Predictive Potential of Motivation to Learn in the use of Learning Strategies

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ABSTRACT – This paper investigates motivation to learn and learning strategies in a sample of 353 Brazilian students in elementary and secondary education. Data were collected through the Motivation to learn scale and two Learning Strategies Assessment Scales, one for elementary school and another for high school. Learning goals and use of metacognitive strategies were predominant in the sample. Significant positive and negative correlations between the subscales were found. Two models emerged explaining 33% and 37% of the variance in the use of learning strategies that can be attributed to motivation to learn factors. The study underscores the importance of motivation to learn for engaging students in strategic behavior.
KEYWORDS: Self-regulation, achievement goals, basic education, cognitive and metacognitive strategies

Potencial Preditivo da Motivação para Aprender no Uso das Estratégias de Aprendizagem

RESUMO – O artigo investigou a motivação para aprender e as estratégias de aprendizagem em uma amostra de 353 estudantes do ensino fundamental e médio brasileiro. Foram utilizadas a Escala de avaliação da motivação para a aprendizagem e uma Escala de Avaliação das Estratégias de Aprendizagem para o Ensino Fundamental e outra para o Ensino Médio. A Meta Aprender e as estratégias metacognitivas foram predominantes na amostra. Foram encontradas correlações positivas e negativas significativas entre as subescalas e emergiram dois modelos que explicaram 33% e 37% da variância no uso de estratégias de aprendizagem que podem ser atribuídos aos fatores da motivação. O estudo reforçou a importância da motivação para aprender no engajamento dos estudantes em comportamentos estratégicos.
PALAVRAS-CHAVE: Autorregulação, metas de realização, ensino básico, estratégias cognitivas e metacognitivas

Self-regulation of learning is the process of self-reflection and action in which students structure, monitor and evaluate their own learning (Zimmerman & Schunk, 2011). Studies such as those by Panadero et al. (2015), Schunk and Zimmerman (2008) and Schunk and Greene (2018) reveal that, in the school environment, students who are more self-regulated learn better and have higher motivation to study and better academic performance.

To be self-regulated is a skill which is acquired throughout life, from individual experiences, from learning from other people and from one's surrounding environment. It is not an innate quality of students. If teachers understood all aspects involving self-regulation of learning, they would be able to promote initiatives aiming to motivate students to self-regulate their learning (Bzuneck, 2009; De Smul et al., 2018; Machado & Boruchovitch, 2021; Schunk & Greene, 2018).

Among the main variables of self-regulated learning, motivation to learn, a multidimensional and complex construct involving all goals outlined by individuals to accomplish a given task, is essential and is the way whereby activities are initiated and maintained (Frison & Boruchovitch, 2020; Schunk & Greene, 2018; Schunk et al., 2014). It is not a stable trait of human behavior, as shown by Bzuneck (2009) and Pansera et al. (2016), since it may undergo change depending on the characteristics of an individual's context.

In the field of education, the Achievement Goal Theory (Ames, 1992; Elliott & Dweck, 1988) aims to explain the motivational orientation of students in the educational context according to three major learning orientations: learning goal orientation, performance-approach and performance-avoidance goal orientations. Learning goal orientation is characterized by a high focus on the learning process, determination to master the content and use of appropriate strategies to achieve the goals. On the other hand, performance-approach goal relates to students who have the need to stand out among their peers, passing themselves off as more intelligent than others, without the main focus being on effective learning. The third kind, performance-avoidance goal, concerns individuals who protect themselves against the devaluation on the part their teachers and classmates. These students are essentially concerned with not seeming incompetent and therefore have less adaptive behaviors (Bzuneck & Boruchovitch, 2016; Senko & Hulleman, 2013; Elliot & Hulleman, 2017).

Research on motivation of primary school students has encompassed learning in different disciplines such as science (Gois & Catanho, 2020; Shin et al., 2019; Srisawasdi & Panjaburee, 2019), biology (Souza & Prestes, 2015), chemistry (Severo & Kasseboehmer, 2017; Vogelzang et al., 2019) and mathematics (Guo & Leung, 2021). Still, they reveal, as in the study by Wirthwein et al. (2020) with 1635 high school students, gender-related differences in student motivation in certain subjects (mathematics, German, English, physics, history, chemistry). These investigations attested the importance of carrying out workshops, linking teaching to ludic activities, and developing creative practices, among other teaching methods that can be considered more attractive and motivating for student learning, in addition to revealing the role of stereotypes inherent to social roles.

