Learning Strategies Assessment Scale for High School (EAVAP-EM)

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Abstract
This study aimed to estimate validity evidence based on the internal structure and accuracy of the adapted version of the Learning Strategies Assessment Scale for High School (EAVAP-EM), using Confirmatory Factor Analysis (CFA). Participants were 701 first- to third-year high school students (M = 16.1; SD = 1.0), from public and private institutions in the states of Paraná and São Paulo. The CFA indicated the presence of the three factors of the EAVAP-EM, with adequate internal consistency. The instrument also showed good fit indices. There were positive and significant correlations between the factors, with magnitude ranging from medium to large. Moreover, students reported making more use of metacognitive strategies. The results evinced significant advances regarding measures with good psychometric parameters to assess learning strategies, considering their relevance to the psychoeducational context.
Keywords: learning; basic education; validity evidence; psychometrics

Escala de Avaliação das Estratégias de Aprendizagem para o Ensino Médio (EAVAP-EM)

Resumo
Objetivou-se no presente estudo estimar indicadores de validade com base na estrutura interna e precisão da versão adaptada da Escala de Avaliação das Estratégias de Aprendizagem para o Ensino Médio (EAVAP-EM), por meio de uma análise fatorial confirmatória (AFC). Participaram 701 alunos do primeiro ao terceiro ano do Ensino Médio (M = 16,1; DP = 1,0), provenientes de instituições públicas e particulares dos estados do Paraná e de São Paulo. A AFC indicou a presença dos três fatores da EAVAP-EM, com consistência interna considerada adequada, sendo que o instrumento apresentou bons índices de ajuste. Houve correlações positivas e significativas entre os fatores, com magnitude variando de média a grande. Ainda, os estudantes reportaram fazer mais uso de estratégias metacognitivas. Os resultados evidenciam importantes avanços no que concerne a medidas com bons indicadores psicométricos para avaliação das estratégias de aprendizagem, considerando sua relevância ao contexto psicoeducacional.
Palavras-chave: aprendizagem; educação básica; evidências de validade; psicometria

Escala de evaluación de estrategias de aprendizaje para el bachillerato (EAVAP-EM)

Resumen
El objetivo del presente estudio fue estimar evidencias de validez a partir de la estructura interna y la precisión de la versión adaptada de la Escala de Evaluación de Estrategias de Aprendizaje para la Escuela Preparatoria (EAVAP-EM), mediante un Análisis Factorial Confirmatorio (AFC). Participaron 701 estudiantes de primero a tercer año de secundaria (M = 16.1; DS = 1.0), de instituciones públicas y privadas de las provincias de Paraná y São Paulo. El AFC indicó la presencia de los tres factores del EAVAP-EM, con consistencia interna considerada adecuada. El instrumento mostró índices de ajuste adecuados. Hubo correlaciones positivas y significativas entre los factores, cuya magnitud varió de moderada a alta. Además, los estudiantes informaron que hacen un mayor uso de las estrategias metacognitivas. Los resultados evidencian avances importantes en cuanto a medidas con buenos indicadores psicométricos para evaluar estrategias de aprendizaje, considerando su relevancia para el contexto psicoeducativo.
Palabras clave:aprendizaje; bachillerato; evidencias de validez; psicometría

Brazilian psycho-educational studies seek to understand the different theoretical and practical aspects that guide education in the country. They employ constructs that, under different methodological conceptions, allow for a better understanding of the learning processes inherent to Basic Education, Higher Education, and Graduate Studies in the country (Galvão, 2019).

This study focuses on the learning strategies employed by high school students, using as references the Strategic Learning model (Weinstein et al., 2011) and the Self-Regulated Learning models (Pintrich, 2004; Zimmerman, 2013). More precisely, we will seek to investigate the psychometric properties of an instrument aimed at assessing learning strategies in high

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school (AERA et al., 2014; Carvalho & Ambiel, 2017) so that these strategies can be identified and mapped to enhance actions more tuned with each student's way of learning. Furthermore, as highlighted by several studies, the use of appropriate learning strategies improves school and academic performance and promotes student self-regulation (Boruchovitch, 1999; McCombs, 2017; Oliveira, 2010; Oliveira et al., 2016; Weinstein, & Acee, 2018).

