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Original Article

HIGH SCHOOL STUDENTS' ACADEMIC PERFORMANCE ASSOCIATED WITH PSYCHOLOGICAL ASPECTS, BODY PRACTICES AND PHYSICAL ACTIVITY

DESEMPENHO ACADÊMICO DE ESTUDANTES DO ENSINO MÉDIO ASSOCIADO A ASPECTOS PSICOLÓGICOS, PRÁTICAS CORPORAIS E ATIVIDADE FÍSICA

Guilherme da Silva Gasparotto[1,2], Aline Bichels[2], Thaynara do Prado Szeremeta[2], Gislaine Cristina Vagetti[2,3] and **Valdomiro de Oliveira[2]**

[1]Federal Institute of Education, Science and Technology of Paraná, Pinhais-PR, Brazil.
[2]Federal University of Paraná, Curitiba-PR, Brazil.
[3]State University of Paraná, Curitiba-PR, Brazil.

RESUMO

O objetivo desse estudo foi verificar a associação de fatores psicológicos e de práticas corporais com o desempenho acadêmico de estudantes do ensino médio. Uma amostra de 330 estudantes participou do estudo, sendo 167 meninas e 163 meninos. Por meio de instrumentos de escala *Likert* foram coletadas informações sobre o autoconceito, autoeficácia geral e acadêmica, também foi contabilizado o tempo em atividade física moderada a vigorosa, bem como a participação em diversos tipos de práticas corporais, como esportes, danças, lutas, artes cênicas e exercícios físicos sistematizados. Já o desempenho acadêmico foi referido com base no conceito obtido pelo estudante nas disciplinas do núcleo comum de aprendizagem. A análise de regressão linear foi utilizada para verificar a associação das variáveis independentes com o desempenho acadêmico. Foi observado que o modelo de regressão ajustado explicou entre 7% e 36% da variância do desempenho acadêmico, sendo que o Autoconceito pode explicar o desempenho acadêmico de seis das doze disciplinas e ainda a média dos conceitos, com valores de *Beta* entre 0,13 (p=0,02) para Sociologia e 0,28 (p<0,01) para Matemática. A autoeficácia acadêmica explicou o desempenho de onze disciplinas, além da média dos conceitos, com valores de *Beta* entre 0,21 (p<0,01) para Educação Física e Filosofia e 0,44 (p<0,01) para Biologia. Já a participação em projetos relacionados a práticas corporais pode explicar o desempenho acadêmico de seis disciplinas e ainda a média dos conceitos, com valores de *Beta* entre 0,14 (p=0,02) para Sociologia e 0,31 (p<0,01) para Artes. Percebeu-se então, que as variáveis psicológicas estudadas e a participação em projetos de práticas corporais em contraturno foram associadas com o desempenho acadêmico em diversas disciplinas escolares e na média dos conceitos.

Palavras-chave: Autoeficácia. Autoimagem. Esportes. Estudantes. Sucesso acadêmico.

ABSTRACT

The objective of this study was to verify the association of psychological factors and body practices with the academic performance of high school students. A sample of 330 students participated, made up of 167 girls and 163 boys. Likert scale instruments were used for collecting information on self-concept, and on general and academic self-efficacy. Time spent on moderate to vigorous physical activity was recorded, and so was participation in several types of body practices, such as sports, dances, martial arts, performing arts, and systematic physical exercises. Academic achievement was referred to from the students' grades on regular subjects. Linear regression analysis was used for verifying the association of independent variables with academic performance. The adjusted regression model explains between 7% and 36% of academic performance variance, whereas Self-Concept explains academic performance on six of the twelve subjects, and the mean of the grades, with Beta values between 0.13 (p = 0.02) for Sociology and 0.28 (p <0.01) for Mathematics. Academic self-efficacy explained performance on eleven subjects and the mean of the grades, with Beta values between 0.21 (p <0.01) for Physical Education and Philosophy, and 0.44 (p <0.01) for Biology. Participation in extracurricular activities involving body practices explained academic performance on six subjects and the mean of the grades, with Beta values between 0.14 (p = 0.02) for Sociology and 0.31 (p <0.01) for Arts. The studied psychological variables and participation in projects concerning body practices during extracurricular activities correlated with academic achievement as to several school subjects, and with the mean of the grades.

