

Strategic-motivational profile and academic achievement in primary school students

Perfil estratégico-motivacional y rendimiento académico en alumnado de Educación Primaria

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ABSTRACT

Among a multitude of variables that are involved in self-regulated learning and that define the student's profile, we find learning strategies and academic motivation. The aim of this study was to analyze relationships between learning strategies, attitude toward study, self-concept, and academic achievement. A total of 519 students from upper primary education in Cantabria (Spain) were participants in this cross-sectional study, which used non-experimental, descriptive, correlational methodology. The results confirmed a tendency for greater use of learning strategies, along with optimal motivation towards schoolwork, to be positively related to overall academic achievement. Moreover, low-medium-high levels of learning strategy use and of academic motivation were differentially associated with

academic achievement. This study has confirmed that complementary learning strategies such as group work or extracurricular activities, as well as academic self-concept, are predictive of achievement in the subjects considered, as well as of academic achievement in general. Educational contexts that take into account learning strategies and academic motivation are called for, both as a means and as an end in themselves, in order to achieve meaningful, practical and functional learning that leads to higher academic achievement.

Keywords: self-regulation, learning strategies, academic motivation, student role, academic achievement

RESUMEN

Dentro de la multiplicidad de variables implicadas en el aprendizaje autorregulado y que definen el perfil del estudiante se encuentran las estrategias de aprendizaje y la motivación académica. El objetivo de este estudio fue analizar las relaciones entre las estrategias de aprendizaje, la actitud ante el estudio, el autoconcepto y el rendimiento académico. Participaron 519 estudiantes del último nivel de primaria de Cantabria (España) en un estudio transversal de metodología no experimental, descriptivo y correlacional. Los resultados confirmaron la tendencia a que un mayor uso de estrategias de aprendizaje, así como una óptima motivación hacia el trabajo escolar, se relacionan positivamente con el rendimiento académico en general. Además, se encontraron diferencias significativas en el rendimiento académico según el nivel (bajo-medio-alto) del uso de estrategias de aprendizaje y motivación académica. En este estudio se ha confirmado que estrategias complementarias al aprendizaje como pueden ser los trabajos en grupo o las actividades extraescolares, al igual que el autoconcepto académico, son predictores del rendimiento en las asignaturas consideradas, así como en el rendimiento académico en general. Se reivindican contextos educativos que consideren a las estrategias de aprendizaje y la motivación académica, como un medio y un fin en sí mismo para alcanzar aprendizajes significativos, prácticos y funcionales que implican un mayor rendimiento académico.

Palabras clave: autorregulación, estrategias de aprendizaje, motivación académica, rol estudiantil, rendimiento académico

INTRODUCTION

A self-regulated student is one who participates actively in their own learning, a process where cognitive, metacognitive, motivational, and behavioral variables blend harmoniously. Consequently, a student's profile or role depends on a broad range of variables pertaining to different dimensions, not only cognitive abilities, but also affective-motivational aspects, an area of great emphasis in recent years. Research that uses scientific evidence to support the dissemination and implementation of educational proposals that apply active, innovative methodologies in the teaching-

learning process, in synergy with development of emotional competencies that favor teaching and learning, gives high priority to these variables (Muntaner et al., 2020). All this has taken shape in a new paradigm that blends the knowledge of neuroscience with contributions from education. Taking the name of neuroeducation or neurodidactics (Bullón-Gallego, 2017; Tapia et al., 2018), this paradigm focuses on the student as protagonist in the learning process (Muchiut et., 2018).

Some notable variables involved in learning are perceived stress, attitudes toward study, academic self-concept and learning strategies used by the student. Along with psychoemotional stability, these factors determine one's success or failure in learning, as measured by academic achievement (Valiente-Barroso et al., 2020). Consequently, the role of each student is defined and outlined by a multiplicity of variables that converge in meaningful, pragmatic, functional learning, where cognitive processes determine appropriate application of different learning strategies (Rodríguez-Pérez & Madrigal-Arroyo, 2016). This has led to self-regulated learning as the object of systematic reviews analyzing the evidence produced by recent research on self-regulation (Dent & Koenka, 2016; Panadero, 2017; Puustinen & Pulkkinen, 2001; Rosário et al., 2014; Sáez et al., 2018), as well as many psychoeducational studies based on the interrelationship between cognitive and affective-motivational factors of learning, their influence on academic achievement (Ben-Eliyahu & Linnenbrink-García, 2015; Ellis et al., 2014; Gaeta et al., 2012; Karabenick & Zusho, 2015; Martínez-Vicente & Valiente-Barroso, 2019; Suárez-Valenzuela & Suárez-Riveiro, 2019), and consequently, on scholastic success or failure (Yan, 2020).

