

WCPCG-2010

Attention in children with intellectual disabilities

Aleksandra Djuric-Zdravkovic^a*, Mirjana Japundza-Milisavljevic^a,
Dragana Macesic-Petrovic^a

^a *Department of Oligofrenology, University of Belgrade, Faculty for Special Education and Rehabilitation,
Visokog Stevana 2, Belgrade 11000, Serbia*

Received January 5, 2010; revised February 2, 2010; accepted March 22, 2010

Abstract

The aim of this study was to determine the reference values of achievement on the test for the assesment of selective attention in children with mild intellectual disabilities. The sample consists of 120 examinees, aged from 12 to 17 years, of both sexes. The intelligence quotient (IQ) of the examinees ranged from 51 to 69, estimated by the standard tests for the evaluation of intellectual capabilities. In this study, the Stroop test was used to assess the level of development of selective attention. The study results show a low level of achievement of this population in the examined work segment, whilst with the statistical data processing a high statistically significant relationship was established between the two assessed variables within the used test.

© 2010 Elsevier Ltd. Open access under [CC BY-NC-ND license](https://creativecommons.org/licenses/by-nc-nd/4.0/).

Keywords: selective attention, mild intellectual disability

1. Introduction

Selectivity of mental processes in psychology is usually referred to as attention and defined as the state of vigilance, which comes to selective perception of sensory and memory information (Ward, 2004).

By securing the basic level of awareness, attention directs mental energy to certain content by way of which it secures the necessary condition for the functioning of the mental apparatus in the processing of the priority information. Attention effectuates priority through multiple levels of selection. Priority can be determined by the characteristics of the actual stimulus or fixated pattern of recognition for the organism of the significant stimulus (Mesulam, 2000). Stimuli that are abrupt, intensive and in contrast with their surroundings, lead to involitional, spontaneous or passive attention. If the stimuli are in accordance with the needs, interests, or tasks of the subject, then that is an intentional, spontaneous, controlled, active, volitional attention (Rueda et al., 2004). Such attention is effectuated following the conscious and volitional decision to direct our mental activity toward the selected content, despite the effect of intensive exterior stimuli. Full, stably organized, socially mediate attention is formed in a child toward the end of its preschool years. Complex, stable forms of volitional attention, which the subject submits to the general intent, is formed between the ages of 12 and 15 (Mesulam, 2000).

* Aleksandra Djuric-Zdravkovic. Tel.: +381-11-2183-036; fax: 381-11-2183-081

E-mail address: adjuriczdravkovic@yahoo.com

Attention deficits in children are usually demonstrated through four basic behavioural characteristics: selective attention –children with ADD function within two extremes of attention, as opposed to the majority of people whose attention is maintained at the mid-level values most of the time, they can have extreme focus of attention, but only in situations which are new and interesting for them and extremely bad concentration when everyday school activities are in question; distractibility – attention easily becomes scattered, any outside external stimulus draws or withdraws their attention, or any flow of ideas which are not in a functional tie with the task which they are working on; impulsiveness-action comes before a reflex, which often leads them to dangerous and unpleasant situations; hyperactivity – too much activity which is not appropriate for the situation in question (Delfos, 2004; Kutscher, 2007; Kutscher, 2008). In this study we made a review of the level of development of only one of the components of attention (selectivity).

The study of the characteristics of the attention of children with intellectual disabilities is inflicted with its manifestative signs, which are particularly expressed in the teaching process. The basis of the cognizance function in children with mild intellectual disability is significantly determined by the attention functions. Neuropsychological research shows that disturbances in attention represent a significant factor of discognitive development, which hinders learning, perceptive and motor functions in children with intellectual disabilities (Bigby, Fyffe, Ozanne, 2007; Delfos, 2004; Kurtz, 2006; Kurtz, 2007). Planning and organization of individual educational and individual training programs when working with these children, regardless of the variety in their form and modality, must be founded on knowledge of the rhythm of development of certain structures and functions and for them to be harmonized accordingly with that rhythm. Apprehension of the characteristics of cognitive organization and more precise designation of the primary deficit would lead to the individualization of the approach used in working with this population of children.

