Research section

Attentional processes and daily stress in a schoolchild population: exploring their relationship

Procesos atencionales y estrés cotidiano en población escolar: un estudio exploratorio de su relación

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Marta Martínez Vicente
https://orcid.org/0000-0001-7053-2625
Universidad Internacional de la Rioja (UNIR)

José Manuel Suárez Riveiro
https://orcid.org/0000-0003-4201-2256
Universidad Nacional de Educación a Distancia

Carlos Valiente Barroso
https://orcid.org/0000-0003-4670-0523
Universidad Villanueva

Abstract

Today we are witnessing a sharp increase in attentional difficulties in students, as well as the presence of increasingly frequent and intense stress symptoms from the earliest years of schooling. The aim of this study, therefore, is to analyze the relationship between children's attentional and inhibitory control processes and their daily stress. A non-experimental, quantitative, correlational and inferential study was designed, in which 558 fifth- and

sixth-graders participated. The results indicated a tendency towards greater attention (sustained and selective), attentional capacity, and impulsivity control when school stress and overall stress were lower. Higher levels of attention deficit, behavior disorders, and hyperactivity with attention deficit, were also observed to correspond with increased stress levels in the four areas analyzed (health, school, family and overall). Based on these relationships, we have verified the predictive nature of attention deficit for school and global stress. In conclusion, and based on the educational neuroscience paradigm, there is a need for teaching actions that develop students' attentional processes, as well as their strategies for coping with stress.

Keywords: daily stress, school stress, attention, impulsivity, primary education.

Resumen

En la actualidad, se constata un crecimiento exponencial de las dificultades atencionales en los estudiantes, así como, la presencia de cuadros de estrés cada vez más frecuentes e intensos desde los primeros años de escolaridad. En esta línea se plantea este estudio con el objetivo de analizar las relaciones entre procesos atencionales y de control inhibitorio y el estrés cotidiano infantil. Se diseñó un estudio no experimental, cuantitativo, correlacional e inferencial en el que participaron 558 estudiantes de 5º y 6º curso de primaria. Los resultados indican la tendencia a una mayor atención (sostenida y selectiva), de la capacidad atencional y de control de la impulsividad cuando es menor el estrés escolar y el estrés en general. Asimismo, se observa que mayores niveles de déficit de atención, de trastornos de conducta y de hiperactividad asociada al déficit de atención, se corresponden con un incremento de los niveles de estrés en los cuatro ámbitos analizados (salud, escolar, familiar y global). Con base en estas relaciones, se comprueba el carácter predictivo del déficit de atención en el estrés escolar y global. Como conclusión y tomando como base el paradigma de la neurociencia educativa, se reclaman actuaciones docentes para desarrollar los procesos atencionales del alumnado, así como de estrategias de afrontamiento del estrés.

Palabras clave: estrés cotidiano, estrés escolar, atención, impulsividad, educación primaria.

Introduction

Attention is a cognitive process involving a set of brain processes that interact among themselves, and that intervene in coding and processing information from the most relevant stimuli or tasks. In line with psychologists, educators

and scientists who are concerned with understanding maturational development and learning processes in childhood (Piaget & Inhelder, 2015), recent studies focus on analyzing processes like mental flexibility, attention, concentration, and executive functioning, among others (Baggetta & Alexander, 2016; Chen et al., 2017; Martínez-Vicente et al., 2023; Restrepo et al., 2019; Rojas-Barahona, 2017). Attention is a control mechanism that plays a fundamental role not only in hierarchical organization of neurocognitive processes, but also in affective-motivational processes (Folgado dos Santos et al., 2020; Ison et al., 2015; Rosa et al., 2020).

In defining the term attention, several explanatory models of increasing complexity have been considered. The traditional idea, considered to be too limited, has been discarded in favor of its definition as an active, constructive mechanism by which each person generates their own attentional potential. Today, taking into account the stimulus and the length of concentration thereon, attention is accepted as having three networks that are functionally and anatomically independent (Llorens et al., 2015). Thus, the alerting network allows the person to maintain a vigilant state, the orienting network is responsible for moving attention in order to attend to sensory events, and the executive network allows for monitoring and conflict resolution in situations of interference (González et al., 2001; Petersen & Posner, 2012). According to the model from Portellano and García (2014), attention is subdivided into two modalities, passive and active. The passive modality, more rudimentary and nonspecific, is involuntary and is not linked to the more immediate motives, needs or interests of the individual. This type of attention encompasses the state of alert and the orienting response. On the other hand, active attention consists of attentional processes that stem from the individual's motivations. Active attention is deployed through intentional, conscious, volitional, and practical actions. Within this modality, we find different types of attention including: selective attention, which maintains a cognitive schema, while avoiding distracting stimuli; focused attention, which concentrates on specific information for carrying out a task, processing the relevant stimuli and ignoring the irrelevant; divided attention, making it possible to respond to different stimuli while carrying out a single task; sustained attention, by which vigilance and response to certain stimuli are maintained during a cer-