Self-regulation is a key factor that should be considered in all study plans. It involves a holistic view of learning that includes both cognitive and self-regulating strategies. The latter include metacognitive strategies, motivational strategies and strategies for managing and monitoring resources (Barca et al., 2013; Suárez & Fernández, 2013; Suárez et al., 2016; Suárez-Valenzuela & Suárez-Riveiro, 2019), all of which are essential to improved academic achievement. Students who use these types of strategies have been shown to practice better management of time and learning resources, key factors in school work. Consequently, they manifest greater security, confidence and persistence. This is reflected in their school grades (Barreto-Trujillo & Álvarez-Bermúdez, 2020; Barrios & Frías, 2015; Fernández et al., 2013; Panadero & Alonso-Tapia, 2014; Rodríguez et al., 2017). In all of this process, one of the ultimate purposes is the development of metacognition that will allow the student to be aware of their mental and psychological processes when performing a task. These are evident when the student is able to monitor, plan and reflect during all phases of learning (DiFrancesca et al., 2016). Thus, when this metacognitive knowledge is attained, students become the true protagonist in their process, exhibiting their skills as autonomous, strategic and, therefore, self-

regulating learners (De la Fuente et al., 2018; García et al., 2016; Mejía-Rodríguez et al., 2018). Results from the meta-analysis by Dent and Koenka (2016) confirm the influence of cognitive and metacognitive processes which are part of self-regulated learning in academic achievement. Therefore, educational programs should address academic motivation, going beyond the strictly curricular content. By doing so, students improved self-efficacy beliefs and value expectations (Cerezo et al., 2019) will lead to improved effort regulation, interest, information processing, and overall, the use of learning strategies, which imply better academic achievement (Cueli et al., 2013; Rodríguez et al., 2014; Stoeger et al., 2015; Suárez et al., 2016; Zimmerman, 2011).

Certain intra-individual motivational variables that define the student's psychological profile, including academic self-concept, have been shown to mediate scholastic and personal adjustment through direct relationships with academic achievement and engagement in learning. For some time, then, there has been a call to establish support networks at school that favor positive self-perception and that revolve around academic motivation and self-concept. In this way, the concept of student profile expands well beyond that of simply a learner (Inglés et al., 2015; Veiga et al., 2015). A students' expectations of being competent and of successfully carrying out tasks with academic subject matter is called perceived self-efficacy; it has become established as one of the strongest variables in predicting academic performance (Cerezo et al., 2019; Schneider & Preckel, 2017). This variable has been explained through studies that show significant, positive relationships between perceived self-efficacy, persistence in academic work, and general achievement (Honicke & Broadbent, 2016; Multon et al., 1991; cited in Garzón et al., 2021), as well as other studies of the directional relationship between the two variables, finding significant, positive relationships in both directions, even if academic achievement's influence on perceived self-efficacy is the stronger of the two (Talsma et al, 2018). In addition to the foregoing, one must consider the protective effect of certain variables on self-regulated learning. In the case of academic goals, as cognitive representations of future events, they guide students' behavior in the academic context, thereby constituting a motivational support for performing scholastic tasks, where perceived academic and social support are present as protective variables for certain students (Gaeta et al., 2017; Gaxiola & González, 2019).

