BRAZILIAN STUDENTS' LEARNING AND STUDY STRATEGIES IN TEACHER EDUCATION PROGRAMS

ESTRATÉGIAS DE ESTUDO E APRENDIZAGEM DE ESTUDANTES BRASILEIROS EM CURSOS DE FORMAÇÃO DE PROFESSORES

ESTRATEGIAS DE ESTUDIOS Y APRENDIZAJE DE ESTUDIANTES BRASILEÑOS EN CURSOS DE FORMACIÓN DE PROFESORES

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Abstract

This investigation is part of a larger ongoing research carried out in interinstitutional exchange with several universities in Brazil, one in the United States, and one in Portugal. Its main objectives are to identify the study and learning strategies of Brazilian university students from a public educational institution in the state of São Paulo and to analyze them in relation to students' sociodemographic and academic life variables. The study included 163 university students enrolled in teacher education programs. Data were collected with the Learning and Study Strategies Inventory (LASSI – 3rd edition) – translated and adapted for use in Brazil – and a sociodemographic questionnaire. Descriptive and inferential statistical procedures were employed for data analysis. Students responded to the survey on the Platform *Autorregular* developed for the research. Overall, students reported using a range of learning and study strategies, with LASSI scale means near the mid-point of the five-point response

scale. Significant relationships were found between LASSI scales and sociodemographic and academic life variables. We hope that data gathered in the present study can contribute to increase knowledge about factors that promote self-regulated learning and empower students towards college success in Brazil.

Keywords: Self-regulation of Learning. University Students. Learning Strategies. Teacher Education.

Resumo

Esta investigação faz parte de uma pesquisa em andamento realizada em intercâmbio interinstitucional com várias universidades no Brasil, uma nos Estados Unidos e uma em Portugal. Seus principais objetivos são identificar as estratégias de estudo e aprendizagem de estudantes universitários brasileiros de uma instituição pública de ensino do estado de São Paulo e analisá-las em relação às variáveis sociodemográficas e de vida acadêmica dos estudantes. O estudo incluiu 163 estudantes universitários matriculados em programas de formação de professores. Os dados foram coletados com o Inventário de Estratégias de Aprendizagem e Estudo (LASSI – 3ª edição) – traduzido e adaptado para uso no Brasil – e um questionário sociodemográfico. Procedimentos estatísticos descritivos e inferenciais foram empregados para a análise dos dados. Os alunos responderam à pesquisa na Plataforma Autorregular desenvolvida para a pesquisa. No geral, os alunos relataram usar uma gama de estratégias de aprendizagem e estudo moderadamente, o que, na pontuação da escala LASSI, significa perto do ponto médio da escala de resposta de cinco pontos. Foram encontradas relações significativas entre as escalas LASSI e as variáveis sociodemográficas e de vida acadêmica. Esperamos que os dados coletados no presente estudo possam contribuir para o aumento do conhecimento sobre fatores que promovem a aprendizagem autorregulada e capacitam os alunos para o sucesso no Ensino Superior no Brasil.

Palavras-chave: *Autorregulação da Aprendizagem. Estudantes Universitários. Estratégias de Aprendizagem. Formação de Professores.*

Resumen

Esta investigación es parte de una pesquisa en curso llevada a cabo en intercambio interinstitucional con varias universidades en Brasil, una en los Estados Unidos y otra en Portugal. Sus objetivos principales son identificar las estrategias de estudio y aprendizaje de estudiantes universitarios brasileños de una institución educativa pública en el estado de São Paulo, así como examinarlas en relación con las variables sociodemográficas. El estudio incluyó a 163 estudiantes universitarios de varios cursos de pregrado. Los datos fueron recolectados a través del Inventario de Estudio y Estrategias de Aprendizaje (LASSI – 3ra edición) – traducidos y adaptados para su uso en Brasil – y un cuestionario sociodemográfico. Se emplearon procedimientos estadísticos descriptivos e inferenciales para el análisis de datos. Los estudiantes respondieron a la encuesta sobre la Plataforma de Autorregulación, creada especialmente para la investigación. En términos generales, los estudiantes relataron usar una variedad de estrategias de estudio y aprendizaje moderadamente, que, en la escala LASSI, significa cerca del punto medio de la escala de respuesta de cinco puntos. Se encontraron relaciones significativas entre las escalas LASSI y algunas variables sociodemográficas. Se espera que los datos obtenidos en el presente estudio puedan aumentar el conocimiento sobre los factores que promueven el aprendizaje

autorregulado y empoderan a los estudiantes hacia el éxito académico en la educación superior del Brasil.