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tain lapse of time; and alternating attention, which maintains cognitive flexibility, switching between tasks with different cognitive executions, and exercising the necessary control to handle them effectively (Portellano & García, 2014; Sánchez et al., 2015; Tejedor-Tejedor et al., 2008).

Research on the deployment of attentional processes is complicated by the difficulty of separating them from processes of coding, memory, and executive functioning itself (Portellano, 2018). Attentional problems are usually accompanied by others related to information processing, which suggests an impairment in learning and academic performance. These difficulties may be due to lack of motivation, inability to focus, lack of concentration, lack of flexibility in switching the focus of attention between two or more important elements, an inadequate level of activation, and so on (Capdevila-Brophy et al., 2006; Tejedor-Tejedor et al., 2008).

Attention and memory mechanisms constitute the primary neuropsychological functions that sustain processes of learning. In many cases, attention deficits or inattention become inherent to a child's development process; this poses a real problem as children grow older and lack attentional strategies or develop inadequate attention habits. Attention is a key element in learning given its close, coordinated relationship with other cognitive processes like memory, motivation, capacity for adaptation, and self-control (Ruff & Rothbart, 1996). Many difficulties seen in students are due to dispersed attention, becoming tired and quickly giving up on tasks, absence of tracking graphic elements, and a lack of concentration and listening to the teacher's instructions, especially in activities that seem demotivating or uninteresting. This situation has led to increased interest in the study of attention on the part of psychologists, pedagogy experts, and neuroscientists, given the impact of attention on children's global development (Monteoliva et al., 2017). Accordingly, attentional functioning has become a primary object of study for neurodidactics or educational neuroscience. This paradigm attests that, in order to promote and enhance knowledge acquisition in the school environment, the most suitable methodologies and strategies must be applied. Teachers must have knowledge of neural systems, and the processes involved in brain functioning (Bernabéu, 2017; Bullón-Gallego, 2017; Tapia et al., 2018).

Elsewhere, the presence of anxiety and stress are recognized as im-

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portant risk factors for well-being and for the personal, psychological, and academic development of children and adolescents. The pertinent scientific literature has shown that most negative consequences affecting students who experience stress are psychological, and bring about problems with learning, anxiety and depression (Palacio Chavarriaga et al., 2018). Not to be overlooked, psychosomatic issues may also affect health; for example, gastrointestinal or skin troubles, and physical complaints (Del Barrio, 2003). Potentially, the consequences of stress are regulated by coping strategies, that is, behavioral and cognitive efforts that change according to external and/or internal demands, and to each individual's available resources for meeting those demands (Lazarus & Folkman, 1986; Morales & Trianes, 2012). In recent years, there has been an abundance of studies on stress in relation to affective-motivational variables involved in learning (Martínez-Vicente et al., 2019; Valiente-Barroso et al., 2020a; Valiente-Barroso et al., 2020b), in addition to those that focus on stress as a consequence of life occurrences, such as school phobias, harassment at school, natural disasters, or grief over the loss of a family member (Furlan et al., 2009; Gaeta, 2013).

In Psychology, studies about stress take different approaches, making it possible to pursue research from different angles. When defining stress, four factors are considered: the presence and identification of an event; the disturbance of physiological and psychological balance; cognitive, emotional, and neurophysiological consequences; and the changes that undercut the individual's ability to adapt. Accordingly, stress is approached from three perspectives that correspond to stress as a stimulus, stress as a response, and stress as a transaction between the person and the environment (Trianes 2002; Trianes et al., 2012). Stress as a stimulus is the product or accumulation of various events involving the experience of threatening and harmful situations that put excessive demands on the person. Stress as a response is the psychophysiological reaction to stressful situations, in other words, the individual's response, experience, or reaction to stressors. Finally, stress as a transaction between the person and the environment includes cognitive variables and the mediational processes that trigger it. Its components are the demands of the context; the individual's perception of threat, harm, or loss; the lack of sufficient resources to meet the demands; the triggering of a negative emotional

experience; and consequently, the danger of inadaptation or the development of a psychopathology (Trianes, 2002).