The problem of this study pertains to the question, whether it is possible to record the reference values of the results (norms) on the test for assessing the selectivity of attention in children with intellectual disabilities and (if it is) how much are their deviations in relation to the reference values of the results achieved (norms) of the examinees of the massive population on the same test.

The aim of this study was to establish the reference values for the results of achievement on the test for the assessment of selectivity of attention in children with mild intellectual disabilities.

1. Sample

The sample encompassed 120 examinees with mild intellectual disabilities, which are students at elementary schools in Belgrade, Serbia.

The study was conducted with examinees of both sexes (there was a somewhat larger number of male students (56.7%) in relation to the examinees who were female (43.3%), aged 12 to 17 years.

The sample is entirely equable in accordance with age group, in other words, 20 students were assessed for each calendar year. The intelligence quotient of the children in the sample ranges between 51 and 69, which are characteristic values for those with mild intellectual disability.

Criteria used in the selection of examinees were:

- ♣ Mild intellectual disability (IQ score of 51-69 on the standard tests of intelligence)
- ♣ Lack of evident somatic and neurological disorders
- ♣ Lack of emphasized emotional disturbances

2. Study Method

In this study, for the evaluation of the level of the development of selective attention we used the Stroop Test (John Ridley Stroop, 1935). This test assesses the extent to which a patient maintains its perceptive set, despite the distraction from interferential and relevant information. In other words, it examines the attentional distractibility, as well as the strength of cognitive control.

The test is founded on the finding that a longer period of time is required to read the names of colours, than is needed to read words, and even more time to say the names of the colours when the colour of the printed word is different than the color of the word that is the target stimulus (Ward, 2004).

In our study, we implemented the Dodrill format (Dodrill format, 1978), which consists of only one paper that contains 176 (11 horizontal and 16 vertical rows) words in colour (red, orange, green and blue), that are randomly

printed in these colours. In the first part of this test, the examinee reads the printed word; the second part requires the examinee to say the colour in which each word is printed. The time required to read the first part and list the colours in the second part is carefully measured and recorded separately. Also, the number of mistakes made by the examinee during the test is also recorded.

Based on the results and for the purpose of easier overview of results the examinees were classified into three groups: first group (I) includes examinees with the best scores (25%); second group (II) are examinees whose results are within the range of the middle values of the sample (50%); and the third group (III) is made up of examinees which had obtained the worst results on the Stroop test (25%).

The obtained results are illustrated in tabular form in their nominal and percentage values.

- Percentages;
- Measure of central tendencies (arithmetic mean);
- Measure of variability (standard deviation);
- Pearson coefficient of linear correlation (r) and its significance.

3. Results

Table 1. Average results of the examinees on the Stroop test (words)

	Stroop – word test	
	Time is sec.	No. of mistakes
min.	66 sec.	0
max.	991 sec.	61
AM	188.73	3.93
SD	122.64	6.67
$r = +0.73$ (level 0.01)		

Table 2. Results of the examinees on the Stroop test (words) classified in groups

	Stroop – word test	
	Time is sec.	No. of mistakes
I (25%)	66 – 117 (n=29)	0 (n=34)
II (50%)	118 – 210 (n=61)	1 – 5 (n=58)
III (25%)	218 – 991 (n=30)	6 – 61 (n=28)

From tables 1 and 2 it can be concluded that the Stroop-word test contains results of the total time period expressed in seconds, with the number of mistakes made, which is required for the reading with the interference of colour, as a measure of selective attention.

Table 3. Average results of the examinees on the Stroop test (colours)

	Stroop – colour test	
	Time is sec.	No. of mistakes
min.	138	1
max.	998	80
AM	311.26	13.33
SD	146.06	10.54
$r = +0.71$ (level 0.01)		

Table 4. Average results of the examinees on the Stroop test (colours) classified in groups

	Stroop – colour test	
	Time is sec.	No. of mistakes
I (25%)	138 – 209 (n=30)	1 – 6 (n=27)
II (50%)	212 – 371 (n=60)	7 – 17 (n=61)
III (25%)	372 – 998 (n=30)	18 – 80 (n=32)

Tables 3 and 4 (Stroop – Colour test) shows the time expressed in seconds, with the number of mistakes made, which is required to name colours with the interference of a conflicting word, as a measure of resistance to distractions.

