

Artículo Original. Relationship of visual, attentional and contextual variables together with internalized (depression), and externalized (behavior) problems. Vol. 7, n.º 2; p. 239-266, mayo 2021. A Coruña. España ISSN 2386-8333

Relationship of visual, attentional and contextual variables together with internalized (depression), and externalized (behavior) problems

Relación de las variables visuales, atencionales y contextuales junto con problemas internalizados (depresión), y los externalizados (comportamiento)

Xavier Estrada Fernández¹; Gemma Viera Segura²; Agnès Ros Morente¹; Carles Alsinet Mora¹; Laura Vicens Nuñez³

¹ Departamento de Psicología. Universidad de Lleida (UdL)

² Viera Visió Lleida

³ Centre Teràpia Visuau

Contacto: x.estrada@icloud.com

Cronograma editorial: Artículo recibido: 02/01/2021 Aceptado: 29/03/2021 Publicado: 01/05/2021

<https://doi.org/10.17979/sportis.2021.7.2.7365>

Abstract

Physical exercise as an educational formula improves the motor and cognitive learning of students, and allows us to strengthen the motor, coordinative and visual skills of the students, boys and girls, that will be decisive for their integral development. The general objective of the study is to examine the relationship of visual, attentional and contextual variables, together with internalized problems (depression), and externalized problems (behavior) in primary school students. 76 students participated in the study, of which 53 were boys (69.73%) and 23 girls (30.27%), with a mean age of 6.68 and a standard deviation of .799. The students participated in a multisport activity where three protocols were previously administered: an optometric evaluation, the Caras-R, Identical Forms-R and SENA to evaluate visual discrimination, sustained attention and contextual factors. The regressive models of the study predict, firstly, that better visual and attentional discrimination avoids depressive symptoms in students, and, secondly, that contextual factors act exclusively and directly in the face of depressive-type symptoms. The importance of the visual task as a variable directly related to depression and significantly together with attention in the prediction of adaptive behaviors stands out as a novelty. Thus, good visual discrimination is an important factor in sports practice and in the prevention of emotional and behavioral problems.

Para citar este artículo utilice la siguiente referencia: Estrada, X.; Viera, G.; Ros, A.; Alsinet, C.; Vicens, L. (2021). Relationship of visual, attentional and contextual variables together with internalized (depression), and externalized (behavior) problems. *Sportis Sci J*, 7 (2), 239-266.

<https://doi.org/10.17979/sportis.2021.7.2.7365>

<http://revistas.udc.es/>

Artículo Original. Relationship of visual, attentional and contextual variables together with internalized (depression), and externalized (behavior) problems. Vol. 7, n.º 2; p. 239-266, mayo 2021. A Coruña. España ISSN 2386-8333

Keywords

Physical exercise; visual discrimination; emotional education; visual training; primary school education.

Resumen

El ejercicio físico como fórmula educativa mejora el aprendizaje motor y cognitivo de los alumnos, y nos permite afianzar las habilidades motoras, coordinativas y visuales de los niños y de las niñas que resultaran determinantes para su desarrollo integral. El estudio tiene por objetivo general examinar la relación de las variables visuales, atencionales y contextuales, juntamente con los problemas internalizados (depresión), y los externalizados (comportamiento) en alumnos de centros educativos de primaria. En el estudio participaron 76 alumnos de los cuales 53 fueron niños (69.73%) y 23 niñas (30.27%), con una media de edad de 6.68 y una desviación estándar de .799. Los alumnos participaron en una actividad multideportiva donde previamente se les administró tres protocolos: una evaluación optométrica, el Caras-R, Formas Idénticas-R y SENA para evaluar la discriminación visual, la atención sostenida y los factores contextuales. Los modelos regresivos del estudio predicen en primer lugar que una mejor discriminación visual y atencional evita sintomatología depresiva en los alumnos, y, en segundo lugar, que los factores contextuales actúan de forma exclusiva y directa delante de sintomatología de tipo depresivo. Destaca como novedad la importancia de la tarea visual como variable relacionada directamente con la depresión y de manera significativa junto con la atención en la predicción de conductas adaptativas. Así, una buena discriminación visual es un factor importante en la práctica deportiva y en la prevención frente los problemas emocionales y de conducta.

Palabras clave

Ejercicio físico; discriminación visual; educación emocional; entrenamiento visual; educación primaria

Introduction

Sports practice contributes to the psychological and emotional state of athletes (Guillamón, Canto & García, 2020; Vaughan, Laborde & McConville, 2019; Tiscini & Delia, 2016), and, according to Vázquez and Márquez (2017), provides a balance between the mind and the body thus satisfying the well-being of the person. In recent years, training has been incorporating techniques to develop skills in the athlete, and achieve better performance (Mantilla, 2019). By way of example, a study by Molina, Chorot and Sandín (2017) with

Artículo Original. Relationship of visual, attentional and contextual variables together with internalized (depression), and externalized (behavior) problems. Vol. 7, n.º 2; p. 239-266, mayo 2021. A Coruña. España ISSN 2386-8333

badminton athletes states that self-confidence is associated with better sports performance due to the management of psychological pressure.

In this sense, it is important to highlight the sensory aspect in training to enhance skills that promote high performance (Mantilla, 2019). A study by Van Dongen, Kersten, Wagner, Morris and Fernández (2016) shows that practicing physical exercise enhances the process of consolidation of information and strengthens memory. Neuropsychology shows that the ability to learn will be determined by the connection between neural networks, which fight, assert themselves or succumb depending on genetic and internal factors, as well as environmental stimuli (Sierra, Pérez & Quianella, 2019). According to Castaldi, Lunghi and Morrone (2020), brain plasticity facilitates these connections, based on the experience of the learning and memorization process, and it is in the early stages of development when brain areas show remarkable plasticity (Guzmán, Villalva & Bernal, 2015) and facilitate modifications in sensory or motor representation (LeWinn, Sheridan, Keyes, Hamilton & McLaughlin, 2017).

Visual system

Image perception develops through the visual system, and vision itself consists of identifying, interpreting and understanding what we see. The retina is connected through the optic nerve to various structures of the brain, transmitting information and allowing the integration of sensory information (Rojas & Jeannet, 2016).

Mobility requires the integrity of both the visual and the motor pathways and inadequate ocular-motor integration can be the basis of learning problems in children (Ferré & Aribau, 2016).

Success in sports and learning depends to a large degree on the analysis of the situation or perception (Pérez & Fleitas, 2019). Visual sports training is a resource that benefits learning through visual re-education (Cagno, 2016; Rugolotto, 2015), enables the development of skills (Appelbaum & Erickson, 2018), cognitive skills (Rugolotto, 2016;

Artículo Original. Relationship of visual, attentional and contextual variables together with internalized (depression), and externalized (behavior) problems. Vol. 7, n.º 2; p. 239-266, mayo 2021. A Coruña. España ISSN 2386-8333

Vidarte, Gutierrez, Ortega, Caicedo & Parra, 2020) and improves emotional management (Ibarra, 2019).

There are numerous studies that point to a relationship between motor and cognitive skills in children between 4 and 16 years old (Van der Fels, et al., 2014) obtaining better results in performance or cognitive and motor improvements through cognitive-motor training (Moreau et al., 2015).

Executive functions

Sustained attention as a participant in higher-order cognitive functions has an important role in children's learning, a role that involves being in charge of regulating behavior to adjust it to the demands of the environment and solve problems (Alarcón, Castillo, Ureña, Torre & Cardenas, 2017). Maintaining adequate sustained attention with an efficient visual system will allow us to focus our attention on the most relevant stimuli of the task and to choose from our memory the best option according to previous experiences.

Regular physical exercise facilitates neural plasticity, producing better cognitive responses in various tests on executive functions such as attention (Alves, et al., 2012), as well as better results in processing speed, selective attention, and short-term memory (Tomporowski, Lambourne & Okumura, 2011). Studies by Pontifex, Scudder, Drollette and Hillman (2012) measured performance in sustained attention in terms of time spent on the task using a flanker task in preadolescents with low and high levels of physical condition and revealed an increase in errors of omission and number of omissions in those of lower physical condition.

