https://doi.org/10.1590/1982-0275202239e210046

Strategies for regulating motivation and motivation to learn of High School students

As estratégias de regulação da motivação e a motivação para aprender de estudantes do Ensino Médio

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Abstract

The aim of this study was to investigate motivational regulation strategies and motivation to learn of High School students, as well as to examine the intercorrelations between these two variables and their relationships with sociodemographic variables. The sample of the study was composed of 233 students from two public schools, who answered a sociodemographic questionnaire and two Likert scales. Data were analyzed through descriptive and inferential statistics procedures. Results revealed that students seem to use motivational regulation strategies and generally feel motivated to learn. Female students reported using significantly more strategies to stay motivated than did males. Positive and significant correlations were found within the factors of the motivational regulation strategies scale and between the two scales. It is expected that the present study stimulates further research and contributes to the design of interventions to strengthen students´ motivation to learn.

Keywords: Brazilian students; High school; Motivation regulation.

Resumo

O objetivo do presente estudo foi investigar as estratégias de regulação da motivação e a motivação para aprender de estudantes do Ensino Médio, bem como examinar as intercorrelações entre essas duas variáveis e suas relações com

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Support: This study was financed by the *Coordenação de Aperfeiçoamento de Pessoal de Nível Superior* (Capes) (Finance Code 001) and by the *Conselho Nacional de Desenvolvimento Científico e Tecnológico* (Process nº 304829/2018-8 and 403620/2016-3).

Article based on the doctoral dissertation of N.M. GÓES, entitled "*As variáveis relacionadas à aprendizagem de alunos e professores do Ensino Médio e o desenvolvimento de um programa de intervenção em estratégias de aprendizagem*". Universidade Estadual de Campinas, 2020.

How to cite this article

Góes, N. M., & Boruchovitch, E. (2022). Strategies for regulating motivation and motivation to learn of High School students. *Estudos de Psicologia* (Campinas), *39*, e210046. https://doi.org/10.1590/1982-0275202239e210046

variáveis sociodemográficas. Participaram da pesquisa 233 alunos de duas escolas públicas, que responderam a um questionário sociodemográfico e a duas escalas Likert. Os dados foram analisados pelos procedimentos da estatística descritiva e inferencial. Os resultados revelaram que os estudantes parecem utilizar estratégias de regulação da motivação e geralmente se sentem motivados para aprender. Estudantes do gênero feminino reportaram usar significativamente mais estratégias para se manter motivados do que os do masculino. Correlações positivas e significativas foram encontradas entre os fatores da escala de estratégias de regulação da motivação e entre as duas escalas. Espera-se que o presente estudo estimule novas pesquisas e possibilite o delineamento de intervenções para fortalecer a motivação para aprender dos estudantes.

Palavras-chave: *Estudantes brasileiros; Ensino médio; Autorregulação da motivação.*

Self-regulated learning is defined as the ability of the individual to control cognitive, metacognitive, motivational and behavioral aspects to achieve a particular school and/or academic goal (Schunk & Greene, 2018; Zimmerman, 2013). Studies such as those of Weinstein and Acee (2018) and Zimmerman (2013), among others, reveal that self-regulated students have a vast repertoire of cognitive and metacognitive learning strategies and are able to adapt their goals and persist in their efforts to achieve them. They are proficient in monitoring their understanding and in modifying strategies according to the demands of each task. They also have robust self-efficacy beliefs for learning, which help them to sustain motivation in the face of complex tasks. In addition, they structure the environment according to their needs and are able to establish a positive atmosphere to learn more and better, which results in higher performance in evaluation situations.

Evidence shows that, just as students can regulate their own learning, they are also able to regulate their motivation (Bzuneck & Boruchovitch, 2016, 2019; Kim et al., 2018; Wolters, 1999, 2003; Wolters & Rosenthal, 2000; Schunk & Greene, 2018; Zimmerman, 2013). Knowing how and when to regulate one's own motivation is essential in the educational context, especially because of the excess of distractors that can interfere in the performance and successful completion of school tasks.