Along with the aspects directly related with motivation of students in the classroom, learning strategies must be considered, since the use of learning strategies is directly related with motivation to learn. Learning strategies also reveal the importance of cognitive and metacognitive dimensions of the self-regulated learning process that, together with the affective, motivational and social dimensions, contribute to enhancing students' academic performance (Bzuneck, 2009; Bzuneck & Boruchovitch, 2016; Hariri et al., 2020; Santos & Inácio, 2020; Schunk & Zimmerman, 2008).

In this study, besides the motivational dimension, the cognitive/metacognitive dimension will also be considered.

This involves the study of strategies and procedures used by students to learn content or do an assignment (Boruchovitch, 2014; McCombs, 2017; Weinstein & Acee, 2018; Zimmerman & Schunk, 2011). Learning strategies may be classified, according to Dembo (1994) and Garner and Alexander (1989), in two major categories: cognitive and metacognitive. Cognitive strategies help in the organization, elaboration and application of information directly by students. Metacognitive strategies, on the other hand, relate to students' reflection of their own learning and are considered more complex for involving planning, monitoring and regulation of learning activities.

The most recent research on the use of learning strategies in basic schooling reveals its use in different disciplines (Mulyani et al., 2020; Oliveira et al., 2017; Owusu & Cobbold, 2020; Zekrati, 2017; Zhou, 2017). In mathematics, for example, Brutron-Zamora and Sanchez-Ruiz (2021) pointed out that students tended to better manage their mathematical knowledge, to seek an adequate learning environment and to research information from different sources in face of difficulties. Relationships between overall academic performance and the use of learning strategies were investigated by Kadioglu-Akbulut and Uzuntiryaki-Kondakci (2020). The authors Palitot et al. (2019) pointed out that the majority of students used cognitive and metacognitive strategies and that the latter enhanced learning in chemistry. Darroz et al. (2018) highlighted that student reported the use of different learning strategies in physics, with the search for interpersonal help being the least reported strategy in their sample, when compared to the others.

Regarding the variety and frequency of the use of learning strategies, Zekrati (2017) considered that, in the sample researched by him, they were not satisfactory and that cognitive strategies were the most used, as in the studies by Zhou (2017) and Oliveira et al. (2017). In the study by Owusu and Cobbold (2020), the use of cognitive strategies was influenced by learning style. In Syafryadin's (2020) research, female students stood out, with higher averages, in the subdimensions of memory strategies, cognitive strategies, metacognitive strategies and affective strategies when compared with male students.

The use of learning strategies according to school grade level was examined by Silva and Caliatto (2017), who observed that first-year high school students had a better average in terms of the rate of use of these strategies in relation to other high school grade levels. Similarly, Brutron-Zamora and Sanchez-Ruiz (2021) found that the group of first-year high school students tended to make more use of the strategies evaluated, when compared to other grade levels.

Several studies examined the use of learning strategies regarding other constructs during high school. Nugraha et al. (2017) aimed to investigate the effect of self-regulated learning strategies in helping students with low self-efficacy, detected by score means in the pre-test. The authors identified, after carrying out an intervention, that students improved their self-efficacy scores in the posttest as a result of the

intervention. Enríquez et al. (2017) analyzed the relation between learning strategies and self-efficacy in academic performance. Results from the study pointed out that learning strategies and self-efficacy were determining positive factors of academic performance. Shirdel et al. (2018) evaluated the structural model of self-regulation based on learning strategies as a mediator of achievement motivation among students. The use of self-regulated learning strategies directly affected students´ motivation in this study.

The evolution of theoretical models reveals the importance of self-regulation, especially considering positive results obtained by intervention programs designed to promote self-regulated learning (Andrzejewski et al., 2016;

Fluminhan & Murgo, 2019, Panadero, 2017; Panadero et al., 2015). In this sense, searching for ways of evaluating variables involved in learning, such as motivation to learn and learning strategies, among others, will allow the analysis of a set of information that can provide the foundations for designing and implementing pedagogical intervention projects to help students in need. In consonance, this study aimed to: 1) characterize the motivational orientation to learn and the learning strategies used by students; 2) examine the existence of differences related to gender and school grade level in these constructs; and, finally 3) analyze correlations between the scales and to estimate the predictive potential of motivation to learn factors in the use of learning strategies.

