

Divergent Tasks in the Diagnosis of Wisdom in Older Preschool Children

DOI: 10.15804/tner.2017.47.1.22

Abstract

The author of the article, popularising education for wisdom as a basis for comprehensive development of pupils, looks for methods supporting the development of wisdom from childhood. Stimulation of wisdom in early education can be a challenge to teachers due to a lack of theoretical and practical guidelines. Thus, the author developed and used in studies specific diagnostic tools for analysing the capabilities and skills of older preschool children in using wisdom in their thinking. The article describes the study results concerning the application of divergent tasks stimulating thinking in children in different ranges of intelligence (based on R.J. Sternberg's concept) and conclusions from the studies conducted based on a randomly selected sample (N = 366), e.g., that used tasks make it possible to differentiate the competences and intellectual capabilities of the children in question.

Keywords: *divergent task, preschool education, wisdom diagnosis*

Introduction

In pedagogical theory, the concept of emancipatory pedagogy is becoming more and more popular. Within this concept, individuals develop an awareness of themselves, the ability to engage in dialogue and work with others, a reflective approach to their surroundings, and the ability to solve problems by asking questions and looking for ways to solve problems on their own (Czerepaniak-Walczak, 2006).

Such an education in relation to preschool children is popularised by D. Waloszek. Her publications contain references to the assumptions and principles of emancipatory pedagogy relating to the fact that the child becomes independent "...of the unnecessary, paralysing power of adults..." (Waloszek, 2014, p.176, transl. E.P.). She also describes the ways in which teachers can create the conditions for stimulating comprehensive development of children by provoking their activity, curiosity and interest. As a result, children go beyond the boundaries of their intellectual, social and physical capabilities to integrate different areas of activity, improve and expand their abilities, and construct new knowledge.

Acquiring knowledge in an independent and active way is the basic assumption of the concept of constructivism in education. It perceives mental processes as the rational processing of information from the environment, based on previous knowledge, skills and experience. As D. Klus-Stańska emphasises, this is the basis for specific education within which "...thanks to the problem-oriented structure of tasks and activities ... instead of listening..." pupils "...try to think and act..." (Klus-Stańska, 2013, p. 36, transl. E.P.). In such situations, learning and development are based on emotions, interpretation, and search for the meaning of events and phenomena, which is very far from the concept of acquiring knowledge provided by others in accordance with adaptation pedagogy.

The bases for education supporting the emancipation of pupils during the learning process and the development of their own competence and capabilities quoted above are in accordance with the concept of the pedagogy of creativity, which is based on open tasks (cf., Szmidt, 2012) and education for wisdom based on activating tasks (cf., Płóciennik, 2016).

When analysing the possibilities for developing wisdom during the course of education, a few basic assumptions should be considered:

- Wisdom as a complex individual characteristic or a cognitive structure can be developed in any person from the earliest years (Meacham, 1990; Pietrasiński, 2001; Sternberg, Jarvin, & Grigorienko, 2009);
- The occurrence of wise thoughts and actions in an individual depends on analytical, practical and creative intelligence and certain personality traits (Sternberg, 2003);
- According to R.J. Sternberg, wisdom guarantees proper application of intelligence and creativity when solving different problems, as it allows for consideration and combination of personal achievements and the general good – as such, it is part of practical intelligence and its application leads to the successful implementation of socially useful ideas (Sternberg & Davidson, 2005, pp.327–340);

- Wise thinking is a complex process consisting of different types of thinking: reflective, dialogical and dialectical (Sternberg et al., 2009, pp.106–110).

Wisdom, however, as a complex personality trait or a property of the mind, escapes the simple measurement that prevails when the capabilities and competence of children are evaluated in preschool testing. So far, Polish methodological textbooks and companions for preschool teachers have offered no guidelines on stimulating and developing wisdom in children. This poses a theoretical and organisational problem with the introduction of the concept to pedagogical practice. Thus, the author of this article has undertaken to develop a set of tasks allowing for determination of the capabilities and limitations of older preschool children when carrying out activities requiring them to think in an analytical, creative, reflective, dialogical and dialectical way, and to verify these tasks in practice, through scientific studies.