Keywords: Self-efficacy. Self-image. Sports. Students. Academic success.

Introduction

Academic performance results from the interaction of intrinsic and extrinsic factors referring to students[1,2]. In addition to exposure to and interaction with scientific content developed by the school, the apprehension of knowledge may be related, among other aspects, to their family's social condition, family environment and psychological characteristics[3].

Within a variety of psychological indicators addressed by researchers in the field of educational psychology, it is possible to perceive an important relationship of academic performance with self-concept and self-efficacy, the latter being treated as a competence in some studies[4]. Self-concept can be defined as an individual's perception of themselves and the concept formed of themselves, based on a socially projected ideal. This construct can be perceived in some dimensions, such as academic, emotional, social or physical self-concepts. Each one is related to different situations of human behavior[5]. Self-efficacy is the perception of an individual's ability to perform various tasks[6]. These studies have addressed self-efficacy in general terms or academically[7].

Other investigations also present different factors that can interfere with academic performance[8,9]. Abruzzo et al.[10] suggest that participation in institutional projects, of varied nature, outside school hours, can favor the improvement of a student's academic performance. These authors showed that participation in projects involving different body practices explained one third of the academic performance variance in a sample of American students.

Therefore, by knowing that different factors can impact academic performance, in addition to covering formal-scientific content, schools and their agents may be able to act in different ways towards the student's academic development. From this perspective, educational institutions could be more equipped to act on psychological aspects and on the different practices that can be explored in school context, than in other domains that may be related to student performance, such as family social condition and personal relationships outside the school[1,11].

Although several studies bring important school performance correlates, a big portion of the investigations that have analyzed these relationships have been conducted with samples composed of children. Therefore, it is difficult to expand the understanding of these results to other age groups within the school, especially adolescents[12,13]. In those researches, psychological indicators were given special importance as school performance predictors, and little has been explored in other practices, such as activities outside school hours, or regular physical activity[14,15].

Presenting possible determinants of academic performance among adolescents is important, since this phase of human development is marked by changes and definitions of concepts and behaviors, which can be fundamental for a good psychological development and, consequently, for control and success in several dimensions of their lives, including in the school environment[4,16]. Adolescence is characterized by the student transitioning from childhood education to high school, which impacts their routine and academic demands, in a moment of intense body, social and emotional changes. These changes need to be absorbed by teenagers at a time of psychological vulnerability, when they are expected to be good students, behave well, and perform satisfactorily in school. These expectations can be frustrated, in part, if the school does not adopt appropriate and attractive methodologies for students in this period of their lives.

With this understanding in mind, it is possible to outline pedagogical approaches that favor the development of these psychological attributes and extracurricular practices, which can interfere with school performance.

In light of the foregoing, this study aimed to verify the association of self-concept, self-efficacy, participation in body practice projects outside school hours, and physical activity with the academic performance of high school students.

Methods

Ethical Aspects

This study was approved by the Research Ethics Committee of the Federal University of Paraná, under legal opinion No 2.327.626, and CAAE 75760017.6.0000.0102.

Population and Sample

The study population was made up of students, of both sexes, attending technical-education-integrated high school, from several campuses of Paraná's Federal Institute of Education, Science and Technology (IFPR). The IFPR has 25 campuses in different regions of the state, 15 of which were represented by a sample of 330 students, including 167 girls and 163 boys, selected and invited by convenience. As selection criterion, the students should be aged between 14 and 17 years old and enrolled in high school/technical courses offered by the IFPR, at any unit of the institution.

The invitation was first made to Physical Education teachers from all campuses that offered body practice projects outside school hours. The teachers who agreed to assist in the research received training to apply the questionnaires used in it. All students involved in projects, who met the eligibility criteria, were invited to join. The same number of students not participating in body practice projects, making up the same number of boys and girls, was also assessed.