High School in Brazil: Brief Considerations

The educational system in Brazil faces several problems related to the mismanagement that has lasted over the centuries and that still today has repercussions on its proposition. Despite the different governmental systems and political and administrative reforms, there was a significant delay in establishing laws that broadly governed education in the country (Galvão, 2019). This delay is notable, markedly, when it comes to high school, because regardless of the differentiation of the education cycles, there were no specific laws in the regulation of each one, bringing relevant reflections in its organization that can be noticed even today (Ramalho et al., 2018).

In summary, after more than 20 years under a military dictatorship, in which technical education was in force, the re-democratization of Brazil occurred in 1985, mainly due to the movement known as "*Diretas Já*" (Direct [elections] Now), and subsequently, a new Federal Constitution was consolidated and enacted in 1988 (Brasil, 1988). Despite these changes, the country's educational system was still ruled by Law nº 5.692/1971. The new National Education Guidelines and Framework Kaw (*Lei de Diretrizes e Bases da Educação* - LDBEN) was only enacted on December 20th, 1996.

As the new LDBEN (1996) came into force, several changes were introduced in Brazilian education, prioritizing the full training of students, preparing them for the exercise of citizenship, and improving their qualification for the job market. The school cycle was divided into Basic Education, which now includes the stages of kindergarten, elementary (8 years) and high school (3 years), and Higher Education. Elementary education became mandatory from 7 to 14 years old and for high school, a progressive and compulsory extension was foreseen.

High school became compulsory in 2009 under Constitutional Amendment no. 59 and was expanded with Law no. 12796 of April 2013, changing LDBEN no. 9,394/1996. As of Amendment no. 59, compulsory and free basic education was expanded, from 4 to 17 years of age, still being divided into kindergarten (0-5 years), elementary education (6-14 years), and high school (15 to 17 years). More recently, government changes to restructure secondary education (high school) gained national repercussion with the implementation of the National Common Curriculum Base (*Base Nacional Comum Curricular*, BNCC) in 2018. The guiding document consolidates norms and guidelines regarding the essential learning that students should attain throughout the stages of education (Brasil, 2018).

The aim of this study was not to judge the proposals presented here, since the curricular organization of high school is not the focus. However, it is important to highlight that, regardless of the teaching model offered, the teacher's actions should be aligned with the expectations, motivations, and learning processes of the students themselves, which, as mentioned, affect school performance and the development of more critical, reflective, and autonomous individuals to act in society (Boruchovitch, 1999; Cunha, 2017; Ramalho et al., 2018).

Therefore, as highlighted by Cunha (2017) and Ramalho et al. (2018), high school in Brazil faces historical problems of access and permanence that reverberate on issues that go beyond the educational field, being also marked by political, cultural, and social problems in the country. This context provides researchers with the challenge of carrying out studies with both a deeper look at this level of schooling and which consider the teaching and learning processes inherent to this period. In this sense, learning strategies are a key variable to strengthen students' ability to learn (Boruchovitch, 1999; McCombs, 2017; Oliveira et al., 2016; Weinstein, & Acee, 2018).

Learning Strategies: Defining the Construct

Learning strategies consist of methods and procedures that students use to acquire information and enhance their learning processes (Weinstein et al., 2011). Their use contributes for students to learn how to keep themselves active and aware whenever they have to deal with the processes involved in the acquisition of new knowledge, i.e., in learning how to learn (Boruchovitch, 1999; Dembo, 1994; McCombs, 2017; Weinstein & Acee, 2018). There are different theoretical categorizations that encompass learning strategies, and this study is guided by the conception that such strategies can be classified into two groups, cognitive strategies and metacognitive strategies

(Dembo, 1994; Boruchovitch & Santos, 2006; Weinstein & Acee, 2018).