Self-regulation of motivation can be defined as actions performed deliberately with the objective of influencing, controlling or managing motivation (Wolters, 1999, 2003). It has been recognized as essential to help students initiate, sustain and increase motivation and effort to learn. It includes knowledge, monitoring and active management of the motivation itself and it is part of a larger system, which is the self-regulation of learning (Schwinger & Stiensmeier-Pelster, 2012; Teng et al., 2020).

Wolters (1999) and Wolters and Benzon (2013) state that there are at least three distinct dimensions for regulation of motivation: knowledge of motivation, its monitoring and control. Knowledge of motivation refers to the knowledge that the student has about his/her own motivation. It involves declarative knowledge (knowing various strategies to regulate one's own motivation), procedural knowledge (knowing how to use them) and conditional knowledge (discerning which strategies to use depending on each moment). Monitoring motivation consists of being aware of one´s own motivation and being aware of the feedback on own motivational process when doing a school activity. The monitoring process will permeate the entire performance of the task, from the beginning (motivation prediction), during (motivation experience) or after the completion of the task (reflection on motivation). Conversely, motivational control includes actions to intervene and control the motivation itself. It encompasses the real strategies used by students to manage the level or nature of motivation (Boekaerts, 1995; Wolters, 2003; Wolters & Benzon, 2013).

Students can use different strategies to regulate their own motivation. In a study conducted with university students, Wolters and Benzon (2013) identified six strategies most used by them: regulation of value, regulation of performance goals, self-consequating, environment structuring, regulation of situational interest and regulation of mastery goals. The regulation of value strategy resides in the student's effort to make the task more likely to be performed, making the material seem more useful, interesting or important

to learn. "I make an effort to relate what we are learning with my personal interest" is an example of this strategy. The strategy of regulation of performance goals refers to the student's effort to complete and perform a task well, motivated by the importance of obtaining a good grade and obtaining good performance. An example of this strategy is "I remind myself how important it is to do well on the tests and assignments in this course". The self-consequating strategy consists of the practice of self-providing rewards with the objective of driving oneself to the accomplishment of a task. "I promise myself I can do something I want later if I finish the assigned work now" is an example of this strategy. "The environment structuring strategy reflects the student's effort to control aspects of his physical, environmental or personal context:" I change my surroundings so that it is easy to concentrate on the work" is an example of this type of strategy. The strategy of regulating situational interest involves the student's investment to make the task more enjoyable and fun to be able to complete it. As an example, one can cite: "I make the studying more enjoyable by turning it into a game". Finally, the strategy of regulating mastery goals reinforces the student's desire to improve and learn as much as possible, considering only learning. "I tell myself that I should keep working just to learn as much as I can" exemplifies this strategy.

Grunschel et al. (2016) identified two more strategies different from those found by Wolters and Benzon (2013): performance avoidance self-talk and proximal goal setting. The strategy of performance avoidance self-talk refers to the students´ effort to perform a task well to avoid embarrassment if their performance is lower than expected. "I imagine that my classmates will make fun of my poor performance" is an example of this strategy. Conversely, the strategy of proximal goal setting means dividing the long-term goal into smaller goals that can be achieved in a short period of time. As an example, the following is mentioned: "I tell myself that I can master the tasks if I set myself subgoals" (Grunschel et al., 2016).

Previous studies show that High School students use strategies to stay motivated (Ferreira, 2018; Smit et al., 2017) and that some of them are used more than others; for example, the strategy of internal monologue oriented to good performance seems to be the most used in national and international studies (Ferreira, 2018; Schwinger & Stiensmeier-Pelster, 2012; Wolters, 1999). They also reveal that sociodemographic variables may interfere with the use of regulation strategies of motivation. Ferreira (2018) found that female students seem to use more regulation strategies of motivation than male students. In contrast, Schwinger and Otterpohl (2017), in turn, found that male students mentioned using more motivational regulation strategies than female students. Students who had never repeated a school year reported using more strategies to regulate own motivation than repetitive students (Ferreira, 2018; Schwinger & Otterpohl, 2017). International studies investigating the use of motivational regulation strategies in relation to age and school year were not found. At the national level, to date, the literature on the subject is still very incipient, and only one study found that there were no statistically significant differences in age and school year in motivational regulation strategies (Ferreira, 2018).

