which are naturally occurring in social situations) allows children to form much differential and therefore more complete writing procedures vs. teaching focused on comprehension letter-phone links which is code-oriented instruction (Pasa, Morin, 2007). These authors postulate the change of approach to research on learning to read and write from subject-centered psychological approach to including social context, educational environment and the methods of teaching (*ibidem*).

The atomism in the manner of conceptualization literacy mainly consists on separate research of reading and writing ability, although many authors highlight close relationship between the development of reading and writing (Frith, 1986; Snowling, 2000; Ehri, 2005). According to Awramiuk and Krasowicz-Kupis (2014), these skills are based on the same cognitive processes, although they go in opposite directions. It may be also considered as a mistake to regard the development of literacy as a process which starts with the onset of formal reading and writing instruction. Since, research results indicate that children use naive writing conceptions during the process of this learning and, e. g. they make characteristic mistakes (Awramiuk, 2013). For understanding the process of literacy development it

is vital to recognize how these conceptions form and how they transform in effective strategies of mature reading and writing. Some authors also indicate that isolated analysis of development of competences' components of literacy may lead to serious mistakes in interpreting achieved results (Paris, 2005; Devonshire, Morris, and Fluck, 2013).

The above limitations in recognition reading and writing find its reflection in construction of methods that are used to individual assessment of literacy. They focus on detecting main symptoms of dyslexia (i.e. speed naming deficit, phonological awareness deficit) or on the measure of particular symptoms of reading and writing (i.e. spelling, word reading, and comprehension). Its authors often do not even try to indicate the model of regular literacy development they base on. Although, according to Hulme and Snowling (2014) it is obligatory if we want to construct the developmental model of any disorder. That is the reason why among them there is a lack of standard tools to measure literacy in age 3-5. Paradoxically, it is assumed that to measure reading and writing skills, the child should read and write in even the most elementary level. However, there is a need to remember that then a large part of literacy development is accomplished.

Cultural-historical approach to literacy

Cultural-historical perspective taken in the concept of Lev S. Vygotsky includes the fact that writing as symbolic record of oral statement had appeared and, subsequently, was included to the group of cultural tools in the history of civilization. Firstly, the status of cultural tool here means the status of a sign as the component of reality which under the convention has a specific meaning. Therefore, it indicates on the other component of reality, different that itself (here: graphic form indicating specific speech sound). Secondly, this status means the affiliation to the elementary human's dowry, used in social life (here: communication by writing). Thirdly, cultural tool is a mean used by adults to form a mature person (here: learning to read and write in school).

Because of the fact that writing is a sign, its usage requires from human to the development of specific form of stimulus-response in which the targeting final response factor are not a physical properties of stimulus (here: graphic shapes) but connected to them meanings (here: speech sounds and word meanings). Such behavioral forms Vygotsky (2005) identifies as higher mental functions and accompanying them mental operations – sign operations or higher mental functions.

Using the writing leads to forming higher mental function, the written speech (Vygotsky, 1971). The consequences of its forming extend far beyond acquiring reading and writing skills. Forming this function begins in preschool or early school period, so within the developing mental system. On one hand, it means that the development of written speech is determined by other mental functions maturity (e. g. perception and memory), whereas, on the other hand, it means that it influence the path of development these functions itself. It is noticeable especially in a process of forming skills of language communication – speaking, in which the written speech appears as the last one, third form (Jabłoński, 2002; also Surd-Büchle, 2011). On the one hand, outer speech (oral) and inner speech are its foundations. On the other hand, the consequence of written speech appearing is raised linguistic awareness and flexibility of speaking and thinking processes (Elkonin, 1998). Written speech can be also perceived as the continuation of graphical reality representation development which appears with progress in drawing. This function bases on perception, motorics and conceptions as well as stimulates its development (Obukhova, Chukhontseva, 2013).

