STUDIA UBB EDUCATIO ARTIS GYMN., LXVI, 1, 2021, pp. 5 – 15
(RECOMMENDED CITATION)
DOI:10.24193/subbeag.66(1).01

CORRELATIONAL STUDY REGARDING THE ATTENTION OF THE PREPARATORY CLASS STUDENTS TO THE PHYSICAL EDUCATION AND SPORT LESSON

BĂLĂNEAN DENISA[1*], PETRACOVSCHI SIMONA[1]

ABSTRACT. Introduction: There are disorders that cannot be observed only with the naked eye and tend to be confused with lack of intelligence, in this category falling attention deficit. **Objectives:** The study aimed to analyze correlations between the level of attention and gender of children in the preparatory class, to highlight differences between girls and boys, as well as to identify the existence of increased attention of each gender, depending on the time of the lesson physical education and sport. **Methods:** Two specific tests were used: The Toulouse-Pieron Test (1982) and The Raven Progressive Matrices (1938). After applying the tests, for a period of 2 months, the direct observation method was applied. This study involved 51 children, including 22 girls and 29 boys, from the preparatory class. **Results:** The link between the level of attention and the gender of the students was demonstrated, at ρ = 0.773, with a significance threshold of .000, which shows the very significant association between the 2 variables. Obtaining a coefficient t = 7.758 and a significance threshold of .000, highlights the existence of a very statistically significant difference between the two groups. There was also a distinct degree of attention between the 2 genres, which fluctuated depending on the activity proposed. **Conclusions:** Girls have a higher degree of attention than boys, there is a link between the gender of students and the focus on certain tasks; girls are more attentive than boys to moments that involve bodily expression activities, while boys are more attentive than girls to competitive activities.

Keywords: *attention disorder, gender, association, concentration, lesson moments*

REZUMAT. ***Studiu corelațional privind atenția elevilor de clasa pregătitoare la lecția de educație fizică și sport*****. Introducere**: Există afecțiuni care nu se pot observa cu ochiul liber şi care pot fi confundate cu lipsa de inteligență, în această categorie încadrându-se deficitul de atenție. **Obiective:** Studiul şi-a propus să analizeze corelaţii între nivelul atenției şi genul copiilor din clasa pregătitoare, să

[1] *West University of Timişoara, Faculty of Physical Education and Sports*

evidenţieze diferenţe între fete şi băieţi şi să identifice existenţa unei atenţii mai sporite a fiecărui gen, în funcţie de momentul lecţiei de educaţie fizică şi sport. **Metode:** S-au utilizat două probe specifice: Testul Toulouse-Pieron (1982) şi The Raven Progressive Matrices (1938). Ulterior aplicării testelor, pe o perioadă de 2 luni s-a aplicat şi metoda observaţiei directe. La acest studiu au luat parte 51 de copii, dintre care 22 de fete şi 29 de băieţi, elevi de clasa pregătitoare**. Rezultate:** S-a demonstrat legătura dintre nivelul atenţiei şi genul elevilor, la un ρ= 0,773, cu un prag de semnificaţie de .000, care arată asocierea foarte semnificativă dintre cele 2 variabile. Obţinerea unui coeficient t= 7,758 şi a unui prag de semnificaţie de .000, evidenţiază existenţa unei diferenţe foarte semnificative statistic între cele două grupuri. S-a observat, de asemenea, un grad distinct de atenţie între cele 2, oscilând în funcţie de activitatea propusă. **Concluzii:** Fetele prezintă un grad mai ridicat de atenţie decât băieţii, existând o legătură între genul elevilor şi focusarea pe anumite sarcini; fetele sunt mai atente decât băieţii la momentele care cuprind activităţi de expresie corporală, în timp ce băieţii sunt mai atenţi decât fetele la activităţile competitive.

