

EFFECTS OF ATTENTION ON GENERAL INFORMATION ACHIEVEMENT IN CHILDREN OF THE TYPICAL POPULATION AND CHILDREN WITH DEVELOPMENTAL DISABILITIES**^{1,*}Dr. Marija Slavković and ²Doc. dr. Sanja Soče**¹Elementary school "Sava Jovanović Sirogojno", Zemun, Bosnia and Herzegovina²Faculty of Educational Sciences, University of Sarajevo, Bosnia and Herzegovina**Received 08th May 2022; Accepted 14th June 2022; Published online 27th July 2022****Abstract**

The emergence of special methods of educational work, stimulated by the effects of predictors of attention during the preschool period, showed a significant impact of cocoa on children of the typical population, as well as on children with developmental disabilities. The level of predictors of attention and achievements on the test of general information is a special subject of this research. This research aims to evaluate the influence of the predictor level (attention) on academic achievements on the general information test in children of the typical population and children with developmental disabilities. The research sample consists of two hundred children of the typical population from the educational group and thirty children with developmental disabilities from the developmental group, aged from 5.5 to 6.5 years. During the testing of children from the typical population, a group of thirty children with developmental disabilities was selected. In the following work, we named the resulting group of children the educational group of children with developmental disabilities. The research used a revised version of the Peabody Individual Achievement Test (Peabody Individual Achievement Test-Revised), for assessing individual achievements, which enables the assessment of general information. The following tests were used to assess attention: Range of numbers and Range of colors. Testing was conducted during September and October 2019. It was concluded that in children of the typical population, the level of attention significantly affects academic achievements in the field of general information, as well as in children from the developmental group, while in children with developmental disabilities in the educational group, this is not the case. This conclusion points to the need for greater engagement and the inclusion of necessary exercises to stimulate the development of attention in children in educational groups, all with the aim of more successful inclusion.

Keywords: Attention, General information, Preschool period, Children of the typical population, Children with intellectual difficulties.**INTRODUCTION**

Attention, as one of the executive functions, is an important predictor of the adoption of academic achievements in the field of general information. The basic psychological function that is part of cognitive abilities is "attention" (Knudsen, 2007). The most common difficulties that occur in the area of attention are recorded in the form of problems in planning, monitoring, execution, and persistence on the set task (Blaye and Jacques, 2009; Gligorović and Buha, 2013; Stevens and Bavelier, 2012). In this research, children with developmental disabilities had a big problem with attention, recorded in the act of monitoring and persistence on given tasks compared to children of the typical population. The relationship between attention and intellectual abilities has often been the subject of research, but the results are not consistent, primarily due to focusing attention on different segments of the content (Schweizer and Moosbrugger, 2004), in these situations the so-called voluntary attention is present (Sternberg, 2005). The results of some studies indicate that attention is related to intelligence (Schweizer, Zimmermann and Koch, 2000). as is the case in this work with children of a typical population. There is also a so-called "divided attention", which is not related to intelligence (Fogarty and Stankov, 1988; Stankov, 1989), which is confirmed in this work by the results of children with developmental disabilities in the educational group. Also, attention and intelligence influence the results in the field of general information.

General information is a parameter for evaluating progress in children's education, in this research, it is quantified in children of preschool age. General information generally contains four factors that represent a general criterion, which is well adapted to the quantification system (Smith, 2015), namely:

1. Frequency of use of concepts by children;
2. The extent to which the concepts could be accessible to most children in all circumstances;
3. The usefulness of concepts in terms of their ability to integrate with other complex ideas that children could form;
4. The extent to which the concept may prove to be critical to children's safety or personal adjustment.

Also, a study by the authors' group (Christian, Morrison and Bryant, 1998) investigated the general awareness subtest of the Peabody Achievement Test-Revised (PIAT-R) and assessed how much children knew their culture. The question that was addressed in the research, which largely coincides with the research from this work, is whether literacy within the family is the only, positive prerequisite for a child to have the general information, and this research also adds how much the level of attention affects the achievements in general information, which exactly points to the goal of this research. The cognitive deficits of people with intellectual disabilities can limit their understanding of important information or force them to rely on caregivers and professionals in their environment (Burhaein *et al.*, 2021).