METHOD

Participants

The sample was composed of 353 students from 6th to 9th grade of elementary school and from 1st to 3rd grade level of high school in schools of Paraná (56.7%; n = 200) and São Paulo (43.3%; n = 153). The minimum age was 11 and the maximum age was 19 (M = 14.8; DP_{age} = 2.0). Of the total participants, 51% (n = 180) declared to be male and 49% (n = 173) to be female.

Instruments

Motivation to learn scale – EMAPRE (Zenorini & Santos, 2007)

The scale has the purpose of evaluating motivation to learn based on the Achievement Goal Theory by means of 28 items organized in a Likert scale of 1 *(Always),* 2 *(Sometimes)* and 3 *(Never)*. Of the total items, 12 are about Learning Goals ("*I don't give up easily in face of a difficult task*"; α = .80), 9 about Performance-approach Goal ("*For me it is important to do things better than others*"; α = .76) and 7 about Performance-avoidance Goal ("*A reason why I don't participate in class is to avoid seeming ignorant;* α = .73).

Learning Strategies Assessment Scale for Elementary School – EAVAP-EF (Oliveira et al., 2010) and *Learning Strategies Assessment Scale for High School – EAVAP-EM* (Inácio et al., in press; Scacchetti et al., 2015).

The EAVAP-EF aims to identify the cognitive, metacognitive and absence of dysfunctional metacognitive strategies used by students. It is composed of 31 items in a Likert scale of 2 points (Always), 1 point (Sometimes) and 0 points (Never). It has evidence of content, of concurrent criteria and predictive validity. Regarding reliability, the total Cronbach's alpha of the scale was α = .79, α = .80 for the subscale of absence of dysfunctional metacognitive learning strategies ("*Do you usually give up when a task is difficult or boring*?"), α = .74 for cognitive strategies ("*Do

you usually underline important parts of the text to learn better?*") and α = .62 for metacognitive strategies ("*Do you notice when you have difficulty learning certain subjects?*").

EAVAP-EM, in turn, relates to an adapted version of the proposed scale for elementary education, with the aim of providing vocabulary suitable to a more advanced school level. The adaptation was published by Scacchetti et al. (2015) with 12 modified items: 2, 3, 4, 8, 12, 18, 19, 23, 24, 25, 26 and 28. The adapted scale had internal consistency of α = .74 for the full scale, α = .77 for absence of metacognitive dysfunctional learning strategies ("*Are you used to studying or doing your homework at the last minute?*"), α = .73 for cognitive strategies ("*When you are writing a text, do you usually make a list of ideas before starting*?") and .57 for metacognitive strategies ("*When you receive back a test, do you usually verify what was wrong*?"). Next, Inácio et al. (in press) carried out a Confirmatory Factorial Analysis (AFC) of the instrument, with 701 students from public and private schools. Internal consistency, evaluated by McDonald's omega, was ω = .70 for full scale, ω = .80 for absence of metacognitive dysfunctional learning strategies, ω = .77 for cognitive strategies and ω = .60 for metacognitive strategies.

Procedures

The research adopted all ethical procedures recommended by Resolution CNS 510/2016 of the National Health Council, and the study was approved by the Research Ethics Committee (CEP) of Universidade São Francisco – CAAE: 14653319.5.0000.5514. Data collection was carried out in person, collectively and in the classroom, after the signing of the Informed Consent Form (FICF) by participants over 18 years of age and by those responsible for underage students. Participants under the age of 18 signed the Free and Informed Assent Term (TALE), consenting to their participation. The time to complete the instruments was approximately 30 minutes for elementary school and 20 minutes for high school.

Data Analysis

Data were entered into an electronic spreadsheet and analyzed using the IBM- Statistical Package for Social Sciences for Windows version 22.0 – SPSS. Descriptive and inferential statistics were used for the analyses, and in the descriptive analysis, data of mean and standard deviation as well as the weighted mean were used. Thus, the predominance results can be obtained, as the results will be compared in a similar way.

After verification of the normal distribution of data using the Shapiro-Wilk test (p > .05), Student's t-test was used to verify differences in the main variables due to students' gender and ANOVA was employed for comparisons involving the grade level variable. Tukey's post-hoc test was required to investigate the possible differentiation of these variables into subgroups based on the scores measured by the scales, with a significance level of .05. Pearson's correlation test was performed next, estimating the magnitude of these correlations based on the assumptions of Dancey and Reidy (2006). Finally, linear regression analysis using the Forward method was performed with the aim of examining the predictive power of motivation to learn (independent variable) in the use of learning strategies (dependent variable).