Overall, the use of learning strategies has the effect of increasing the chances of successful learning (Weinstein et al., 2011). However, they have important specificities to be considered. Cognitive strategies consist of processes by which one aims to store information without necessarily monitoring the courses of action used for a given purpose. These are specific activities, categorically subdivided into rehearsal strategies (repeating, copying, underlining), elaboration strategies (summarizing, creating analogies, answering questions), and organization strategies (selecting ideas, making diagrams and maps) (Boruchovitch, 1999; Dembo, 1994; Garner & Alexander, 1989; McCombs, 2017; Weistein & Acee, 2018).

Metacognitive strategies, in turn, present a higher degree of complexity and refer to procedures that individuals use to plan, monitor, and regulate their thinking. This process helps students activate the acquired knowledge and make it ready for use, which facilitates the organization and understanding of the material. Thus, they encompass monitoring comprehension, regulating time and study environment, effort management, peer cooperation, and help-seeking, among other possibilities (Boruchovitch, 1999; Dembo, 1994; Garner & Alexander, 1989; McCombs, 2017; Weistein & Acee, 2018).

Learning strategies are part of the psychoeducational research agenda in Brazil. However, there is a higher prevalence of studies focused on elementary school (Boruchovitch et al, 2006; Fluminhan & Murgo, 2019; Oliveira et al., 2020; Suehiro et al., 2018; Trassi et al., 2019) and higher education (Boruchovitch et al., 2020; Endo et al., 2017; Oliveira et al., 2019). Therefore, research aimed at examining the learning strategies of high school students is still incipient in the country.

Oliveira (2010) analyzed motivation to learn and learning strategies in 347 students from three years of high school in the state of Bahia. The instruments used were a motivation to learn scale and the Elementary School Learning Strategies Assessment Scale - EAVAP-EF (Oliveira et al., 2010). The results indicated that the Learning Goal is positively related to the absence of dysfunctional metacognitive strategies, cognitive strategies, and metacognitive strategies.

Santos and Alliprandini (2018) examined the effects of an intervention on cognitive learning strategies in the curricular infusion modality. The proposal was applied to 26 students, aged 16 to 19 years old, from the Paranaense High School, with the use of the EAVAP-EF. The intervention was conducted for 18 weeks and was found to have positive effects on the use of cognitive strategies by students. In this study, in which the EAVAP-EF was used for the target audience of high school students, the authors analyzed the internal consistency of the instrument, which showed that the Cronbach's alpha coefficient was good for the factors cognitive strategy (α = .79) and absence of dysfunctional metacognitive strategies (α = .78), and acceptable for the factor metacognitive strategies (α = .60), according to Prieto and Muñiz (2000).

Pereira et al. (2020) sought to investigate the psychometric properties of the Learning Strategies Assessment Scale for students in Vocational Education (EAVAP-EP). This scale was adapted from the context of elementary school to vocational-technical education using a focal study with teachers and students and, subsequently, applied to 401 students from different courses in a vocational school in the countryside of the state of São Paulo. The 28 items presented were arranged in three dimensions, namely, cognitive, metacognitive, and dysfunctional metacognitive, with factor loadings above .30. The reliability of the total scale was α = .86.

The scarcity of studies focusing on high school reaffirms the issues highlighted by Cunha (2017) and Ramalho et al. (2018) regarding identity problems arising from a late and unfinished democratization process that hinders propositional and affirmative actions for this age group. Supported by the conjectured theoretical conceptions, this study sought to examine the internal structure validity evidence and reliability of the adapted version of the Learning Strategies Assessment Scale for High School students (EAVAP-EM), using Confirmatory Factor Analysis (CFA) and by verification of its internal consistency.

The choice for the CFA was due to the fact that, theoretically, the instrument had its dimensions identified by the Exploratory Factor Analysis (EFA) performed by Scacchetti et al. (2015). These dimensions were also consistent with the version of the elementary school scale (Boruchovitch & Santos, 2004; Oliveira et al., 2010). Thus, the confirmatory analysis seeks to compare the fit of the model, identifying its plausibility (Hauck Filho, 2019). The second objective of this study was to estimate correlations between the factors of the scale. Finally, the present study also investigates the learning strategies employed by students of the sample.

Considering the existing educational problems in high school, as described previously, it is believed that a measurement instrument that assesses learning strategies according to its target audience, especially with appropriate psychometric parameters, will provide an opportunity to map these strategies and improve them in the school environment. It will also contribute to the planning of more effective actions focused on improving student learning at this stage of schooling since the effective use of learning strategies is a factor closely associated with school achievement.