Literacy development

Written speech is one of the higher mental functions responsible for communication with other people by language. Its specification is defined by particular form of signs used in this communication, so using graphic shapes representing sounds of speech. In the analyses of the written speech process there is a need to consider its two inseparable dimensions simultaneously: communication and mental (Surd-Büchele, 2011). From one sight, particular steps of this process designate changes in the manner of understanding the role of writing in communication and, from the other sight, the maturity of mental functions is essential to communicate with writing used in recognized role (Jabłoński, 2013). There is also a need to remember that written speech comes in two twin-forms of process of written communication: an impressive one, receiving information and an expressive one, creating statement (Krasowicz-Kupis, 2008).

Lev S. Vygotsky (2005) identifies four significantly different manners of cultural signs comprehension, which also point out four main steps in the process of its acquisition. With regard to the writing, they define four stages of written speech development (see Table 1).

In natural stage (1) graphic signs are treated as the components of syncretic structure of various stimulus with which it coexist, like incomprehensible drawings. In naive stage (2) a child stays under the illusion that every graphic shape created by writing signs has assigned specific name. Therefore, it is sufficient to remember the names of all words to learn how to read and write. In outer stage (3) a child explores, alone or with help of adults, that writing is a graphic record of sounds of speech and starts to read written texts correctly or write by ear. However, the operation of formulating or receiving written statement takes place via sounds of speech. In the last, inner stage (4) of speech the rules of coding and decoding meanings of written statements are internalized. In consequence, a child gains confidence in reading and writing skills and ease and fluency while using them (more details see: Jabłoński, 2013).

Table 1. Characteristics of literacy development stadiums

stadium	characteristics	aspects	
		impressive form	expressive form
natural	Children do not understand the meaning of writing and they treat it just like one of graphic forms, usually as a type of a picture.	<ul style="list-style-type: none"> – Writing is not distinguished from pictures – The aim and procedure of reading remains unknown 	<ul style="list-style-type: none"> – Acts of writing and reading are not differentiated – The aim and procedure of writing remains unknown
naive	Children tend to believe that every graphic shape made from writing symbols (e.g. letters) has a special name. For learning how to read or write, it is enough to remember the names of all words.	<ul style="list-style-type: none"> – All captions (words) placed in the same graphic context (pictures) are recognized to be the same – All words that have similar shape are recognized as the same ones 	<ul style="list-style-type: none"> – Ability to copy words
outer	Children discover that writing is a graphic description of speech sounds so they can read aloud written texts and write spoken texts	<ul style="list-style-type: none"> – Words or texts are read aloud 	<ul style="list-style-type: none"> – Words or texts are being said aloud while writing
inner	Children write and read „silently”, as they are able to write without reproducing the sound form of written text	<ul style="list-style-type: none"> – Silent reading – Texts are understand while reading 	<ul style="list-style-type: none"> – Silent writing – Texts of own conception are written correctly

Source: Jabłoński, Kleka (2014)

Cultural-historical approach to processes of literacy development includes the consequences of first child's essential experiences which take place in early childhood as well as on transforming this competence in a tool of learning and gaining knowledge. This manner of literacy development conceptualization seems to be much more complete.

RESEARCH

The main aim of the presented study was to check whether the cultural-historical perspective is useful for measuring literacy development. Especially whether it allows differentiating the stages of literacy development in equally in the period of gaining literacy skills (learning how to read and write) and the prior period, traditionally called the pre-literacy period.

Participants

Participants were 944 children between 3 years and 0 months to 8 years and 11 months of age. The majority of children were recruited for the study via preschool and school institutions they attended. In order to obtain a homogeneously diversified and representative – in respect of age and gender – sample, the children were assigned to 28 quarterly and 2 half-year gender groups. Thanks to this procedure, a satisfactory homogeneity of the two variables in the sample was achieved (see Table 2).