Children's daily stress fits into the perspective of stress as a stimulus, because it results from frustrating, irritating demands in constant interaction with the environment, and which more deeply impact emotional development than do other chronic stressors (Torres et al., 2014; Trianes et al., 2011). These types of external events or stressors are frequent worries, incidents, problems or disappointments, which, though low in intensity, can do noticeable harm in the areas of health, family, and school. Their consequences constitute an upset to the physiological and psychological balance, provoking internalized symptomatology, such as external locus of control, feelings of incapacity, low self-esteem, anxiety and depression (Escobar et al., 2010; Trianes et al., 2012).

In a school-age population, the following are some of the important stressors identified: test-taking, learning difficulties, excess of homework and extracurricular activities, time limits to turn in assignments, class participation, curricula, academic demands, attention and concentration deficits, lack of reading comprehension, poor report card grades, competitiveness, difficulties in peer relationships, and social rejection (Aselton, 2012; Cobo-Cuenca et al., 2012; Pulido et al., 2011; Shiralkar et al., 2013; Sohail, 2013; Trueba et al., 2013). Certain learning situations, such as homework overload, high demands, and a merely instructive teaching methodology can become stressors for children, who respond with negative, hostile attitudes, and consequently their achievement falls (Pérez, 2012). Other stressors have to do with certain negative situations in the family setting, such as high demands, financial problems, insufficient attention from parents, sickness or death of a loved one, and parental separation or divorce. On the other hand, regarding health, sickness and doctor visits are constant sources of worry (Pozos-Radillo et al., 2015; Pulido et al., 2011; Trueba et al., 2013).

Continuous pressures in daily life, unpleasant micro-events or challenges in the daily routine, are defined as micro-stressors (Johnson & Swendsen, 2015) and are considered risk factors as they build upon each other, contributing to emotional and behavior impairment in children and adolescents (Bridley & Jordan, 2012). Cases of stress can become visible through

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psychological, physical, and behavioral symptoms. Demotivation, uninterest, reduced intellectual performance, anxiety, mistakes in memory, affective lability, dispersed attention, lack of concentration, irritability, indifference and apathy are all psychological symptoms. Among the physical symptoms, we find digestive issues, general discomfort, headaches, sleep alterations, and body aches and pains. Finally, the most common behavioral symptoms are increased mistakes, blocks, unfinished homework, rejection toward school and difficulties relating to peers (Maturana & Vargas, 2015).

In the scientific literature, there are studies in a Spanish population that address attentional processes and their relationship to, or repercussions on academic achievement, as well as other studies that consider certain emotional issues associated with anxiety or depression (Fernández-Castillo & Gutiérrez-Rojas, 2009; Reveló-García & Suárez-López, 2024). To date, however, there is a lack of studies that analyze these processes in depth, and take into account psychological variables and variables of well-being, such as children's daily stress. Attention deficits can result in a drop in academic achievement, which in turn can be the cause of behavior problems, and then trigger the presence of anxious or depressive symptomatology (Barriga et al., 2002; Cole et al., 2001). These problems, when identified early, can receive intervention and so reduce the risk of suffering associated disorders (Herman et al., 2007).

Although there is little empirical evidence that addresses the relationship between attention and daily stress, previous studies analyze the relationship between daily stressors and cognitive performance. The results indicate that children with higher scores in daily stressors reveal less capacity for sustained attention and need more time to recall information in working memory (Maldonado et al., 2008). It can thus be affirmed that students subject to constant daily stress tend to have lower capacity of sustained attention and episodic memory, they have concentration problems and are usually unmotivated toward schoolwork, resulting in lower academic achievement than expected (Suárez-Riveiro et al., 2020; Torres et al., 2014).