Method

Participants

The sample was selected by convenience, consisting of 701 students enrolled in the 1st (28.6%; *n* = 112), 2nd (33.8%, *n* = 132) and 3rd (37.6%, *n* = 147) years of high school in public (62.9%, *n* = 441) and private (37.1%, *n* = 260) institutions in the states of Paraná (90.3%, *n* = 633) and São Paulo (9.7%, *n* = 68). The mean age was 16 years and 1 month (*SD* = 1.0), with an age range of 14-19 years. Girls represented 53.9% (*n* = 378) of the sample and boys, 46.1% (*n* = 323).

Instruments

Learning Strategies Assessment Scale for High School (*Escala de Avaliação das Estratégias de Aprendizagem no Ensino Médio* - **EAVAP-EM**): Adapted by Scacchetti and Oliveira (2012) for vocational-technical education, and later published by Schacchetti et al. (2015), the scale had its initial version proposed for elementary education, developed by Boruchovitch and Santos (2004) and validated by Oliveira et al. (2010). The adapted version has 12 modified items (items 2, 3, 4, 8, 12, 18, 19, 23, 24, 25, 26 e 28) to cover a more specific vocabulary for students in more advanced school levels, due to the childish connotation found in questions of the instrument in its first proposal. After the adaption of the instrument, the adapted items were submitted to an evaluation of three judges (PhDs and masters experts) to assess the loss of childish connotation of these items. The result indicated an 80% agreement among the judges, thus all the adapted items were maintained. As an example of adapted items, we can cite: (original: Do you usually study or do your homework at the "last minute"? adapted: Do you usually study or do schoolwork at the last minute?). It is noteworthy that the adjustments made in the instrument for vocational-technical education were similar to the age and grade range of regular high school, therefore no further adaptations were considered necessary.

The instrument aims to identify cognitive and metacognitive strategies, as well as the absence of dysfunctional metacognitive strategies used by students. Consisting of 31 questions, the items are presented on a three-point Likert scale, in which the options assigned are always (2 points), sometimes (1 point), and never (0 points). The scale's total score can range from 0 and 62 points, in cognitive strategies from 0 to 22 points, in metacognitive strategies from 0 to 14 points, and in the absence of dysfunctional metacognitive strategies from 0 to 26 points. The adapted version (Schacchetti et al., 2015) showed an internal consistency of $\alpha = .74$ for the total scale, $\alpha = .77$ for the factor Absence of Dysfunctional Metacognitive Learning Strategies, and $\alpha = .73$ for Cognitive Strategies, values which can be considered acceptable. However, there was an exception regarding the Metacognitive Strategies factor ($\alpha = .57$), given that the minimum acceptable value would be $\alpha = .60$ (Prieto & Muñiz, 2000).

Procedures

Ethical procedures were followed and are in accordance with Resolution 466/2012 of the National Health Council and with Resolution 510/2016 and its complements. The project was submitted and approved by the Research Ethics Committee for research with human beings under approval no. 1.748.266.

The adolescents signed the Informed Consent Form and the parents of those under 18 years old signed the Free and Informed Consent Form. The application of the scale occurred collectively at the school institutions, in a meeting lasting approximately 30 minutes. The students were assured of the confidentiality of all information, that their participation was voluntary, and that withdrawal would be accepted at any time during the research.

Data analysis

The theoretical three-factor structured model was tested in this study using the Weighted Least Square Mean and Variance Adjusted (WLSMV) estimator, which employs polychoric correlations. The rotation was oblique (Geomin). Fit indices were analyzed from the Root Mean Square Error of Approximation (RMSEA < .08), the chi-square ratio for degrees of freedom ($\chi^2/df < 3$), Confirmatory Fit Index (CFI > .90), and Tucker-Lewis Index (TLI > .90) (Hu, & Bentler, 1999). The reliability of the scale was verified

using the McDonald omega coefficient - ω total > .70, considered adequate (Dunn et al., 2014).