Academic achievement may constitute one of the most important dimensions in the teaching-learning process of students. It is a multi-factorial phenomenon influenced by many variables, which make it hard to properly conceptualize. It has been called scholastic achievement, academic achievement and scholastic aptitude, referring in any case to synonymous concepts; in the practice and experience of school, academics, and teaching, distinctions are a mere question of semantics. Beyond any such considerations, concern for the study of academic

achievement has always aroused interest from various fields, which offer different lines of research whereby we can approach the complexity of the term by trying to understand its meaning both inside and outside the school context. Research in this regard has made it possible to develop theories with regard to learning and teaching methodologies; these in turn explain common, daily problems in the life of students (Castedo et al., 2016). From a didactic point of view, achievement has generally been measured by considering the outcomes of students' tests and assignments, and assigning a number that represents the level of development attained in the different areas or subjects, thus representing their acquisition of knowledge in each subject according to previously formulated didactic objectives and evaluation criteria (Ramudo et al., 2017). It can be considered to be a student's demonstrated level of knowledge in a given area of the curriculum, with reference to their age group and academic level; from this perspective, then, the corresponding assessment processes produce a measured value. But we must bear in mind other variables that intervene in academic achievement, among which are cognitive or intellectual level, aptitudes, motivation, personality, study techniques and habits, expectations and interests (Barreto-Trujillo & Álvarez-Bermúdez, 2020).

Previous studies have focused on the relationship between self-regulated learning and academic achievement to promote research in development of promotional, preventive, and compensational programs that improve students' academic adaptation (Elvira-Valdés & Pujol, 2014; Gaxiola & González, 2019). Students with self-regulating strategies are thus confirmed to have an optimal level of academic achievement (DiFrancesca et al., 2016; Rodríguez et al., 2014; Yan, 2020). In this regard, statistically positive relationships have been demonstrated between self-regulated learning, motivation, self-efficacy and academic achievement (El-Adl & Alkharusi, 2020), and specifically in achievement in subjects like mathematics (Lawrence & Saileella, 2019). These students are characterized by an awareness that their intrinsic motivation when engaging in tasks determines academic success, they also show perseverance, interest and personal initiative outside the learning context (Álvarez-Bermúdez & Barreto-Trujillo, 2020; Rivera, 2017; Valle et al., 2010).

Continuing in this approach, the general aim of the present study was to examine how different variables of a student profile that are related to self-regulated learning, such as learning strategies and academic motivation, relate to academic achievement in Language Arts, Mathematics, English as a Foreign Language and overall academic achievement. Significant differences were expected in academic achievement (in Language Arts, Mathematics, EFL and overall), in accordance with low, medium, and high levels of learning strategies and academic motivation. We also expected to demonstrate the ability of these variables to predict academic achievement in upper primary education.

METHOD

Participants

Incidental non-probabilistic sampling was used to select 519 fifth- and sixth-graders from nine schools in the Cantabria region of northern Spain. Of these participants, 344 (53%) were boys (177 fifth-graders, 167 sixth-graders); and 305 (47%) were girls (165 fifth-graders, 140 sixth-graders). The age range was 10 to 12 years old ($M = 10.74$; $SD = 0.66$).

Instruments

The instrument used was the Diagnóstico Integral del Estudio [comprehensive diagnosis of study] (Pérez et al., 2002). This tool collects information on different learning strategies and motivational variables. It assesses the student's behavior in personal, autonomous work in their individual learning process, focusing on the before, during and after of schoolwork and study (motivation and planning, performance, and assessment), as well as on complementary strategies such as working in a group and extracurricular activities. The test contains 60 items on a Likert scale with three possible answers: 1 (always or almost always), 2 (sometimes), and 3 (never or almost never). Four direct variables were obtained, namely: support strategies, complementary strategies, attitude towards study, and academic self-concept. Five combination variables were also obtained: total strategies (which integrates support strategies and complementary strategies), attitude towards study/support strategies, attitude towards study/complementary strategies, academic self-concept/support strategies, and academic self-concept/complementary strategies. The instrument's manual reports internal consistency as a Cronbach alpha of .85 for the standardization sample. This represents an adequate level, and is confirmed in previous studies such as Díaz & Jaimes (2017), whose value is .80. The aspects that each of these variables evaluates, and the reliability indices obtained for each of them, are given in more detail below:

- Attitude toward study/support strategies: provides information on the student's view of conditioning factors that they consider important in study, work and distracting factors at home, place of study, reading level and concentration. (Items 1-15, e.g. "They interrupt and distract me when I study at home"). Internal consistency measured with the alpha coefficient was .67, McDonald's omega coefficient .71, and average variance extracted (AVE) was .55.