Studies reveal that there are empirical and theoretical reasons to state that motivational beliefs, such as task value, self-efficacy, and goal orientation (learning and performance), are important factors for understanding the use of various strategies to regulate motivation (Wolters, 2003; Wolters & Rosenthal, 2000). These studies also found that the use of motivational regulation strategies is triggered, in most cases, when students have some problems with their level of motivation. If students are highly motivated within a particular context, it becomes more unlikely that they use strategies to regulate their motivation (Wolters, 2003; Wolters & Rosenthal, 2000).

Investigating the motivation to learn of Brazilian High School students, whether they use motivational regulation strategies and which ones are used, is essential, especially when taking into account both the low performance of these students in large-scale tests (Instituto Nacional de Estudos e Pesquisas Educacionais Anísio Teixeira, 2019, 2020) and the scarcity of Brazilian studies on this theme in secondary education (Ferreira, 2018), as well as the fact that the school assignments proposed to students are often unattractive,

given the numerous other more pleasurable activities (Bzuneck & Boruchovitch, 2016; Wolters, 1999). In addition, identifying the motivation to learn and the motivational regulation strategies used by students can direct the pedagogical practice of teachers to the real needs they have. Thus, the present study is part of a larger study of the first author and aims to investigate the motivational regulation strategies and motivation to learn of High School students, as well as to examine the intercorrelations between these two variables and their relationships with sociodemographic characteristics of the sample.

Method

Participants

The study included 233 High School students from two public schools in the state of Paraná, located in the central region of the city. Both serve an average of 300 High School students. Of the students in the sample, 133 (57.1%) were female, and 100 (42.9%) were male. The mean age of the students was 15.94, and the standard deviation was 1.034. The students were enrolled in the 1st year (36%), 2nd year (28%) and 3rd year (36%). Most students (78.5%) reported that they had never repeated a school year and that they did not work (76.4%).

Instruments

The students answered three instruments in the present study: a sociodemographic questionnaire, the Brazilian translation of Motivational Regulation Scale for High School students and the Brazilian translation of the Learning and Study Strategies Inventory (LASSI). These instruments are described next.

Sociodemographic questionnaire

The objective of this instrument was to characterize the participants. It contained fourteen questions, eight of which were multiple choice, for example:" "School year", "Work or not" and the other questions (6) were open." As examples of these questions, the following can be cited: "Name", "Age" and "How many hours of work per day".

Motivational Regulation Scale (Wolters, 1999) – Translation and adaptation Boruchovitch and Felicori (2015)

This scale was developed by Wolters (1999) and is of the Likert type. It aims to evaluate the motivational regulation strategies used by High School students. The instrument consists of 25 items and has 7 response options, ranging from 1 (strongly disagree) to 7 (strongly agree). The minimum score value of the scale is 25 points, and the maximum is 175 points. It was translated into Portuguese by Boruchovitch and Felicori (2015). Back-translation procedures and expert analysis were performed.

The scale items were organized into five factors. Factor 1 – Interest Enhancement consists of eight items (1,2,3,4,5,6,7 and 8) and refers to making the task more interesting, enjoyable and fun. An example of an item of this factor is "I make studying more enjoyable by turning it into a game ($\alpha = 0.90$). Factor 2 – Performance Self-talk. It consists of five items (9, 10, 11, 12 and 13) and refers to the thoughts projected by the students to increase the desire to complete the task, intensifying the focus on obtaining

good grades. "I remind myself about how important it is to get good grades" is an example of an item of this factor (α = 0.84). Factor 3 – Self-consequating encompasses four items (14, 15, 16 and 17) and alludes to the condition in which the student promises rewards for himself/herself if he/she completes the task. An example of an item of this factor is "I promise myself some kind of a reward if I get the assignment done" (α = 0.87). Factor 4 – Mastery Self-talk is composed of four items (18, 19, 20 and 21) and concerns the student's desire to learn the materials or tasks to increase their motivational level. As an example of this item, one can cite "I persuade myself to work hard just for the sake of learning" (α = 0.85). Finally, Factor 5 – Environmental Control contains four items (22, 23, 24 and 25) and evaluates the intention of students to avoid or reduce distractors to complete their academic tasks. "I try to study at a time when I can be more focused" is an example of an item in Factor 5 (α = 0.73). The interpretation of the scale data follows the logic that the higher the mean, the more students report using the strategies investigated in each factor.