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METHODS

A sample

At the beginning of the research, the sample included 200 respondents from the typical population and 30 respondents with developmental disabilities, of both sexes. The respondents were divided into three groups. The first group included children with intellectual disabilities who attended developmental preschool groups and they consisted of 30 respondents (hereinafter: developmental group). Data related to children from this group were taken from the findings and decisions of the interdepartmental commission.

Based on the available documentation, it was determined that they meet the following criteria:

- Intelligence quotient within the range of 50 to 69 units;
- Chronological age from 5 to 6.5 years;
- Absence of obvious neurological, sensory and combined disorders.

During testing children who attended regular educational preschool groups, children with significantly lower values on the subtest for academic achievements in the field of general information as well as on the predictor test for attention were singled out. It was found that their mean and maximum achievement values on the mentioned subtests are significantly lower than other children from the typical and developmental groups. This caused these children to be separated into a special group, i.e. a group of children with developmental disabilities who attend regular preschool groups and they consisted of 30 respondents (hereinafter: educational group). Other children from the typical group who had higher mean and maximum achievement values on the academic subtest of general information and the predictor test for the assessment of attention were classified into the typical group, 170 subjects remained in that group after the test.

Instruments and procedure

After forming the sample, as well as obtaining informed consent, both from parents or guardians, as well as from the heads of the institutions where the research was carried out, an assessment was carried out. Data on the degree and type of disability of the respondents, the chronological age of the respondents, and the level of education of the parents were taken from the children's files. The research was conducted in September and October 2019. When conducting the research, direct contact with respondents was necessary, which was carried out individually, in isolated rooms in kindergartens and schools. The independent variable shows attention, and the dependent variable shows general awareness. The revised Peabody Individual Achievement Test: Revised - PIAT-R (Markwardt, 1998) was used to assess individual academic achievements in the field of children's general information. The test provides insight into children's achievements in five areas, and in this work, we use only one area, namely general information. It is a revision of the previous test from 1970, the "Peabody Individual Achievement Test" PIAT (Dunn and Markwardt, 1970), with updated norms, a larger number of items, and updated item content. The general information subtest measures the subject's general encyclopedic knowledge. In this subtest, the examiner reads the question aloud, and the subject answers verbally. Administration of the

subtest: Scoring instructions are provided with each question. This instruction determines which answers will be considered correct and which will be incorrect, and for which additional clarifications will be requested. The examiner evaluated as correct even those rare answers that were not specified in the scoring instructions, provided that they were logically correct and sophisticated as the assumed correct answers. Additional clarifications of the answers were requested only until we were sure whether the answer was correct or incorrect. Respondents were not asked additional questions if the answers were incorrect or even partially correct.

In the answer recording form, a key word or phrase from the child's answer was written down, on the basis of which it was decided whether the answer should be scored as correct or incorrect. If the respondent does not give any answer, in that case write NZ (for the answer "I don't know") or BO (if there is no answer). To assess attention (range of numbers and range of colors), tests taken from the book "Clinical assessment and treatment of difficulties in mental development" (Gligorović, 2013) and Protocol for assessing the educational potential of children with developmental disabilities (Fasper 179025, Belgrade 2015) were used. From the aforementioned protocol, a part of the tests called Oligophrenological assessment, a protocol for assessing cognitive abilities, was used (Gligorović *et al.*, 2015). Digit Span is intended to assess auditory attention and memory. The task consists of verbally presented strings of randomly distributed one-digit numbers (from 1 to 9). Number sequences are of increasing complexity, from two to nine numbers in a sequence. The examinee is expected to repeat the numbers read to him by the examiner in the same order (forward range). The level (range) of attention is determined on the basis of success on the items, which form two strings of identical length. The number of successfully repeated sequences is recorded and the level of reproduction achieved is evaluated (Gligorović, 2013). The Color Span Test is also intended to assess attention and short-term memory. The examinee is successively shown cards with increasing sequences of three to eight colors. The examinee is expected to reproduce those colors by pointing at a separate card. Two items are provided for each level. The total number of successfully repeated sequences of colors and mastery of the level are recorded (Gligorović, 2013).