Recent studies show that emotional impairments, stress, fear and anxiety have direct repercussions on processes of attentional control and selective attention. Selective processes can be affected by stress that prompts a network

of excessive vigilance. In the classroom, some students may be more tuned in to peripheral information that comes through auditory stimuli, making it hard to draw their attention to the content they are learning at that time (Camargo & Riveros, 2015). There is an innovative line of work that focuses on the development of attentional networks through training from an early age, with impact on both the brain and behavior. Results from research that focused specifically on executive attention confirm the importance of brain plasticity for responding to environmental stimuli through modifications and adjustments in structural and functional brain architecture (Juárez-Ramos & Fuentes-Canosa, 2018; Molina-Rodríguez et al., 2018).

Taking into account the theoretical concerns presented above, the general aim of this study was to analyze the relationship between attentional and inhibitory control processes, and children's daily stress, in a sample of fifth- and sixth- graders. One specific objective derived from this general aim is to verify whether there are differences in these attentional and inhibitory processes according to different levels (low, medium and high) of school stress and general stress. Finally, we analyzed the predictive value of attentional and inhibitory processes for children's daily stress, in the school context and the general environment.

Method

Participants

Participating in this study were 558 students from a non-clinical population of fifth- and sixth-graders. All were enrolled in nine (public and charter) schools from the region of Cantabria (Spain). Non-probability, convenience sampling was used, with representativeness ensured at all times. Of the participants, 295 (52.86 %) were boys (150 fifth-graders and 145 sixth-graders) and 263 (47.14 %) were girls (140 fifth-graders and 123 sixth-graders). Their ages ranged from 10 to 12 years (M = 10.76, SD = 0.67).

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Instruments

To collect information on their attentional and inhibitory control processes, we used the following instruments:

The *FACES* test of perception of similarities and differences, revised (CARAS-R, in Spanish) (Thurstone & Yela, 2012), assesses visuoperceptual and attentional capacity, as well as the subject's impulsivity in task execution. It contains 60 graphic elements that represent faces, where the students' task is to identify which of the three faces is different in each set, and cross it out. The test can be applied individually or collectively, and the time allotted to complete the test is three minutes. The present study considered scores in sustained and selective attention, errors committed, attentional and visuoperceptual capacity, and the Impulse Control Index (ICI), which identifies lack of inhibitory control. Internal consistency for the total sample, as measured by Cronbach's alpha coefficient, was 0.91.

The Spanish adaptation (Farré & Narbona, 2013) of Conners' ADHD Rating Scale (*EDAH*), was used to assess ADHD, risk of ADHD, and behavioral disorders, whether or not concomitant. This test is a teacher-report, based on previous observation of the student's behavior. The scale contains 20 items with Likert-type responses from 1 (not at all) to 4 (very much); these are divided into two subscales of 10 items each, corresponding to attention deficit with hyperactivity and behavior disorders. Results are produced for two other subscales, on hyperactivity/impulsivity and attention deficit. This study considers students' scores on the four subscales. Internal consistency for the global scale, as measured by Cronbach's alpha coefficient, was 0.95.

The *Inventario de Estrés Cotidiano Infantil (IECI)* [Children's Daily Stress Inventory] (Trianes et al., 2011) was used to measure perceived stress. It contains 22 yes/no questions that provide information to assess daily stress in boys and girls enrolled in primary education. For this study, we initially considered the results of its scales on health problems, stress at school, and stress in the family, as well as an overall stress measurement which is a sum of the three. Internal consistency for the global scale, as measured by Cronbach's alpha coefficient, was 0.81.

Procedure

We first contacted the school administration at each school to request an in-person meeting, where we would present the research project and report on the study aim. After agreeing to participate, the head of studies at each school conveyed the information to the families and to each homeroom teacher from the participating classrooms, with support from the guidance counselors in all cases. Following this, written informed consent was requested from the families; after it was obtained, the tests were administered in each classroom by a member of the research team, always in the presence of the homeroom teacher. Both of them controlled the distracting elements in the application of the attention and impulsivity control test. The conditions and instructions for each test were explained, and students were assured of anonymity and data confidentiality. The same day of the classroom tests, the homeroom teacher for each student was given their EDAH questionnaire. These were completed and collected at a later time by a member of the research team. The collected data was handled according to Spanish legislation (Organic Law 3/2018, 5th December, on Protection of Personal Data and Guarantee of Digital Rights), ensuring respect for the dignity, integrity, and identity of study participants.

Data analysis

Given the level of inquiry into the object of study, an exploratory study was designed, with a nonexperimental, cross-sectional, descriptive, correlational and inferential methodology. All data analyses were performed using IBM SPSS version 29.0 for Windows.