Contextual and social factors

These factors would encompass family, school and cultural conditions, indicating the degree of imbalance and maladaptation to the context, as well as the level of dissatisfaction and perceived tension with their environment. Studies have been conducted with university students that demonstrate this with regard to academic performance (López, 2014; Ramos, 2010; Roux & Anzures, 2015), and Ferreiro, Mato and Chao (2014) and Salinas, Hernández

Para citar este artículo utilice la siguiente referencia: Estrada, X.; Viera, G.; Ros, A.; Alsinet, C.; Vicents, L. (2021). Relationship of visual, attentional and contextual variables together with internalized (depression), and externalized (behavior) problems. *Sportis Sci J*, 7 (2), 239-266.

<https://doi.org/10.17979/sportis.2021.7.2.7365>

<http://revistas.udc.es/>

Artículo Original. Relationship of visual, attentional and contextual variables together with internalized (depression), and externalized (behavior) problems. Vol. 7, n.º 2; p. 239-266, mayo 2021. A Coruña. España ISSN 2386-8333

and Barboza (2017) observed the obtaining of better academic performance if they came from families with high cultural and academic levels. The family environment plays an important role for academic performance (Reynoso, et al., 2018) and for better overall performance (Barrios & Frías, 2016).

The emotional manifestations of boys and girls are reflected through internalizing factors which refer to behaviors that the individual themselves experiences (Luengo, 2014), showing symptoms such as depression. These manifestations indicate the degree to which emotional alterations and symptoms related to the main affective or mood problems are shown, and specifically, the presence of depressive symptoms characterized by feelings of guilt, worthlessness, helplessness and others. Studies by Voltas, Hernández-Martínez, Arija and Canals (2016) affirm that children with depression and anxiety show a significant deterioration in family activities, in school and in relationships with their peers.

The externalizing factors (Alvarenga, Mansur-Alves & Franco, 2009; Campbell, Shaw & Gilliom, 2000), focus behavior towards other people due to a low regulation of impulses, high activity and mistrust; issues like attention problems, hyperactivity-impulsiveness, anger control, aggression, as well as defiant and antisocial behaviors are all highlighted. In this case, the external and disruptive behavioral manifestations that invade the child's environment are indicated, generating interpersonal conflicts and hindering the normal development of activities, projecting a behavior of defiance and opposition to parents, tutors and adults, hindering socialization as well as social, family and school integration.

Objectives

On the basis of the data subsequently revealed, the hypothesis is established that primary school boys and girls, who, when evaluated through the administration of psychometric protocols, display better visual discrimination and fewer attention errors manifest fewer depressive symptoms and fewer problems with conduct. Furthermore, it is hypothesized that the degree of visual discrimination will partly explain the presentation of these symptoms in the future.

Para citar este artículo utilice la siguiente referencia: Estrada, X.; Viera, G.; Ros, A.; Alsinet, C.; Vicents, L. (2021). Relationship of visual, attentional and contextual variables together with internalized (depression), and externalized (behavior) problems. *Sportis Sci J*, 7 (2), 239-266.

<https://doi.org/10.17979/sportis.2021.7.2.7365>

<http://revistas.udc.es/>

Artículo Original. Relationship of visual, attentional and contextual variables together with internalized (depression), and externalized (behavior) problems. Vol. 7, n.º 2; p. 239-266, mayo 2021. A Coruña. España ISSN 2386-8333

The first objective of the present study is to examine the relationship of the visual, attentional and contextual variables, together with the internalized problems (depression), and the externalized ones (behavior), psychometrically evaluated. It also aims to demonstrate the importance of visuospatial tasks in the prevention of behavioral problems.

A second objective is to demonstrate and analyze the importance of the contextual and family variable as a means of preventing the emotional manifestations of depression as an internalizing problem.

Material and method

Participants

The research is a descriptive cross-sectional study conducted with a sample of 76 primary school students, 53 boys (69.73%) and 23 girls (30.27%), between 6 and 12 years old, with a mean age of 6.68 and a standard deviation of .799, from five public educational centers in the city of Lleida.

The selection criterion has been the voluntary participation in an extracurricular sports activity with an experimental format for boys and girls from the various levels of primary education in the public sphere. In order to be eligible to take part in the study, only those participants whose response pattern was complete and satisfactory according to the relevant protocols were taken into account.

Instruments

In the first place, the data of all the students participating in the activity was acquired by means of a sociodemographic questionnaire, which made it possible to encode the collected data and work completely anonymously. The students from each of the centers have undergone a first session of optometric evaluation and the subsequent performance, during the same session, of two protocols: The task of sustained attention in childhood-revised (Servera & Llabrés, 2015) and the evaluation system for children and adolescents (Fernández-Pinto, Santamaría, Sánchez-Sánchez, Carrasco & del Barrio, 2015) for the Initial and Middle Cycle

Para citar este artículo utilice la siguiente referencia: Estrada, X.; Viera, G.; Ros, A.; Alsinet, C.; Vicents, L. (2021). Relationship of visual, attentional and contextual variables together with internalized (depression), and externalized (behavior) problems. *Sportis Sci J*, 7 (2), 239-266.

<https://doi.org/10.17979/sportis.2021.7.2.7365>

<http://revistas.udc.es/>

Artículo Original. Relationship of visual, attentional and contextual variables together with internalized (depression), and externalized (behavior) problems. Vol. 7, n.º 2; p. 239-266, mayo 2021. A Coruña. España ISSN 2386-8333

pupils; and the test of identical forms-Revised (Thurstone, 1996;adaptation Cordero, Seisdedos, González & Victoria de la Cruz, 2013) and the System of Evaluation of Children and Adolescents for Higher Cycle Vocational Education (Fernández-Pinto et al., 2015a, 2015b).

Process

The directors of the primary schools participating in the study and all the parents of the participants were informed of the study objectives and its protocol beforehand in person and signed the voluntary, free and informed consent form in order to participate in the study. This research has followed the guidelines set out in the Declaration of Helsinki (World Medical Association, 2008), regarding research projects, in addition to the national legislation for clinical trials (Law 223/2004 of February 6), for biomedical research (Law 14/2007 of July 3) and confidentiality of the participants (Law 15/1999 of December 13).

The visual skills assessment procedure was conducted using a touch screen with COI-VISION software developed by Plou, García, Nacher and Velasco (2009). The test is based on the administration of different tests: a first test allows identification and coordination, to evaluate eye-muscle coordination and concentration; the second is a tachistoscopic method with numerical presentation, which is used to evaluate the minimum visual perception time.

After the optometric evaluation, the sustained attention task protocol in childhood-revised (CSAT-R) (Servera & Llabrés, 2016) was used, which is a computerized test whose purpose is to evaluate the sustained attention capacity of children between 6 and 11 years (from 1st to 4th grade of primary school) through a surveillance task. The CSAT-R test has adequate reliability, together with convergent, discriminant, predictive and construct validity (Servera & Cardo, 2006). The test displays a series of numbers on the computer screen, from 0 to 9, for 7.5 minutes, every 500 milliseconds, and those numbers remain on the screen for 250 milliseconds. The student has to press the space bar on the keyboard each time a number 3 preceded by a 6 appears on the screen.

Para citar este artículo utilice la siguiente referencia: Estrada, X.; Viera, G.; Ros, A.; Alsinet, C.; Vicents, L. (2021). Relationship of visual, attentional and contextual variables together with internalized (depression), and externalized (behavior) problems. *Sportis Sci J*, 7 (2), 239-266.

<https://doi.org/10.17979/sportis.2021.7.2.7365>

<http://revistas.udc.es/>

Artículo Original. Relationship of visual, attentional and contextual variables together with internalized (depression), and externalized (behavior) problems. Vol. 7, n.º 2; p. 239-266, mayo 2021. A Coruña. España ISSN 2386-8333

The test provides the Hits (A) of the performance, which represents the number of pulses on the bar in the presence of the target stimulus (6-3); errors committed or commissions (E), which indicates the number of pulsations made before sequences other than the target stimulus, related to inhibitory control; and the reaction time (TR), namely, the average time it takes to get the hits (milliseconds), related to the processing speed. In addition, scores are obtained that allow two indices to be obtained: sustained attention capacity (A 'and d') and an index of response style (C) within the conservative-impulsive continuum. It also shows the type of errors that the child has made based on their cause: persistence (PE), distraction (ED), impulsiveness (EI) or chance (EA). The test complies with standards of reliability and validity and was administered individually, following prior instructions and training. It showed acceptable reliability values, which fluctuate around 0.80 for hits, 0.85 for reaction times and 0.80 for error commissions.

