Proposal for a L1 special issue on *Executive functions and children’s literacy development*, edited by Sławomir Jabłoński and Ludmila Liptáková

In the recent years, executive functions (EF) have been the subject of intense studies in different scientific perspectives – mostly neurocognitive, developmental and neuropsychological. These functions are considered to form the basis of such skills like: refraining from reflex or impulsive reactions, problem solving, planning, initiating and flexible realization of an action and monitoring the various stages of goal-oriented actions. Thus they determine one of the most characteristic and key aspect of people’s behavior, which is rapid and flexible adaptation to the constantly changing conditions of life. Together with literacy EF are seen as essential competences for reaching a life-long learning ability, good life-course outcome, and general social health. This means that an assessment of their development can be conducive to the prevention and early identification of groups at risk of not only different types of school difficulties but social exclusion in adulthood as well.

The proposed special issue of L1 contains cross-sectional studies on mutual connections between EF and literacy development in the period of intensive progress in both abilities. The authors try to reveal how the level of EF development may lead to an increasing ability to read and write. Inhibition, attentional control and working memory are studied as main components of EF in children aged from 3 to 10 years. Development of literacy is described mostly with emphasis placed on reading comprehension but other aspects of reading and writing are also considered. The most important value of the L1 issue is that the authors make an attempt to draw practical conclusions based on results achieved in their research. Suggestions described in the papers about organizing preschool and school teaching for improving EF and literacy may be inspiring for educators.

**Preliminary contents of the proposed L1 special issue:**

1. *Does the level of executive functions link to the specific relationship between reading and writing in 3-8 aged children?*

   **Sławomir Jabłoński**, Adam Mickiewicz University in Poznań, Poland

Development of reading is usually studied separately from development of writing despite the fact that some authors emphasise the interplay between them. From the perspective of Lev S. Vygotsky’s theory, literacy develops as a tool for executing the task of communicating by the use of script. Thus reading and writing can be treated as two variants of one process of communication: the impressive variant (comprehending the meaning of a written text) and the expressive variant (conveying meaning in a written form). Both executive functions (EF) and literacy quickly develop between 3 and 8 years of age. The main research hypothesis is that the level of EF relates to the specific way reading and writing are linked together. A cross-sectional study of 906 healthy, Polish speaking children between the age of 3 and 8 was conducted. The sample was created by means of assigning children to 22 age groups, composed of children born in the same quarter or half of a given year. The subjects were examined with the use of the Literacy Assessment Battery, designed by the author for assessing the development of literacy. The
paradigm of dimensional change card sort was applied for EF measurement. Patterns of links between EF and reading and writing are described in the paper. The study was carried out under the research project no. N N106 047839 titled *Construction of tools for psychological assessment of learning readiness of children between the age of 3 and 11*, financed by the Polish Ministry of Science and Higher Education.

2. *Working memory and school achievement among 6- and 7-year-old children*  
**Dorota Campfield, Radosław Kaczan, Piotr Rycielski**, Educational Research Institute, Poland  
Results are presented of the study of 1200 6/7 year old pupils in school year 2014/2015, *Pierwszoklasista 2014*. The sample was not representative for Poland as a whole, retaining stratification of most of the areas in three voievodships where subjects were randomly selected. The school year 2014/2015 is demonstrably historical in the Polish education system, being the first to be affected by reform of entry age, which was reduced from age 7 to 6. The study covers the full intake of 7 year olds and half of the 6 year olds entering the education system for the first time. Pupils were individually tested by psychologists using a battery of tests for executive function and working memory. They also sat an adaptive computerised test of scholastic skills. The article models relations between the properties of cognitive tests with respect to biological age, controlling for family characteristics. The main results, in line with expectations, confirm a positive and statistically significant relationship between general indicators of working memory with results of scholastic ability measuring on written, reading and mathematical skills. Results also indicated a significant relationship between age and family background with children’s general cognitive development.

3. *Developmental patterns of relationships between inhibitory control and reading ability in early-school children*  
**Anna Kamza**, Adam Mickiewicz University in Poznań, Poland  
Inhibitory control is one of the most important components of executive function, which allows to suppress or regulate prepotent attentional or behavioral responses. It was proved to be a crucial factor for school achievement, including math abilities and reading acquisition. In the present cross-sectional study the developmental patterns of relationships between inhibitory control and reading ability were examined. The sample consisted of 256 grade 1-3 primary school children. Decoding and comprehension, the two subcomponents of reading ability, were assessed using Prolexia Test, while cognitive inhibitory control was measured with the Color Word Stroop Task. Regression analyses were conducted controlling for child’s age and sex. A significant age and sex interaction was observed in the patterns of the investigated relations. Namely, it was found that comprehension ability was related to inhibitory control but only among boys from 1st and 2nd grades (but not among 3rd graders). No relations between reading ability and
inhibitory control were found among girls. Also no significant relationship between decoding and Stroop Task performance was found among both sexes. The findings suggest that sex plays a significant role in cognitive development of early school children, and they provide some insight into the role of sex in developmental links between inhibitory control and reading ability.