First, the variables' goodness of fit to normal distribution was calculated using the Kolmogorov-Smirnov test, and also homoscedasticity. After seeing that most of the study variables did not meet the normality principle, we elected to use nonparametric statistical tests. Correlation analyses were conducted using Spearman's Rho coefficient, and two differential analyses were carried out using the Kruskal-Wallis H test for ($k \geq 2$) independent samples, to examine whether there were significant differences in attentional and inhibitory processes based on the level of school stress and overall stress

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(given the previously tested correlations between these variables). In both cases, three groups are formed according to level of stress (low, medium and high), based on calculations of the mean and standard deviation. In the case of school stress, Group 1 was formed of scorers falling between the minimum score and the mean minus one-half standard deviation (0; .89), taking in 16.48 % of students, who had a low stress level. Group 2 was formed of students with scores ranging between the mean minus one-half standard deviation and the mean plus one-half standard deviation (.90; 2.30), which represented 45.34 % of the total sample, who had a medium stress level. Group 3 scores ranged between the mean plus one-half standard deviation, and the maximum score on school stress (2.31; 7), representing 38.17 % of the students, who had a high stress level. As for overall stress, Group 1, with scores ranging from the minimum score to the mean minus one-half standard deviation (0; 3.33), took in 39.06 % of students, who had low stress levels. Group 2 was formed of students with scores ranging between the mean minus one-half standard deviation and the mean plus one-half standard deviation (3.34; 6.66), which represented 31.72 % of the total sample, who had a medium stress level. Group 3 was formed of students with scores ranging between the mean plus one-half standard deviation and the maximum score in overall stress (6.67; 16), representing 29.21 % of the sample, who had high overall stress. In addition, whenever there were significant between-group differences, *post hoc* contrasts were carried out using the Mann-Whitney U, with the Bonferroni correction, whose significance value was established at .05. Cohen's *d* was also calculated to learn the effect size of the differences found; its interpretation is simple, with small ($.20 \leq d \leq .50$), moderate ($.51 \leq d \leq .79$) and large ($d \geq .80$) (Sun et al., 2010).

Finally, two stepwise, multiple linear regression analyses were conducted in order to study the predictive nature of attentional and inhibitory processes for daily stress, considering the criterion or dependent variables to be school stress and overall stress.

Results

Correlational analysis

Table I shows results from the correlation analysis between the variables pertaining to attentional and inhibitory processes and children's daily stress. The variables of sustained and selective attention, attentional and visuoperceptual capacity, and the impulsivity control index had statistically significant, low-intensity, negative relationships with stress on the school and overall scales. The variables of attention deficit, behavior disorders, and attention deficit with hyperactivity showed statistically significant, positive, low-intensity relationships with stress in the four spheres analyzed (health, school, family and overall). On the other hand, statistically significant, positive relations were observed between the error's variable and stress in the health and overall scales. Finally, hyperactivity/impulsivity showed statistically significant, positive relationships with school and overall stress.

TABLE I. Correlations between attentional and inhibitory processes and children's daily stress

	1	2	3	4	5	6	7	8	9	10	11	12
A (1)	1											
E (2)	-.03	1										
AV (3)	.98**	-.22**	1									
ICI (4)	.21**	-.93**	.39**	1								
H (5)	-.06	.08	-.08	-.11**	1							
AD (6)	-.15**	.15**	-.18**	-.17**	.50**	1						
BD (7)	-.11**	.14**	-.13**	-.17**	.72**	.51**	1					
H-AD (8)	-.12**	.14**	-.15**	-.17**	.86**	.87**	.71**	1				
HS (9)	-.05	.09**	-.07	-.06	.03	.13**	.10*	.09*	1			
SS (10)	-.12**	.08	-.13**	-.11*	.15**	.31**	.12**	.26**	.37**	1		
FS (11)	-.04	.08	-.06	-.06	.06	.18**	.09*	.11*	.25**	.38**	1	

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OS (12)	-.09**	.12**	-.12**	-.11*	.11*	.26**	.15**	.21**	.74**	.77**	.68**	1

Note. A=Selective and sustained attention; E= Errors; AV= Attentional and visuoperceptual capacity; ICI=Impulse Control Index; H=Hyperactivity/impulsivity; AD= Attention deficit; BD= Behavior disorder; H-AD= Hyperactivity-attention deficit; HS: Health stress; SS: School stress; FS: Family stress; OS: Overall stress
**p <. 01; *p <. 05
Source: Compiled by the authors

Differential analyses according to levels of school stress and overall stress

Considering the correlational results, we choose to conduct two differential analyses of attentional and inhibitory processes, according to the different levels of school stress and overall stress. In the case of school stress, results from the Kruskal-Wallis H test showed statistically significant differences in attention deficit, behavior disorders, and attention deficit with hyperactivity, as a function of different levels of students' school stress (Table II).