- Attitude toward study/complementary strategies: indicates how the student handles schoolwork and study, favorable aspects and difficulties that they perceive in the learning process, attitude toward grades and the way classes are held. (Items 31-45) (e.g. "I find it easy to identify the important ideas in the study topics"). Internal consistency measured with the alpha coefficient was .69, McDonald's omega coefficient .75, and average variance extracted (AVE) was .56.
- Academic self-concept/support strategies: refers to the student's perception of how they deal with daily study at home, concentration, place of study, time devoted, activities to carry out for improved learning. (Items 46-60) (e.g. "I have a regular study schedule that follows a plan I developed myself"). Internal consistency measured with the alpha coefficient was .68, McDonald's omega coefficient .75, and average variance extracted (AVE) was .57.
- Academic self-concept/complementary strategies: refers to the student's perception of their own use of study techniques, method of working, time distribution, reading, teamwork and test performance. (Items 16-30) (e.g. "My study method consists only of reading each paragraph or topical section several times"). Internal consistency measured with the alpha coefficient was .66, McDonald's omega coefficient .71, and average variance extracted (AVE) was .54.
- Support strategies: refers to prior conditions that are essential to study, such as place, time and material. Reading and certain internal factors like motivation, concentration and relaxation are essential prerequisites. (Items 1-15; 46-60) e.g. "When I start to study, it takes me quite a while to get concentrated"). Internal consistency measured with the alpha coefficient was .76, McDonald's omega coefficient .81, and average variance extracted (AVE) was .61.
- Complementary strategies: examples of this category are extracurricular activities, group work, making text commentaries, note taking, and library use. In other words, all activities that involve additional work beyond the required minimums, and that enhance one's development as a student. (Items 16-45) (e.g. "Almost every day I spend some time studying at home, in addition to doing the homework."). Internal consistency measured with the alpha coefficient was .73, McDonald's omega coefficient .78, and average variance extracted (AVE) was .59.
- Attitude toward study: indicates the value given to an ideal conception of study, predisposition toward study, each student's image and ideal conception. It incorporates the subject's consideration of what they must do for personal study, and includes expectations (personal and social), socio-scho-

lastic desires and aspirations that affect them. (Items 1-45) e.g. "It's normal that the hardest or most boring material gets left to the last minute"). Internal consistency measured with the alpha coefficient was .77, McDonald's omega coefficient .81, and average variance extracted (AVE) was .61.

- Academic self-concept: is defined as each subject's perception of themselves, their understanding of what they do or do not do as a student, assessing their self-image in the context of study and their own situation. (Items 16-60) (e.g. "Normally I settle for studying what is essential for passing the exams"). Internal consistency measured with the alpha coefficient was .79, McDonald's omega coefficient .85, and average variance extracted (AVE) was .62.
- Total strategies: a general measure of strategies resulting from the sum of the foregoing. Measures should be taken to work on elements of personal study in cases where scores fall below 75. For the instrument as a whole, Cronbach's alpha was .89, considered very good. In addition, the McDonald omega coefficient was calculated with a value of .90 and the average variance extracted (AVE) was .64, which explains the variance of all the indicators it comprises.

Information was collected on perceived self-efficacy (a variable linked to academic motivation) in the subjects of Language Arts, Mathematics and English as a Foreign Language, through an item where students had to respond to the statement "In these subjects I consider myself to be", followed by four options on a Likert scale: (1) Bad, (2) Average, (3) Good or (4) Very good. Internal consistency for general self-efficacy, combining the three items, revealed a Cronbach alpha of .67. In addition, the McDonald omega coefficient was calculated at .78, and the average variance extracted (AVE) was .55.

General academic achievement was assessed as the average of students' year-end grades in the subjects of Language Arts, Mathematics and English as a Foreign Language. All scores were measured on a scale from 0 to 10 points.

Procedure

The research project was presented to the school principals at sixteen schools of primary education; nine of these ultimately agreed to participate. School administrations were informed of the study aim at a meeting, and the heads of study at each school were charged with informing the parents and guardians of each participating class group, with additional support from the school psychology teams. Written informed consent from the families was then requested and obtained, after which the tests were applied in each of the participating classrooms, during

one class session. The test administrator was one of the members of the research team, always in the presence of the regular classroom teacher. The students took approximately thirty minutes to complete the questionnaires. Students' anonymity and the confidential nature of all data was ensured at all times.