The Cronbach's alpha values described previously were based on samples composed of American High School students, and all values were considered good. A study conducted with Brazilian High School students also found good and similar Cronbach's alpha values in the scale factors, ranging from 0.75 to 0.84 (Ferreira, 2018).

Learning and Study Strategies Inventory – High School version (LASSI-HS) (Weinstein & Palmer, 1990) – Translation and adaptation by Boruchovitch, Felicori and Góes (2016)

The LASSI-HS was developed with the objective of measuring the use of learning and study strategies of High School students. It is a self-report instrument consisting of 76 items, with five response options: (a) Not at all like me, (b) Not very much like me, (c) Somewhat like me, (d) Fairly much like me and; (e) Very much like me. The LASSI items are subdivided into ten scales: Attitude, Motivation, Time Management, Anxiety, Concentration, Information Processing, Selecting Main Ideas, Study Aids, Self Testing and Test Strategies. Some items have inverted scores.

The authors of the scale consider that the instrument can be used both jointly, considering the ten scales that compose it, and separately. Due to the objectives of the present study, only the Motivation Scale was used. Composed of 8 items, 3 of which have an inverted score, this scale evaluates diligence, self-discipline and the willingness of students to study. In the original version, the Cronbach's alpha value was 0.78 (Weinstein & Palmer, 1990). As an example of items on this scale, the following can be cited: "Even when study materials are dull and not interesting, I manage to keep working until I finish". The minimum score of the scale is 8 points, and the maximum is 40 points. The higher the score, the more motivated the student is to learn.

Procedures

The research project was submitted to the Ethics Committee of the State University of Campinas and approved in March 2017 under Opinion nº 64526117.3.0000.5404. Before data collection, it was first necessary to ask for authorization from the parents and/or guardians of the students so that they could participate in the study, since they were under 18 years old. To get the parents or guardians consent, it was scheduled a day with the school teachers to talk with the students about the research objective, how and where it would be conducted and hand in the informed consent form, so that they could take it to their parents or guardians. The first author, along with the school's pedagogue, visited all the High School classrooms, and all students received the appropriate guidance and informed consent form. Such procedures were adopted in both schools.

Of a total of 600 informed consent forms delivered to the students, only 233 parents and/or guardians (38.8%) returned and signed the form. Data collection occurred in four days, two in one school and two in the other. In one of the schools, data collection occurred in the Noble Hall and, in the other school, in a room previously reserved for this purpose.

On the day previously scheduled for data collection, the High School students who were under 18 years old received a special informal consent form, and those who were 18 years old or more received the informed consent form to read and sign them, if they agreed on participating in the research. Subsequently, the instruments were applied in different sequences to avoid the fatigue effect. The students had no doubts to answer them. Data collection took, on average, 20 minutes.

Data Analysis

The data were analyzed using the statistical software SPS®SIBM®. Descriptive analyses were performed in which the means, standard deviations, medians, minimum and maximum values of the scales were computed. Cronbach's alpha values of the scales were also estimated. Comparative analyses of the two scales were also carried out as a function of the variables gender, age, school year and repetition. Moreover, correlation analyses were conducted between the factors of the Motivational Regulation Scale and the LASSI Motivation Scale using the Spearman correlation coefficient. The magnitude values were interpreted according to the criteria of Cohen (1988). After verifying that the data did not show a normal distribution, according to the values obtained in the *Shapiro–Wilk* and *Kolmogorov–Smirnov* tests, the *Mann–Whitney* test was used to compare the variables between two groups, and the *Kruskal–Wallis* test was used to compare the variables between the three groups.