TABLE II. Kruskal-Wallis H test as a function of school stress groups

Variable	Mean Rank			χ^2	η_p^2
	Low school stress (n = 92)	Medium school stress (n = 253)	High school stress (n = 213)		
Selective and sustained attention	278.22	278.52	261.46	1.49	.002
Errors	246.91	277.84	275.96	3.27	.006
Attentional and visuoperceptual capacity	284.63	278.99	258.09	2.69	.003
Impulse Control Index	297.07	266.37	267.80	3.17	.003
Hyperactivity/impulsivity	250.04	278.17	290.91	4.43	.010
Attention deficit	232.28	276.99	299.83	11.70**	.020
Behavior disorder	238.66	268.86	306.79	14.26***	.017
Hyperactivity-attention deficit	231.08	276.99	300.33	11.98**	.019

***p < .001; **p <. 01; *p<. 05
Source: Compiled by the authors

To ascertain what between-group differences existed in school stress, the Mann-Whitney U was calculated, taking the groups two by two, and applying Bonferroni's correction (Table III). The results indicated that in hyperactivity/impulsivity, attention deficit, behavior disorder, and attention deficit with hyperactivity, there were significant between-group differences between high and low groups in school stress; and between low and medium school-stress groups in attention deficit and attention deficit with hyperactivity; and between medium and high school-stress groups in behavior disorders.

TABLE III. Comparison of attentional and inhibitory processes according to school-stress groups

	Group	*M*	*SD*	Group	*M*	*SD*	*U*	*d*
Hyperactivity/impulsivity	Low	2.11	2.95	High	3.15	3.84	8197.50*	-.30
Attention deficit	Low	2.24	2.79	Medium	3.34	3.67	9580.50*	-.33
		2.24	2.79	High	3.76	3.70	7229.50***	-.46
Behavior disorder	Low	2.31	3.96	High	4.09	5.30	7259.00***	-.38
	Medium	3.11	4.77	High	4.09	5.30	23245.00**	-.19
Hyperactivity-attention deficit	Low	4.36	5.06	Medium	6.06	6.20	9514.00*	-.35
		4.36	5.06	High	6.92	6.53	7188.00***	-.49

***$p < .001$; **$p <. 01$; *$p <. 05$
Source: Compiled by the authors

On the other hand, in the case of overall stress, results from the Kruskal-Wallis H test, as shown in Table IV, indicated statistically significant differences in selective and sustained attention, attentional and visuoperceptual capacity, attention deficit, behavior disorders, and attention deficit with hyperactivity, according to students' level of overall stress.

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TABLE IV. Kruskal-Wallis H test as a function of overall-stress groups

Variable	Mean Rank			χ^2	η_p^2
	Low stress level (n = 218)	Medium stress level (n = 177)	High stress level (n = 163)		
Selective and sustained	294.10	261.03	257.25	6.43*	.012
Errors	264.52	261.04	294.10	4.78	.011
Attentional and visuoperceptual capacity	296.82	260.98	253.52	8.32*	.016
Impulse Control Index	280.05	282.45	252.55	4.22	.009
Hyperactivity/impulsivity	266.04	284.67	291.89	2.88	.013
Attention deficit	236.98	285.02	330.37	32.96***	.065
Behavior disorder	250.79	290.50	305.95	13.25***	.024
Hyperactivity-attention deficit	243.42	285.41	321.34	22.49***	.045

***$p < .001$; **$p <. 01$; *$p <. 05$
Source: Compiled by the authors

The differences in overall stress were analyzed with Mann-Whitney U, taking the groups two by two, and applying Bonferroni's correction. Following the results shown in Table V, significant differences were observed between the low and medium stress groups and between the low and high groups, in selective and sustained attention, attentional and visuoperceptual capacity, attention deficit, behavior disorders, and attention deficit with hyperactivity. In addition, significant differences were observed between the medium and high stress groups, in errors committed, attention deficit, and attention deficit with hyperactivity.