Palabras clave: *Autorregulación del Aprendizaje. Estudiantes Universitarios. Estrategias de Aprendizaje. Formación de Professores.*

1 Introduction

Brazilian education has had severe weaknesses in all segments of schooling (INEP, 2019). Data from the Basic Education Development Index (IDEB – *Índice de Desenvolvimento da Educação Básica*) showed that, on a scale from zero to 10, only seven Brazilian states met the proposed goal of 4.7 points for 2017 in the final years of Elementary School. In addition, no Brazilian state reached the expected goal of 4.7 points for High School. From 3.7 in 2015, High School results improved only to 3.8 points in 2017 (INEP, 2019). Undoubtedly, the underperformance in primary and secondary education has had negative repercussions on higher education. Increasing access to higher education, through democratization, has increased the diversity of the student body and created greater opportunities for Brazilian citizens. However, along with that, more students who are underprepared for college-level work are entering college, including those in teacher education programs (OSTI; ALMEIDA, 2019; SANTOS; FERRAZ; INÁCIO, 2019).

The number of students enrolling in undergraduate courses of private universities is growing significantly, representing almost 50% of higher education admissions. This increased entry into higher education has led neither to higher scholastic performance in college nor to persistence to degree attainment, given the high dropout rates in higher education (MERCURI; FIOR, 2017; SANTOS; FERRAZ; INÁCIO, 2019). Research shows that students enter higher education with several shortcomings in information processing, and, by the end of college, most lack adequate preparation for advanced studies. Many students struggle to use effective and efficient learning strategies and have difficulty with reading comprehension. They also face many challenges with time management and the use of motivational and emotional regulation strategies. Unfortunately, most of the time, they are not even aware of these problems (BEMBENUTTY; CLEARY; KITSANTAS, 2012; BORTOLETTO; BORUCHOVITCH, 2013; BZUNECK; BORUCHOVITCH, 2019; ENDO; MIGUEL; KIENEN, 2017; PEKRUN *et al.,* 2011). Moreover, many students are still uncertain about their vocation, which may greatly impact their motivation, engagement, performance, and future competitiveness in the labor market (MERCURI; FIOR, 2017; OSTI;

ALMEIDA, 2019). Coupled with ineffective and inefficient study and learning habits, there are issues that may further hinder students' success in the university context. Among them, we highlight the disarticulation between theory and practice in undergraduate courses, professors' lack of empathy, and lack of adequate higher education policies to support students' permanence (MARINI; BORUCHOVITCH, 2014; MERCURI; FIOR, 2017; OSTI; ALMEIDA, 2019). It is, therefore, essential that teacher education programs in public and private institutions invest efforts towards the improvement of the quality of education for future teachers. This will likely result in improvements in primary school assessments in subsequent years. Fostering university students' self-regulation of learning can be a promising way to improve the quality of education in teacher education programs (BARTALO; GUIMARÃES, 2008; GANDA, 2016; LINS, 2013; IQBAL; SOHAIL; SHAHZAD, 2009).

The perspective of self-regulation of learning became outstanding in contemporary times, as it is associated with deep learning and better academic achievement. Evidence suggests that it can be fostered during formal education (BEMBENUTTY; CLEARY; KITSANTAS, 2012; OSTI; ALMEIDA, 2019). Self-regulated learning requires control of cognitive, metacognitive, motivational, emotional, and behavioral processes, which empowers students to learn more and better (ZIMMERMAN, 2002, 2013). Given the democratization of Higher Education, research points out the importance of fostering self-regulation of learning in the academic context, so that students can better plan, monitor, regulate, think about their learning, and become proactive facilitators of this process (GANDA; BORUCHOVITCH, 2018; WEINSTEIN; ACEE, 2018). Moreover, the theoretical foundations of self-regulated learning should be taught in teacher education courses to better prepare future teachers to use effective instructional methods that both help students learn the course content and cultivate their self-regulatory skills from the earliest years of schooling onward. Teaching teachers about self-regulated learning could contribute to a new generation of more self-reflective, strategic, and self-regulated teachers and students (ÁVILA *et al.*, 2018; GANDA; BORUCHOVITCH, 2018; PISCALLO *et al.*, 2018).