RESULTS AND DISCUSSION

The influence of attention on general information, that is, establishing the existence of a correlation, as well as a better understanding of the connection between the independent and dependent variable, was done with the help of a simple linear regression analysis by groups, as well as on the total sample. In order to determine whether there is a difference in the slope of the regression curve between the groups, a homogeneity test of the slope coefficient was performed, i.e. regression coefficient. Table 1 shows the values of correlation coefficients as well as other indicators of the dependence model of children's results on the subtest general awareness of the results, i.e. degree of attention. Children's attention was assessed with two subtests: number span and color span. When we look at the whole sample, we see that there is a significant, very strong positive correlation between the range of numbers and general information, i.e. the better the children's results on the number span subtest, the better their achievements were on the general information subtest. As much as 72% of the variation of the dependent variable can be explained by the independent

variable. A similar significant correlation, but of a weaker intensity, was observed between the mentioned variables in children of the typical and developmental groups. In these groups, about 50% of the variation in the scores on the general awareness subtest can be explained by the number span. However, in the educational group of children, no correlation was observed between the range of numbers as an independent variable and the results on the general information subtest, as a dependent variable.

Table 1. The influence of attention on achievements on the general awareness subtest

Subtest	Group	r	r ²	B	df	F	p
Range of numbers	TG	0.72	0.52	0.74	1, 168	117.30	0.00
	VG	0.04	0.00	0.02	1, 28	0.40	0.84
	RG	0.71	0.50	0.39	1, 28	28.32	0.00
	Total sample	0.85	0.72	0.85	1, 228	592.26	0.00
Color range	TG	0.72	0.52	0.78	1, 168	182.21	0.00
	VG	0.25	0.06	0.10	1, 28	1.79	0.19
	RG	0.61	0.37	0.32	1, 28	16.51	0.00
	Total sample	0.84	0.71	0.84	1, 228	560.16	0.00

Legend: TG=typical group, VG=educational group, RG=developmental group; r=correlation coefficient, r²=dispersion proportion of the dependent variable, B=regression coefficient, df=degrees of freedom; F=quotient F; p=significance.

The bond between the range of colors and the results on the general information subtest is very similar to the link between the range of numbers and the mentioned dependent variable in the case of the total sample and typical and educational groups of children. A somewhat lower correlation was observed in the development group, as well as the fact that 37% of the variation in general information can be explained by the results of the color range subtest (Table 1).

Table 2. Determination of significant differences of regression coefficients between comparison groups

Dependent variable – results on the general information subtest.

Range of numbers	TG	VG
VG	0.00	
RG	0.00	0.04
Color range	TG	VG
VG	0.00	
RG	0.00	0.04

Legend: TG=typical group, VG=educational group, RG=developmental group.

The test of homogeneity of regression coefficients, i.e. slope coefficient, it was found that there is a significant difference in this parameter between the groups in the case when the independent variable is the range of numbers (df=2, F=7.84, p=0.00), as well as when the independent variable is the range of colors (df=2, F =12.85, p=0.00). The subsequent Scheffé test determined that all examined groups differed significantly in the slope coefficient (Table 2). Based on the results, it can be concluded that the children of the typical group had the highest level of development of predictors of attention to academic achievements on the subtest of general information which was measured with two subtests. Then, children from the developmental group had better results than children from the educational group and their level of predictor development is significantly higher for academic achievement on the subtest of general information.

Attention is an age-old complex concept that has been researched in psychology for more than a century. It can be defined as "a state of focused awareness on a subset of available perceptual information" (Oakes and Amso, 2018),

which includes perceptual, cognitive, neurophysiological and behavioral aspects. Preschool children are known to have difficulty maintaining attention on tasks or subjects and are easily distracted. Numerous studies measure and study attention in different ways. A study by Oakes and Amso (Oakes and Amso, 2018) examined attention using the concept of attentional inertia and attentional states in five- to six-year-old preschoolers. Ruff and Capozzoli (Ruff and Capozzoli, 2003) used the idea of sustained attention in their studies of preschool children. Another study by Ruff (Ruff, 1990) classified attention into three types: focused attention, steady attention, and intermittent attention while looking at the development of attention in early childhood. Casual attention and calm attention differ in terms of object intensity, as the former are viewed less intensely than the latter.