Cuvinte cheie: *deficit de atenţie, gen, asociere, concentrare, momentele lecţiei*

INTRODUCTION

Attention deficit disorder is one of the most common psychopathological problems encountered in children, this term going through several concepts and proposals issued in various fields, but in general, the starting point of the definition is clear and shows inattention, impulsivity and hyperactivity, all these being multiple dimensions that are related to each other (Guevara & Galarza, 2015; Piek & Dyck, 2004; Urzua, Alfonso, Marcos et al., 2009). In addition to difficulty concentrating, the inability to shape their attention in response to the demands of the external environment, as well as the immediate reaction given by impulsivity (Salamanca, 2015), these children also have a number of motor deficits, including and motor coordination (Flapper, Schoemaker, 2006; Pitcher, Piek & Hay, 2003; Sergeant, Piek & Oosterlaan, 2006).

For decades, the way in which motor coordination disorders in childhood did not manifest itself only as an isolated problem has been highlighted (Missiuna, 1994). The child's educational stages are considered to be sensitive phases in which attention is manifested through movement, and this is similar to existing evidence of how cognitive structures (especially attention) are affected, leading to a negative consequence in motor skills (Ruiz, Gómez & Navia, 2018). These deficits found in children with attention disorders are well recognized in the literature worldwide (Doyle, Wallen & Whitmont, 1995; Parry, 1996; Piek, Pitcher &

Hay, 1999; Whitmont & Clark, 1996). Some longitudinal studies have shown that those with these deficits have a higher risk of learning difficulties due to high comorbidity (Jongmans, Smits-Engelsman & Schoemaker, 2003). Therefore, it has been pointed out in studies that motor coordination disorders have been closely linked to the existence of other problems that affect certain cognitive abilities, including the ability to maintain attention (Dewey, Kaplan & Crawford, 2002). However, the association between motor coordination and attention deficit disorder is poorly recognized in the DSM-IV (American Psychiatric Association, 1994).

Despite the fact that many studies attest to the link between attention deficit and coordination, research on the difference between the female and male gender is quite rare in the literature. After conducting a meta-analysis of the literature on these deficits, Gaub and Carlson (1997) argued that there were no gender differences in aspects such as impulsivity, academic performance, social functioning, and motor skills, indicating that few studies included a number of sufficient female participants to justify gender-based conclusions. Some differences appear to be strongly mediated by the effects of prejudice, especially that in studies conducted in school contexts, it is argued that teachers tend to rate girls slightly differently than boys, leading to derivation processes (Coles et al., 2012; Hart , Grand & Riley, 2006), and the male gender to be assessed more severely than the female gender (Gillberg & Kadesjo, 2003), which is why the results may not be considered valid. On the other hand, in a similar study (Meyer & Sagvolden, 2006) girls scored much lower than boys on a coordination test.

OBJECTIVES

The study aimed to analyze correlations between the level of attention and gender of children in the preparatory class, to highlight differences between girls and boys, as well as to identify the existence of increased attention of each gender, depending on the time of the lesson physical education and sport.

HYPOTHESES

1. There is a statistically significant association between the level of attention and the gender of children in the preparatory class.

2. There is a statistically significant difference between boys and girls in terms of level of attention.

3. Girls are more attentive than boys at times of lesson involving activities of body expression, while boys are more attentive than girls at times involving competitive activities.

MATERIAL AND METHODS

This study involved a number of 51 students from a school in Timisoara (43.14% girls and 58.86% boys), aged between 6 years (54.90%) and 7 years (45.10%.), Participants in the lesson of physical education and sport.

Under the guidance of a licensed psychologist, two tests were applied to these students: the Perception and Attention Test (Toulouse-Pieron, 1982) and the Raven Progressive Matrix Test (1938, J. C Raven, et al. L. S. O. Enrose). The perception and attention test measures the ability to focus on motor tasks, along with perceptual speed and continuous attention. The Raven Progressive Matrix Test was built to primarily assess general intelligence, using two categories of skills: educational and reproductive.

Following the collection of data (results from psychological tests and gender of students), they were centralized and introduced in the statistical program SPSS, which was used to obtain the results of the proposed hypotheses.