TABLE V. Comparison of attentional and inhibitory processes according to overall-stress groups

	Group	*M*	*SD*	Group	*M*	*SD*	*U*	*d*
Selective and sustained	Low	36.80	8.43	Medium	34.95	8.32	16496.00*	.22
		36.80	8.43	High	36.64	9.64	14442.50*	.02
Errors	Medium	.97	1.94	High	1.39	2.79	11944.50*	-.17
Attentional and visuoperceptual capacity	Low	35.94	8.71	Medium	33.98	8.67	16314.00*	.22
		35.94	8.71	High	33.33	9.81	14039.00*	.28
Attention deficit	Low	2.35	2.97	Medium	3.39	3.58	15903.50**	-.31
		2.35	2.97	High	4.52	3.96	11886.50***	-.62
	Medium	3.39	3.58	High	4.52	3.96	12013.50**	-.29
Behavior disorder	Low	2.41	3.72	Medium	3.85	5.23	16583.50*	-.31
		2.41	3.72	High	4.10	5.66	14217.00***	-.35
Hyperactivity-attention deficit	Low	4.69	5.38	Medium	6.23	6.11	16351.50**	-.26
		4.69	5.38	High	7.82	6.90	12842.00***	-.50
	Medium	6.23	6.11	High	7.82	6.90	12530.00*	-.24

***$p < .001$; **$p <. 01$; *$p <. 05$
Source: Compiled by the authors

Multiple regression analyses

Finally, two multiple regression analyses were conducted to analyze which variables were predictive of school stress and overall stress. Results are presented in Table VI, indicating that in both cases, stress was predicted by the attention deficit variable, explaining 9.6 % of the total variance of school stress, and in the case of overall stress, 6.1% of the total variance was explained. This variability may be significant (even though the percentage is not high), given the importance of these variables in child development.

TABLE VI. Results of the regression analysis with school stress and overall stress as criterion variables

	R	R^2	*Adjusted* R^2	Durbin-Watson	*F*	*gl*	B	ET	β	*t*
School stress										
Attention deficit	.312	.098	.096	1.88	49.97^{***}	1,544	.11	.02	.29	7.07^{***}
Overall stress										
Attention deficit	.248	.061	.061	1.85	35.48^{***}	1,544	.23	.04	.25	5.89^{***}
$^{***}p < .001$										

Source: created by the authors

Discussion / Conclusions

In the educational context, an abundance of studies have focused on cognitive and executive processes that predispose or interfere in learning, as well as in students' psychological and personal well-being, at any stage of education (López-Pereyra et al., 2021; Trigueros et al., 2023). All this takes on greater importance under the educational neuroscience paradigm, which encompasses a broad range of variables related to the learner's mental health (Martínez-Cienfuegos, 2020). Based on these ideas and recognizing that there is no consolidated theoretical framework that contributes scientific, empirical evidence of the relations between cognitive variables—attentional processes among them—and other psychology variables such as children's daily stress, the present study sought to analyze relationships between these variables in fifth- and sixth-graders.

In response to the general objective of analyzing relations between attentional and inhibitory control processes and daily stress, the results confirmed the tendency that students with higher levels of daily stress, in general, as well as stress related to health, family and particularly to school, were the

students who showed greater attention deficit in class, greater behavior disorders, and in general, higher levels of attention deficit with hyperactivity. On the other hand, higher levels of selective and sustained attention, better attentional and visuoperceptual capacity, and better impulsivity control, were observed in the students who presented lower levels of school stress, as well as overall stress.