Results

The Cronbach's alpha values, the mean, the median, the minimum and maximum values of the Motivational Regulation Scale and the LASSI Motivation Scale, in the total sample are shown in Table 1.

Table 1
Descriptive analysis of the Motivational Regulation Scale and Motivation Scale in the total sample

Factors	Motivational Regulation Scale*				
	α	Mean	Mín	Median	Máx
1. Interest enhancement	0.838	3.99	1.00	4.13	7.00
2. Performance self-talk	0.905	5.81	1.00	6.20	7.00
3. Self-consequating	0.881	4.11	1.00	4.25	7.00
4. Mastery self-talk	0.825	4.21	1.00	4.25	7.00
5. Environmental control	0.834	5.06	1.00	5.25	7.00
	Learning and study strategies Inventory*				
	α	Mean	Mín	Median	Máx
Motivation Scale	0.788	3.28	1.25	3.25	5.00

Note: *N = 233. Max: Maximum; Min: Minimum.

Table 1 shows that Cronbach's alpha values, in the different factors of the Motivational Regulation Scale, ranged from 0.825 to 0.905 and that the LASSI Motivation Scale had a Cronbach's alpha value of 0.788. These results were similar to those obtained in the studies conducted by the original authors of the scales (Weinstein & Palmer, 1990; Wolters, 1999), showing that the instruments have good internal consistency and adequate reliability for use in the present sample (Pestana & Gageiro, 2014).

The overall analysis of the scores of the total sample in the factors of the Motivational Regulation Scale indicated that the means ranged from 3.99 to 5.81 and the medians from 4.13 to 6.20. The mean and lowest median were found in the factor "Interest enhancement" (*M* = 3.99, *Mdn* = 4.13) and the highest in the factor "Performance self-talk" (*M* = 5.81; *Mdn* = 6.20). In the factors "Self-consequating" and "mastery self-talk", the score values can be considered intermediate, 4.11 and 4.21, respectively, and the medians showed the same value (*Mdn* = 4.25). In turn, in the "Environmental control" factor, the mean and median were slightly higher (*M* = 5.06; *Mdn* = 5.25). In turn, on the LASSI Motivation Scale, the mean was 3.28, and the median was 3.25. In this sense, the results revealed that students, regardless of the sociodemographic characteristics investigated, report using strategies to regulate their own motivation and are usually motivated to study and learn. By analyzing the means by factors, it was possible to note that they tend to be motivated to perform their tasks, thinking more about how their grades may be affected if they do not do them. It also seems to be common among students to control the environment in which they study to remain engaged in their tasks. They promise to reward themselves if they complete their tasks and tend to motivate themselves, thinking only about the importance of learning the content, but to a lesser extent. In addition, it does not seem usual for students to make the content more enjoyable and playful to learn.

Table 2, in turn, shows the results of the sample in the Motivational Regulation Scale and LASSI Motivation Scale in relation to the variables: gender, age, school year and repetition.

Table 2

Results of the comparison between Motivational Regulation Scale and the motivation scale as a function of the variables gender, age, repetition and school year

Motivational Regulation Scale						
Gender (Male = 100; Female = 133)						
Factors	Male		Female		*z*	*p*
	M	*Mdn*	*M*	*Mdn*		
Factor 1	3.96	4.06	4.01	4.13	0.16	0.875
Factor 2	5.56	5.90	5.99	6.40	2.40	**0.016**
Factor 3	3.61	3.75	4.49	4.75	3.82	**< 0.001**
Factor 4	4.04	4.25	4.34	4.50	1.48	0.140
Factor 5	4.59	4.88	5.41	5.75	3.69	**< 0.001**
Repetition (Yes = 50; No = 183)						
Factors	Yes		No		*z*	*p*
	M	*Mdn*	*M*	*Mdn*		
Factor 1	4.02	4.13	3.98	4.13	0.07	0.945
Factor 2	5.62	6.00	5.86	6.20	0.86	0.392
Factor 3	3.74	3.63	4.22	4.25	1.57	0.116
Factor 4	4.39	4.38	4.16	4.25	0.77	0.442
Factor 5	4.85	5.00	5.12	5.50	0.97	0.334
Age (14-15 years = 75; 16 years = 93; 17-19 years = 65)						
Factors	14-15		16		17-19		χ^2	*p*
	M	*Mdn*	*M*	*Mdn*	*M*	*Mdn*		
Factor 1	4.02	4.38	3.84	3.88	4.16	4.13	1.92	0.382
Factor 2	5.84	6.20	5.71	6.20	5.90	6.40	0.47	0.792
Factor 3	4.15	4.25	4.21	4.50	3.94	4.00	0.79	0.672
Factor 4	4.24	4.50	4.20	4.25	4.18	4.25	0.18	0.912
Factor 5	4.77	5.00	5.28	5.50	5.07	5.25	5.75	0.056