After applying the tests, for a period of 2 months, the method of direct observation was applied in order to record the main gender differences in terms of attention to the lesson of physical education and sports. Regarding this method, a certain homogeneity of the whole sample was tried, being created a single group for each class, in work formations that allowed the placement of a girl next to a boy.

RESEARCH RESULTS

Hypothesis 1: There is a statistically significant association between the level of attention and the gender of children in the preparatory class.

The testing of this hypothesis started at the ascertaining level, by verifying the normality of the distribution related to the attention variable, indicated by means of the obliquity index and the vaulting index.

Their values together with the indicators of the central tendency of the variable in question are presented below:

Table 1. Descriptive attention indicators for the whole sample (N=51)

Variable	N	Mean	St. Dev	Minimum Value	Maximum Value	Skewness	Kurtosis
Attention	51	67.54	31.23	15	140	-0.21	-0.01

Given the values of the obliquity index of -0.21 and the vaulting index of -0.01, it was found that the distribution in the case of the attention variable in the case of the entire investigated sample meets the criterion of normality. However, the fact that the gender of the participants is represented by a dichotomous variable, it is necessary to test the working hypothesis using as a statistical technique a non-parametric correlation, namely the Spearman correlation.

Table 2. Correlation indices attention - gender

		Gender
Attention	*Spearman correlation*	.773
	Sig.	.000
	N	51

ρ (49) = 0.773, p= .000 (p < .01), bilateral test, r^2= .59

The value of the coefficient ρ = 0.773 shows that the association between the variables is high, while the significance threshold of .000 shows that the identified association is very statistically significant (p <.01). The magnitude of the observed effect is strong (r^2 = .59). Thus, the working hypothesis is supported by the data obtained.

Hypothesis 2: There is a statistically significant difference between boys and girls in terms of level of attention.

First, the ascertaining level for the distributions of the attention variable related to each group was achieved. The descriptive indicators are presented below:

Table 3. Descriptive indicators attention for girls (N=22) and boys (N=29)

Group	N	Mean	St. Dev	Minimum value	Maximum value	Skewness	Kurtosis
1 Girls	22	93.9	22.96	64	87	0.95	-1.92
2 Boys	29	47.55	18.4	15	140	-0.06	0.71

As shown in Table no. 3, the values of the skewness and the vaulting indices in both the girls and the boys group fall within the range corresponding to the distributions that meet the normality criterion.

Thus, for testing the hypothesis, the t test for independent samples was used as a statistical technique, given that the two groups are not pairs, the measurements are not repeated, and the distributions of the attention variable are symmetrical. The values obtained from the application of the t test are presented in the following tables:

Table 4. Group statistics

Variable	Group	N	Mean	Standard deviation	St. error
Attention	1 girls	22	93.9	18.4	3.92
	2 boys	29	47.55	22.96	4.26

Table 5. T test for independent sample

Variable		Levene's test for equality of dispersion		T test for equality of means		
		F	Sig	T	Df	Sig.
Attention	Homogeneous dispersion	7.484	.009	7.758	49	.000
	Heterogeneous dispersion			7.998	48.82	.000

t(49)= 7.758, p=.000 (<.01), bilateral test, r^2=.55

Therefore, a coefficient t = 7.758 and a significance threshold of .000 (p <.01) was obtained, which means that the difference between the two groups is very statistically significant; the average of the group of girls (M = 93.9) being significantly higher than that of boys (M = 47.55). The magnitude of the effect is strong (r^2 = .55). The working hypothesis is supported by the data obtained.

Hypothesis 3: Girls are more attentive than boys at lesson moments that involve body expression activities, while boys are more attentive than girls at moments that involve competitive activities.