Instruments and Procedures

Independent Variables

To assess the self-concept construct, the AF5 Self-Concept Multidimensional Scale was employed. It measures the participants' self-concept in five dimensions: academic, family, physical, social and emotional. It is suitable for measuring self-concept in students, from the fifth grade to college, and in uneducated adults. This instrument was validated for Portuguese by Coelho et al.[17]. It consists of 30 elements formulated in positive and negative terms. Answers range from 1 to 99, with "1" being the score that designates total disagreement with the statement, and "99" meaning total agreement with it. The scale presented Cronbach's Alpha values varying from 0.70 to 0.83 among its dimensions.

In this research, self-efficacy was assessed in two ways: 1) Perceived General Self-Efficacy Scale, which covers general aspects of the individual's life; and 2) Academic Self-Efficacy Scale, which deals with the individual's perception of their own academic competence.

The Perceived General Self-Efficacy Scale, validated for Portuguese by Sbicigo et al.18, is a Likert-type instrument with ten items on a scale from 1 to 5; the higher the score, the higher one's self-efficacy perception. Each item refers to the achievement of goals and implies a stable internal attribution of success. The original Scale presents a 0.84 Cronbach's Alpha.

The Academic Self-Efficacy Scale, designed and validated by Neves and Faria[19], is a Likert-type instrument with twenty-six items on a scale from A to F (six points). It measures general academic self-efficacy in Portuguese and mathematics. In the instrument validation study, the scale presented a Cronbach's Alpha ranging from 0.88 to 0.95.

Engagement in physical activity was assessed through the International Physical Activity Questionnaire (IPAQ - short version), validated for adolescents by Guedes et al.[20] This instrument consists of four questions with a and b subdivisions, referring to engagement in activities – walking, moderate activity, vigorous activity – and to sedentary practice time. The questions are made up of items covering activity frequency and quantity per session in minutes. The students were classified as active when they met the WHO recommendation of

420 minutes (60 daily minutes) or more of moderate-vigorous physical activity (MVPA) per week[21].

To classify the students socioeconomically, the methodology of the Brazilian Association of Polling Companies[22] was used; the individual checked how many of the items listed on the instrument they had: television, radio, bathroom, car, monthly-wage housekeeper, washing machine, VCR/DVD, fridge, freezer, microcomputers, dishwasher, microwaves, motorcycles, clothes dryer; they should also inform whether their residence had water coming from the distribution network, and whether their street was paved, in addition to the educational level of their household's head. Scores were attributed to the quantity of each item owned and, after summed, indicated the students' socioeconomic classification, according to the methodology of the instrument. Thus, the participants were classified into A, B, C, D and E.

A demographic questionnaire was also prepared for information concerning: age, sex, participation in any school sports project outside school hours, participation in any project involving other body practices (dance, fight, performing arts, or systematic physical exercises). Those who reported a minimum frequency of four weekly hours divided into at least two days a week were considered as participating in a project.

Dependent Variables

Academic performance outcome was measured by the last bimonthly grade, attributed to the student's performance throughout the period, on all curricular components belonging to the common core (Arts, Biology, Physical Education, Philosophy, Physics, Geography, History, Foreign Language, Portuguese, Mathematics, Chemistry and Sociology), in addition to the weighted average of the values attributed to grades on all components.

At the institution participating in the study, school performance is graded as follows: A, B, C and D, with A being the highest grade, and D the lowest one. For analysis purposes, values were attributed to said grades: A = 4, B = 3, C = 2 and D = 1.

Statistical Analysis

Data were tabulated and analyzed by means of the Statistical Package for the Social Sciences (SPSS 24.0). Data normality was assessed using the Kolmogorov-Smirnov test. For descriptive statistics, central tendency (mean) and dispersion (standard deviation) measures were determined for all continuous variables. Categorical variables were expressed as absolute (n) and relative (%) frequencies. To determine internal consistency, the alpha homogeneity coefficient was calculated for each one of the scales used for assessing self-concept, general self-efficacy, and academic self-efficacy. Spearman's correlation test was employed to verify correlations among variables. To analyze the association of independent variables with the students' academic performance, linear regression analysis was run. For said analysis, the regression model was controlled by age, sex, and socioeconomic status. Significant results were considered those whose p value was lower than 5%.