Later, the regular classroom teachers who participated provided students' year-end grades for the subjects of Language Arts, Mathematics and English as a Foreign Language (EFL).

Data analyses

The study methodology was nonexperimental, cross-sectional, correlational, inferential and explanatory, due to the level of inquiry into our object of study. The database was designed using SPSS version 25.0 for Windows.

The Cronbach's alpha coefficient, McDonald's omega coefficient and the average variance extracted (AVE) were used to calculate the reliability of the assessment instrument. Correlational and inferential analyses were carried out after using the Kolgomorov-Smirnov test to estimate the variables' goodness of fit to the normal distribution, as well as homoscedasticity. After verifying that most of the variables did not meet the normality principle, we opted for nonparametric statistical tests. We conducted a correlational analysis using Spearman's Rho coefficient, and differential analyses using the Kruskal-Wallis H for independent samples to study whether there were significant differences in academic achievement in Language Arts, Mathematics, EFL, and general academic achievement, as a function of the level of learning strategies and academic motivation. In addition, when there were significant between-group differences, post hoc tests were carried out by calculating the Mann-Whitney U and applying the Bonferroni correction, whose significance value was set at .05. Cohen's d was also calculated to assess the magnitude or effect size of the differences found (Sun, Pan & Wang, 2010); its interpretation is straightforward, where $0.20 \leq d \leq 0.50$ is a small effect size, $0.51 \leq d \leq 0.79$ is medium, and $d \geq 0.80$ is large. To perform the differential analyses, three groups (low, medium, high levels) were formed based on a k-means cluster analysis. Cluster analysis is a multivariate grouping technique that makes it possible to organize the subjects of a large sample into homogeneous groups. In this study, it was decided to form three groups at the outset, since the k-means clustering method requires that the number of clusters to be obtained be established beforehand. Finally, four multiple regression analyses were conducted (stepwise method) to determine the value of the variables linked to learning strategies and academic motivation for predicting achievement in each of the three subjects (Language Arts, Mathematics and EFL), as well as general academic achievement.

RESULTS

Correlational analysis

Results of the correlational analysis between the variables of learning strategies and motivation and academic achievement are shown in Table 1. The results showed how the variables of attitude towards study/support strategies, attitude towards study/complementary strategies, academic self-concept/support strategies, academic self-concept/complementary strategies, support strategies, complementary strategies, attitude towards study, academic self-concept and total strategies, maintained clear, positive, statistically significant relationships with academic achievement in Language Arts, Mathematics, EFL, and general academic achievement. Statistically significant relationships were not established between the variables of perceived self-efficacy in Language Arts, Mathematics and EFL, and academic achievement in Language Arts, Mathematics, EFL or general academic achievement.

Differential analysis

In order to analyze differences in academic achievement according to learning strategies and academic motivation, these variables were made categorical using a k-means cluster analysis. This type of analysis makes it possible to form homogeneous groups based on the variables selected; in this study, students were grouped into three different groups according to their use of strategies and their academic motivation towards learning.

The first group contained 199 students (38.34 %) with a high level of learning strategies and academic motivation, attaining high scores in all variables except perceived self-efficacy in Mathematics and EFL. A second, mid-level group in learning strategies and academic motivation contained 40.46% of the total (210 students); these students obtained mid-level scores in all variables. Finally, the low-level group in learning strategies and academic motivation included 110 students (21.19 %) with low scores in all variables except perceived self-efficacy in Mathematics and EFL, where they attained the highest scores.

Using the groups defined by the k-means cluster analysis, we conducted the differential analysis of academic achievement through estimating Kruskal-Wallis's H for independent samples. The results, shown in Table 2, indicate significant differences between the high, medium, and low groups in learning strategies and academic achievement, for all areas: Language Arts, Mathematics, EFL and general academic achievement.