The second objective was to verify whether there were differences in attentional and inhibitory processes according to different levels (low, medium and high) of school stress and overall stress. The results reaffirm that the students with higher levels of school stress were those with higher scores in attention deficit, behavior disorders, and attention deficit with hyperactivity. Moreover, students with low levels of overall stress presented better selective and sustained attention, as well as better attentional and visuoperceptual capacity, in comparison to those with high levels of overall stress. The latter group equates with those who, based on teacher reports, scored higher in attention deficit, behavior disorders and attention deficit with hyperactivity. Consequently, as has been demonstrated previously, we confirm that children with higher scores in daily stressors have lower attentional capacity (Maldonado et al., 2008). It is possible that stress level has a direct relationship with attention deficits or problems that may interfere substantially in a child's development, affecting their daily life, in its personal, psychological, academic, and relational aspects. In short, these results reinforce what others have reported in recent years, where direct relationships were found between certain negative attitudes in the school context, and children's daily stress, and these are linked, for example, to attention deficit, and consequently to lower levels of cognitive and academic performance (Martínez-Vicente et al., 2023; Torres et al., 2014; Trianes et al., 2012; Valiente-Barroso et al., 2024). This situation thus explains how high levels of stress result in lower achievement. Consequently, keeping these relationships in mind, empirical research in this matter constitutes the foundation upon which to justify teaching and educational practices that aim to redirect and mitigate the effects of these deficiencies or difficulties on learning. In the educational context, therefore, being alert and observant of each student is foremost. Low attention and concentration may be psychological symptoms that are being produced as a con-

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sequence of stress, the latter being understood as the set of everyday, frequent events that may interfere in the student's normal development.

Finally, a regression analysis was carried out in which attention deficit was seen to predict stress in the school environment, as well as stress overall. These results fall in line with previous studies that call for recognition of the influence of a wide range of variables—including cognitive, affective, and motivational factors—on both the actual and perceived health of learners. They suggest that in an educational context, it is essential to develop all these skills, including attentional skills, which are closely linked to academic abilities themselves (Sáinz et al., 2012; Valiente et al., 2020a).

This study allows us to identify and underscore certain problems which teachers must be aware of. Namely, children may be affected by everyday stressful situations, and specifically those in the school context itself, which then become risk factors that may visibly impact their functioning (Bruguera et al., 2017). Nonetheless, as Morales and Trianes point out (2012), we must bear in mind that these stressors may act as protectors in certain cases, because they trigger and develop coping mechanisms that are not available by any other means. We must consider that childhood exposure to moderately stressful situations can buffer against harmful effects from typical stressors in later stages like adolescence (Shapero et al., 2015).

As for the limitations of this study, we point to its cross-sectional nature, where the data is gathered at a single point in time, not allowing us to see the evolution of the data over time. A longitudinal design could provide better assurance of these study conclusions, specifying the directionality of the relations between children's daily stress and students' attention problems. Moreover, non-random sampling may imply the presence of many extraneous variables. Another limitation is the use of self-reports to gather information, since they may add in the social desirability effect. However, in the field of education, questionnaires are among the instruments most used for collecting relevant information, as long as conditions of validity and reliability are ensured. Regarding the instruments used, the *EDAH* should also be completed by other teachers who deal with students in the classroom, not only the homeroom teacher, in order to contrast the information collected. Finally, another limitation is the lack of prior research that incorporates these study variables,

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making it important to continue in this line of investigation. Future research might also consider other variables that may mediate in this relationship, for example self-esteem, motivation, and emotional intelligence, and the age range could be expanded to consider compulsory and college-preparatory stages of secondary education.

In short, from an applied perspective, these results highlight the importance of the relationship between attentional processes and other behavioral or affective processes that affect health, such as stress. These are determining factors for proper school adaptation and successful coping with typical situations of everyday life. Studies such as this one are necessary to provide empirical evidence for disciplines like positive psychology, where the emphasis is placed on these youngsters' strengths, because these are determining factors in their optimal personal and mental development. Hence, the need to promote actions that improve well-being and personal development, within the educational sphere. In this regard, the importance of cognitive training has outgrown its restriction to the clinical sphere, now emerging under a broad umbrella of possibilities within the sphere of education. We emphasize the interaction of genetic and environmental factors, and propose interventions that support processes of maturation and development of the executive attention network. These interventions to optimize attentional processes through attention training-based activities, are also under consideration for transfer to other skills of emotional and behavioral self-regulation. Such skills have significant repercussions on the student's overall development at any stage of education (Juárez-Ramos & Fuentes-Canosa, 2018). In conclusion, we call for teaching actions that, upheld by the educational neuroscience paradigm, are focused on improving executive and cognitive competencies, as well as optimizing diverse variables that define students' psychological profile.

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Address information: Marta Martínez Vicente. Universidad Internacional de la Rioja (UNIR), Facultad de Ciencias de la Educación y Humanidades. E-mail: mmv3619@hotmail.com