Results

The scales used for measuring academic self-efficacy, self-concept, and perceived general self-efficacy were subjected to Cronbach's Alpha reliability test and presented the following values: Academic Self-efficacy Scale: $\alpha = 0.79$; AF5 Self-Concept Multidimensional Scale: $\alpha = 0.81$; Perceived General Self-Efficacy Scale: $\alpha = 0.78$. Thus, the consistency of the scales stood between reasonable and good.

Table 1 displays a descriptive analysis in terms of relative and absolute frequencies for sex, participation in projects involving institutional body practices, and socioeconomic level, and in terms of mean and standard deviation for values attributed to the students' grades.

Table 1. Descriptive analysis in terms of relative and absolute frequencies for sex, participation in projects involving institutional body practices, and socioeconomic level, and in terms of mean and standard deviation for values attributed to the grades of students attending technical-education-integrated high school from the IFPR, Paraná

Variables	Percentage	N
Sex		
Male	49.4	163
Female	50.6	167
Participation in projects		
Yes	63.6	210
No	36.4	120
Socioeconomic level		
A	39.7	131
B	49.1	162
C	10.6	35
D	0.6	02
	Mean	**SD**
Age (years)	16.1	0.6
General Self-Concept	62.9	13.2
Academic Self-Efficacy	34.7	8.3
General Self-Efficacy	29.9	4.7
MVPA	339	121
Arts Grade	3.6	0.7
Biology Grade	2.8	0.8
Physical Education Grade	3.5	0.7
Philosophy Grade	3.1	0.9
Physics Grade	2.6	0.9
Geography Grade	3.2	0.8
History Grade	3.3	0.8
Foreign Language Grade	3.2	0.8
Portuguese Grade	3.1	0.9
Math Grade	2.7	1.1
Chemistry Grade	2.6	1.1
Sociology Grade	3.1	0.8
Mean of the grades	3.1	0.5

Note: MVPA: Moderate-vigorous physical activity
Source: The authors

The correlation analysis for age, sex, socioeconomic level, participation in institutional projects involving body practices, MVPA, self-concept, academic self-efficacy, and general self-efficacy with the students' academic performance (Table 2) showed a weak and inverse correlation for the sex variable with academic performance on geography, history and Portuguese. Participation in body practice projects outside school hours showed positive, weak to moderate correlation values for performance on arts, biology, physics, history, foreign language, portuguese, mathematics, and for average performance on all subjects. Self-concept also showed a weak to moderate correlation with performance on most subjects, except for arts, philosophy and history. The values of the highest correlation coefficients were identified in the relationship between the students' academic self-efficacy and academic

performance. This correlation was found for almost all subjects, except for arts. Finally, perceived general self-efficacy did not correlate with the means of the students' academic performance values.

Age, socioeconomic status and MVPA time showed no correlation with the students' academic performance on any subject.

Table 2. Correlation among age, sex, socioeconomic level, participation in institutional projects involving body practices, MVPA, self-concept, academic self-efficacy, and general self-efficacy with the academic performance of students attending technical-education-integrated high school from the IFPR, Paraná

Variables	ART	BIO	PHYS EDUC	PHIL	PHY	GEO	HIS	FL	POR	MATH	CHE	SOC	Mean
Age	-0.03	-0.01	0.02	-0.07	-0.09	0.08	0.06	0.02	0.04	-0.09	-0.07	0.07	0.08
Sex	0.05	-0.06	-0.02	-0.06	0.04	-0.15*	-0.14*	-0.08	-0.19*	0.01	-0.09	-0.09	-0.13
SEL	-0.03	-0.05	0.02	-0.06	-0.04	0.11	0.03	-0.02	0.03	0.01	-0.01	-0.05	-0.02
Projects Part.	0.29*	0.26*	0.09	-0.05	0.26*	-0.02	0.29*	0.22*	0.23*	0.25*	-0.04	0.06	0.26*
MVPA	-0.03	0.07	0.04	-0.01	-0.07	-0.08	0.09	-0.11	-0.06	0.07	0.04	-0.05	-0.08
Self-Concept	0.01	0.28*	0.26*	0.06	0.29*	0.13*	-0.04	0.22*	0.24*	0.32*	0.34*	0.26*	0.28*
Academic Self-Concept	0.08	0.46*	0.29*	0.21*	0.42*	0.31*	0.25*	0.31*	0.28*	0.43*	0.44*	0.36*	0.44*
General Self-Efficacy	-0.01	0.11	-0.02	0.02	0.09	0.03	-0.01	-0.02	0.09	0.06	0.11	0.06	0.07