Table 1*Spearman's Rho correlations between measures*

	Academic achievement in Language Arts	Academic achievement in Mathematics	Academic achievement in EFL	General academic achievement
Attitude toward study/support strategies	.126**	.120**	.166**	.156**
Attitude toward study/complementary strategies	.320**	.319**	.304**	.351**
Academic self-concept/support strategies	.105*	.053	.123**	.105*
Academic self-concept/complementary strategies	.209**	.174**	.237**	.234**
Support strategies	.135**	.100*	.161**	.148**
Complementary strategies	.305**	.288**	.311**	.338**
Attitude toward study	.277**	.273**	.285**	.312**
Academic self-concept	.192**	.141**	.209**	.203**
Total strategies	.252**	.266**	.267**	.279**
Perceived self-efficacy in Language Arts	.025	.014	.033	.024
Perceived self-efficacy in Mathematics	-.022	-.040	-.006	-.026
Perceived self-efficacy in English as a Foreign Language	-.005	-.070	-.050	-.048

*p < .05; **p < .01

Table 2*Kruskal-Wallis H test for academic performance according to the learning strategies and academic motivation groups*

Variable	Mean Rank			χ^2	p	η_p^2
	Group 1 (n = 199)	Group 2 (n = 210)	Group 3 (n = 110)			
Academic achievement in Language Arts	295.92	251.16	211.89	24.17	<.001	.042
Academic achievement in Mathematics	295.45	248.96	216.95	21.89	<.001	.038
Academic achievement in EFL	296.00	250.45	213.11	23.69	<.001	.046
General academic achievement	301.19	248.40	207.63	29.79	<.001	.052

The Mann-Whitney U was estimated, in order to learn which pairings of groups (low-medium-high levels of learning strategies and academic motivation) revealed significant differences in academic achievement when applying the Bonferroni correction. A Bonferroni correction controls the probability of committing Type I errors, where statistically significant differences are found even though there are none. This type of correction uses a significance level equal to .05 divided by the number of comparisons made in the study; in this study, since there were three groups of learning strategies and academic motivation, comparisons were made two by two, taking a new significance level of .016 as our reference. The data in Table 3 report the results obtained after completing all the calculations. Here we can observe that, after applying the Bonferroni correction, there were significant differences between students in the high level group and in the medium and low level groups in Language Arts; in Mathematics there were differences between students in the high and low level groups; and in EFL the differences appeared between students in the high group and those in the medium and low groups, respectively. Finally, in general academic achievement, significant differences were observed between the high level group and the medium and low level groups in learning strategies and academic motivation.

Table 3

Mann-Whitney U test to compare academic achievement according to the learning strategies and academic motivation groups

Academic achievement	Group	M	SD	Group	M	SD	U	p	d
Language Arts	High	7.49	1.36	Medium	7.04	1.585	17269.000	.009	.305
				Low	6.66	1.482	7423.000	<.001	.583
	Medium	7.04	1.585	Low	6.66	1.482	9779.500	.069	.247
Mathematics	High	7.31	1.519	Medium	6.87	1.754	17184.000	.032	.268
				Low	6.41	1.792	7602.000	<.001	.542
EFL	High	7.46	1.574	Medium	6.96	1.728	17217.000	.009	.302
				Low	6.49	1.644	7459.500	<.001	.603
	Medium	6.96	1.728	Low	6.49	1.644	9877.500	.035	.278
General	High	7.42	1.307	Medium	6.95	1.529	16651.500	.005	.326
				Low	6.52	1.438	699.500	<.001	.655
	Medium	6.95	1.529	Low	6.52	1.438	9742.500	.021	.294

Regression analyses

Finally, we conducted four multiple linear regression analyses (stepwise method), where the criterion variables were academic achievement in Language Arts, Mathematics, EFL, and general academic achievement, respectively. In each of the analyses, all the variables linked to learning strategies and academic motivation were introduced as predictors, except the three measures of perceived self-efficacy for the three class subjects addressed. In no case did perceived self-efficacy by subject correlate significantly with academic achievement in that subject. The results, presented in Table 4 and including only significant predictors, showed that complementary strategies and academic self-concept were variables predictive of academic achievement in Language Arts, explaining 9.9% ($R^2 = .099$) of the total variance, and of overall academic achievement, explaining 13.9% ($R^2 = .139$) of the total variance. In the case of academic achievement in Mathematics, the predictive variables were attitude towards study-complementary strategies, academic self-concept-support strategies and academic self-concept-complementary strategies, jointly explaining 12.5% ($R^2 = .125$) of the total variance. Finally, academic achievement in English as a Foreign Language was predicted only by the complementary strategies variable, explaining 10% ($R^2 = .10$) of the total variance. In all the analyses, percentage of explained variance is low, though significant, which may be due to primary students' scarce use of learning strategies. One also observes that in subjects related to language skills, that is, Language Arts and English as a Foreign Language, complementary strategies were the predictors in both cases. However, in the case of Mathematics, motivational variables such as attitude towards study and self-concept stand out as predictors for this subject.