Descriptive analyses were performed to characterize the sample and to estimate the means and standard deviations obtained by the students in the instrument. As the number of items in each of the three factors was not equal, the performance comparison was based on the weighted average, which divides the average of points by the total number of items in each factor. Pearson's r correlations between the factors were also examined, considering the magnitude indices proposed by Cohen (1988) as a parameter for interpreting the magnitude. The analyses were developed using MPlus 7 (Muthén & Muthén, 2011) and Jamovi 0.9 (The Jamovi Project, 2019).

Results

In order to estimate validity evidence based on the internal structure and the reliability of the Learning Strategies Assessment Scale for High School (EAVAP-EM), Confirmatory Factor Analysis (CFA) was carried out. The tested model indicated the fit indices provided in Table 1. Next, Table 2 refers to the distribution of items per factor with their respective factor loadings and the internal consistency parameters evaluated using McDonald's Omega.

Based on Table 1, the fit indices were considered adequate. Only $\chi 2/df < 3$ showed a value slightly higher than expected. Table 2, in turn, shows that all factors of the instrument were maintained, including the same number and arrangement of items from the originally proposed scale for elementary school (7 for metacognitive strategies, 11 for cognitive strategies, and 13 for the absence of dysfunctional metacognitive strategies). The factor loadings of the items ranged from .523 (item 19) to .866 (item 28). The internal consistency of the factors was considered adequate, except for metacognitive strategies, in which McDonald's Omega was lower than .70. Furthermore, the internal consistency of the total scale was also calculated, and the value obtained was adequate (ω = .70). Next, Table 3 shows the correlation between the factors of the instrument.

Table 3 shows the existence of positive and significant correlations among the EAVAP-EM factors, with magnitudes ranging from medium to large, according to Cohen (1988). Next, Table 4 presents the scores of the students in the sample in the Learning Strategies Assessment Scale.

Table 4 shows that students in the sample reported making more frequent use of metacognitive learning strategies, followed by the absence of dysfunctional metacognitive strategies. In contrast, the lowest scores were in relation to cognitive strategies. It is worth noting that the participants were slightly above average when considering the total possible points.

Discussion

The main objective of this study was to estimate validity evidence based on the internal structure and the reliability of the adapted version of the Learning Strategies Assessment Scale for High School (EAVAP-EM) by means of Confirmatory Factor Analysis (CFA) and verification of its internal consistency. The instrument had already been investigated for evidence of internal structure validity using EFA, by authors Schacchetti et al. (2015), based on three factors, namely, cognitive strategies, metacognitive strategies, and absence of dysfunctional metacognitive strategies.

In this research, the CFA indicated that the fit indices were considered adequate concerning the Root Mean Square Error of Approximation (RMSEA < .08), in which the result was .06; Confirmatory Fit Index (CFI > .90) with .96, and Tucker-Lewis Index (TLI > .90) with .95. The chi-square for degrees of freedom ($\chi^2/df < 3$) showed a result slightly above the indicated $\chi^2/df = 4.14$ (Hu & Bentler, 1999). Furthermore, the CFA attested to the adequacy of the theoretical model, in which all three factors of the EAVAP-EM were maintained, with item factor loadings above .30.

The accuracy of the model was confirmed using the internal consistency measured by McDonald's Omega, where the minimum expected value would

Table 1.
Fit Indices of EAVAP-EM

RMSEA < .08	χ^2/df < 3	CFI > .90	TLI > .90
.06	4.14	.96	.95

Table 2.
Distribution of Items by Factor and their Respective Factor Loadings and Internal Consistency