Note: SEL: Socioeconomic level; MVPA: Moderate-vigorous physical activity; ART: Arts; BIO: Biology; PHYS EDUC.: Physical Education; PHIL: Philosophy; GEO: Geography; HIS: History; FL: Foreign Language POR: Portuguese; MATH: Mathematics; CHE: Chemistry; SOC: Sociology; * $p < 0.05$
Source: The authors

Adjusted R^2 values, for the suggested model, explained between 7% and 36% of the variance in the students' academic performance values, among the studied subjects. Self-concept had a significant participation in these results for physical education, physics, geography, mathematics, and in the mean of the values attributed to academic performance. In its turn, academic self-efficacy did not help explain the variance in the students' performance on arts. General self-efficacy showed such an association with these subjects: physical education, geography, foreign language, and mathematics. The participation of the students in body practice projects outside school hours helped explain the variance in school performance on arts, history, foreign language, Portuguese, mathematics, sociology, and in the mean of the values attributed to their academic performance. Table 3 displays an analysis of association among the independent variables: self-concept, academic self-efficacy, general self-efficacy, participation in body practice projects, and minutes spent on MVPA, with the means of the values attributed to academic performance grades adjusted for the students' age, sex and socioeconomic classification.

Table 3. Linear regression for self-concept, academic self-efficacy, general self-efficacy, participation in body practice projects, and minutes spent on MVPA (independent variables) with the means of the values attributed to academic performance grades adjusted for the age, sex and socioeconomic classification of students attending technical-integrated-education from the IFPR, Paraná

Variables	**Adjusted R^2**	**Beta**	**SE**	**95% CI Beta**	**Standardized Beta**	**p**
Self-Concept						
Arts	0.10	-0.004	0.04	- 0.012 – 0.004	- 0.08	0.31
Biology	0.23	0.007	0.01	- 0.002 – 0.009	0.10	0.12
Physical Education	0.15	0.012	0.04	0.02 – 0.017	0.17	0.01*
Philosophy	0.07	0.005	0.05	0.005 - 0.014	0.07	0.31
Physics	0.25	0.016	0.05	0.06 – 0.021	0.24	<0.01*
Geography	0.12	0.018	0.01	0.011 – 0.022	0.17	0.01*
History	0.21	0.001	0.05	0.001 – 0.009	0.01	0.92
Foreign Language	0.23	0.006	0.05	0.001 – 0.01	0.11	0.23
Portuguese	0.24	0.004	0.05	0.002 – 0.009	0.09	0.44
Math	0.31	0.016	0.05	0.002 – 0.027	0.28	<0.01*
Chemistry	0.26	0.019	0.06	0.007 – 0.029	0.24	0.01*
Sociology	0.18	0.011	0.04	0.001 – 0.018	0.13	0.04*
Mean of the grades	0.36	0.015	0.03	0.009 – 0.019	0.12	0.02*
Academic Self-Efficacy						
Arts	-	0.009	0.06	0.003 – 0.021	0.11	0.13
Biology	-	0.047	0.07	0.034 – 0.061	0.44	<0.01*
Physical Education	-	0.022	0.06	0.009 – 0.033	0.21	<0.01*
Philosophy	-	0.022	0.07	0.009 – 0.031	0.21	<0.01*
Physics	-	0.038	0.08	0.023 – 0.053	0.31	<0.01*
Geography	-	0.027	0.03	0.012 – 0.038	0.23	<0.01*
History	-	0.037	0.07	0.024 – 0.051	0.32	<0.01*
Foreign Language	-	0.035	0.07	0.021 – 0.051	0.29	<0.01*
Portuguese	-	0.026	0.05	0.012 – 0.041	0.23	<0.01*
Math	-	0.051	0.08	0.036 – 0.066	0.37	<0.01*
Chemistry	-	0.036	0.08	0.021 – 0.053	0.28	<0.01*
Sociology	-	0.035	0.06	0.021 – 0.049	0.35	<0.01*
Mean of the grades	-	0.036	0.05	0.028 – 0.044	0.48	<0.01*
General Self-Efficacy						
Arts	-	0.004	0.01	- 0.024 – 0.015	0.03	0.65
Biology	-	- 0.018	0.01	- 0.04 – 0.003	- 0.10	0.12
Physical Education	-	0.028	0.02	0.011 – 0.034	0.12	0.02*
Philosophy	-	- 0.006	0.01	- 0.028 – 0.016	-0.03	0.61
Physics	-	- 0.020	0.01	- 0.045 – 0.006	- 0.11	0.12
Geography	-	0.043	0.02	- 0.007 – 0.093	0.12	0.04*
History	-	0.001	0.01	- 0.021 – 0.023	0.06	0.92
Foreign Language	-	0.019	0.01	0.005 – 0.029	0.11	0.04*
Portuguese	-	0.007	0.01	- 0.016 – 0.031	0.03	0.52
Math	-	0.035	0.02	0.011 – 0.044	0.16	0.01*
Chemistry	-	- 0.009	0.01	- 0.037 – 0.018	- 0.04	0.51
Sociology	-	- 0.008	0.02	- 0.031 – 0.015	- 0.05	0.49
Mean of the grades	-	- 0.007	0.01	- 0.021 – 0.006	- 0.06	0.27
Participation in projects						
Arts	-	0.391	0.09	0.213 – 0.593	0.31	<0.01*
Biology	-	0.114	0.08	- 0.104 – 0.322	0.06	0.31
Physical Education	-	0.022	0.09	- 0.196 – 0.181	0.08	0.54
Philosophy	-	- 0.165	0.112	- 0.324 – 0.051	- 0.09	0.13
Physics	-	0.187	0.124	- 0.068 – 0.438	0.09	0.15
Geography	-	0.142	0.253	- 0.357 – 0.642	0.03	0.57
History	-	0.293	0.111	0.121 – 0.469	0.16	0.02*