RESULTS

The assessment of motivation to learn and learning strategies in the surveyed sample is shown in Table 1, in which the average, standard deviation and weighted average scores of the subscales can be observed, as well as the minimum and maximum values of possible and obtained correct answers.

The data in Table 1 show the predominance of Learning goal, followed by Performance-Approach and Performance-Avoidance goals. Regarding learning strategies, students reported using more metacognitive strategies, followed by absence of metacognitive dysfunctional strategies and cognitive strategies.

Concerning the second objective of this study, which was to analyze differences in the constructs in relation to gender and school grade level, results indicated that there was a significant difference between genders only in relation to Performance-approach goal ($t = 3.757$; $p = .001$) of the Motivation to Learn Scale, in which the boys' score ($M = 17.01$) was significantly higher than that of the girls ($M = 15.17$). As for learning strategies, there were gender differences in metacognitive strategies ($t = 2.513$; $p = .012$) and in cognitive strategies ($t = 3.441$; $p = .001$), both with higher scores for girls. ANOVA analysis of variance was performed to examine possible differences in motivation scores regarding school grade level. The results can be seen in Table 2, presented next.

Table 2 shows that there was a difference in Learning goal with a separation in two groups, with students from 6th grade having higher means than the other school grade levels. For Performance-approach goal there was a division in three groups, with preponderance of 6th and 9th grades over 7th grade, 8th grade and 3rd grade. Finally, regarding learning strategies, there was a difference only related to regarding metacognitive strategies in two groups, with the 1st grade of high school outperforming 7th grade of elementary school. Also, it is worth mentioning that there were no statistically significant differences in the constructs regarding the 2nd grade of high school.

The correlations between the subscales of the two instruments (motivation to learn and learning strategies scales) were estimated and can be seen in Table 3. Next, Table 4 presents the results regarding the predictive power of motivation factors in the report of using learning strategies.

It is possible to note, in Table 3, the existence of positive and significant correlations between Learning goal and the subscales of learning strategies. Also, there are negative and significant correlations with Performance-avoidance goal. The correlations found were of weak and moderate magnitude, according to the classification of Dancey and Reidy (2006).

As shown in Table 4, two statistically significant explanatory models emerged. In the first, the Learning goal was able to explain 33% of the variance in learning strategies (EAVAP Total). It can be inferred by the second model that the Learning goal and the Performance-avoidance goal together can explain 37% of the variance in learning strategies (Total EVAP).

Table 1
Descriptive Results of Instruments

Instrument	M	Weighted average	DP	Obtained minimum and maximum	Possible minimum and maximum
Learning Goal	27.87	2.32	4.96	12-36	0-36
Performance-approach	16.11	1.79	4.55	9-27	0-27
Performance-avoidance	12.37	1.76	3.85	7-21	0-21
Metacognitive Strategies	10.48	1.49	2.06	3-14	0-14
Cognitive Strategies	9.03	0.82	3.97	0-20	0-22
Abs.Disfun Meta.	12.89	0.99	4.55	0-25	0-26
EAVAP total	32.37	1.04	7.00	10-50	0-62

Table 2

Differences by School Grade Level indicated by Tukey Post-hoc Test

	Group 1	**Group 2**	**Group 3**	**P**
Learning goal	1st ($M = 27.01$)	6th ($M = 30.73$)	-	.002
	3rd ($M = 27.20$)		-	.007
	7th ($M = 26.59$)		-	.001
	8th ($M = 27.61$)		-	.038
	9th ($M = 27.81$)		-	.047
Performance-approach	3rd ($M = 13.97$)		6th ($M = 17.38$)	.004
	3rd ($M = 13.97$)		9th ($M = 17.59$)	.002
	8th ($M = 14.58$)	7th ($M = 17.14$)		.010
	8th ($M = 14.58$)		9th ($M = 17.59$)	.024
Metacognitive strategies	7th ($M = 9.50$)	1st ($M = 11.30$)	-	.001

Table 3

Correlations between factors of EMAPRE and EAVAP

Factor	**Correlation Between Factors**						
	F1	**F2**	**F3**	**F4**	**F5**	**F6**	**F7**
Learning Goal	-	.197**	−.136*	.116*	.446**	.433**	.576**
P approach		-	.083	−.044	.103	.072	.099
P avoidance			-	−.021	−.049	−.385**	−.281**
Metacognitive strategies				-	.117*	−.126*	.287**
Cognitive strategies					-	.216**	.751**
Abs. Disfun. Meta.						-	.745**
Total EAVAP							-

Note. * $p < .05$; ** $p < .01$; P approach = Performance-approach; P avoidance = performance-avoidance.