Items	Description	Standardized Factor Loadings			C.
		1	2	3	
1	Do you usually underline the important parts of the text in order to learn better?		.798		.637
2	When you are writing a text, do you usually make a list of ideas before you start writing?		.748		.559
3	Do you usually study or do your homework at the last minute?			.702	.493
4	When you are attending a class, do you usually take your own notes?		.799		.638
5	Do you usually read other texts and books about the subject the teacher explained in class?		.782		.612
6	When you study, do you often notice that you don't understand what you are studying?	.725			.525
7	Do you usually give up when an assignment is difficult or boring?			.664	.441
8	Are you often distracted during the explanation in class?			.785	.616
9	Do you usually make an outline using the main ideas of the text?		.742		.551
10	When you finish studying for a test, do you usually ask yourself questions to check if you have understood what you have studied?		.739		.545
11	When you read a text, do you try to write in your own words what you understood from the reading, so that you can study later?		.727		.529
12	Do you feel tired when you study, or when you do a school assignment?			.707	.499
13	Do you realize when you have difficulty in learning certain subjects?	.817			.667
14	When you study, do you read the subject and then close your notebook and say out loud everything you understood?		.703		.494
15	Do you usually think about something else when the teacher is explaining?			.824	.680
16	When you learn something new, do you usually try to relate what you are learning to something you already knew?		.680		.463
17	Do you summarize the texts that the teacher asks you to study?		.686		.470
18	When you receive a test, do you usually check what you got wrong?	.701			.492
19	Do you listen to music while studying or doing school work?			.523	.273
20	Do you create questions and answers about the subject you are studying?		.748		.559
21	When you are doing a difficult assignment, do you often get very nervous?			.634	.402
22	When you study, do you find that you are not succeeding in learning?	.736			.542

(Continued)

Table 2.
Distribution of Items by Factor and their Respective Factor Loadings and Internal Consistency (Continuation)

Items	Description	Standardized Factor Loadings			C.
23	After you sit down to do your homework, do you keep getting up every time to get some material?			.705	.497
24	Do you usually eat while you study or do your homework?			.704	.496
25	Do you usually forget to do the school tasks that are asked of you?			.851	.724
26	Are you often distracted or thinking about something else when you are reading or doing homework?			.811	.657
27	When you realize that you do not understand what you read, do you usually stop and read it again?	.799			.638
28	Do you often forget to do your homework?			.866	.749
29	Do you realize when you don't understand what you are reading?	.731			.534
30	Do you usually study or do your homework while watching TV?			.751	.563
31	Do you usually ask your classmate or someone at home for help when you don't understand a subject?	.662			.439
McDonald's Omega		.60	.77	.80	

Note. 1 = Metacognitive; 2 = Cognitive strategies; 3 = Absence of Dysfunctional Metacognitive Strategies; C. = Communality of items.

Table 3.
Correlation between EAVAP-EM Factors

	Factors	Correlation between factors			
		F1	F2	F3	F4
F1	E. Metacognitive	-	.312**	.315**	.494**
F2	E. Cognitive		-	.540**	.592**
F3	Absence of Meta. Dysfunctional s.			-	.611**
F4	Total scale				-

Note. * $p < .05$; ** $p < .01$

Table 4.
Students' Scores at EAVAP-EM

Factors	Minimum and maximum achieved	Means	Weighted mean	Standard-deviation
Metacognitive s.	0 – 14	10.4	1.48	2.07
Cognitive s.	0 – 22	10.2	.92	4.38
Absence of Meta. Dysfunctional s.	0 – 26	13.1	1.00	4.40
Total Scale	0 – 62	33.6	1.08	6.30

be .70. The total scale and the factors of cognitive strategies and absence of dysfunctional metacognitive strategies showed satisfactory internal consistency, but the factor of metacognitive strategies was below the expected (ω = .60). Such results can be interpreted as the adequacy of the factors in measuring the respective psychological variables with a low level of error associated with the measurement (Urbina, 2014). It is noteworthy that in the aforementioned studies, internal consistency was assessed using Cronbach's Alpha, in which the minimum expected value would be .60 (Prieto & Muñiz, 2000). Even in the research by Scacchetti et al. (2015), the metacognitive strategies factor showed a value slightly below the threshold (α = .57).

A closer examination of this factor in the present sample reveals that the factor loadings of the items related to metacognitive strategies can be considered rather satisfactory, ranging from .66 to .81, as well as the communalities, defined as the proportion of the variability of each variable explained by the factors, which ranged between .43 and .66. However, the internal consistency of each of the items of this factor, measured in the present study by the McDonald Omega, was low, ranging from ω = .46 to ω = .56.