The “Identical Forms” (FI-R) protocol used for Upper Cycle students assesses perceptual and attentional skills. The task is to identify which figure is equal to a model. Its application individually is performed by computer within a time limit of 4 minutes. It enables the Perception and Attention Index (AE, net hits) to be obtained, which relates the total number of hits (A) with the total number of errors (E) and the Net Hit Index (EA) between the total number of answers given (A + E). The reliability and validity coefficients are satisfactory for use in combination with other information.

Finally, the administration of the Child and Adolescent Assessment System (SENA), (Fernández-Pinto et al., 2015a, 2015b) is a self-report model according to the age of the student that allows the detection of a wide spectrum of emotional and behavioral problems: internalized (depression, anxiety, etc.); externalized (impulsivity, hyperactivity, aggressiveness, etc.) and specific (behavior problems, learning, etc.). Its application for students in the Initial Cycle was performed using a protocol adapted for paper and pencil, with instructions from the professional in each of the questions, and in the Middle and Upper Cycle it was carried out by means of an online version with previous explanations being given before its completion. Each questionnaire consists of a number of items, ranging from 77 to

Para citar este artículo utilice la siguiente referencia: Estrada, X.; Viera, G.; Ros, A.; Alsinet, C.; Vicents, L. (2021). Relationship of visual, attentional and contextual variables together with internalized (depression), and externalized (behavior) problems. *Sportis Sci J*, 7 (2), 239-266.

<https://doi.org/10.17979/sportis.2021.7.2.7365>

<http://revistas.udc.es/>

Artículo Original. Relationship of visual, attentional and contextual variables together with internalized (depression), and externalized (behavior) problems. Vol. 7, n.º 2; p. 239-266, mayo 2021. A Coruña. España ISSN 2386-8333

188, with a Likert response format, whereby the frequency of appearance of the described behavior is assessed using a five-point scale (from ‘never’ to ‘almost never’ to ‘always’ or ‘almost always’), except in the case of the self-report of 6 to 8-year-olds, which includes a scale of three options: ‘yes’, ‘no’ and ‘sometimes’. The questionnaires have a multidimensional approach and assess a broad set of content using three scales: scales of problems, vulnerability and personal resources. The problem scales are organized into different groups, according to the manifestation of the disorder they assess. Thus, the group of internalized problems includes the following scales: Depression (DEP), Anxiety (ANS), Social Anxiety (ASC), Somatic Complaints (SOM), Post-traumatic Symptoms (PST) and Obsession-compulsion (OBS). The group of externalized problems includes the scales: Attention problems (ATE), Hyperactivity-impulsivity (HIP), Anger control problems (IRA), Behavior problems (PCO), Aggression (AGR), Challenging behavior (DES) and Antisocial behavior (ANT). A third block includes scales that allow the evaluation of specific problems: substance use (SUS), eating behavior problems (ALI) and schizotypy (ESQ). The last block is made up of the contextual problem scales: Family problems (FAM), School problems (ESC) and Peer problems (COM). In addition, a block of vulnerability scales is included, permitting the assessment of aspects such as Emotional regulation problems (REG) and Sensation seeking (BUS), along with one final block of personal resource scales: Self-esteem (AUT), Integration and social competence (SOC) and Problem Awareness (CNC).

The scores obtained show internal consistency in the vast majority of scales and indices ($> .70$), in accordance with the standards typically established (Hernández, Ponsoda, Muñiz, Prieto & Elosua, 2016). The test-retest reliability coefficients indicate that the stability is satisfactory given the age at which the test is conducted ($> .70$) (del Barrio, 2014).

Statistics analysis

For the purposes of statistical analysis, the SPSS 25.0 statistical program was used. Since the objective of the study is not, strictly speaking, to compare the means between categories, but rather to analyze the variance for predictive power, it was preferred to use the ANOVA procedure as a prior step to the linear regression analysis. A posteriori, therefore,

Para citar este artículo utilice la siguiente referencia: Estrada, X.; Viera, G.; Ros, A.; Alsinet, C.; Vicents, L. (2021). Relationship of visual, attentional and contextual variables together with internalized (depression), and externalized (behavior) problems. *Sportis Sci J*, 7 (2), 239-266.

<https://doi.org/10.17979/sportis.2021.7.2.7365>

<http://revistas.udc.es/>

Artículo Original. Relationship of visual, attentional and contextual variables together with internalized (depression), and externalized (behavior) problems. Vol. 7, n.º 2; p. 239-266, mayo 2021. A Coruña. España ISSN 2386-8333

two linear regression models are analyzed with the study variables so as to predict their effect on internalized and externalized factors.

Results

To verify the hypotheses of the present work, different statistical procedures were conducted. First, a comparison of the means of the different study variables was performed through the analysis of variance with the ANOVA procedure (see Table 1). Subsequently, two linear regression models were carried out (see Tables 2 and 3) to study the predictive power of the variables of visual tasks, executive functions and contextual variables on the depression variable (internalizing) and the behavioral problems variable (externalizing).

As can be seen in Table 1, the obtained results showed statistically significant differences in the means obtained between those boys and girls with a better score in visual discrimination and those with a lower discriminatory capacity.

In this sense, the boys and the girls with better discrimination recorded significantly better scores in emotional well-being, lower anxiety, etc., with the most significant being anger control ($p = 0.006$) and external manifestations ($p = 0.004$). The least significant are listed below according to the scores obtained: attention ($p = 0.011$), behavioral problems ($p = 0.014$), depression ($p = 0.028$), errors committed ($p = 0.030$), hyperactivity and impulsivity ($p = 0.040$) and emotional factors ($p = 0.044$).

Table 1. ANOVA means comparisons between the group of children with high and low discrimination.

(n=76)	Group	Mean	Total Sum of squares	gl	Quadratic mean	F	p
PAT score	Boys	27.11	2.137	1	2.137	0.060	0.807
	Girls	27,48					
Commission errors	Boys	47.66	1119.928	1	1119.928	4.882	0.030
	Girls	39.30					

Para citar este artículo utilice la siguiente referencia: Estrada, X.; Viera, G.; Ros, A.; Alsinet, C.; Vicents, L. (2021). Relationship of visual, attentional and contextual variables together with internalized (depression), and externalized (behavior) problems. *Sportis Sci J*, 7 (2), 239-266.

<https://doi.org/10.17979/sportis.2021.7.2.7365>

<http://revistas.udc.es/>

Artículo Original. Relationship of visual, attentional and contextual variables together with internalized (depression), and externalized (behavior) problems. Vol. 7, n.º 2; p. 239-266, mayo 2021. A Coruña. España ISSN 2386-8333

Emotional	Boys	52.47	421.101	1	421.101	4.179	0.044
	Girls	47.35					
External and disruptive manifestations	Boys	58.83	1733.297	1	1733.297	8.720	0.004
	Girls	48.43					
Contextual	Boys	61.96	595.401	1	595.401	3.667	0.059
	Girls	55.87					
Depression	Boys	55.85	565.171	1	565.171	5.007	0.028
	Girls	49.91					
Anxiety	Boys	48.57	157.263	1	157.263	1.731	0.192
	Girls	45.43					
Attention	Boys	53.55	651.498	1	651.498	6.865	0.011
	Girls	47.17					
Hyperactivity and impulsivity	Boys	51.85	276.693	1	276.693	4.368	0.040
	Girls	47.70					
Anger control	Boys	57.72	1487.459	1	1487.459	8.098	0.006
	Girls	48.09					
Conduct disorder	Boys	57.57	1026.737	1	1026.737	6.339	0.014
	Girls	49.57					
Family variables	Boys	62.77	653.344	1	653.344	2.705	0.104
	Girls	56.39					
Peers	Boys	57.26	235.204	1	235.204	1.850	0.178
	Girls	53.43					
Self-esteem	Boys	37.26	875.481	1	875.481	3.224	0.077
	Girls	44.65					
Sustained attention	Boys	13.72	142.310	1	142.310	0.334	0.565

Para citar este artículo utilice la siguiente referencia: Estrada, X.; Viera, G.; Ros, A.; Alsinet, C.; Vicents, L. (2021). Relationship of visual, attentional and contextual variables together with internalized (depression), and externalized (behavior) problems. *Sportis Sci J*, 7 (2), 239-266.