Table 4

Results of the regression analysis with the variables academic performance as criteria and the variables related to learning strategies and academic motivation as predictor variables

	R	R ²	R ² adjusted	F _(df)	p	β	t
Academic achievement in Language Arts							
Model 1	.317	.101	.099	57.88(1,518)	<.001		
Complementary strategies						.31	7.61***
Model 2	.340	.116	.112	33.71(2,518)	<.001		
Complementary strategies						.49	6.72***
Academic self-concept						-.22	-2.94**
Academic achievement in Mathematics							
Model 3	.324	.105	.103	60.51(1,518)	<.001		
Attitude toward study/ complementary strategies						.32	7.78***
Model 4	.347	.120	.117	35.26(2,518)	<.001		
Attitude toward study/ complementary strategies						.39	8.29***
Academic self-concept/support strategies						-.14	-3.01**
Model 5	.360	.130	.125	25.59(3,518)	<.001		
Attitude toward study/ complementary strategies						.36	7.19***
Academic self-concept/support strategies						-.17	-3.57***
Academic self-concept/ complementary strategies						.11	2.37*
Academic achievement in EFL							
Model 6	.320	.102	.100	58.85(1,518)	<.001		
Complementary strategies						.32	7.67***
General academic achievement							
Model 7	.350	.122	.121	71.99(1,518)	<.001		
Complementary strategies						.35	8.48***
Model 8	.378	.143	.139	42.97(2,518)	<.001		
Complementary strategies						.56	7.70***
Academic self-concept						-.25	-3.52***

*p < .05; **p < .01; ***p < .001

DISCUSSION AND CONCLUSIONS

Continuing in the line of study initiated in the 1990s by researchers interested in demonstrating the relevance of a numerous, diverse set of variables in learning --including cognitive, metacognitive and affective-motivational strategies-- the present study seeks to reinforce these previous studies. Toward this end, the general objective of this study was to analyze the association between learning strategies, academic motivation and achievement in a convenience sample made up of students in upper primary school (5th and 6th grades), since this period represents a turning point and a transition between two stages of education, leading into significant changes in terms of student autonomy, and the demands and complexity of their studies.

In view of these results, there is a tendency that greater use of learning strategies, along with optimal motivation towards schoolwork, imply higher academic achievement in general. This has also been confirmed in previous studies that explain the direct relationship between students' study habits and their overall academic achievement, and that explain the academic difficulties that stem from a lack or misuse of learning strategies, thereby hindering the development of deep, meaningful learning and of putting what has been learned to use. The information presented in this paper supports ideas about the effectiveness of training in learning strategies. Along with other variables such as previous knowledge, academic goals, beliefs, expectations, self-concept, effort, engagement, and demands of the tasks assigned, use of learning strategies is a determining factor in the achievement of satisfactory academic outcomes (Alvarado et al., 2014; Martín-Antón et al., 2012).

Findings from this study that indicate direct relations between attitude toward study and self-concept reinforce results from prior studies that explain the positive effects of these motivational variables on emotional control, and on information-seeking and effective problem-solving in the learning process (González-Cabanach et al., 2017; Panadero & Alonso-Tapia, 2014). Essential among these attitudes towards learning, intrinsic motivation, initiative, perseverance and effort all significantly improve students' academic achievement at all stages of education, when students are able to adequately implement self-regulatory strategies in their learning (Cueli et al., 2013; Ellis et al., 2014; Suárez et al., 2016). In this study there were students with different levels of learning strategies and academic motivation, as evidenced by the cluster analysis where we were able to differentiate three types of students. The first group was characterized by a high level of learning strategies and academic motivation, the second group by medium levels, and the third group by a low level of learning strategies and academic motivation. In view of the obtained results, there were notable differences between the high-level group and the medium- and low-level groups in academic achievement in Language Arts, EFL, and general