Research Methodology

Education for wisdom is based on different open and activating tasks, thanks to which children have an opportunity to analyse and evaluate the conditions of the situation presented in the task, analyse the information and their experiences, generate ideas for solving the problem, and evaluate the solutions proposed. These tasks should stimulate children's thinking, both ambiguous and incomplete, and provide them with the conditions for subjective interpretation and a strategy for acting. The use of such tasks allows children to try their hand at things, identify their strong and weak points, understand the principles of purposeful and ordered activities, identify the relationships between the aim of an activity and its result, combine different forms of an activity and the stages of idea implementation, acquire skills in organising the conditions of an activity, and invoke responsibility for task performance.

The studies described herein were conducted on a sample of 366 older preschool children in three different cities. The subjects of the studies were the children's responses in response to the instructions given for the test tasks, and the problems of characters presented in the educational materials – pictures showing children's problems in different situations. These pictures served several purposes: they depicted scenes understandable to the children (e.g. positive and negative behaviour of children interacting with their peers); maintained the children's interest in the content through their ambiguity (e.g., by showing negative behaviour of heroes, which had to be changed in order to avoid danger); encouraged them to

give elaborate answers (e.g., through interpretation of the pictures); to give advice (e.g., in relation to the selection or change of food products), and inspired the children to look for solutions to the problems of the characters in the pictures (e.g., with a ball stuck in a tree). Such tasks support the maintenance of balance when developing and stimulating different skills and capabilities of preschool children, being part of not only analytical but also practical and creative intelligence. Moreover, they take into consideration different ways of solving problems through analysis, critical and creative thinking, and references to practical activities all at the same time.

The pictures and the problems they showed were discussed with the children individually. Face-to-face conversations with the children about the pictures were designed to reveal the children's independent, divergent and wise thinking when solving tasks. The main difficulty when developing the research problem selected was its novel character, and the subsequent lack of objectivised pedagogical tools for analysing and developing wisdom in thinking. Moreover, tools supporting the development of wisdom are complex and there are many correct responses, which is why their evaluation is multidimensional. However, open tasks are effective when measuring the ability to compare, work out, construct and assess, when giving reasons, identifying causes, generalising, drawing conclusions, creating, analysing and synthesizing; when assessing the level of divergent thinking (fluency, flexibility and originality of thinking), ingenuity, tolerance for ambiguity, and the ability to find remote associations and redefine problems (cf., Karwowski, 2006). This is why open tasks were the basis for the selection of tools applied in the study described.

When selecting and configuring the tools, and when assessing products for the purpose of empirical verification of the tasks described, the suggestions and guidelines of M. Karwowski (2006), J. Brzeziński (2000) and Cz. Nosal (1990) were taken into consideration. Moreover, tasks developing and diagnosing the wisdom of preschool children were verified based on the thesis advanced by R.J. Sternberg that dominant and developed creativity, evaluative cognitive style (the tendency to evaluate and compare) and progressive style (readiness to go beyond rules and tolerance for ambiguity) are predictors of wisdom in thinking and acting (cf., Sternberg, 1996).

Table 1. Test tasks used with children aged 5–6 years, to develop and analyse wisdom in thinking.

Categories of dependent variables	Tasks (indicators of dependent variables)	Proposed scoring (raw scores)
Dv 1: ANALYTICAL INTELLIGENCE		
The ability to generalise (Dv1a)	Determining the topic of a picture (tasks 2 and 8)	1 point for 1 title
The ability to connect causes and effects (Dv1b)	Identifying the danger resulting from the behaviour of the characters in the pictures (task 4)	1 point for an idea
The ability to give reasons (Dv1c)	Justifying an evaluation of the attractiveness of tasks (task 9)	1 point for an idea
The ability to define characteristics (Zz1d)	Indicating similarities and differences between the child's own characteristics and behaviour and the characteristics and behaviour of a wise man (task 10)	1 point for an idea
Dv 2: PRACTICAL INTELLIGENCE WITH WISDOM (REFLECTIVENESS, DIALOGICAL AND DIALECTICAL THINKING)		
Cognitive courage (Dv2a)	Selection of a difficulty level from three options (task 1)	1 point for the selection of a difficult task 2 points for the selection of a very difficult task
	Willingness to perform additional tasks (task 1)	2 points for expressing willingness
The ability to give advice to others (Dv2b)	Coming up with advice for the characters in the pictures (tasks 3 and 7); Coming up with advice for the hero of a story (task 5)	1 point for each piece of advice
Dialogical thinking and empathy (Dv2c)	Considering the difficult situation of the hero of a story, indicating their emotions (task 5)	2 points for references to the emotions of the hero, "assuming the role" – situations and emotions of the hero
Dialectical thinking (Dv2d)	Synthesis of a thesis and an antithesis (task 7)	4 points for a synthesis
Self-reflection and the ability to assess oneself (Dv2e)	Expressing one's own preferences with regard to the tasks proposed (task 9)	1 point for indicating advantages or disadvantages of the solutions to the tasks
	Assessing oneself in terms of similarity to a wise man (task 10)	1 point for each characteristic indicated