Table 3 continues...

Variables	Adjusted R^2	Beta	SE	95% CI Beta	Standardized Beta	p
Foreign Language	-	0.342	0.112	0.121 – 0.564	0.18	0.01*
Portuguese	-	0.286	0.110	0.057 – 0.516	0.15	0.01*
Math	-	0.346	0.112	0.101 – 0.598	0.16	<0.01*
Chemistry	-	0.148	0.141	- 0.012 – 0.452	0.07	0.29
Sociology	-	0.229	0.118	- 0.042 – 0.459	0.14	0.04*
Mean of the grades	-	0.134	0.065	0.004 – 0.254	0.11	0.03*
MVPA (minutes)						
Arts	-	0.024	0.03	- 0.011 – 0.043	0.12	0.09
Biology	-	0.003	0.06	- 0.035 – 0.013	0.06	0.31
Physical Education	-	0.008	0.07	- 0.025 – 0.018	- 0.01	0.84
Philosophy	-	0.011	0.06	- 0.012 – 0.028	- 0.09	0.13
Physics	-	0.021	0.06	- 0.012 – 0.048	0.11	0.09
Geography	-	0.009	0.08	- 0.002 – 0.028	- 0.02	0.71
History	-	0.019	0.07	0.007 – 0.046	0.12	0.12
Foreign Language	-	0.024	0.05	0.009 – 0.046	0.16	0.08
Portuguese	-	0.021	0.07	0.005 – 0.037	0.12	0.10
Math	-	0.005	0.06	- 0.015 – 0.014	0.06	0.66
Chemistry	-	0.003	0.08	- 0.012 – 0.012	0.05	0.51
Sociology	-	0.026	0.07	0.005 – 0.043	0.11	0.09
Mean of the grades	-	0.025	0.08	0.009 – 0.041	0.09	0.12

Note: R^2: Adjusted model; SE: Standard error; CI: Confidence interval; MVPA: Moderate-vigorous physical activity; * p <0.05
Source: The authors

Discussion

The purpose of the study was to verify how the variables suggested in the analysis model could account for the students' academic performance. It was possible to observe that only time spent on MVPA was not related to the students' grades as a form of performance. It is worth mentioning that the objective was not to discuss the effectiveness of this type of assessment in measuring the students' knowledge, but rather to use one of the few possible quantitative measures to try to unravel correlations with the selected attributes. In this sense, the concepts and grades, transformed into values and expressed as means in this study, could help understand these relations. Several recent international studies have also used grades, or even scores on tests outside the school, to run similar analyses[7,23,24]. Castejón et al.[23] used grades on nine subjects taught at a Spanish secondary school to assess the academic performance of 1,400 teenage students. Similarly, Lone and Lone[24] also used the grades recorded on the school records of 248 Indian students enrolled in high school.