Table 2

Results of the comparison between Motivational Regulation Scale and the motivation scale as a function of the variables gender, age, repetition and school year

Motivational Regulation Scale								
High School year (1° = 84; 2° = 65; 3° = 84)								
Factors	1°		2°		3°		χ^2	*p*
	M	*Mdn*	*M*	*Mdn*	*M*	*Mdn*		
Factor 1	3.97	4.19	4.08	4.25	3.94	3.94	0.86	0.649
Factor 2	5.73	6.10	5.88	6.40	5.82	6.20	0.97	0.615
Factor 3	4.22	4.25	3.92	3.50	4.16	4.25	1.22	0.545
Factor 4	4.29	4.38	4.16	4.25	4.17	4.25	0.32	0.851
Factor 5	4.84	5.00	5.08	5.50	5.26	5.75	3.55	0.169

Learning and study strategies Inventory				
Motivation Scale	*M*	*Mdn*	*z*	*p*
Gender				
Male (*n* = 100)	3.09	3.06	3.26	0.001
Female (*n* =133)	3.43	3.50		
Repetition				
Yes (*n* = 50)	3.10	3.13	1.92	0.055
No (*n* =183)	3.33	3.38		
Age			χ^2	*p*
14-15 years (*n* =75)	3.25	3.38		
16 years (*n* = 93)	3.36	3.38	2.46	0.292
17-19 years (*n* = 65)	3.21	3.13		
High School year				
1° (*n* = 84)	3.19	3.25		
2° (*n* = 65)	3.36	3.25	1.35	0.509
3° (*n* = 84)	3.31	3.25		

Note: M: Mean; Mdn: Median; Factor 1: Interest enhancement. Factor 2: Performance self-talk. Factor 3: Self-consequating. Factor 4: Mastery self-talk. Factor 5: Environmental control. Bold p-values indicate statistically significant differences.

By analyzing the students' motivational regulation strategies in relation to gender, higher scores were found in all factors for females. However, statistically significant differences were found only in Factor 2 for females ($M = 5.99$; $Mdn = 6.40$; $p = 0.016$; $Z = 2.40$) when compared to males ($M = 5.56$; $Mdn = 5.90$). Females had higher scores in Factor 3 ($M = 4.49$; $Mdn = 4.75$; $p < 0.001$; $Z = 3.82$) than did males ($M = 3.61$; $Mdn = 3.75$). Similar gender differences were found in Factor 5. Again, females ($M = 5.41$; $Mdn = 5.75$; $p < 0.001$; $Z = 3.69$) outperformed males ($M = 4.59$; $Mdn = 4.88$). The results indicate that female students reported using the strategies of "Performance self-talk", "Self-consequating" and "Environmental control" more than male students. No statistically significant age, school year and grade repetition – related differences were found in students' strategies to regulate their motivation.

On the LASSI Motivation Scale, only a statistically significant difference emerged, indicating that female students ($M = 3.43$; $Mdn = 3.50$; $Z = 3.26$; $p = 0.001$) seem to be more motivated to study and learn than males ($M = 3.09$; $Mdn = 3.06$). Table 3 shows the results obtained from the correlations between the factors that compose the Motivational Regulation Scale and the LASSI Motivation Scale.