As the lowest value of internal consistency in this factor also occurred in a previous study (Scacchetti et al. 2015), the congruence of the findings would suggest that this fact may be due to the complexity of metacognition and/or problems with the writing of the items. However, reexamination of the 7 items related to the factor indicates that they are clearly and cohesively written. They contain only one idea, with short statements, and are intelligible to the age group of the sample. Therefore, it suggests that the lower value of alpha and Omega obtained in the present sample and the research by Scacchetti et al. (2015) may be related to specific characteristics of the samples of both studies, in which most participants are from the state of Paraná.

Given the relevance of both metacognitive strategies for deep quality learning and the learning strategies construct, we recommend that this subscale and the scale as a whole be revisited in future studies, using larger and more representative samples. Furthermore, future investigations should include participants from different sociocultural levels and different regions of Brazil so that more knowledge on the reliability of the scale and each of its factors can be gathered.

Regarding the second objective - to estimate the correlations between the EAVAP-EM factors - the existence of positive and significant correlations was evidenced. The metacognitive strategies factor was correlated with the cognitive strategies factor and with the absence of dysfunctional metacognitive strategies, showing a medium magnitude (Cohen, 1988). The cognitive strategies factor was positively and significantly correlated with the absence of dysfunctional metacognitive strategies, with a large magnitude. These results reveal that strategies, in general, are mutually present in students´ repertoire at different levels (McCombs, 2017; Saraçoğlu, 2020; Weinstein et al., 2011).

The second result, in turn, indicates an even greater relationship between the absence of strategies detrimental to learning (such as doing other activities while studying, for example) and the use of strategies aimed at storing information, such as underlining, summarizing, mapping, among others (Boruchovitch, 1999; Dembo, 1994; McCombs, 2017; Weinstein & Acee, 2018). Overall, the correlations confirmed the interdependence in the use and functionality of different types of strategies. They showed that a cognitive-type strategy, such as taking notes, can be used for the purpose of maintaining attention, which would therefore be metacognitive in nature (McCombs, 2017; Weinstein et al, 2011).

Concerning the last objective, which was to investigate the use of learning strategies in the sample, it was found that students reported making more use of metacognitive strategies, followed by the absence of dysfunctional metacognitive strategies, and cognitive strategies, respectively. This result can be considered satisfactory, since, despite the difficulties encountered in high school and now evidenced in this study (Cunha, 2017; Ramalho et al., 2018), students in this sample still seemed to be able to reflect on their learning processes and, therefore, reported making use of more complex strategies, which involves monitoring and regulating their thinking (Dembo, 1994; Weinstein et al., 2011).

It should be mentioned that students also reported not using dysfunctional metacognitive strategies when studying. This fact is particularly relevant when analyzing the issues inherent to human development that correspond to the high school age group. It is common for young people to perform several activities simultaneously while studying (Piletti et al., 2017). Thus, it can be assumed that because students are more metacognitively oriented, i.e., they probably understand their learning processes more deeply (McCombs, 2017; Weistein & Acee, 2018), they realize when something may hinder effective understanding of the content and turn to other, more favorable resources.

The present research achieved its proposed objectives, showing validity evidence based on the internal structure and the reliability of the Learning Strategies Assessment Scale for High School (EAVAP-EM) as well as presenting the correlations and strategies employed by the students in the sample. The use of an instrument that can assess the learning strategies of high school students, with a language suitable for the reality of this age group, and, especially, with adequate psychometric parameters (AERA et al., 2014; Carvalho & Ambiel, 2017), increases the chances that educational institutions and their respective teaching staff will plan actions tailored to their audience of students. This fact provides opportunities not only for the mapping of these strategies but also for their development and improvement in the classroom.

Despite the contributions of the present study, it also has some limitations. In this regard, it is worth pointing out that the sample was represented by students from two regions of Brazil, one of which had only 9.7% students. Further studies should be more comprehensive, including larger and more representative samples, which could not only confirm the present results but also allow for the standardization of the instrument and thus its inclusion in psychological assessment protocols. Additionally, we recommend that the construct be evaluated in association with other relevant variables such as socioeconomic factors, school achievement, motivation to learn, to name a few, so that other validity estimators can also be assessed.

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