Following the application of the observation method, the following were found in the Physical Education and Sport lesson:

Table 6. Observation of gender differences

LESSON MOMENTS	OBSERVATION
1. Organizing the group of students	No differences were observed between boys and girls, both genders showing the same degree of attention in each class.
2. Preparing the body for effort	No differences were observed between boys and girls, both genders showing the same degree of attention in each class.
3. Selective influence of the musculoskeletal system	There was a difference between boys and girls, the female being much more focused on harmonious physical development exercises, but also on those in gymnastics, where they tried to use auxiliary objects (gymnastic sticks). There was a visible difference, especially since after each set of exercises performed, a verbal command was used to which a quick response was expected, and the girls were more focused on what they had to do.
4. Development of motor quality with aerobic energy (Coordinative Capacity/ Speed)	There was a difference between boys and girls, this time the male gender showing a higher concentration, especially in exercises and games designed to develop speed. Mainly, I found a burning desire to win, and this competitiveness led them to pay more attention.
5. Acquisition, consolidation, improvement of general or specific motor skills and abilities of some sports	A difference was observed between boys and girls, but which fluctuated depending on the proposed theme. Thus, in the dynamic competition exercises, as well as in the preparatory ones for a sports game, the boys remained focused for a longer period of time, compared to the girls. On the other hand, the female gender manifested this concentration in the exercises in artistic gymnastics, balance and even in practicing motor acts that involved body expression activities.
6. Development of motor quality with aerobic energy (Strength / Endurance)	There was a difference between boys and girls, with a predominance of attention, especially in males, particularly in exercises and games designed to develop strength.
7. Cooldown	No differences were observed between boys and girls, both genders showing the same degree of attention in each class.
8. Appreciations and recommendations	No differences were observed between boys and girls, both genders showing the same degree of attention in each class.

Therefore, it was observed that girls are more attentive at times of the lesson that involve activities of body expression, while boys are more attentive than girls at times that involve competitive activities.

DISCUSSIONS

Academic performance can be influenced by a multitude of variables, such as socioeconomic status, family structure, sociocultural level, personal motivation, individual abilities, time and effort devoted to study (Cano, 2001).

The first hypothesis, which supports the idea that there is a statistically significant association between the level of attention and the gender of children in the preparatory class, has been confirmed. In a similar study (Fernández-Castillo, Gutiérrez Rojas, 2009), gender differences in selective attention were found, where the girls showed a remarkable increase in selective visual attention effort when an invalid, comparative signal appeared, while it was not the same with the boys, who benefited from this type of signal anyway. This demonstrates the possible statistical difference, in which boys and girls respond to an attention task differently (Fernández Castillo et al, 2009). There are also differences in the use of attention techniques and strategies, with the frequency of use being higher in girls than in boys (Tejedor, González & García-Senoran, 2008).

Also in the aforementioned study from 2009, it is confirmed that one of the factors that contributes to the difference between boys and girls with attention deficit disorder is depression. It was found that depressive symptoms are associated with selective attention only in boys, not girls. Also, for the male gender, this symptomatology manifests itself more often in the school environment. Another rather important factor mentioned in the study is the association of anxiety with a low level of selective attention only in the case of males, not females.

In contrast, Biederman et al. (2010) found differences in the comorbidity of each gender, noting that girls, compared to boys, are more likely to develop anxiety disorders. This information may be useful in a possible future study, which could find out how much attention is influenced by depression and what the real difference would be, analyzing the child's condition and diagnosing other possible symptoms.

Regarding hypothesis 3, the researchers examined the effects of coordinated-bilateral exercises on attention and concentration in young children (6-8 years). Budde et al. (2008) found that bilateral coordination exercises in Physical Education and Sport lessons led to significant improvements in children's attention. Similarly, Smits-Engelsman et al. (2012) examined the attention of 90

children, tested before, during, and immediately after the experiment. They found that coordination exercises increased significantly the children's ability to concentrate and pay attention.

Moreover, in a systematic review of physical activity interventions, Van der Fels and colleagues (2015) suggest that a short physical activity intervention can improve attention, processing speed, and focus. According to authors such as Khan and Hillman (2014), the practice of physical activity in the early stages of life can optimize children's cognitive functions, as it promotes the maturation of the brain and allows better development of neural networks. Other recent studies have also shown the existence of an association between physical activity practice and executive functioning (Chaddock, Hillman, Buck & Cohen, 2011; Scudder et. al, 2014).