Table 2. Distribution of age and gender in the sample

Age	3;0	3;3	3;6	3;9	4;0	4;3	4;6	4;9	5;0	5;3	5;6	5;9
	3;2	3;5	3;8	3;11	4;2	4;5	4;8	4;11	5;2	5;5	5;8	5;11
Girls	8	17	19	16	15	15	22	16	19	17	19	19
Boys	15	17	22	15	15	23	17	15	11	19	18	17
Total	23	34	41	31	30	38	39	31	30	36	37	36
Age	6;0	6;3	6;6	6;9	7;0	7;3	7;6	7;9	8;0	8;6		
	6;2	6;5	6;8	6;11	7;2	7;5	7;8	7;11	8;5	8;11		
Girls	18	28	32	30	24	21	29	25	24	36		
Boys	22	23	29	34	22	24	26	30	27	34		
Total	40	51	61	64	46	45	55	55	51	70		

Procedure

The study discussed in this paper was a part of a larger research project (see author's note), in which each of the participants took part in two 40-minute research sessions, separated from one another with at least one-day break. The analyses presented here pertain to the results obtained during each child's first session, carried out between June 2012 and February 2014. The sessions were conducted by specially trained researchers who possessed a prior experience in working with children. Before the study, each child's parent received a form with information about the research procedure, on which s/he expressed an informed and voluntary agreement to the participation of his or her child in the study. Each child, whose parent signed the consent, was asked, both before and during the procedure, about his or her willingness to take part in the study. In the case of a negative response, the procedure would be stopped. Each session

had the form of an individual meeting with the researcher, and it was conducted in a quiet place, enabling the child to work effectively.

Method

During one research session a child was performing the Literacy Assessment Battery (LAB) and Raven's Coloured Progressive Matrices (CPM) test. The LAB consists of 9 tasks providing the assessment of impressive and expressive form of literacy development in each of three stadiums (see Table 3). It was assumed that a child in natural stadium of literacy development will not be capable of performing the LAB.

Table 3. Design of Literacy Assessment Battery (*i.e. 'NATI' – NATtural stage of Impressive aspect of written speech; 'OUTE' – OUTEr stage of Expressive aspect of written speech)

Tool number	Tool name	Characteristics of the task	Aids	Variable symbol*	Variable name
1	What is it (reading)?	Subject answers two questions: What is that (print)? What for people read? and follow one instruction: Will you show me how to read, please?	A chart with an illustrated tale	NAVI1	Picture-print discrimination
2	What is it (writing)?	Subject answers three questions: What am I doing (drawing)? What am I doing (writing)? For what reason people write? and follow one instruction: Will you show me how to write, please?		NAVE1	Drawing-writing discrimination
3	Find the same word	Subject points at the word (name of the object illustrated in the picture) identical with the pattern	5 charts with pictures, each with 1 pattern and 5 pictures with names, some names do not match the objects presented on the pictures	NAVI 2	Visual recognizing names of objects presented on pictures
4	Compare words	Subject is supposed to state whether the two words that s/he sees are identical or different	5 series of cards with single words, in each one card with a word-pattern and 4-5 cards with words to be compared with the pattern	NAVI 3	Discrimination of words
5	Write a word	Subjects writes down on a piece of paper 3 consecutive words s/he hears using a chart	A chart with pictures and words-names, none of the included names matches the presented pictures, but the name of each object is presented on the chart	NAVI 4	Object names writing
				NAVE2	Copying of words
6	Read a word	Subject reads a word and after a while answers the	6 cards with single words	OUTI 1	Word reading
				OUTI 2	Way of reading

		question "What was this word?"			
7	Write a sentence	Subject writes down on a piece of paper the sentence s/he hears	A card with 3 sentences to be read to the subject	OUTE 1	Way of writing
				OUTE 2	Sentences writing
8	Split into sentences	Subject marks the end of each sentence, placing there a dot	A card with a short story, sentences do not start with capital letters and do not end with dots	INTI 1	Reading comprehension
				INTI 2	Reading rate
9	Write a story	Subject writes down constructed by her- himself sentences	A chart with 4 pictures creating a picture story	INTE 1	Grammar
				INTE 2	Syntax
				INTE 3	Coherence

Source: Jabłoński, 2013

Each one of 15 variables measured by LAB belongs to crucial features for the process of reading and writing, and enables to identify stadiums of written speech development. All LAB tasks are arranged from the easiest to the most difficult ones and in this order they are presented to the subjects. The battery has a high reliability for most of tools that consist of three and more items (see Table 3). Reliability was checked for a group of 1103 children, aged 3-11. From this group, the sample presented in this study was selected (both research were part of the same project – see author's note)