<https://doi.org/10.17979/sportis.2021.7.2.7365>

<http://revistas.udc.es/>

Girls 16.70

Subsequently, two regression models were explored to study the contribution of the different types of variables to explain the tendency towards internalizing problems and externalizing problems in the child population studied.

First, a linear regression with three different levels was conducted, in order to explore its prediction of the variable tendency to depression, as an internalizing problem (see Table 2). This first model presents ($B = 35,994$, compared to $B = 0,576$). In the first place, only the digit task was incorporated as a predictor variable. In this case, the variable turned out to be statistically significant in terms of its prediction of depression. Then, at a second level, the variables of errors committed and sustained attention were also introduced, to see if executive functions might explain, to a greater or lesser degree, the tendency to depression. Curiously, the errors committed results did provide a significant explanation for the variable, but not for that of attention. The digit task (discriminative) continued to show statistical significance. Interestingly, in the third level of the regression, in which the contextual variables were incorporated, the tendency towards depression was explained in a statistically significant way, while all the previous variables ceased to show significance ($R=.713$) In this sense, the results suggest a possible mediation of contextual and family variables in the relationship between executive functions and visual discrimination and the tendency towards depression.

Table 2. Statistically significant comparisons between depression as an internalizing problem and predictive models

Model (n=76)	Non-standardized coefficients		Standardized coefficients		
	B	Standard error	Beta	t	p
	55.942	1.478		37.856	0.000
Digit tasks	-6.579	2.710	-0.275	-2.427	0.018
	65.319	4.206		15.531	0.000

Para citar este artículo utilice la siguiente referencia: Estrada, X.; Viera, G.; Ros, A.; Alsinet, C.; Vicents, L. (2021). Relationship of visual, attentional and contextual variables together with internalized (depression), and externalized (behavior) problems. *Sportis Sci J*, 7 (2), 239-266.

<https://doi.org/10.17979/sportis.2021.7.2.7365>

<http://revistas.udc.es/>

Artículo Original. Relationship of visual, attentional and contextual variables together with internalized (depression), and externalized (behavior) problems. Vol. 7, n.º 2; p. 239-266, mayo 2021. A Coruña. España ISSN 2386-8333

Digit tasks	-7.571	2.705	-0.317	-2.799	0.007
Errors committed					
Sustained attention	-0.178	0.085	-0.237	-2.094	0.040
	-0.076	0.059	-0.142	-1.285	0.203
	35.994	5.324		6.760	0.000
Digit tasks	-2.873	2.203	-0.120	-1.304	0.197
Errors committed	-0.070	0.068	-0.093	-1.030	0.307
Sustained attentions					
Sena Contextual	-0.004	0.047	-0.008	-0.094	0.926
Categories					
Sena Family	10.136	3.116	0.412	3.253	0.002
Categories	7.359	3.131	0.289	2.350	0.022

Note. Dependent variable: Depression.

Finally, a second linear regression was performed, following the same steps, but focussing on the tendency towards behavioral problems (see table 3). This second model was much less revealing than the previous one ($B = 55,942$, compared to $B = 1,308$), but even so, it showed a similar pattern. As with the first hypothesized model, the digit task, that is, the ability to discern and discriminate stimuli, shows a statistically significant contribution to explaining the externalizing variable of tendency towards behavioral problems. At the second level, in contrast with what had happened in the case of the tendency towards depression, the attentional tasks (executive function) did not explain or predict the results in the tendency towards behavioral problems evaluated psychometrically. Interestingly, at the third level, none of the variables were found to contribute significantly to the appearance of disruptive behaviors or the tendency towards behavioral problems, suggesting a different pattern from that of internalizing problems, which can only be explained by an ability to discriminate stimuli, that is to say, in visuospatial tasks ($R=531$).

Table 3. Statistically significant comparisons between behavior as an externalizing problem and predictive models

	Non-standardized coefficients	Standardized coefficients
--	-------------------------------	---------------------------

Para citar este artículo utilice la siguiente referencia: Estrada, X.; Viera, G.; Ros, A.; Alsinet, C.; Vicents, L. (2021). Relationship of visual, attentional and contextual variables together with internalized (depression), and externalized (behavior) problems. *Sportis Sci J*, 7 (2), 239-266.

<https://doi.org/10.17979/sportis.2021.7.2.7365>

<http://revistas.udc.es/>

Artículo Original. Relationship of visual, attentional and contextual variables together with internalized (depression), and externalized (behavior) problems. Vol. 7, n.º 2; p. 239-266, mayo 2021. A Coruña. España ISSN 2386-8333

Model (n=76)	B	Standard error	Beta	t	p
	1.308	0.057		23.068	0.000
Digit tasks	-0.262	0.104	-0.285	-2.522	0.014
	1.349	0.166		8.145	0.000
Digit tasks	-0.247	0.107	-0.268	-2.314	0.024
Errors committed	0.000	0.003	0.010	0.086	0.932
Sustained attention	-0.004	0.002	-0.192	-1.689	0.096
	0.576	0.248		2.325	0.023
Digit tasks	-0.123	0.102	-0.134	-1.201	0.234
Errors committed	0.003	0.003	0.109	0.998	0.322
Sustained attentions	0.003	0.003	0.109	0.998	0.322
Sena Contextual	-0.002	0.002	-0.101	-0.946	0.347
Categories	-0.002	0.002	-0.101	-0.946	0.347
Sena Family	0.250	0.145	0.264	1.724	0.089
Categories	0.213	0.146	0.217	1.460	0.149

Note. a. Dependent variable: Sena Behavioral Category.

Discussion

The present study proposes the hypothesis that primary school students who have better visual discrimination and fewer attention errors will show fewer depressive symptoms and fewer behavioral problems. The general analysis of the data emphasizes the special relevance of the visual variable as a direct protective factor against maladaptive behavior and, furthermore, of the contextual and family variable to help avoid internalized problems such as depression.

Several studies relate the visual abilities of students with academic performance (Lázaro, García & Perales, 2013), and there are numerous studies that have investigated the effect of physical exercise and cognition through different types of processing, such as perceptual discrimination (Lambourne & Tomporowski, 2010; McMorris, et al., 2009; Tomporowski, et al., 2011; McMorris, Tomporowski & Audiffren, 2009; Mamani, et al., 2019), and also for cognitive development (Price & Henao, 2011). Nevertheless, there are still

Para citar este artículo utilice la siguiente referencia: Estrada, X.; Viera, G.; Ros, A.; Alsinet, C.; Vicents, L. (2021). Relationship of visual, attentional and contextual variables together with internalized (depression), and externalized (behavior) problems. *Sportis Sci J*, 7 (2), 239-266.

<https://doi.org/10.17979/sportis.2021.7.2.7365>

<http://revistas.udc.es/>

Artículo Original. Relationship of visual, attentional and contextual variables together with internalized (depression), and externalized (behavior) problems. Vol. 7, n.º 2; p. 239-266, mayo 2021. A Coruña. España ISSN 2386-8333

relatively few studies that relate visual discrimination as a preventive factor against maladaptive behaviors (Beaudry, 2006) and problems such as depression (Andrés, Castañeiras, Stelzer, Canet & Introzzi, 2016).

The results of the present study show statistically significant differences in the visual discrimination of digits (Plou, et al., 2009) by the students. According to the data obtained, students with a lower discriminatory capacity for digits also registered significantly worse scores indicating external and disruptive behavioral manifestations, anger, attention, behavior problems, depression, errors of commission, hyperactivity and impulsivity and, to a lesser extent, in terms of emotional problems.

Analyzing the first linear regression model employing the variables of visual tasks, executive functions and contextual variables, it can be deduced that a better score in visual discrimination and a lower number of commission errors (Servera & Llabrés, 2015) in an attentional task are important indicators when it comes to preventing the presence of depressive symptoms as an internalizing factor. Contextual characteristics, such as family, allow a direct and novel assessment of the difficulties of adaptation of the child to the main environments where it develops, and constitute a risk factor or a protective factor in depressive problems.

The visual and attentional variables would predict depressive symptoms, as pointed out in studies by Fernández (2017), which relate the increase in depressive symptoms with low levels of executive functions. However, with the results obtained, the importance of contextual factors such as family, school or classmates (Beltrán, Pérez & Ortega, 2006) is emphasized as an exclusive factor to prevent depressive symptomatology as an internalizing problem, these results being congruent with those described by authors such as Cortés, Cantón and Cantón (2014).