How exercise helps children focus is not yet clear and there is a clear need for future research to determine the mechanisms of the brain involved.

CONCLUSIONS

Following the study, we found that there is a link between children's attention and their gender and, in terms of the difference between boys and girls, we found differences in attention, a balance that leans in favor of girls. It has also been observed that girls show a higher degree of attention when subjected to artistic or bodily expression tasks, while boys are more focused on competitive activities.

Regarding the different degree of attention depending on the time of the lesson, it is observed that both girls and boys prefer certain types of exercises and games, each with different objectives that inevitably affect the level of attention. In order for this study to not lead to gender bias, we propose for the following research directions to include larger samples, with different ages and targets.

REFERENCES

1. American Psychiatric Association (1994). *Diagnostic and statistical manual of mental disorders* (4 Ed.). Washington, D.C.: American Psychiatric Publishing.
2. Biederman, J., Petty, C.R., Evans, M., Small, J., Faraone, S.V. (2010). How persistent is ADHD? A controlled 10-year follow-up study of boys with ADHD. *Psychiatry Res*. 30; 177(3):299-304. doi:10.1016/j.psychres.2009.12.010. PMID: 20452063; PMCID: PMC2881837.

3. Budde, H., Voelcker-Rehage, C., Pietrassyk-Kendziorra, S. (2008). Acute coordinative exercise improves attentional performance in adolescents. *Neuroscience Letters*, 441, 219 – 223.
4. Cano, J.S. (2001). El rendimiento escolar y sus contextos. *Revista complutense de Educación,* 12(1), 15-80.
5. Chaddock, L., Hillman, C.H., Buck, S.M., Cohen, N.J. (2011). Aerobic fitness and executive control of relational memory in preadolescent. *Med Sci Sports Exercises*, 43(2), p. 344-349.
6. Coles, E., et al (2012). Exploring the gender gap in referrals for children with ADHD and other disruptive behavior disorders. *Journal of Attention Disorders, Thousand Oaks*, v.16.
7. Dewey, D., Kaplan, B.J., Crawford, S.G., & Wilson, B.N. (2002). Developmental coordination disorder: Associated problems in attention, learning, and psychosocial adjustment. *Human Movement Science,* 21, 905–918.
8. Doyle, S., Wallen, M., & Whitmont, S. (1995). Motor skills in Australian children with attention deficit hyperactivity disorder. *Occupational Therapy International*, 2, 229–240.
9. Fernández-Castillo, A., & Gutiérrez Rojas, M.E (2009). Atención selectiva, ansiedad, sintomatología depresiva y rendimiento académico en adolescentes. *Electronic Journal of Research in Educational Psychology*, vol. 7, ISSN. 1696-2095.
10. Flapper, B.C, Houwen, S., Schoemaker, M.M (2006). Fine motor skills and effects of methylphenidate in children with attention-deficit hyperactivity disorder and developmental coordination disorder. *Dev Med Child Neurol*, 48:165-169. 21.
11. Gaub, M. & Carlos, C.L. (1997). Gender Differences in ADHD: A Meta-Analysis and Critical Review. *Journal of the American Academy of Child & Adolescent Psychiatry*, 36(8), 1036–1045. doi:10.1097/00004583-199708000-00011.
12. Gillberg, C., & Kadesjö, B. (2003). Why bother about clumsiness? The implications of having developmental coordination disorder. *Neural plasticity*, *10*(1-2), 59–68. https://doi.org/10.1155/NP.2003.59.
13. Guevara, M.E. (2015). Respuesta motora en el trastorno por déficit de atención con hiperactividad. *Revista Tecnológica ESPOL*, *28*(2).
14. Hart, N., Grand, N., & Riley, K. (2006). *Making the grade: the gender gap, ADHD, and the medicalization of boyhood*. In: Rosenfeld, Faircloth (Ed.). Medicalized masculinities. Philadelphia: Temple University Press, p. 132-165.
15. Jongmans, M.J., Smits-Engelsman, B.C.M., Schoemaker, M.M. (2003). Consequences of Comorbidity of Developmental Coordination Disorders and Learning Disabilities for Severity and Pattern Perceptual-Motor Dysfunction. *Journal of Learning Disabilities*; 36(6):528-537. doi:10.1177/00222194030360060401.
16. Khan N., Hillman, C.H. (2014). The relation of childhood physical activity and aerobic fitness to brain function and cognition. *Pediatric Exercises*, 26(2), p. 138-146.
17. Meyer, A., & Sagvolden, T. (2006). Fine motor skills in South African children with symptoms of ADHD: influence of subtype, gender, age, and hand dominance. *Behavioral and brain functions: BBF*, *2*, 33. https://doi.org/10.1186/1744-9081-2-33.