Table 4

Regression Analysis of Motivation Factors for Learning Strategies

Dependent Variables		**Standard Coefficient**	**T**	**P**	**Adjusted R^2**
Total EAVAP		**B**			
Model 1	Learning Goal	.576	12.16	<.01	.33
Total EAVAP		**Standard Coefficient**	**T**	**P**	**Adjusted R^2**
		B			
Model 2	Learning Goal	.554	12.02	<.01	.37
	Performance-avoidance	−.210	−4.56	<.01	

DISCUSSION

The main objectives of this study were to characterize the motivational orientation to learn and the learning strategies employed by students, to analyze the existence of differences in the constructs regarding gender and school grade level, as well as to verify the correlations between the instruments and to estimate the predictive potential of motivation to learn factors in the employment of learning strategies.

Regarding the first objective of the study, to characterize the motivational orientation to learn and the learning strategies used by students, there was a predominance of Learning goal and the report of use of metacognitive strategies in the sample. This result can be considered positive, since this goal characterizes involvement with the learning processes and desire to master content, combined

with metacognitive strategies that are related to the process of planning, monitoring and regulating activities inherent to learning, revealing that students in this sample were more oriented towards in-depth learning and processing information (Ames, 1992; Dembo, 1994; McCombs, 2017; Weinstein & Acee, 2018). In addition, learning goal and metacognitive strategies are conceived in the literature as essential to better school performance in the most diverse subjects (Bzuneck & Boruchovitch, 2016; Darroz et al., 2018; Kadioglu-Akbulut & Uzuntiryaki-Kondakci, 2020; Mulyani et al., 2020; Palitot et al., 2019).

Moreover, there was a statistically significant gender difference only in relation to Performance-approach goal, with a higher score for boys. This fact indicates that boys tend to be more concerned with demonstrating capacity, without necessarily focusing on in-depth learning and knowledge acquisition. As mentioned by Bzuneck (2009), the Brazilian educational system itself embraces a certain social comparison, as an important performance indicator. The predominance of this goal among boys is in line with other findings of the scientific literature, such as the studies by Santos et al. (2018) and Santos and Inácio (2020), which also reveal that boys are more oriented towards Performance-approach goal when compared to girls. It is noteworthy that gender differences are widely debated in educational psychology literature throughout history. In this field, there is a definition of some stereotypes inherent to social roles, in which girls are more predominantly oriented by motivation for the arts, language and writing. Boys, in turn, tend to be seen as more confident and interested in math and science (Meece et al., 2006; Wirthwein et al., 2020).

More precisely with regard to gender differences in learning strategies, there was a preponderance of girls reporting the use of cognitive and metacognitive strategies. Such results are also consistent with those in the literature in the area. Both of the studies mentioned previously (Santos et al., 2018; Santos & Inácio, 2020), as well as the one developed by Fluminhan and Murgo (2019), which evaluated academic and self-regulation, found similar trends in the strategies of 6th graders of elementary school.

Concerning differences in school grade level, data revealed that students in 6th grade stood out in relation to those in other grades for Learning goal and, together with students in 9th grade, differed in relation to Performance-approach goal. These results are also similar to those of Santos et al. (2018). It is hypothesized that higher motivation at the beginning of the second cycle of elementary education may occur because it is a new stage in the schooling process, with new expectations and previously acquired knowledge that enable a focus on learning. Furthermore, the literature indicates that Performance-approach goal contains important incentives for studying and learning, especially when combined with Learning goal (Bzuneck, 2009; Elliot & Hulleman, 2017; Senko & Hulleman, 2013).

Students in the first year of high school differed from those in 7th grade, with a higher average for the first year in the report of use of metacognitive strategies. Thus, it can be said that students in the present sample with a background of experiences in the schooling process, when entering the last stage of basic education (i.e., secondary education), make more use of these deep processing strategies to learn, with a focus on reflection and self-monitoring as well as on self-learning (Dembo, 1994; McCombs, 2017; Weinstein & Acee, 2018). It is noteworthy that no other studies were found that had investigated both stages of schooling, providing comparisons of this nature. However, research focusing on secondary education shows results which are similar to those found in this study (Brutron-Zamora & Sanchez-Ruiz, 2021; Silva & Caliatto, 2017), with a predominance of the use of metacognitive strategies at this stage of schooling.