Academic self-efficacy was the attribute that most correlated to the students' performance; only the grades on the arts subject cannot be partially explained by this variable. This result is in line with Bandura's idea[25], which suggests that students with a high belief in academic efficacy may be more available for studying and more persistent in the face of academic challenges. From this perspective, even those with modest performance skills, if they believe in their ability, could achieve good results. Pajares and Olaz[26] tested this premise and found that students who believed in their ability to perform well predicted good academic results, regardless of their cognitive skills.

As for academic self-efficacy, Schunk and Ertmer[27] also state that students with a good level of academic self-efficacy are more motivated to use self-regulation processes. Thus, the belief in self-efficacy can contribute to the use of self-regulatory learning strategies, such as setting goals and objectives, as well as selecting and adopting learning strategies. As observed, the results corroborate the findings of some previous studies. However, one must

pay attention to what Honicke and Broadbent[28] suggest in a systematic review on the relationship between academic self-efficacy and school performance, in which they stress the need for a cautious analysis, since this relationship is complex and presents interaction with several mediating variables.

Unlike what Bandura[25] suggested when proposing that efficacy expectations have a strong tendency to generalize, that is, the belief that being able to perform a task successfully in some domain can easily affect the same expectation in another domain, in present study, the relationship between general self-efficacy and academic performance was not as expressive as with academic self-efficacy, although it was related to the results of some subjects. From this viewpoint, the belief in diverse skills did not necessarily reflect on academic performance. This result is in line with what Jansen et al.[7] suggest when proposing the application of an academic self-efficacy scale to students, since it takes the school context into account. These authors further specifies the type of self-efficacy to be assessed, when using an instrument to detect the perception of specific self-efficacy in sciences. Similarly, Aurah[29] also used a scale to assess science-specific academic self-efficacy. In said research, the authors found that the greater the perception of this type of self-efficacy, the better the academic performance, among more than two thousand teenage students from Kenya.

Self-concept is referred to as one of the main psycho-affective constructs that can interfere with a student's academic performance[30-32]. In the present study, this attribute helped explain the students' performance on most subjects, in addition to the overall means of the grades. This result reinforces the idea that a positive perception of oneself compared to peers and under the expectation of a socially created ideal can result in successful tasks. Awuan et al.[9] suggest that a positive self-concept is capable of impacting a student's level of motivation and consequently improve academic performance. Motivation, according to the authors, is highly stressed as a psychological need for one to develop their own autonomy, which, in its turn, implies choosing experiences, as well as maintaining and regulating their behaviors. In a recent systematic review on the relationship between self-concept and academic performance, Gasparotto et al.[1] showed that, although other factors are related to an adolescent's academic performance, the variable that best explains this outcome is the student's self-concept.

Lone and Lone[24] point out that, once an association between general self-concept and academic performance has been identified, it is necessary to take into account the academic planning that the institution has carried out, in order to give students the opportunity to develop guided and playful activities inside and outside the school, aimed at boosting self-concept. Castejón et al.[23] identified higher values for self-concept among students with high academic performance, compared to those with medium and low performance. These authors suggested that the success of students with high academic performance lies in the number and diversity of learning strategies that they are capable of developing and in their willingness to work on them. They also mention that further research is needed to determine whether the lower academic self-concept among students with low school performance derives from compensation due to low personal self-concept.

Another factor that correlated to the students' academic performance was participation in body practice projects outside school hours. Participation in extracurricular activities offered by the school has already been reported as a predictor of the academic performance of American students by Abruzzo et al.[10]. For these researchers, frequent engagement in sports and participation in other activities organized by the school, outside school hours, such as music, theater and others, explained, along with self-concept, more than one third of the academic results of those students. These authors highlight sports as an environment that favors self-concept and, consequently, improves school performance. Soares et al.[33] identified a relationship between sports and academic success among Portuguese high school students.