Positive, significant and low- and moderate-magnitude correlations were found between all factors of the Motivational Regulation Scale and between the LASSI Motivation Scale and the factors of the Motivational Regulation Scale. Positive correlations of low magnitude were found only between Factor 1 "Interest enhancement" and Factor 2 "Performance self-talk", as well as between Factor 1 "Interest enhancement and the LASSI Motivation Scale. The other correlations were of moderate magnitude.

Table 3
Correlations between the factors of the Motivational Regulation Scale and the Motivation Scale

Factors	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Factor 2	*r* = 0.236				
	p = **0.000**				
Factor 3	*r* = 0.324	*r* = 0.353			
	p = **0.000**	*p* = **0.000**			
Factor 4	*r* = 0.461	*r* = 0.435	*r* = 0.481		
	p = **0.000**	*p* = **0.000**	*p* = **0.000**		
Factor 5	*r* = 0.317	*r* = 0.429	*r* = 0.396	*r* = 0.466	
	p = **0.000**	*p* = **0.000**	*p* = **0.000**	*p* = **0.000**	
LASSI Motivation	*r* = 0.274	*r* = 0.413	r = 0.349	*r* = 0.363	*r* = 0.351
	p = **0.000**	*p* = **0.000**	*p* = **0.000**	*p* = **0.000**	*p* = **0.000**

Note: Factor 1: Interest enhancement. Factor 2: Performance self-talk. Factor 3: Self-consequating. Factor 4: Mastery self-talk. Factor 5: Environmental control. Reference values of the correlations: 0.10 to 0.29 Low correlation; 0.30 to 0.49 moderate correlation; 0.50 to 1.00 High correlation (Cohen, 1988). Bold *p*-values indicate statistically significant correlations.

Discussion

The objective of the present study was to investigate the motivational regulation strategies and the motivation to learn of High School students, as well as to examine the intercorrelations between these two variables and their relationship with sociodemographic characteristics of the sample.

In general, the results obtained in the Motivational Regulation Scale in the present study corroborate the data found in the literature of the area, especially when the students of the present sample reported using motivational regulation strategies (Ferreira, 2018; Smit et al., 2017); mentioned using more the strategies of "Performance self-talk" (Ferreira, 2018; Schwinger & Stiensmeier-Pelster, 2012; Wolters, 1999); had a lower mean in Factor 1 "Interest enhancement" (Ferreira, 2018; Schwinger & Otterpohl, 2017); female students mentioned using more strategies of "Performance self-talk", "Self-consequating" and "Environmental control" (Ferreira, 2018), and when no statistically significant differences were found as a function of age and school year (Ferreira, 2018).

However, some results diverged from the literature. Schwinger and Otterpohl (2017) found greater use of the "Self-consequating" and "Environmental control" strategies among American High School students. Ferreira (2018) found that Brazilian students who never repeated a school year report using more "Interest enhancement" strategies than did those students who had repeated.

The results of the Motivational Regulation Scale suggest that there were no differences in the use of these strategies according to age, school year and school year retention experiences. In addition, there were higher scores in "most common strategies", such as those listed in Factor 2 and "Performance self-talk", which do not necessarily require explicit teaching and which, in fact, are strongly reinforced by the Brazilian evaluation system, which highly values the grades obtained in tests. It can also be assumed that the students of this sample did not receive any instruction on the other strategies that can be used to maintain motivation.

The average and non high scores of the students in Factor 4 "Mastery self-talk", a factor that alludes to strategies that aim to maintain motivation with a focus only on learning itself suggests that this result may be associated with the Brazilian evaluation system, which places high emphasis on achievement of high scores. Given the importance of the set of strategies that make up this factor for the maintenance of motivation that leads to learning of good quality, it would be desirable to have found higher scores on it among the participants of the present study. Future research needs to focus on the investigation of motivational regulation strategies in relation to the type of evaluation to which students are exposed.