In this study, as in ours, it was also shown that better results are achieved among children with developmental disabilities, because special education teachers actively focus on their development, than children who are not officially confirmed to have some kind of disorder and are placed to attend an educational group along with the typical population of children. However, neither random nor sustained attention is strong enough to create an interaction with the object, which is the case with focused attention (Ruff, 1990). In this study, attention refers to the duration of focused attention that increases as children get older. Focused attention span is the period when concentration on a specific task occurs, including minimal body movements, intense facial expressions, and body posture that shows interest, and then shows the best results in mastering academic achievement (Ruff, 1990), which was also observed in our work with children of a typical population. The children were maximally focused on giving answers from the academic field of general information. According to Ruff et al. (Ruff and Capozzoli, 2003), the average focused attention span of 47 months (4 years) was about 260 seconds (4.3 minutes), derived from their empirical study with young children who played with construction (problem-solving) toys. Attention is variably defined and figures from numerous different literature, including research on temperament (where it is usually described as the ability to sustain attention) (Rothbart and Jones, 1998) and executive function (where the focus is on redirecting attention (Blair and Razza, 2007). All the above was also shown in our work with children with developmental disabilities, where selective attention was present at certain moments, which led to the redirection of attention outside the task. The attention, measured in this study, is directed according to the level of adoption of academic achievements in the field of general information as the ability to regulate attention and reject distractions, which is conceptualized in the research of this research.

A substantial body of clinical literature has shown that children with attention deficits, along with high impulsivity and activity levels, have relatively poor school performance (Kos, Richdale and Hay, 2006). Indeed, some studies suggest that attention, which is related to both aggressive behavior and academic achievement, explains the common finding of significant associations between aggressive behavior and underachievement (Barriga, et al., 2002), which is observed in work with children of preschool age from educational group to the school system is a problem to which additional attention must be paid. Several studies have looked at the link between attention and academic achievement, among others general awareness. Studies typically do not track academic outcomes

for more than a few years. follow-ups show that attention (as conceptualized in this study) measured in preschool and elementary school predicts academic outcomes at least one year later (Diamantopoulou, Rydell and Thorell, 2007). For example, in an analysis of six longitudinal studies, Duncan et al. (2007) found that attention assessed at entry into elementary school significantly predicted reading, general information, and math skills in later grades. The amount of attention among children, both typical and children with developmental disabilities, contributes to their inclusion in the learning processes of general information and to the development of their abilities. Attention is an important element in the learning process to enhance cognitive, motor, physical and emotional development. Precisely because of all the above, this research indicates that it is necessary to timely diagnose children with developmental disabilities in educational groups and provide them with all the necessary materials for work, create individual educational programs (hereinafter IEP) and thereby facilitate the inclusive moment. Only by introducing the mentioned suggestions can we influence the primary importance of the attention span and enable the child to focus on the task for a certain period of time (Diamond and Lee, 2011). Children's sense of brashness and understanding are also determined by attention span. In short, in our research it was observed that attention spans help children to stay engaged in an activity without distraction and thereby show satisfactory academic results, which agrees with the claims of Nesbitt and colleagues (Nesbitt, Farran, and Fuhs, 2015). Children with developmental disabilities often do not follow directions and do not seem to listen when spoken to directly. They may show a reluctance to engage in tasks that require continuous mental effort or great attention to detail and may make careless mistakes in their work, which was also shown in this study of children with developmental disabilities in educational groups.

The subtest of general information in children measures the child's general encyclopedic knowledge in the content areas of science, history, humanities and social studies. The questions are read aloud, and the child answers orally. In order to answer the tasks, you need reasoning and factual knowledge, so it is necessary to have good attention. According to our results, children from the typical population achieved significantly better results on this test than children from other groups. The results of general information showed how children of the typical population mastered the use of terms and concepts that they encounter every day, and children with developmental disabilities also showed this in accordance with their abilities. Our research is supported by Smith's (Smith, 2015) study on general information. The study shows the frequency of use of those concepts that children use almost every day, up to those concepts that the child rarely or never comes into contact with, all with the aim of improving the education of children in preschool age, between the ages of 42 and 72 months, using test sections as the core. which were previously used at the Iowa Child Welfare Research Station. The goal was to include concepts that children would use in practice without verbalization, and concepts that children could develop thanks to good attention and memory (Smith, 2015).