These authors could observe that girls who played sports presented better academic performance than those who did not play, in addition to presenting lower retention rates.

Some authors have suggested that systematic body practices, as well as regular physical activity, could play an important role in mediating the perception of important psychological variables related to a student's academic performance, such as self-concept and self-efficacy (or perceived competence). Bao and Jin[34] carried out an experiment in which a group of adolescents received Tai Chi classes for a year, every week. The authors found that, compared to a control group, the experimental group improved their self-concept and school performance, in addition to other factors such as anxiety and wellbeing. For the researchers, the students were able to develop a better cognitive self-perception, enabled by the Tai Chi teachings focused on concentration.

Differently from what was observed with the participation in projects involving body practices, time spent on MVPA did not correlate with academic performance. Nevertheless, it is necessary to explore this variable more effectively, as well as participation in other body practices as a possible mediator of the relationship between psychological constructs and academic performance, since correlations have already been identified between regular engagement in physical activities and self-concept, self-esteem and self-efficacy[35,36].

In short, this study reported moderate associations of self-concept and of participation in body practice projects with the academic performance of adolescents on half of the school subjects, and academic self-efficacy was the factor that most strongly correlated with performance on almost all subjects; only one was not associated. However, MVPA did not show any association with the students' academic performance.

The present research had some limitations that must be taken into account when interpreting results. Although the sample includes students from fifteen of the twenty-five institutional campuses in the state, it was composed and selected by convenience and is not representative of the population in question, which makes it difficult to extrapolate its results. One must consider that the addressed psychological constructs are multidimensional and difficult to be measured objectively; therefore, caution is necessary to avoid incurring in a simplistic analysis of the importance of these variables. However, these attributes have already been tested with the instruments used in this investigation and are widely cited in the current literature. Finally, concept (and grade) is one of the ways to assess student performance and represents a product at the end of a cycle, composed of other evaluation measures used by the teacher. However, according to the literature, it is one of the best quantitative indicators to infer on a student's academic performance.

Conclusions

It was possible to observe that self-concept, academic self-efficacy, general self-efficacy and participation in body practice projects outside school hours presented correlations with the students' academic performance, represented by the mean of the values attributed to the grades on the subjects related to the common core of the academic curriculum. MVPA did not correlate with the students' academic performance.

Self-concept and participation in body practice projects presented moderate associations in half of the subjects listed for the study, corresponding to the common core of school education. General self-efficacy presented the least significant associations with some of the subjects. In its turn, academic self-efficacy stood out among the explanatory factors of academic performance, and did not show any association with only one of the twelve subjects; the highest association values were also found for this factor.

The results of this study allow suggesting that schools should seek alternatives to improve the academic performance of high school students, beyond the traditional

development of theoretical-scientific teaching, using methodologies that favor psychological attributes related to self-perception, such as self-concept and self-efficacy, presented in this study. Moreover, students must be provided with an environment that enables body practices, such as sports, dances, fights, performing arts, which proved to be a relevant option for the academic development of adolescents.

Future studies could focus on a longitudinal observation of groups participating and not participating in body practices and regular physical activity, in order to verify how the academic performance of these groups behaves over time. Another suggestion is the attempt to use a representative sample towards establishing more robust conclusions about the results.

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Author's **ORCID:**
Guilherme da Silva Gasparotto: https://orcid.org/0000-0002-9712-7571
Aline Bichels: https://orcid.org/0000-0001-5161-8706
Thaynara do Prado Szeremeta: https://orcid.org/0000-0002-9071-7886
Gislaine Cristina Vagetti: https://orcid.org/0000-0003-0704-1297
Valdomiro de Oliveira: https://orcid.org/0000-0002-8709-8471

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Author address: Guilherme da Silva Gasparotto. Rua Governador Jorge Lacerda, 244 casa 04, Guabirotuba – Curitiba/PR. CEP [Postal code]: 81510040. Email: guilhermegptt@gmail.com