Categories of dependent variables	Tasks (indicators of dependent variables)	Proposed scoring (raw scores)
Dv 3: CREATIVE INTELLIGENCE		
Ideational fluency (Dv3a)	Coming up with as many pieces of advice as possible for the problem "How to get the ball out of the tree?" (task 3); Coming up with as many pieces of advice as possible for the hero of a story (task 5); Coming up with as many ideas as possible for a change of behaviour of the characters in the pictures (task 4); Coming up with as many metaphors as possible (task 6); Coming up with as many pieces of advice as possible for the problem "How to reconcile the healthy, disliked food with the unhealthy food you like?" (task 7)	1 point for each idea
Adaptation flexibility (Dv3b)	Looking for the best ideas and eliminating the worst ones (task 3); Generalising the content of the picture, considering the qualitative diversity of the ideas (task 8)	1 point for each idea 2 points for a name
Originality (Dv3c)	Providing unique ideas in each group (in each sentence)	1 point for a unique idea in a given group
The ability to make transformations (Dv3d)	Suggesting a change of negative behaviour to positive behaviour (task 4); Suggesting a change of an unhealthy or disliked product (task 7)	1 point for each idea
The ability to use metaphors (Dv3e)	Using a metaphor with justification (task 6)	1 point for each idea
The ability to refine (elaboration) (Dv3f)	Justifying the evaluation of the usefulness of the child's own idea (tasks 3 and 6)	2 points for each justification with elaboration

Source: Own work.

Research Results

The methodological principles (canons) provided by the literature demand objectivity, reliability of the study description, sufficient justification and verification of hypotheses and assumptions, and accuracy of the descriptions made and judgments formed. This also applies to the research and diagnostic work of teachers, particularly when they employ techniques of testing pupils' knowledge, skills and thinking (cf., Niemierko, 2005; Palka 2006).

The **accuracy** of tasks used in a test is confirmed when the test measures the indicators assumed and when the test results are correlated to external criteria. One of the four ways¹ of justifying the accuracy of tests used in social studies is their theoretical (basic) accuracy. This consists in demonstrating to what extent an individual has a given characteristic or property, revealed in accordance with the study assumptions, using a given test. This tool is considered accurate when its results allow for discussion of the intensity of a phenomenon the researcher is interested in. On the other hand, the **reliability** of a research tool determines its measurement accuracy and stability under different conditions². Analysis of reliability mostly concerns the extent of the repeatability of the measurement of the same characteristic, while the application of reliability analysis in studies facilitates their increased quality. The criteria for analysis of the test tasks used in the presented study were whether they were accurate and reliable (given also that they were being applied for the first time in preschool education).

When describing the results of these studies, it must be stated that the difficulty and novelty levels of the tasks performed were the same for all children. The studies were carried out between March and June of 2016, in three cities referred to herein as P, Ł, and W. Thus, it can be said that the same research tool and the same didactic measures were used three times, and that certain intervals between studies using the same test were maintained. Considering also the fact that the group of children from Ł achieved slightly higher results (50.5 on average) than the group of children from W, where the last studies were conducted (49.77 on

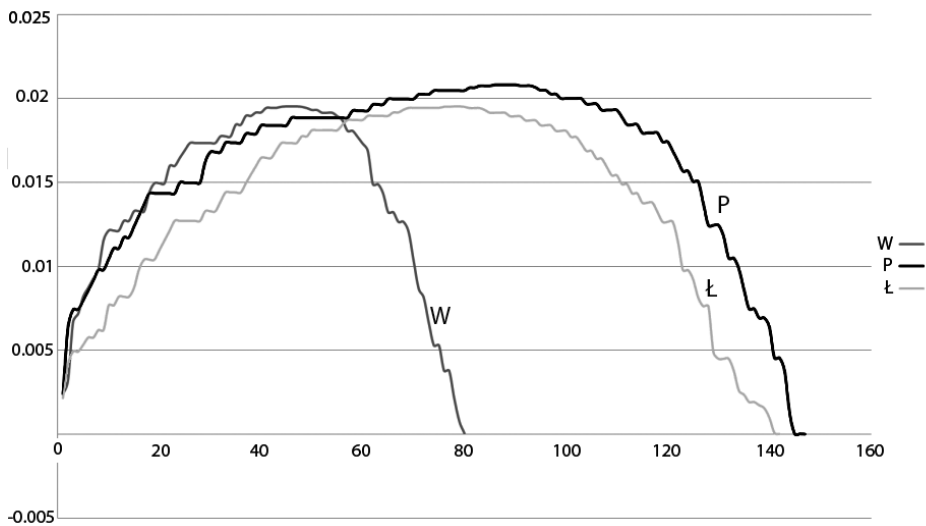
¹ The remaining three criteria are: diagnostic, prognostic and content accuracy (Brzeziński 2000, p.17; Kubielski 2006, p.157).