Conclusion

From the performance of children from the educational group with developmental disabilities and the results we obtained, we can conclude that the situation with their development of attention, and therefore its influence on achievements in

general information, is becoming worrisome, in terms of their further progress in regular school system. Children with developmental disabilities do not progress if they are not sufficiently encouraged by various measures (methodical-didactic apparatus led by an educated teacher, modified programs, etc.). Unlike them, children of the typical population realize their maximum potential thanks to the use of information and communication technologies for educational purposes. Children are thus motivated in multiple ways and directed towards new knowledge. Such an approach is the ultimate good result shown by our respondents of the typical population on the subtest of attention and general information. Intensive social changes and achievements in the field of modern technology, as well as the increasing needs of the market for qualified staff, require a change in the paradigm of education, from kindergarten age, which encourages the maximum development of the potential of each child, whether he comes from a typical population or belongs to a group of children with developmental disabilities. The basic goals of education in Serbia, defined in the Law on the Basics of the Education System, are accessibility, quality education for all and the democratization of education, which implies inclusive education that opens the possibility for all children to receive support for developing their educational potential (Popović, Lazović, Milosavljević, 2017).

This research paper presented the importance of predictors on the academic achievements of children of a typical population in educational preparatory preschool groups, and also showed that predictors have a significant impact on the academic achievements of children with developmental disabilities in developmental groups. Attention is a decisive moment in mastering academic skills in the field of general information and must be worked on continuously, especially with children who have developmental disabilities. The early intervention of the child is also an important factor so that the child with an adequate diagnosis would join the preparatory preschool group where the IEP would be prepared for him according to his abilities and sensibility, unlike the previous practice of detecting problems with a test in the preschool period, which could be seen in the results of this research.

The research contributed to the development of further thoughts because the group of children with developmental disabilities within the educational group was differentiated by the application of standardized tests. For the mentioned group of children in the files, it was written b.o., which means that they do not have any diagnosis and that is why they are placed in the group of children of the typical population. A separate group of children worked according to the regular plan and program for children of the typical population and therefore showed poor results. If the inclusion of children is the goal, it requires that a child with an already established diagnosis and the opinion of the interdepartmental committee join an inclusive group with all the benefits to which he is entitled (creation of IEP, use of adequate didactic-methodical apparatus, services of a special education teacher), to more successfully implement inclusion. This research should represent the basis for future research, which should be directed towards measures of tolerance of educators, their continuous education, and adequate application of IEP. It is also necessary to train attention with adequate didactic methodical apparatus and help from a special education teacher so that academic achievements in the transition of the school system would be by the child's chronological age. The results

of this research showed that there is a significant difference in the level of development of predictors of attention in relation to academic achievements in the field of general information between children of the typical population and children with developmental disabilities. Children from the typical group show the best levels of influence of attention on the level of achievement in general information. We also came to the conclusion that there is a difference in the mastery of predictors of attention to academic achievements in the field of general information in favor of children with intellectual disabilities from the developmental group compared to children with intellectual disabilities from the educational group. Attention and working memory are not completely different cognitive functions, because working memory involves attentional processes (Engle, 2002). Engle (2002) explains that working memory capacity reflects the ability to use attention to avoid distraction. In the paper, we came to the conclusion that working memory is strongly involved in attention problems with intellectual disabilities, and there is evidence that working memory training can reduce attention problems in children with intellectual disabilities (Beck *et al.*, 2010), in addition to Therefore, we believe that attention problems and impulsivity increase when children are faced with poor working memory. Attention can help in faster, more efficient and more productive mastering of academic achievements in the field of general information, that is why they are in a strong correlation in children of the typical population, and in children with developmental disabilities, attention, as a determinant predictor, goes into the proposal for continuous training in order to help children to enter the transition of the school system more easily. Research has proven that attention is a consequence of children's learning, as it increases children's engagement and participation in academic endeavors and increases children's ability to solve problems. It was expected that children of the typical population from the typical group would show better levels of attention focused on the realization of academic achievements in the field of general information than children from the developmental group with developmental disabilities. Children with intellectual difficulties in the educational group, due to late detection, did not have enough time to adapt to new models of inclusive approach and therefore their level of attention proved to be insignificant for solving academic achievements in the field of general information.

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