Table 4. Validity of LAB for tools with 3 or more items

tool number	1	2	3	4	5
variable name	picture-print discrimination	drawing-writing discrimination	visual recognizing names of objects on pictures	discrimination of words	object names writing
variable symbol	NAVI1	NAVE1	NAVI2	NAVI3	NAVI4
lambda*	0,575	0,624	0,977	0,918	0,981
N	985	1011	1102	1098	1039
k	3	4	5	5	3
tool number	5	6		7	
variable name	copying of words	word reading	way of reading	sentences writing	way of writing
variable symbol	NAVE2	OUTI1	OUTI2	OUTE1	OUTE2
lambda	0,955	0,965	0,947	0,960	0,929
N	1039	915	914	918	918
k	3	6	6	3	3

*lambda – lower limit of real validity, N – sample size, k – number of items

Source: Jabłoński, Kleka, 2014

Subjects were not informed of correctness of their answers during the test. Each variable is scored separately, by summing the points from all items in a task that are related to the variable. The evaluation

criteria of each task were prepared in such a way, that the higher value of a variable, the higher the hypothetical level of written speech development in measured feature.

Results

Correlation analyses of LAB results with age and Raven's Coloured Progressive Matrices results showed significant, but weak relations among most variables (see Table 5 and 6). It suggests that results of the test are in some extent independent from processes of organism maturing, as represented by its age and innate intelligence. If the research was conducted in a long-term design, the dynamics of written speech development of participating children could possibly be diversified.

Table 5. Spearman statistics for correlation between LAB results and age

tool number	1	2	3	4	5		6	
variable name	picture-print discrimination	drawing-writing discrimination	visual recognizing names of objects on pictures	discrimination of words	object names writing	copying of words	word reading	way of reading
variable symbol	NAVI1	NAVE1	NAVI2	NAVI3	NAVI4	NAVE2	OUTI1	OUTI2
rho	,671**	,589**	,703**	,637**	,805**	,776**	,809**	,379**
N	937	943	942	941	888	888	826	825
tool number	7		8		9			
variable name	sentences writing	way of writing	reading comprehension	reading rate	grammar of text	syntax of text	coherence of text	
variable symbol	OUTE1	OUTE2	INTI1	INTI2	INTE1	INTE2	INTE3	
rho	,849**	,112**	,498**	-,039	,216**	,374**	,021	
N	805	802	382	382	372	361	372	

** $p < 0,001$

Table 6. Spearman statistics for correlation between results of LAB and CPM

tool number	1	2	3	4	5		6	
variable name	picture-print discrimination	drawing-writing discrimination	visual recognizing names of objects on pictures	discrimination of words	object names writing	copying of words	word reading	way of reading
variable symbol	NAVI1	NAVE1	NAVI2	NAVI3	NAVI4	NAVE2	OUTI1	OUTI2
rho	,632**	,567**	,685**	,612**	,689**	,681**	,680**	,325**
N	934	940	939	938	885	885	824	823
tool number	7		8		9			
variable name	sentences writing	way of writing	reading comprehension	reading rate	grammar of text	syntax of text	coherence of text	
variable symbol	OUTE1	OUTE2	INTI1	INTI2	INTE1	INTE2	INTE3	
rho	,724**	,049	,468**	,041	,202**	,306**	,154*	
N	803	800	380	380	371	360	371	

* p = 0,003

** p < 0,001

Such hypothesis is stronger justified by the results of method of hierarchical clustering cases with the use of mean distance between clusters. Such method enables to distinguish relatively homogenous samples of subjects, without any arbitral classification (e.g. based on age) of the investigated children to the comparison groups. The analysis was carried out for all variables measured by LAB, except for INTI1, INTI2, INTE1, INTE2, INTE3, connected to the tasks no. 8 and 9. They turned out to be too difficult for most of investigated children and were not taken into further consideration. 173 results were not analysed due to missing data. Results of this statistic procedure are showed on Figure 1. The 4th cluster is not presented due to few subjects (consisted of 2 subjects).