Within the Stroop –word test (table 1) and Stroop – colour test (table 3), between the variables: time to solve the test and the number of mistakes made, the Pearson coefficient of linear correlation was established as $r = +0.73$ (for words) and $r = +0.71$ (for colours), which is significant at a level of 0.01. With 99% certainty we can conclude that the longer the time period required for the test to be completed, the greater the number of mistakes made is. These two variables have a high positive relation.

There exists an explicit interdependence between the accuracy and the speed with which the reply is given, in the sense that a greater number of mistakes is followed by slower performance, however the “graveness” is not the same for all mistakes, whereas more serious mistakes (overlooked mistakes) have less influence over the speed in which the test is done, than the minor ones (mistakes which the examinee spontaneously corrects).

Children in our sample with mild intellectual disability have worse results on the test for assessing the level of selective attention in relation to the children of the mass population who are of the same age. Such deviation in favour of the general population was registered in numerous studies that have been undertaken in the past (Deutsch, Dube, McIlvane, 2008; Simonoff, 2007).

The reference values obtained in the studies of other authors, on the test for the assessment of selective attention which was applied in our study as well, can be used, at least for orientative comparison of individual results and showing the quality of the selectivity of attention of the examinees with mild intellectual disabilities in relation to the same ability in the examinees of the mass population.

Table 5. Reference values taken over from the results on the test for the assessment of selective attention of the subjects from the mass population aged 12 to 17 years of age

Test for the assessment of selective attention	Reaction time (seconds)	Reaction time (seconds)	
Stroop–word test	82 – 88	0 – 1	*
Stroop–colour test	165 – 184	7 – 12	*

*Data adopted from other authors (Seron i Laterre, 1982-according to Ward, 2004)

Table 6. Average results of examinees in our study on the test for the assessment of selective attention in relation to the adopted reference values of the subjects of the mass population

Test for the assessment of selective attention		Stroop–word test	Stroop–colour test
A M	Reaction time (seconds)	188.73	311.26
	Accuracy (seconds)	3.93	13.33
Above average	seconds	% 1.7	8.3
		n 2	10
	mistakes	% /	22.5
		n /	27
Harmonious development	seconds	% /	4.2
		n /	5
	mistakes	% 39.2	35
		n 47	42
Distinct disturbances	seconds	% 98.3	87.5
		n 118	105
	mistakes	% 60.8	42.5
		n 73	51

From the tabular survey number 6 it can be observed that a small number and an insignificant percentage of the examinees that participated in our study reaches the level of the reference values in the reaction time on the tasks in the evaluation (expressed in seconds) which are above average and at the level of the reference values (harmonious development) of the subjects of the mass population.

In the assessment of the quality of development of volitional attention, through the reaction time on the tests (expressed in seconds), we observe an extremely high number of examinees with disturbances in this function. (Stroop test (words) – 98.3%, Stroop test (colour) – 87.5%).

Numerically and proportionally, the results of the examinees on the tests for assessing the organization of attention, with an analysis of the mistakes made are better in relation to the analysis of the reaction time (speed at which tasks are completed).

4. Discussion

The results obtained of the frequency of a decrease in the quality of selective attention in children with mild intellectual disability bear witness to the neglect of attention in the process of special education and rehabilitation in which these children are included during their schooling.

Attention deficit which is often seen in children and adults with intellectual disabilities significantly determine their learning and behaviour (Deutsch et al., 2008; Simonoff, 2007).