In general, the results also evidenced the existence of significant differences in the visual and attentional variables with respect to externalizing problems such as behavior, the visual variable acquiring a relevant importance in this regard. There is some research that

Artículo Original. Relationship of visual, attentional and contextual variables together with internalized (depression), and externalized (behavior) problems. Vol. 7, n.º 2; p. 239-266, mayo 2021. A Coruña. España ISSN 2386-8333

relates behavior problems in boys and girls between 6 months and 5 years old with visual impairment (Tirosh, Shnitzer, Davidovitch & Cohen, 1998).

Specifically, sports vision is a technique used to improve sports performance (González & Camacho, 2017), to improve visual and physical skills in sports teams (Busquets, Seirul.lo & Bosch, 2017) and to assist the improvement of motor and sensory movements (Jozami, 2020), but rarely to implement improvements in emotional or behavioral aspects.

Other evidence from the study refers to the relationship between contextual and family factors with depressive symptoms presented by boys and girls, thus confirming the results of other studies that found greater depressive symptoms in boys and girls with divorced parents compared to children of married parents (Kalmijn, 2016); and others that relate depression to the family environment, with family conflicts being a risk factor (Del Barrio, 2014). Parental divorce is also another factor that is associated with a greater increase in internalized problems in children such as depression (Amato & Anthony, 2014; Weaver & Schofield, 2015). Some studies in adolescents reach the conclusion that there is a significant relationship between familial satisfaction and depression (Carrasco, Martínez, Noreña & Bao, 2020; Borja, et al., 2019).

In addition, the results show that better understanding, family support and less tension will lead to a relative absence of emotional problems of a depressive nature. Contextual conditions play an important role in learning situations because in the different suggested environments the boys and girls feel supported and encouraged by their role models, allowing them to function appropriately in different environments (Beltrán, et al., 2006).

In short, contextual variables such as family can play a possible mediating role between the visual aspect and depression, allowing those who have more visual and attention difficulties to mitigate their deficiencies with the proper emotional support from the family and the context, and, consequently, of the social variable (Contreras, et al., 2005).

Para citar este artículo utilice la siguiente referencia: Estrada, X.; Viera, G.; Ros, A.; Alsinet, C.; Vicents, L. (2021). Relationship of visual, attentional and contextual variables together with internalized (depression), and externalized (behavior) problems. *Sportis Sci J*, 7 (2), 239-266.

<https://doi.org/10.17979/sportis.2021.7.2.7365>

<http://revistas.udc.es/>

Artículo Original. Relationship of visual, attentional and contextual variables together with internalized (depression), and externalized (behavior) problems. Vol. 7, n.º 2; p. 239-266, mayo 2021. A Coruña. España ISSN 2386-8333

On the other hand, when behavior problems are analyzed as an externalizing factor in a second linear regression model using the variables mentioned above, this model can only be explained by efficient visual discrimination of the student. In other words, efficient visual performance results in less problematic behavior (Erazo, 2018). In this model the attentional variable and the contextual variables alone could not explain behavior problems. Behavior problems as an externalizing factor have historically been attributed to attention problems and impulsivity, even though there is no consensus on these results (Braga & Flores-Mendoza, 2018). In this case, it is striking that efficiency in visuospatial tasks correlates with more adaptive behavior (Bausela, 2014) and can predict it solely and exclusively via visual discrimination as a biological variable, and not by social or attentional factors.

These results further stress the importance of visual discrimination not only to mediate behavior but also to reduce the behavioral difficulties of adaptation a child may be experiencing. Furthermore, commission errors cease to be statistically significant in terms of depression prevention as soon as results related to contextual and family variables is added to the model. This points to a possible mediator effect of the visual variables for this relationship and emphasizes the role of visual evaluation in ruling out a visual problem (López, Salamanca & Törnquist, 2019).

Thus, visual ability will be a preventive factor with regards to behavioral problems and depression, in the sense that it might encourage the planning of new activities and sports programs focused on this field (Quevedo, 2010). Such sports activities should allow the integration of visual sports training (Appelbaum & Erickson, 2018; Cagno, 2016; Rugolotto, 2015) to develop a more efficient motor system (Jozami, 2020), perform better emotional management (Ibarra, 2019) and improve the social relations (Ventura, Laborda, & Álvarez, 2018).

The limitation of the study results from the size of the sample due to the expensive procedure of visual tasks that hinders the evaluative dynamics and, in addition, the costs of standardized protocols, making it impossible to expand the sample without private or institutional support. Despite these limitations, the results obtained show the importance of

Para citar este artículo utilice la siguiente referencia: Estrada, X.; Viera, G.; Ros, A.; Alsinet, C.; Vicents, L. (2021). Relationship of visual, attentional and contextual variables together with internalized (depression), and externalized (behavior) problems. *Sportis Sci J*, 7 (2), 239-266.

<https://doi.org/10.17979/sportis.2021.7.2.7365>

<http://revistas.udc.es/>

Artículo Original. Relationship of visual, attentional and contextual variables together with internalized (depression), and externalized (behavior) problems. Vol. 7, n.º 2; p. 239-266, mayo 2021. A Coruña. España ISSN 2386-8333

continued research in this direction so as to promote the integral development of boys and girls in primary education. On the other hand, as a practical application derived from this study, it is recommended that more technicians be given sufficient training in order to carry out the optometric evaluations of boys and girls. In this way, it would allow us to register a larger sample of participants in a shorter space of time, thereby permitting, at the same time, the participation of more educational centers.

Conclusion

The first educational stages are of the utmost importance for the physical, cognitive and emotional development of students, not least because this is when different learning is consolidated. It is a stage where brain structures mature and are influenced in part by the stimuli they receive from the environment, shaping them for the future.

Activities based on visual perception and attentional tasks would allow students to develop the necessary skills to avoid depressive symptoms and act as a protective factor against maladaptive behaviors, which would facilitate, at the same time, a more efficient adaptation to the child's environment. A sporting context would facilitate the development of these skills by containing the appropriate stimuli.

In future lines of research, it would be interesting to carry out sports activities that introduce visual sports training and the acquisition of emotional competences, and analyze, through a longitudinal study, the impact of these practices in later stages, and their relationship with the student performance in various areas. This type of activity would allow, in an integrated way, to work on the physical, cognitive, emotional and social aspect, and to enhance the visual and attentional aspects of the participants as precursors to avoid emotional and behavioral problems.

A second line of research would be to promote parental education programs in primary schools and involve parents in the education of their children and thus prevent emotional problems such as depression.

References

Para citar este artículo utilice la siguiente referencia: Estrada, X.; Viera, G.; Ros, A.; Alsinet, C.; Vicents, L. (2021). Relationship of visual, attentional and contextual variables together with internalized (depression), and externalized (behavior) problems. *Sportis Sci J*, 7 (2), 239-266.

<https://doi.org/10.17979/sportis.2021.7.2.7365>

<http://revistas.udc.es/>

Artículo Original. Relationship of visual, attentional and contextual variables together with internalized (depression), and externalized (behavior) problems. Vol. 7, n.º 2; p. 239-266, mayo 2021. A Coruña. España ISSN 2386-8333