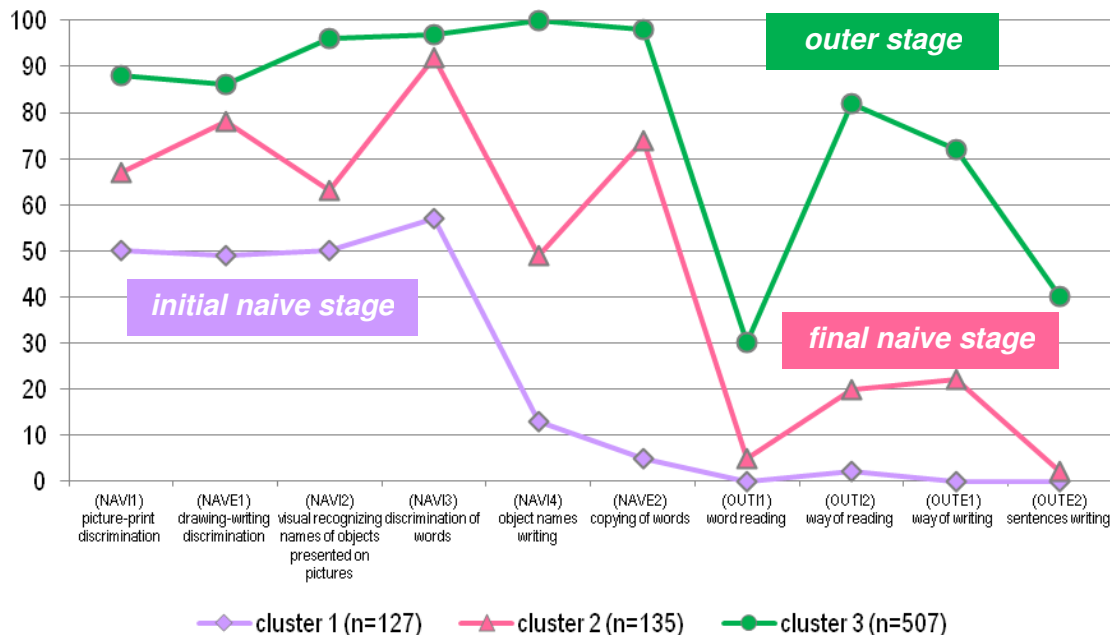


Figure 1. Mean results of LAB for transformed variables in clusters number 1, 2 and 3 (transformed variables = percentage proportion of maximal available score for raw variable)

Children from the cluster number 1 ($n=127$) scored mean results about 50, for 4 out of 6 variables connected to naive stadium of written speech development and mean results close to 0 for variables connected to outer stadium.

Children from the cluster number 2 ($n=135$) scored mean results range 49-92 for all variables connected to naive stadium of written speech development and low scores (range 2-22) for all variables connected to outer stadium. Basing on these results, it is allowed to conclude that both groups of children are in the naive stadium of written speech development. However, the character of differences in achieved by them results indicates that they are on a different stage of development on this stadium. In cluster number 1 the scores are lower, so children in this cluster are probably in the initial stage of naive stadium. In cluster number 2, the scores in variables connected to naive, as well as, outer stadium, are higher what suggests that these children are in final stage of naive stadium and they are entering outer stadium of written speech development.

Children in cluster number 3 ($n=507$) scored high (range 86-100) in naive stadium and differentially (range 30-82) in outer stadium. They have finished naive stadium and in the moment of testing they were in outer stadium of written speech development.