The results referring to LASSI Motivation Scale indicate that students tend to feel motivated to study and learn and that female students seem to be more motivated than male students. Data similar to those of the present study on motivation to learn and gender were obtained by Ghazvini and Khajehpour (2011). The intercorrelations between the factors that compose the Motivational Regulation Scale were positive, low and moderate, showing, on the one hand, that the factors are different constructs. On the other hand, students who tend to use one of the strategies are also likely to use the others. Similar results were found by Ferreira (2018) and Wolters (1999). It was also interesting to note that the correlations of the factors of the Motivational Regulation Scale with the LASSI Motivation Scale were all positive and moderate in magnitude for four of the five factors and low in only one of them.

The data also showed that even students who were motivated to study and learn reported use of strategies to maintain their motivation based more on the strategies listed in "Performance self-talk", "Self-consequating", "Mastery self-talk" and "Environmental control" factors and less on those that compose the "Interest enhancement" factor, whose correlation was weak with LASSI Motivation Scale.

In general, results found were instigating because they challenge, in a way, the literature that indicates that the more motivated to study and learn is the student, the less he tends and needs to use strategies to regulate their motivation (Wolters, 2003; Wolters & Rosenthal, 2000). The preexisting motivation to learn would be sufficient to ensure student engagement in learning and study situations, and strategies to maintain and control motivation are not necessary. Thus, they confirm the need for more studies on the relationships between the motivational levels of students and the use of strategies to regulate their motivation. Moreover, they lead to the hypothesis that it may be positive that even students who are motivated to learn, know and make use of motivational regulation strategies, since the increasing demands imposed by the advancement of schooling are not necessarily accompanied by pleasurable activities to keep students truly focused on them. Nevertheless, it leads us to reflect on the fact that if school activities and contents were presented to students in an interesting way and thus aroused their interest, maybe it would not even be necessary for them to use strategies to maintain motivation.

Furthermore, future studies are also needed to deepen the relationship between gender and motivation to learn and the use of strategies to regulate motivation, since female students in the present study reported both higher motivation to learn and higher use of strategies to regulate their motivation. The data obtained in the present study do not allow generalizing whether male students would need to be more encouraged to use motivational regulation strategies and have their motivation to learn more strengthened.

Although the present study has important contributions to the advancement of knowledge about the constructs investigated, especially for the Brazilian context, it certainly has limitations that must be overcome by future research, given its important psychoeducational implications. A limitation of the present study was to use only self-report instruments, which may have generated social desirability. For future research, it is suggested that other instruments be used and that qualitative measures be combined with quantitative ones. The two instruments applied in the present study, despite having good internal consistency, which were similar to those found in international studies, are still in the process of validation in Brazil. Another limitation of the present study may be related to the fact that the Motivational Regulation Scale requires students to reflect on what they do to deal with school tasks they considered boring/uninteresting. The results of the present study could have been different if the items dealt with more specific school content in different areas of knowledge, such as Portuguese and/or Mathematics, or dealt with specific school tasks. Thus, it is recommended that, in future studies, other types of school activities and contents be considered, as new motivational regulation strategies can emerge from them.

The sample size is another limitation of this study. It is suggested that future studies investigate the motivation to learn and the strategies to regulate it in larger and more representative samples, as well as

in other segments of schooling and in association with both sociodemographic variables and with other key constructs for learning, such as self-efficacy beliefs and the use of learning strategies, among other possibilities.

Conclusion

Research on the variables that impact learning is essential in the educational and academic context, especially when considering the low performance of Brazilian High School students in large-scale national and international tests. The present study presents important results on two psychological variables still not much investigated in Brazilian High School students, such as the motivation to learn and the strategies to maintain it. It shows that these variables are positively associated and that they differ in relation to some sociodemographic characteristics of the sample. As the importance that motivation plays for learning is well acknowledged by research, Brazilian schools need to invest more efforts in fostering motivation to learn and strategies to maintain it among their students. It is equally important that interventions to strengthen them be designed based on scientific evidence.

Acknowledgments

The authors thank *Espaço da Escrita* (*Coordenadoria Geral – Universidade Estadual de Campinas*) for the language services provided via American Journal Experts (AJE) digital translation.

Contributors

Both authors contributed equally to the writing and revision of the article.

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Received: March 15, 2021
Final version: September 10, 2021
Approved: April 18, 2022