² There are four methods for evaluating (estimating) the **reliability** of tests: estimation of reliability (e.g., two studies with the use of the same test, one by one); estimation of consistency (two studies with the use of parallel test forms or calculation of the correlation between test halves); estimation of stability (two studies with the use of the same tests conducted at a certain interval), and estimation of their consensus (with reference to two competent judges assessing test answers) (e.g., Brzeziński 2005).

average), it can be said that the study dates (i.e., the process of maturation and development of children over four months) were not a factor impacting on the results.

An analysis of raw scores in the medium range and of the standard deviation has indicated that the tasks and their scoring in all groups of children produced distributions close to normal, and also in the case of groups diverse in quantitative terms and results suggesting larger or smaller individual differences in the groups³.

Figure 1. An analysis of study results from the perspective of normal distribution



To verify the reliability of the measurement scale, an additional method for scaling the intra-content conformity of Cronbach's Alpha was applied. Analysis of the study results with the use of this statistical method indicated that all the groups achieved satisfactory measurement conformity in different tasks. As such, it can be stated that the tasks proposed are reliable and adjusted to the capabilities of children from different environments and in the three different areas in which the studies were conducted.

³ With average results: (P; Ł; W) 49.55; 50.5; 49.72 and standard deviation: (P; Ł; W) 19.6; 21.75; 20.55.

Table 2. Results of the reliability analysis of the set of test tasks.

Tasks	Total position correlation			R2			α after the removal of the position			α		
	Ł	P	W	Ł	P	W	Ł	P	W	Ł	P	W
Task 1 in total	.21	.29	.31	.07	.16	.24	.74	.64	.76			
Task 2 in total	.24	.09	.18	.09	.08	.11	.73	.64	.76			
Task 3 in total	.53	.46	.54	.31	.26	.41	.69	.57	.72			
Task 4 in total	.64	.45	.71	.57	.31	.58	.69	.60	.70			
Task 5 in total	.63	.33	.46	.44	.19	.40	.70	.62	.74			
Task 6 in total	.36	.46	.41	.18	.30	.22	.72	.57	.74	.76	.68	.77
Task 7 in total	.30	.47	.50	.14	.26	.30	.73	.60	.73			
Task 8 in total	.43	.10	.51	.23	.11	.37	.71	.65	.73			
Task 9 in total	.45	.45	.36	.29	.26	.27	.72	.60	.75			
Task 10 in total	.59	.33	.54	.40	.14	.44	.68	.61	.72			

Source: Own work.

Some of the older preschool children successfully complete tasks in the assessment and evaluation of the behaviour of characters presented in educational situations, and that they are able to: give advice on improving or changing the behaviour of the characters presented while referring to universal standards and values; transform ideas and determine the usefulness of their own ideas; exercise self-reflection and come up with metaphors and syntheses based on distant notions. Examples of the children’s ideas about the individual tasks are presented in Table 3.

Table 3. Children’s wisdom in thinking – examples of children’s responses

Example task	Responses of children taking part in the studies
Assessment of the behaviour of others, with justification	(The behaviour is bad because...) ... <i>their clothes get dirty because they are kneeling.</i> (The behaviour is bad because ...) ... <i>they’re playing in the street.</i> (The behaviour is good because ...) ... <i>they cooperate together.</i> (They’re playing correctly because...) ... <i>they’re sharing building blocks.</i>