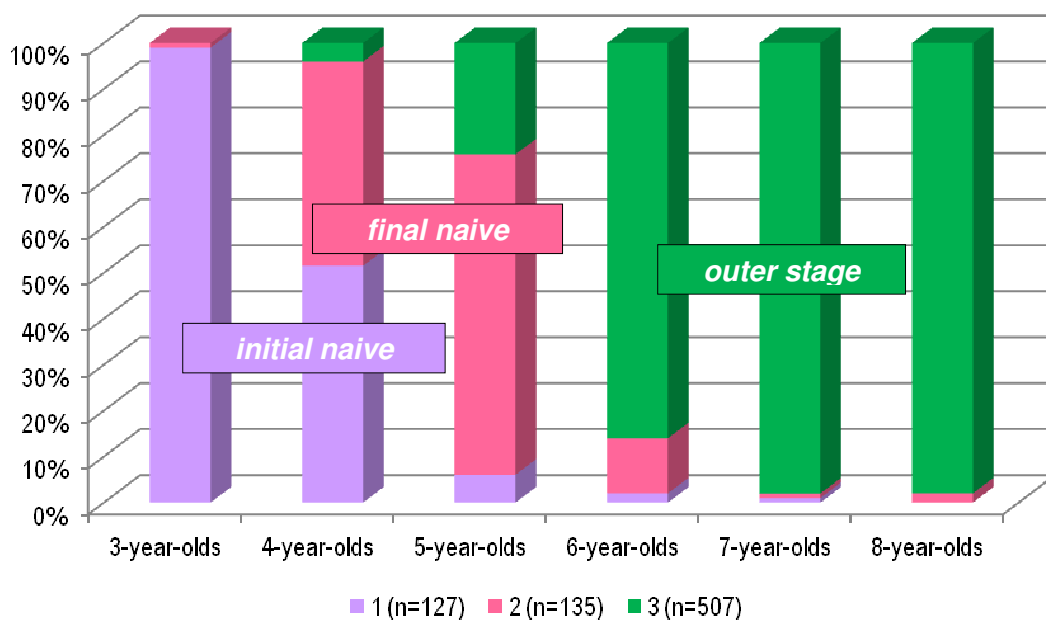


Figure 2. Size of clusters in age groups

Analysis of size of clusters in age groups reveals the reason of relatively low correlations of LAB results with age and CPM results. Children from the 1st cluster are aged from 3 to 7 years, although most of them come from a group of 3-year-olds (see Figure 2). Children from the 2nd cluster are present in all age groups, but most of them are among 5-year-olds. The 3rd cluster consists mostly of 6-, 7- and 8-year-olds, although also 4- and 5-year-olds may be found among them.

The dispersion of children from all clusters in age groups indicates that the level of written speech development is connected to age and that is why the significant correlations are observed (see Table 5). However, maturing is most probably, not the only factor determining written speech development. That is the reason of wide age range in clusters. Children from most distant age groups in each cluster are a group of risk or special abilities of literacy skills. This hypothesis demands further research, though.

SUMMARY

In contemporary times a man is immersed, from the moment of birth, in an environment filled with writing. A child is observing adults reading books, newspapers, manuals and also has a contact with print in children books, on toys and packages of different products. Not to mention the space outside of home that is full of commercials, billboards or information boards. It cannot be assumed that the first contact a child has with a written text is in kindergarten or school or even more, that it occurs during the beginning of formal or informal teaching of reading and writing. Thus, when teachers or parents try to reveal the code of writing to a child, the child already has some naive theory concerning the aim and method of reading and writing. It is particularly visible in the beginning of school education, when one may observe that the quality of progress in reading and writing is highly dependent on prior joint writing activities

taken spontaneously together by children and their parents. These are special activities orientated on the code of writing which are familiarizing a child with letter-sound connections and single words, as well as, orientating on the meaning of writing, that is loud reading of stories and talking with a child about them (Hulme, Snowling, 2013).

It seems that the most ecologically valid is to treat reading and writing skills as means of communication and not as complex „technical” procedures that have to be acquired step by step same as a house being build brick by brick. The necessity of treating literacy as a whole derives also from research on dysfunctions or difficulties during the process of acquiring this ability. For some researchers suggest treating dyslexia and disorders in understanding written texts separately (e.g. Hulme, Snowling, 2014). Such holistic view on literacy may be found in cultural-historical perspective. Studies presented in this paper show that it is possible to make use of this perspective to assess the written speech development also in pre-literacy period. Contrary to the mainstream research on literacy development and reading and writing disorders, this perspective includes also the impressive and expressive forms of communication through writing and enables to study the interplay between them. It also shows that both reading and writing should be introduced and taught as means of communication rather than procedure to be mastered, and that in reading and writing instruction there should also be included a differentiated level of literacy in kindergarten children. In order to recognize other possibilities for the use of cultural-historical perspective (e.g. diagnose of school readiness or school difficulties) more research in this paradigm needs to be conducted.

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