- Alarcón, F., Castillo, A., Ureña, N., Torre, E. & Cárdenas, D. (2017). Creatividad táctica y funciones ejecutivas en los deportes de interacción. *SPORT TK-Revista EuroAmericana De Ciencias Del Deporte*, 6(2), 147-152. DOI: <https://doi.org/10.6018/300501>
- Alvarenga, M. A., Mansur-Alves, M. & Franco, F. M. (2009). *O desenvolvimento das dimensões anti-sociais da personalidade*. En V. G. Haase, F. O. Ferreira, & J. F. Penna. Aspectos Biopsicossociais da saúde na infância e adolescência (pp. 231-258). Belo Horizonte: Coopmed.
- Alves, C. R., Gualano, B., Takao, P.P., Avakian, P., Fernandes, R. M., Morine, D. & Takito, M. (2012). Effects of acute physical exercise on executive functions: a comparison between aerobic and strength exercise. *Journal Sport Exercise Psychology*, 34(4), 539-549. DOI: <https://doi.org/10.1123/jsep.34.4.539>
- Amato, P. R. & Anthony, C. J. (2014). Estimating the effects of parental divorce and death with fixed effects models. *Journal of Marriage and Family*, 76, 370-386. DOI: <https://doi.org/10.1111/jomf.12100>
- Andrés, M.L., Castañeiras, C., Stelze, F., Canet J.L. & Introzzi, I. (2016). Funciones Ejecutivas y Regulación de la Emoción: evidencia de su relación en niños. *Psicología desde el Caribe*, 33(2), 170-179. DOI: <https://doi.org/10.14482/psdc.33.2.7278>
- Appelbaum, L. & Erickson, G. (2016). Sports vision training: A review of the state-of-the-art in digital training techniques. *International Review of Sport and Exercise Psychology*, 11, 160 - 189. DOI: <https://doi.org/10.1080/1750984X.2016.1266376>
- Barrios, M. & Frías, M. (2016). Factores que Influyen en el Desarrollo y Rendimiento Escolar de los Jóvenes de Bachillerato. *Revista Colombiana de Psicología*, 25(1), 63-82. DOI: <https://doi.org/10.15446/rcp.v25n1.46921>

Para citar este artículo utilice la siguiente referencia: Estrada, X.; Viera, G.; Ros, A.; Alsinet, C.; Vicents, L. (2021). Relationship of visual, attentional and contextual variables together with internalized (depression), and externalized (behavior) problems. *Sportis Sci J*, 7 (2), 239-266.

<https://doi.org/10.17979/sportis.2021.7.2.7365>

<http://revistas.udc.es/>

Artículo Original. Relationship of visual, attentional and contextual variables together with internalized (depression), and externalized (behavior) problems. Vol. 7, n.º 2; p. 239-266, mayo 2021. A Coruña. España ISSN 2386-8333

- Bausela, E. (2014). Funciones ejecutivas: nociones del desarrollo desde una perspectiva neuropsicológica. *Acción Psicológica*, 11(1), 21-34. DOI: <https://doi.org/10.5944/ap.1.1.13789>
- Beaudry, I. (2016). *Un trastorno en el procesamiento sensorial es frecuentemente la causa de problemas de aprendizaje, conducta y coordinación motriz en niños*. Boletín de la Sociedad de Pediatría de Asturias, Cantabria, Castilla y León, 46(197), 200-203.
- Beltrán, J., Pérez, L.F. & Ortega, M.I. (2006). *CEA. Cuestionario de Estrategias de Aprendizaje*. Madrid: TEA.
- Borja, C., Ruilova, E., García, D., Sanchez, S., Guevara, K. & Morales, A. (2019). Factores que inciden en la presencia de la depresión en adolescentes. *Polo del Conocimiento: Revista científico-profesional*, 4(2). DOI: <https://doi.org/10.23857/pc.v4i2.900>
- Braga, L. S. & Flores-Mendoza, C. (2018). Relación entre conductas externalizantes en la infancia y rasgos de personalidad en la vida adulta. *Revista de Psicología Clínica con Niños y Adolescentes*, 5(3), 36-41. DOI: <https://doi.org/10.21134/rpcna.2018.05.3.5>
- Busquets, J., Seirullo de Vargas, F. & Bosch, J. V. (2017). *Gobernando líderes: Una reflexión sobre el fútbol como sistema de juego complejo*. Harvard Deusto business review, (267), 72-81.
- Cagno, A. & Rinaudo, M. (2016). *Si può rispondere anche ai servizi bomba” in Supertennis.it*: 18 julio 2016.
- Campbell, S.B., Shaw, D.S. & Gilliom, M. (2000). Early externalizing behavior problems. Toddlers and preschoolers at risk for later maladjustment. *Development and Psychopathology*, 12 (3), 467-488. DOI: <https://doi.org/10.1017/s0954579400003114>
- Carrasco, M.A., Martínez, M., Noreña, C. & Bao, C.L. (2020). Satisfacción familiar, depresión y rendimiento académico en adolescentes de un Colegio Estatal de Huánuco, Perú. *Redipe*, 9 (2), pp. 197-210. DOI: <https://doi.org/10.36260/rbr.v9i2.922>

Para citar este artículo utilice la siguiente referencia: Estrada, X.; Viera, G.; Ros, A.; Alsinet, C.; Vicents, L. (2021). Relationship of visual, attentional and contextual variables together with internalized (depression), and externalized (behavior) problems. *Sportis Sci J*, 7 (2), 239-266.

<https://doi.org/10.17979/sportis.2021.7.2.7365>

<http://revistas.udc.es/>

Artículo Original. Relationship of visual, attentional and contextual variables together with internalized (depression), and externalized (behavior) problems. Vol. 7, n.º 2; p. 239-266, mayo 2021. A Coruña. España ISSN 2386-8333

- Castaldi, E., Lunghi, C. & Morrone, M. C. (2020). Neuroplasticity in adult human visual cortex. *Neuroscience and Biobehavioral Reviews*, 112, 542-552. DOI: <https://doi.org/10.1016/j.neubiorev.2020.02.028>
- Contreras, F., Espinosa, J., Esguerra, G., Haikal, A. & Rodríguez, A. (2015). Autoeficacia, ansiedad y rendimiento académico en adolescentes. *Perspectivas en Psicología*, 1 (2), 183-194. DOI: <https://doi.org/10.15332/s1794-9998.2005.0002.06>
- Cordero, A., Seisdedos, N., González, M. & Victoria de la Cruz, M^a. (2013). *Formas idénticas R. FI-R*. Manual. Madrid: TEA Ediciones.
- Cortés, M. R., Cantón, J. & Cantón, D. (2014). Desarrollo socioafectivo en el contexto familiar. En M. R. Cortés Arboleda, J. Cantón Duarte y D. Cantón Cortés, *Desarrollo socioafectivo y de la personalidad*. (213-257). Madrid: Alianza.
- Del Barrio, V. (2014). *Evaluación Psicológica*. Madrid: Centro de Estudios Financieros.
- Erazo, O. (2018). Dificultades en integración sensorial, afectividad y conducta en estudiantes de una escuela pública. *Praxis & Saber*, 9(20), 143-165. DOI: <https://doi.org/10.19053/22160159.v9.n20.2018.5884>
- Fernández, E. (2017). *Relación entre las funciones ejecutivas y el estado emocional*. (trabajo de máster). Universidad Internacional de La Rioja. Logroño. <https://reunir.unir.net/handle/123456789/7414>
- Fernández-Pinto, I., Santamaría, P., Sánchez-Sánchez, F., Carrasco, M. A. & del Barrio, V. (2015). *SENA. Sistema de Evaluación de Niños y Adolescentes. Manual de aplicación, corrección e interpretación*. Madrid: TEA Ediciones.
- Ferré, J. & Aribau, E. (2016). *El desarrollo neurofuncional del niño y sus trastornos*. Ediciones Lebón. Barcelona
- Ferreiro, F., Mato, M. & Chao, R. (2014). Análisis del rendimiento académico por género medido a través del premio extraordinario de la ESO. *Revista de Investigaciones*

Para citar este artículo utilice la siguiente referencia: Estrada, X.; Viera, G.; Ros, A.; Alsinet, C.; Vicents, L. (2021). Relationship of visual, attentional and contextual variables together with internalized (depression), and externalized (behavior) problems. *Sportis Sci J*, 7 (2), 239-266.

<https://doi.org/10.17979/sportis.2021.7.2.7365>

<http://revistas.udc.es/>

Artículo Original. Relationship of visual, attentional and contextual variables together with internalized (depression), and externalized (behavior) problems. Vol. 7, n.º 2; p. 239-266, mayo 2021. A Coruña. España ISSN 2386-8333

Políticas y Sociológicas, 13(2), 53-76.
<https://www.redalyc.org/pdf/380/38032972005.pdf>

García, E., Guillamón, A. & Nieto, L. (2020). Nivel de actividad física, consumo habitual de tabaco y alcohol, y su relación con la calidad de vida en adolescentes españoles (Physical activity level, tobacco and alcohol habitual consumption, and its relationship with quality of life in Spanish adolescents). *Retos*, 39, (112-119). DOI: <https://doi.org/10.47197/retos.v0i39.78489>

González, J. & Camacho, M. (2017). *Capacidad de reacción y coordinación ojo-mano*. Grupo Franja, 1-2.