18. Missiuna, C. (1994). Motorskills acquisition in children with developmental coordination disorder. *Adapt Phys Act Q*; 11:214-235.
19. Parry, T. (1996). Multiple stimuli disorganisation syndrome: Treatment and management of children with attentional disorders. *The Australian Educational and Developmental Psychologist*, 13, 56–58.
20. Piek, J.P., & Dyck, M.J. (2004). Sensory motor deficits in children with developmental coordination disorder, attention deficit hyperactivity disorder and autistic disorder*. Human Movement Science, 23(3-4), 475–488.* doi:10.1016/j.humov.2004.08.019.
21. Piek, J.P., Pitcher, T.M. & Hay, D.A. (1999). Motor coordination and kinaesthesis in boys with attention deficit-hyperactivity disorder. *Developmental Medicine & Child Neurology*, 41, 159–165.
22. Pitcher, T.M., Piek, J.P., & Hay, D.A. (2003). Fine and gross motor ability in males with ADHD. *Developmental Medicine & Child Neurology*, 45, 525–535.
23. Ruiz, L.M., Gómez, M.A., & Navia, J.A. (2018). *Physical Activity practice, sleeping habits and academic achievement.* Ed. Blandina Bernal-Morales*,* Health and Academic Achievement, IntechOpen*.* DOI: 10.5772/intechopen.71282.
24. Salamanca Duque, L. M et al. (2015). Asociación de características de trastorno del desarrollo de la coordinación con síntomas de TDAH en ninos de la ciudad de Manizales. *Rev Colombiana Psiq.* http://dx.doi.org/10.1016/j.rcp.2015.09.003.
25. Sergeant, J.A, Piek, J.P, Oosterlaan, J. (2006). ADHD and DCD: A relationship in need of research. *Hum Mov Sci*, 25:76-89.
26. Smits-Engelsman, B., Hill, E.L. (2012). The Relationship Between Motor Coordination and Intelligence Across the IQ. *Pediatrics,* 130(4), e950–e956. doi:10.1542/peds.2011-3712
27. Tejedor, Francisco-García-Señorán, María & González (2008). Estrategias atencionales y rendimiento académico en estudiantes de secundaria. *Revista Latinoamericana de Psicología*, 123-132. ISSN 0120-0534.
28. Urzua M., Alfonso, D.S., Marcos, C., Andrea, R.B, Mireya & Quiroz, J. (2009). Trastorno por Déficit de Atención con Hiperactividad en Niños Escolarizados. *Revista chilena de pediatría*, *80*(4), 332-338.
29. Van der Fels, I.M.J., Wierike, S.C.M., Hartman, E., Elferink-Gemser, M.T., Smith, J., & Visscher, C. (2015). The relationship between motor skills and cognitive skills in 4–16 year old typically developing children: A systematic review*. Journal of Science and Medicine in Sport, 18(6), 697–703.* doi:10.1016/j.jsams.2014.09.007.
30. Whitmont, S., & Clark, C. (1996). Kinaesthetic acuity and fine motor skills in children with attention deficit hyperactivity disorder: A preliminary report. *Developmental Medicine and Child Neurology*, 38, 1091–1098.