academic achievement; significant differences in the subject of Mathematics were also found between students with a high level of learning strategies and academic motivation and those with a low level. All these results stand in agreement with other previous results claiming that students with negative achievement outcomes show little knowledge of learning strategies (Barreto-Trujillo & Álvarez-Bermúdez, 2020; Barrios & Frías, 2016; Rodríguez et al., 2017), deficient affective-motivational conditions, and unorganized previous knowledge, and are unable to properly manage their time and the effort applied to tasks (Fernández et al., 2013; Panadero & Alonso-Tapia, 2014).

This study has confirmed that complementary learning strategies such as group work or extracurricular activities, as well as academic self-concept, are predictive of achievement in the subjects considered, as well as of academic achievement in general. These results follow the line of other researchers, where evidence shows that students with greater use of learning strategies, including the cognitive, metacognitive and motivational, obtain higher academic achievement (Cueli et al., 2013; Rodríguez et al., 2017; Stoeger et al., 2015). This reinforces previous studies where higher-achieving students are considered to have greater self-regulation strategies, applying reflection before, during and at the end of learning (Yan, 2020). All this comes as a consequence of the cognitive and metacognitive training they have gained by constantly taking actions to plan and monitor, while simultaneously controlling motivation and affect. This allows them to become self-regulated, autonomous, strategic learners who supervise their own learning process, thus ensuring optimal learning (De la Fuente et al., 2018; García et al., 2016; Mejía-Rodríguez et al., 2018; Valle et al., 2010). Regardless of the learning context, these students become experts when they are able to activate cognitions and behaviors to control comprehension, attention, and review, ultimately reaching the goals they have set (Ellis et al., 2014; Suárez et al., 2016). The result of this whole process can be seen in the attitudes of motivation, initiative, effort and perseverance that reveal how learning, motivation and achievement are directly related to attitudes towards schoolwork and study (Álvarez-Bermúdez & Barreto-Trujillo, 2020; Panadero & Alonso-Tapia, 2014; Rivera, 2017).

Limitations of this study include those typical of cross-sectional studies: Carried out at a specific moment in time, the study does not allow for comparison of the same students' outcomes over time. Furthermore, since the study addresses a specific stage and level of education, results cannot be extrapolated or generalized to the entire student population. Longitudinal studies along these same lines, which allow the generalization of these exploratory results to the student population of all educational stages, would be of benefit. Another limitation is the use of a self-report instrument for data collection; this can lead to bias in the results --which are marked by a certain subjectivity-- although one must emphasize the characteristic frankness

of students at these early ages. Regarding the instrument used, another limitation is its answer range of three options, unusual in the assessment of self-regulated learning, though we must note that this instrument was chosen for this investigation owing to the scarcity of instruments for measuring self-regulated learning, especially in primary education. One of the long-time challenges for researchers has been precisely that of constructing instruments to assess self-regulated learning (Rósario et al., 2014; Sáez-Delgado et al., 2021). As for measuring perceived self-efficacy, a very important motivational variable in explaining academic achievement, a very simplistic, one-item measure was used, which may suggest a limitation when we consider the lack of significance found when correlating these self-efficacy items with students' grades in the same subjects. Additionally, another limitation is the use of school grades in certain subjects as the only variable to measure academic achievement; the competency approach should be taken into account, documenting its direct relationship with learning, since competency assessment is currently proposed as a short-term goal (Muntaner et al., 2020). It is important to recognize that greater competency development is a cognitive consequence of a student's intrinsic motivation, and is fundamental for acquisition of the learning to learn competency, in increasingly competitive, globalized contexts (Godás-Otero et al., 2015). Finally, another study limitation to be added is the non-normality of most variables, which recommended the use of nonparametric tests.

In light of the foregoing analysis, the conclusions of this study center around the priority that should be given to learning strategies and academic motivation in the educational context, as a means and an end in themselves, for attaining meaningful, practical and functional learning with increased academic achievement, going beyond quantitative ratings to address competencies. In this way, gaps in the teaching-learning process can be bridged, where even today the process is still focused on outcomes, with less attention on the continuous progress that takes place from the moment a student begins their journey through the educational system.

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