Example task	Responses of children taking part in the studies
Advice on the problem of “How to get the ball out of the tree?”	<p><i>Stand on tiptoes and reach with your hand.</i></p> <p><i>Make a ladder, climb a rope.</i></p> <p><i>Wait until it falls down.</i></p> <p><i>Ask this man to bring a ladder.</i></p>
Assessment of the usefulness of the child’s own ideas in solving a problem	<p>The best advice:</p> <p><i>Ask a tall child because hardly any adult wants to lift the child up and the stick might be too short.</i></p> <p><i>Ask a man (passing by) because he is tall, and the children could fall down.</i></p> <p>The worst advice:</p> <p><i>Give a child a piggyback because the child could step on somebody’s face.</i></p> <p><i>Ask a man (passing by) because he is either going to work or in a hurry.</i></p>
Advice on changing negative behaviour to positive behaviour (behaviour transformation)	<p>A character is holding a coloured pencil in their mouth: <i>Hold two things in one hand – take the pencil with this hand or put the pencil here.</i></p> <p>A character has a rope around their neck while playing “Horse and carts”: <i>Use a toy (as a horse) or make the horses hold the rope (shows: with their hands) and do not put it around their necks.</i></p> <p>A character is playing in the kitchen: <i>Play using a toy cooker.</i></p> <p>Toys are scattered around the kitchen floor: <i>Put these (dishes from the floor) here (on the table)</i></p>
Coming up with a solution to the problem: “What to do when you can choose between unhealthy but tasty doughnuts and a healthy but disliked apple?”	<p><i>If she likes bananas, I’d give her a banana (instead of an apple and a doughnut).</i></p> <p><i>So that she eats a half of the doughnut and the whole apple, as she likes doughnuts she could eat one but then the whole apple.</i></p> <p><i>She can eat an apple with a doughnut because it’s healthy.</i></p> <p><i>Eat yoghurt – it’s healthy and sweet.</i></p>
Coming up with metaphors: “A wise man is like... because...”	<p><i>...computer because he’s almost never wrong</i></p> <p><i>... high-speed Internet because he thinks fast</i></p> <p><i>...a good lion because... he only fights with enemies</i></p> <p><i>...a wizard because he knows and can do everything</i></p>
Self-reflection: “In what ways am I similar to a wise man and in what ways am I different from him?”	<p><i>I’m similar to a wise man because...</i></p> <p><i>I tell someone, a friend, no to do this.</i></p> <p><i>I don’t climb trees, I don’t ride my bike up steep hills, I don’t cross the street when the light is red.</i></p> <p><i>I’m not similar to a wise man because...</i></p> <p><i>I sometimes get bored and I don’t tidy up after myself.</i></p> <p><i>I shout at my Mum and I tell her I’ll move out.</i></p>

Source: Own work.

Conclusions

After using diverse statistical analyses to analyse the reliability and accuracy of the tools in stimulating and diagnosing the children's wisdom in thinking (in accordance with the WICS concept by R.J. Sternberg) in the studies, it turned out that:

- With the use of prepared sets of open tasks activating thinking, wisdom and wisdom predictors in preschool children can be diagnosed – such tasks make it possible to differentiate the competences and intellectual capabilities of the children in question;
- Divergent tasks used in studies are appropriate for preschool children – most of these tasks were performed by children taking part in the studies, with greater differences only appearing in the case of tasks in metaphorical thinking and idea transformation;
- The studies indicated that even such difficult tasks as creating metaphors and transforming ideas and solutions can be used in preschool education, as some children are indeed able to perform them. This is proved by the examples provided above;
- The studies conducted can undergo further statistical and qualitative analyses as the basic condition has been confirmed: normal distribution close to the representative distribution, developed based on raw scores⁴ and the measurement cohesion of the tasks employed;
- It will be possible to treat the conclusions from the studies conducted based on a randomly selected sample (N = 366) as justified, taking into consideration other logical and methodological principles.

According to the guidelines of the psychologists and pedagogues popularising the concept of wisdom development, wisdom is shaped under adequate conditions and when the subject takes a conscious and active part in different educational and social situations. Simple and intuitive knowledge is also related to the child's own development, so its use, stimulation and further development should become standard in the educational process.

⁴ Studies analysing the creativity of individuals usually do not achieve such distribution and have to be transformed into so-called sten scores (cf., Szmidi 2003, p.53).