Children with an attention deficit often require individual educational programs that take into consideration their attention deficit and decreased ability to learn. Emphasis is placed on specific activities and exercises which improve coordination and sensory organization and which should be implemented in accordance with individual abilities and capabilities of children with intellectual disabilities (directing attention, abstracting of important from unimportant stimuli, recognizing the significant details of objects, stimulation to the completion of the task at hand, strengthening of resistance to distractions, executive control, maintenance of attention, etc.) (Bigby et al., 2007, Fowler, 2008; Martin, Pear, 2005). In the event that these children begin to see themselves as inadequate, incompetent and unsuccessful in all of their interpersonal relations, they will also require supportive dynamic psychotherapy (Deutsch et al., 2008).

Treatments such as: play therapy, special ADHD diet, psycho-education (because these children have significant difficulties in learning), cognitive therapy and dynamic psychotherapy in more differentiating personalities, family therapy, psycho-dynamic counselling of parents, thus support for the parents and their appropriate training so that they can cope easier with these types of children, have been characterized as being promising, however behavioural therapy has shown the best results (Heward, 2008). The fundamental idea behind this therapy is the establishment of specific rules that shall determine the child's behaviour with established consequences for their respect or disrespect thereof.

Pelham suggests a strategy for good ADHD behavioural therapy – take care that the child understands the rules, give clear commands, do not expect perfection, use directives involving “if-then” to increase the child's motivation, plan out the child's activities for the entire day while its in the classroom in accordance with the calendar age of the child (younger child should be made activate with physical activity and the older should be involved in predominantly social spheres so that they do not feel frustrated) (Deutsch et al., 2008).

Nevertheless, the prevailing opinion is that one treatment approach cannot resolve the problem of a child with an attention deficit and that the combination of various therapy methods is becoming a necessity (Delfos, 2004; Martin, Pear, 2005). It is useful to implement in practice all of the therapeutic methods for which research has shown as being efficient.

References

- Bigby, C., Fyffe, C., Ozanne, E. (2007). *Planning and Support for People with Intellectual Disabilities*. London: Jessica Kingsley Publishers
- Delfos, M. (2004). *Children and Behavioural Problems Anxiety, Aggression, Depression and ADHD – A Biopsychological Model with Guidelines for Diagnostics and Treatment*. London: Jessica Kingsley Publishers
- Deutsch, C., Dube, W., McIlvane, W. (2008). Attention deficits, Attention-Deficit Hyperactivity Disorder, and intellectual disabilities. *Developmental Disabilities Research Reviews*, **14**(4), 285-292
- Fowler, S. (2008). *Multisensory Rooms and Environments Controlled Sensory Experiences for People with Profound and Multiple Disabilities*. London: Jessica Kingsley Publishers
- Heward, W.L. (2008). *Exceptional Children: An Introduction to Special Education. International Edition, 9/E*. Upper Saddle River, NJ: Merrill Prentice Hall
- Kurtz, L. (2006). *Visual Perception Problems in Children with AD/HD, Autism, and Other Learning Disabilities*. London: JKP Essentials
- Kurtz, L. (2007). *Understanding Motor Skills in Children with Dyspraxia, ADHD, Autism, and Other Learning Disabilities*. London: JKP Essentials
- Kutscher, M. (2007). *Kids in the Syndrome Mix of ADHD, LD, Asperger's, Tourette's, Bipolar, and More!* London: Jessica Kingsley Publishers
- Kutscher, M. (2008). *ADHD - Living without Brakes*. London: Jessica Kingsley Publishers
- Martin, G. & Pear, J. (2005). *Behavior Modification: What it is and how to do it (8th Edition)*. Englewood Cliffs, New Jersey: Prentice Hall
- Mesulam, M.M. (2000). *Principles of behavioural and cognitive neurology. 2nd ed.* New York: Oxford University Press
- Rueda, M.R., Fan, J., Halparin, J., Gruber, D., Lercari, L.P., McCandliss, B.D. & Posner, M.I. (2004). Development of attention during childhood. *Neuropsychologia*, **42**, 1029-1040

- Simonoff, E. (2007). ADHD symptoms in children with mild intellectual disability. *Journal of the American Academy of Child and Adolescent Psychiatry*, **46**(5), 591-600
- Ward, A. (2004). *Attention: A Neuropsychological Approach*. Psychology Press: Taylor & Francis Group