Finally, this study sought to exam the correlations between the scores obtained in the scales and to estimate the predictive potential of motivation to learn factors in the use of learning strategies. Positive and significant correlations between Learning goal and the learning strategy subscales, besides negative and significant correlations with Performance-avoidance goal were found. All these correlations were of weak and moderate magnitude according to the classification of Dancey and Reidy (2006). Such results are similar to those of Santos and Inácio (2020), when they evaluated both constructs in a sample of 261 high school students from private schools in Bahia. These results were expected, as the literature indicates relationships between motivation to learn and the use of more adequate learning strategies (Bzuneck, 2009; Schunk & Zimmerman, 2008).

Regarding the predictive power of motivation to learn factors in the use of learning strategies, two statistically significant explanatory models were found. In the first, learning goal was able to explain 33% of the variance in learning strategies (Total EVAP) and, in the second model, learning goal and Performance-avoidance goal together were able to explain 37% of the variance in learning strategies (Total EVAP). The hypothesis was that there would be predictive power, considering the literature on this subject, as well as the correlations found in previous studies (Bzuneck, 2009; Hariri et al., 2020; Santos & Inácio, 2020; Weinstein & Acee, 2018). However, the percentage of explained variance in the two models was somewhat low, as were the magnitudes of the correlations, which ranged from low to moderate. It is therefore recommended that further studies be carried out to deepen this issue, as the literature is consistent regarding its existence (Bzuneck, 2009; Schunk & Zimmerman, 2008).

Accordingly, it can be said that students' focus on both mastering content and effective learning are capable of predicting the use of appropriate learning strategies to a certain extent at the time of the study. Furthermore, learning goal, associated with Performance-avoidance goal, has an even greater predictive power for engagement in the use of

learning strategies. This result was also found in the study by Santos and Inácio (2020), in which the authors highlighted that concern with actual learning and avoidance of devaluation in relation to others can explain the use of learning strategies because they also contribute to better academic performance. In this regard, as mentioned earlier in this discussion, the emphasis on successful performance and high achievement in school is consensual in the Brazilian schooling process (Bzuneck, 2009).

Notably, Performance-avoidance goal by itself can harm learning processes, being related to low persistence and higher levels of anxiety, for example (Bzuneck & Boruchovitch, 2016; Senko & Hulleman, 2013). Thus, considering that motivation is a multidimensional construct that can be modified throughout life (Bzuneck, 2009; Pansera et al., 2016; Schunk et al., 2014), orientation to Performance-avoidance goal can also be changed during the schooling process to favor learning.

FINAL CONSIDERATIONS

This study reinforced the importance of motivation to learn in engaging in strategic behaviors, as evinced by the literature. It identified differences related to gender and school grade level in motivation to learn factors and learning strategies. Such data can be used to help educators in their effort to design preventive and formative intervention actions aimed at improving learning, based on the knowledge acquired by this research, focusing on more specific and vulnerable groups of students. In this sense, for example, boys need more attention as they are more concerned with performance than with their learning, also tending to make less use of learning strategies.

Furthermore, it was found that orientations more focused on mastering content and effective learning were able to predict the use of appropriate learning strategies at the time of the study. Note that, motivation differs from a skill or knowledge and can be improved and changed by pedagogical practices. Accordingly, the more knowledge teachers have of the motivational orientations and learning strategies used by their students, as well as the variables that affect them, the more they will be able to precisely align their pedagogical practices to favor the development of students who are more participative, more active in their learning processes and more persistent in the face of challenges. Therefore, valid

and reliable psychological assessment instruments are of paramount importance to provide teachers with support for their pedagogical practices.

It is noteworthy that although the results now obtained were in the expected direction, the percentages of explained variance were not high. Also, there are few national studies that investigated the two levels of education together, as was done in this research. As for the limitations of this research, it can be stated that the sample was not representative, as it is relatively small and includes only students from two Brazilian states. Thus, it is expected that further studies will be carried out in order to expand knowledge of the variables in question, in larger and more nationally representative samples. Future investigations should also involve students from the early years of elementary school, in addition to including other constructs that may shed light on the complexity of factors associated with students' engagement in motivated and strategic behaviors.

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