Guillamón, A., Canto, E. & García, H. M. (2020). Influencia de un programa de actividad física sobre la atención selectiva y la eficacia atencional en escolares. *Retos*, 38(38), 560-566. DOI: <https://doi.org/10.47197/retos.v38i38.77191>

Guzmán-Cortés, J. A., Villalva-Sánchez, A. F. & Bernal, J. (2015). Cambios en la estructura y función cerebral asociados al entrenamiento aeróbico a lo largo de la vida. Una revisión teórica. *Anuario de psicología*, 45(2), 203-217. DOI: <https://doi.org/10.1002/14651858>

Hernández, A., Ponsoda, V., Muñiz, J., Prieto, G. & Elosua, P. (2016). Revisión del modelo para evaluar la calidad de los tests utilizados en España. *Papeles del Psicólogo*, 37, 161-168. DOI: <https://doi.org/10.1037/14668-002>

Ibarra, J. (2019). *Neurociencias y entrenamiento deportivo: una herramienta complementaria*. 13 Congreso Argentino de Educación Física y Ciencias, 30 de septiembre al 4 de octubre de 2019, Ensenada, Argentina. Educación Física: ciencia y profesión. En: Actas. Ensenada: Universidad Nacional de La Plata. Facultad de Humanidades y Ciencias de la Educación. Departamento de Educación Física. https://www.memoria.fahce.unlp.edu.ar/trab_eventos/ev.12968/ev.12968.pdf

Para citar este artículo utilice la siguiente referencia: Estrada, X.; Viera, G.; Ros, A.; Alsinet, C.; Vicents, L. (2021). Relationship of visual, attentional and contextual variables together with internalized (depression), and externalized (behavior) problems. *Sportis Sci J*, 7 (2), 239-266.

<https://doi.org/10.17979/sportis.2021.7.2.7365>

<http://revistas.udc.es/>

Artículo Original. Relationship of visual, attentional and contextual variables together with internalized (depression), and externalized (behavior) problems. Vol. 7, n.º 2; p. 239-266, mayo 2021. A Coruña. España ISSN 2386-8333

- Jozami, S. (2020). *Potenciando tu mente deportiva: Neurociencia simple para transformar el rendimiento deportivo*. Caligrama.
- Kalmijn, M. (2016). Father-child contact, interparental conflict, and depressive symptoms among children of divorced parents. *European Sociological Review*. DOI: <https://doi.org/10.1093/esr/jcv095>
- Lázaro, M., García, J.A. & Perales, F.J. (2013). Anomalías de la visión y rendimiento escolar en Educación Primaria. Un estudio piloto en la población granadina. *Revista Interuniversitaria de Formación del Profesorado*, 76(27,1).
- LeWinn, K.Z., Sheridan, M.A., Keyes, K.M., Hamilton, A. & McLaughlin, K.A. (2017). Sample composition alters associations between age and brain structure. *Nature Communications*. 8, 874. DOI: <https://doi.org/10.1038/s41467-017-00908-7>
- López, V., Salamanca, O. F. & Törnquist, A. L. (2019). Recomendaciones para el examen visual en los niños. *Iatreia*, 32(1), 40. DOI: <https://doi.org/10.17533/udea.iatreia.v32n1a05>
- López, J. R. P. (2014). Los estudiantes universitarios ante las actividades extracurriculares. *Anduli, Revista Andaluza de Ciencias Sociales*, 13, 137-150. DOI: <https://doi.org/10.12795/anduli.2014.i13.08>
- Luengo, M. (2014). Cómo intervenir en los problemas de conducta infantiles. Padres y Maestros. *Journal of Parents and Teachers*, [S.l.], n. 356, p. 37-44. DOI: <https://doi.org/10.14422/pym.v0i356.3071>
- Mamani Ramos, A. A., Huamaní Arredondo, F. J., Cabrejos Ramos, J. C., Lava Gálvez, J. J., Arce Roncal, D. L., Mora Santiago, R. J., Quisocala Mamani, J. A., Torres Cruz, F., Lipa Tudela, L. & Fuentes López, J. D. (2019). Autoconfianza y su relación con el rendimiento, procedencia, logros y edad en jugadoras de voleibol peruanas en categoría de formación. *Sportis. Scientific Journal of School Sport, Physical*

Para citar este artículo utilice la siguiente referencia: Estrada, X.; Viera, G.; Ros, A.; Alsinet, C.; Vicents, L. (2021). Relationship of visual, attentional and contextual variables together with internalized (depression), and externalized (behavior) problems. *Sportis Sci J*, 7 (2), 239-266.

<https://doi.org/10.17979/sportis.2021.7.2.7365>

<http://revistas.udc.es/>

Artículo Original. Relationship of visual, attentional and contextual variables together with internalized (depression), and externalized (behavior) problems. Vol. 7, n.º 2; p. 239-266, mayo 2021. A Coruña. España ISSN 2386-8333

Education and Psychomotricity, 6(1), 145-165. DOI:
<https://doi.org/10.17979/sportis.2020.6.1.5543>

Mantilla, J. I. (2019). Neurociencia y entrenamiento en el deporte de alto rendimiento. *Revista Iberoamericana De Ciencias De La Actividad Física Y El Deporte*, 8(2), 79-90. DOI:
<https://doi.org/10.24310/riccafd.2019.v8i2.6698>

McMorris, T., Davranche, K., Jones, G., Hall, B. Corbett, J. & Minter, C. (2009). Acute incremental exercise, performance of a central executive task, and sympathoadrenal system and hypothalamic-pituitary-adrenal axis activity. *International Journal of Psychophysiology*, 73(3), 334-340. DOI:
<https://doi.org/10.1016/j.ijpsycho.2009.05.004>

McMorris, T., Tomporowski, P. & Audiffren, M. (2009). Exercise and cognitive function. *Wiley-Blackwell*. DOI: <https://doi.org/10.1002/9780470740668>

Molina, J., Chorot, P. & Sandín, B. (2017). Miedo a la evaluación negativa y autoestima como factores predictivos del rendimiento deportivo: Papel mediador de los estados de ansiedad y autoconfianza. *RICYDE. Revista Internacional de Ciencias del Deporte*, 13(50), 381-396. DOI: <https://doi.org/10.5232/ricyde2017.05005>

Moreau, D., Morrison, A. B. & Conway, A. R. (2015). An ecological approach to cognitive enhancement: complex motor training. *Acta psychologica*, 157, 44–55. DOI:
<https://doi.org/10.1016/j.actpsy.2015.02.007>

Pérez, M. & Fleitas, I. (2019). Las percepciones especializadas en la iniciación deportiva de Gimnasia Rítmica: juegos para su entrenamiento (Original). *Revista Científica Olimpia*, 17, 913-922. <https://revistas.udg.co.cu/index.php/olimpia/article/view/1849>

Plou, P. (2007). Bases fisiológicas del entrenamiento visual. *Apunts. Educación física y deportes*, (88), 62-74. <https://www.redalyc.org/articulo.oa?id=5516/551656954010>

Pontifex, M.B, Scudder, M.R, Drollette, E.S. & Hillman, C.H. (2012). *Fit and vigilant: the relationship between poorer aerobic fitness and failures in sustained attention during*

Para citar este artículo utilice la siguiente referencia: Estrada, X.; Viera, G.; Ros, A.; Alsinet, C.; Vicents, L. (2021). Relationship of visual, attentional and contextual variables together with internalized (depression), and externalized (behavior) problems. *Sportis Sci J*, 7 (2), 239-266.

<https://doi.org/10.17979/sportis.2021.7.2.7365>

<http://revistas.udc.es/>

Artículo Original. Relationship of visual, attentional and contextual variables together with internalized (depression), and externalized (behavior) problems. Vol. 7, n.º 2; p. 239-266, mayo 2021. A Coruña. España ISSN 2386-8333

preadolescence. Neuropsychology. 26(4):407-13. DOI:
<https://doi.org/10.1037/a0028795>

Price, M. S. M. & Henao, J. (2011). Influencia de la percepción visual en el aprendizaje. *Ciencia y Tecnología para la salud visual y ocular*, 9(1), 93-101.