References

- Brzeziński, J. (2000). *Badania eksperymentalne w psychologii i pedagogice* [Experimental Studies in Psychology and Pedagogy; transl. E.P.]. Warsaw: Scientific Publishing "Scholar".
- Brzeziński, J. (2005). *Trafność i rzetelność testów psychologicznych. Wybór tekstów* [Accuracy and Reliability of Psychological Tests. Selection of Texts; transl. E.P.]. Sopot: GWP.
- Czerepaniak-Walczak, M. (2006). *Pedagogika emancypacyjna, rozwój świadomości krytycznej człowieka* [Emancipatory Pedagogy. The Development of Man's Critical Consciousness; transl. E.P.]. Sopot: GWP.
- Karwowski, M. (2006). *Identyfikacja potencjału twórczego. Teoria – metodologia – diagnostyka* [Identification of Creative Potential. Theory – Methodology – Diagnosis; transl. E.P.]. Warsaw: Wydawnictwo Psychopedagogiczne Transgresje.
- Klus – Stańska, D., ed. (2013). *(Anty) edukacja wczesnoszkolna* [(Anti) Early School Education; transl. E.P.]. Krakow: Printing House "Impuls".
- Kubielski, W. (2006). *Podstawy pomiaru, konstruowania i ewaluacji testu dydaktycznego* [Fundamentals of Measurement, Construction and Evaluation of Test Teaching; transl. E.P.]. Warsaw: WSP TWP.
- Łobocki, M. (2005). *Metody i techniki badań pedagogicznych* [Methods and Techniques of Pedagogical Research; transl. E.P.]. Krakow: Printing House "Impuls".
- Meacham, J. (1990). *The loss of wisdom*. In: *Wisdom. Its nature, origins, and development*, ed. R.J. Sternberg, 181–211. New York: Cambridge University Press.
- Niemierko, B. (2005). *Ocenianie szkolne bez tajemnic* [School Evaluating without Secrets; transl. E.P.]. Warsaw: WSiP.
- Nosal, Cz. S. (1990). *Psychologiczne modele umysłu* [Psychological Models of the Mind; transl. E.P.]. Warsaw: PWN.
- Palka, S. (2006). *Metodologia. Badania. Praktyka pedagogiczna* [Methodology. Research. Teaching practice; transl. E.P.]. Sopot: GWP.
- Płóciennik, E. (2016). *Rozwijanie mądrości dziecka. Koncepcja i wskazówki metodyczne*, [The Child's Wisdom Development. The Concept and Methodological Guidelines; transl. E.P.]. Łódź: Lodz University Press.
- Runco, M.A. (2005). *Creative Giftedness*. In: *Conceptions of giftedness*, eds. R.J. Sternberg & J.E. Davidson, 295–311. New York: Cambridge University Press.
- Schaffer, H.R. (2005). *Psychologia dziecka* [Introducing Child Psychology], Warsaw: PWN.
- Sternberg, R. (1996). *Successful intelligence: How practical and creative intelligence determine success in life*. New York: Simon&Schuster.
- Sternberg, R.J. (2003). *Wisdom, Intelligence, and Creativity Synthesized*. Cambridge: Cambridge University Press.
- Sternberg, R.J. & Davidson, J.E. (2005). *Conceptions of giftedness*. New York: Cambridge University Press.
- Sternberg, R.J., Jarvin, L., Grigorienko, E.L. (2009). *Teaching for Wisdom, Intelligence, Creativity, and Success*. Thousand Oaks: Corwin A SAGE Company.

- Sternberg, R.J. Jordan, J. Eds. (2005). *A Handbook of wisdom. Psychological perspectives*. New York: Cambridge University Press.
- Szmidt, K.J. (2003). *Czy twórczość można zmierzyć? Spory wokół psychometrycznych metod badania twórczości* [Can Creativity Be Measured? Disputes over Psychometric Testing Methods; transl. E.P.]. In: *Twórczość – wyzwanie XXI wieku* [Creativity – the Challenge of the 21st Century; transl. E.P.], eds. E. Dombrowska & A. Niedźwiecka, 39–59. Kraków: Printing House “Impuls”.
- Waloszek, D. (2014). *Między przedszkolem a szkołą. Rozważania o gotowości dzieci do podjęcia nauki w szkole* [Between Kindergarten and School. Considerations about Children’s Readiness to Start Education; transl. E.P.]. Warszawa: Academic Press „Żak”.
- Wood, D. (2006). *Jak dzieci uczą się i myślą* [How Children Think and Learn: The Social Contexts of Cognitive Development]. Kracow: Jagiellonian University Press.
- Wygotsky, L.S. (2005). *Narzędzie i znak w rozwoju dziecka* [Tool and Symbol in Child Development]. Warsaw: PWN.