4. The relationship of fluid intelligence and deductive inferencing with deriving word meaning from context: Is there an interaction with attentional control?
Marta Filičková, Iveta Kovalčíková, Ivan Ropovík, University of Prešov, Slovakia

The primary intent of this paper is to contribute to the understanding of the nature of deductive reasoning/hypothetical thinking and of deductive inferencing when deriving word meanings from context (DIWM). Struggling readers are significantly less efficient at deriving word meanings from context; more successful readers typically use root words, contrast, logic, definition, example, and grammar as context cues to derive word meanings. To examine this in depth, we looked at the cognitive correlates of this critical component of reading.

Two purposes guided the basic research work: (a) to explore the relationship between fluid intelligence (gf), attentional control (AC), and deductive inferencing with deriving word meanings from context (DIWM); and (b) to investigate the interaction effect between gf and AC on DIWM. The sample consisted of 210 children attending the fourth grade in a standard elementary school. It was hypothesized that the magnitude of the association between gf and DIWM would depend on the level of attentional control, so that low levels of AC would weaken or possibly break that link, while high levels of AC would facilitate the employment of fluid general ability in learning situations. The results show that there was a moderate relationship between the measures of gf and DIWM, while gf was not found to be related to AC. Regarding the hypothesized interaction effect, the data suggest that the relationship between deductive inferencing with deriving word meaning from context and fluid intelligence is invariant with regard to the level of attentional control in the given sample. The possible reasons for the lack of moderation effect are discussed.

This work was supported by the Slovak Research and Development Agency under grant number APVV-0281-11.

5. Tasks on factual text comprehension as a tool for stimulating executive functions in 9-10 years old children
Martin Klimovič, Juraj Kresila, Ľudmila Liptáková, University of Prešov, Slovakia

The paper is a reflection of new inspirations for L1 education drawn from psychology and educational sciences. It describes the application of findings from cognitive education to teaching L1. The knowledge base of this educational paradigm is provided by cognitive sciences. Cognitive education
accentuates the need to activate pupil’s cognitive functions as a mental tool for learning within the so-called cognitive curriculum in addition to acquiring knowledge within disciplinary curriculum. Executive functions as a component of cognition that directs and controls mental processes is one of the concepts of the cognitive education paradigm.

This study is a part of APVV-0281-11 interdisciplinary research project on *Executive Functions as a Structural Component of the Ability to Learn: Diagnostics and Stimulation* (led by Iveta Kovalčíková). Our task, within the project, is to compose a program for stimulating executive functioning in 9-10 years old children utilising the selected curricular areas of L1 (Slovak) in primary education. The relevant curricular area chosen for the stimulation program is the domain of pupil’s receptive competences with a focus on reading and comprehension of factual text. The reason for this choice is the complex, abstract and relational nature of the receptive processes. Such processes assume recipient’s cognitive activity at different hierarchical levels of text comprehension. According to the theory, executive functions are triggered in such educational situations that are complex in nature, fall outside the routine way of thinking and create the need to integrate multiple sources of information. It is thus the educational situations which require cognitively active, adaptive and flexible verbal behaviour of the pupil that bear relevance to executive functions in the processes of text comprehension.

In the paper we present: 1) a review of basic theoretical approaches to researching the relationship of executive functions and the processes of text comprehension, 2) a theoretical analysis of pedagogical foundations for stimulating executive functions in 9-10 years old pupils through the processes of text comprehension, 3) the research design which is of applied character with qualitative methodological preference, 4) the results which form of a model of stimulating pupil’s executive functioning, 5) discussion, questions and implications of the research.

**Publication schedule:**

- abstract submission – December 15, 2015
- full papers’ submission – January 15, 2016
- internal review – February 15, 2016
- revised papers’ submission – March 15, 2016
- external review – April 15, 2016
- revised papers’ submission – May 15, 2016
- final review and submission of the introduction to special issue – June 15, 2016
- publication – September 15, 2016

**Type of proposal:**

This is a half open proposal. If you want to contribute to the special issue, please contact Sławomir Jabłoński (slawo@amu.edu.pl) and Ľudmila Liptáková (ludmila.liptakova@pf.unipo.sk).