Quevedo, Ll. & Solé, J. (2010) *Entrenamiento visual en el deporte*. En Vicente Rodríguez Salvador, Irene Gallego Lago y Diego Zarco Villarosa (Comps.), *Visión y Deporte* (pp. 93-102). Barcelona: Editorial Glosa.

Ramos, C. (2010). Hacia una cultura de responsabilidad social universitaria. *CICAG*, 7(2), 97-116. DOI: <https://doi.org/10.5944/educxx1.19442>

Reynoso, O., Caldera, J., De la Torre, V., Martínez, A. & Macías, G. (2018). Autoconcepto y apoyo social en estudiantes de bachillerato. Un estudio predictivo. *Revista de Psicología y Ciencias del Comportamiento de la Unidad Académica de Ciencias Jurídicas y Sociales*, 9(1), 100-119. DOI: <https://doi.org/10.29365/rpcc.20180529-66>

Riquelme, D., Sepúlveda, C., Muñoz, M. & Valenzuela, M. (2013). Ejercicio físico y su influencia en los procesos cognitivos. *Revista Motricidad y Persona*, (13), pp. 69-74.

Rojas, G. & Jeannet, E. (2016). *Neurobiología de la percepción visual*. Editorial Universidad del Rosario. DOI: <https://doi.org/10.12804/tm9789587387483>

Roux, R. & Anzures, G. (2015). Estrategias de aprendizaje y su relación con el rendimiento académico en estudiantes de una escuela privada de Educación Media Superior. *Revista Electrónica Actualidades Investigativas en Educación*, 15(1), 1-16. DOI: <https://doi.org/10.15517/aie.v15i1.17731>

Rugolotto, V. (2016). *La visione guida del movimento corporeo: dall'organizzazione neurale all'allenamento visuo-motorico con metodo S.V.T.A*. Tesis. Università degli Studi de Padova.

Salinas, D., Hernández, A. & Barboza, M (2017). Condición de becario y rendimiento académico en estudiantes de una universidad peruana. *Revista Electrónica de*

Para citar este artículo utilice la siguiente referencia: Estrada, X.; Viera, G.; Ros, A.; Alsinet, C.; Vicents, L. (2021). Relationship of visual, attentional and contextual variables together with internalized (depression), and externalized (behavior) problems. *Sportis Sci J*, 7 (2), 239-266.

<https://doi.org/10.17979/sportis.2021.7.2.7365>

<http://revistas.udc.es/>

Artículo Original. Relationship of visual, attentional and contextual variables together with internalized (depression), and externalized (behavior) problems. Vol. 7, n.º 2; p. 239-266, mayo 2021. A Coruña. España ISSN 2386-8333

Investigación Educativa, 19(4), 124-133. DOI:
<https://doi.org/10.24320/redie.2017.19.4.1348>

Servera, M. & Llabrés, J. (2015). *CSAT-R. Tarea de Atención Sostenida en la Infancia-Revisada*. Madrid: TEA Ediciones.

Sierra, E. M., Pérez, L. & Quianella, M. (2019). Plasticidad cerebral, una realidad neuronal. *Revista de Ciencias Médicas de Pinar del Río*, 23(4), 599-609. DOI:
<https://doi.org/10.1152/jn.1963.26.6.1003>

Tiscini, R. & Dello Strologo, A. (2016). What drives the value of football clubs: An approach based on private and socio-emotional benefits. *Corporate Ownership & Control*, 14(1-4), 673-683. DOI: <https://doi.org/10.22495/cocv14i1c4art14>

Tirosh, E., Shnitzer, M., Davidovitch, M. & Cohen, A. (1998). Problemas de conducta entre los 6 meses y los 5 años en niños con deficiencia visual. *Entre dos mundos: revista de traducción sobre discapacidad visual*. 8(51-58).

Tomprowski, P. D., Lambourne, K. & Okumura, M. S. (2011). *Physical activity interventions and children's mental function: an introduction and overview*. Preventive medicine, 52 Suppl 1(Suppl 1), S3-S9. DOI:
<https://doi.org/10.1016/j.ypmed.2011.01.028>

van Dongen, E.V., Kersten, I., Wagner, I.C., Morris, R. & Fernández, G. (2016). Physical Exercise Performed Four Hours after Learning Improves Memory Retention and Increases Hippocampal Pattern Similarity during Retrieval. *Current biology: CB*, 26(13), 1722-1727. DOI: <https://doi.org/10.1016/j.cub.2016.04.071>

Van der Fels, I., Te Wierike, S., Hartman, E., Elferink, M., Smith, J. & Visscher, C. (2014). The relationship between motor skills and cognitive skills in 4-16 years old typically developing children: A systematic review. *Journal of Science and Medicine in Sport* 18(6), 697-703. DOI: <https://doi.org/10.1016/j.jsams.2014.09.007>

Para citar este artículo utilice la siguiente referencia: Estrada, X.; Viera, G.; Ros, A.; Alsinet, C.; Vicents, L. (2021). Relationship of visual, attentional and contextual variables together with internalized (depression), and externalized (behavior) problems. *Sportis Sci J*, 7 (2), 239-266.

<https://doi.org/10.17979/sportis.2021.7.2.7365>

<http://revistas.udc.es/>

Artículo Original. Relationship of visual, attentional and contextual variables together with internalized (depression), and externalized (behavior) problems. Vol. 7, n.º 2; p. 239-266, mayo 2021. A Coruña. España ISSN 2386-8333

- Vaughan, R., Laborde, S. & McConville, C. (2019). The effect of athletic expertise and trait emotional intelligence on decision-making. *European journal of sport science*, 19(2), 225-233. DOI: <https://doi.org/10.1080/17461391.2018.1510037>
- Vázquez, P. G. & Márquez, A. R. (2017). *La actividad física como fuente de salud y calidad de vida*. Wanceulen Editorial.
- Ventura, T. C., Laborda, J. L. A. & Álvarez, Á. L. (2018). La educación física y las relaciones sociales en educación primaria. *International Journal of Developmental and Educational Psychology*, 2(1), 269-282. DOI: <https://doi.org/10.17060/ijodaep.2018.n1.v2.1225>
- Vidarte, J., Gutierrez, C., Ortega, A., Caicedo, S. & Parra, J. (2020). Programa de entrenamiento deportivo sobre variables cognitivas en deportistas de selección colombiana de gimnasia artística. Serie de casos. *Sportis. Scientific Journal of School Sport, Physical Education and Psychomotricity*, 6(2), 204-227. DOI: <https://doi.org/10.17979/sportis.2020.6.2.5737>
- Voltas, N., Hernández-Martínez, C., Arija, V. & Canals, J. (2019). Suicidality in a Community Sample of Early Adolescents: A Three-Phase Follow-Up Study. *Archives of Suicide Research*, 1-32. DOI: <https://doi.org/10.1080/13811118.2019.1588816>
- Weaver, J. M. & Schofield, T. J. (2015). Mediation and moderation of divorce effects on children's behavior problems. *Journal of Family Psychology*, 29(1), 39-48. DOI: <https://doi.org/10.1037/fam0000043>
- World, M. A. (2008). Declaración de Helsinki de la Asociación Médica Mundial. Principios éticos para las investigaciones médicas en seres humanos. *In Anales del Sistema Sanitario de Navarra*, 24, (2), 209-212. DOI: <https://doi.org/10.4067/S1726-569X2000000200010>

Para citar este artículo utilice la siguiente referencia: Estrada, X.; Viera, G.; Ros, A.; Alsinet, C.; Vicents, L. (2021). Relationship of visual, attentional and contextual variables together with internalized (depression), and externalized (behavior) problems. *Sportis Sci J*, 7 (2), 239-266.

<https://doi.org/10.17979/sportis.2021.7.2.7365>

<http://revistas.udc.es/>

Artículo Original. Relationship of visual, attentional and contextual variables together with internalized (depression), and externalized (behavior) problems. Vol. 7, n.º 2; p. 239-266, mayo 2021. A Coruña. España ISSN 2386-8333

Para citar este artículo utilice la siguiente referencia: Estrada, X.; Viera, G.; Ros, A.; Alsinet, C.; Vicents, L. (2021). Relationship of visual, attentional and contextual variables together with internalized (depression), and externalized (behavior) problems. *Sportis Sci J*, 7 (2), 239-266.

<https://doi.org/10.17979/sportis.2021.7.2.7365>

<http://revistas.udc.es/>