The existing problems in Brazilian Higher Education and the need to investigate variables associated with self-regulated learning and academic success in this segment, given the scarcity of literature on this topic in Brazil, motivated the present research. This study is part of a larger ongoing research project carried out in interinstitutional exchange with several Brazilian universities, one from the United States, and one from Portugal. Its main objectives

are to identify the study and learning strategies of Brazilian university students, from teacher education programs of a public institution in the state of São Paulo, and to examine them in relation to students' sociodemographic variables. The data gathered could be useful to inform and support the design of interventions aimed at improving teacher education, so that future teachers can be better prepared to address the challenges facing Brazilian Primary Education (ÁVILA *et al*., 2018; PISCALLO *et al*., 2018).

2 Methods

2.1 Research Question

Do LASSI scale scores differ by age group, sex, ethnicity, type of high school, type of education course, time of course, persistence intentions, and expected course grades?

2.2 Participants

The sample included 163 students enrolled in teacher education programs of a public university from the state of São Paulo. Of the total, 116 (71.7%) were female and 47 (28.8%), male. In relation to age, 19 (11.7%) were under 20 years old, 99 (61.1%) were between 20 and 24 years old, and 44 (27.16%) were over 25 years old. The average age was 23.32 years old, and the standard deviation was 4.587. The course semesters ranged from the first to the tenth, with students more concentrated in the third ($n = 25$; 15.3%), fifth ($n = 21$; 12.8%), and seventh ($n = 36$; 22.1%), and ninth ($n = 23$; 14.1%). Regarding ethnicity, participants were predominantly white ($n = 111$; 68.10%), brown ($n = 31$; 19.2%), and black ($n = 14$; 8.6%). Indigenous, Oriental, and other ethnic groups accounted for less than 5% of the total sample. Most students were from public schools ($n = 93$; 57%). Although participants were from various undergraduate courses, most were Pedagogy students ($n = 48$; 29.45%). The remaining 115 (70.55%) participants were from different courses, as follows: bachelor and licentiate degree in Physical Education ($n = 17$; 10.43%), bachelor and licentiate degree in Biological Sciences ($n = 15$; 9.20%), licentiate degree in Languages and Literature ($n = 13$; 7.98%), licentiate degree in Mathematics ($n = 13$; 7.98%), and bachelor and licentiate degree in Chemistry ($n = 12$; 7.36%). Students predominantly reported having very strong intention to continue with their undergraduate studies the following year ($n = 110$; 67.48%). Of the total sample, 32 students (19.63%) reported having strong intentions and 21 (12.88%)

revealed no to moderate intentions to continue with their undergraduate studies the following year. Participants rated their course grades as well above average (n = 41; 25.15%), above average (n = 78; 47.85%), around average (n = 38; 23.31%), below average (n = 5; 3.07%), and well below average (n = 1; 0.61%).

2.3 Instruments

2.3.1 Sociodemographic and student academic life questionnaire

This questionnaire had ten multiple choice questions. Among them, three encompassed the students' personal data, such as: age, gender, and ethnicity. The seven remaining questions were aimed at knowing issues of students' academic life, such as: course, semester, time of the course, type of High School education attended (public, private, or both), intention to continue the undergraduate studies the following year (ACEE, personal communication, 2018; FLAGGS, 2018) and self-perception about course performance.

2.3.2 Learning and Study Strategies Inventory (LASSI 3rd edition)

The LASSI 3rd edition (henceforth, LASSI) was developed by Weinstein, Palmer, and Acee (2016). It aims to assess students' awareness of the use of study and learning strategies related to cognitive learning processes, motivation, and self-regulation, components of strategic learning, according to the Model of Strategic Learning (MSL) (WEINSTEIN; ACEE; JUNG, 2011; WEINSTEIN; PALMER; ACEE, 2016). The LASSI consists of 60 items, with 5 response choices: *Not at all typical of me, Not very typical of me, Somewhat typical of me, Fairly typical of me, and Very much typical of me*. Of the 60 items, 34 use reverse scoring, because of the directionality in which they were written. LASSI items are subdivided into 10 scales: *Anxiety* (example item: "I feel very panicky when I take an important test"), *Attitude* ("I only study the subjects I like"), *Concentration* ("I concentrate fully when studying"), *Information Processing* ("I try to find relationships between what I am learning and what I already know"), *Motivation* ("Even when study materials are dull and uninteresting, I manage to keep working until I finish"), *Selecting Main Ideas* ("During class discussion, I have trouble figuring out what is important enough to put in my notes"), *Self-testing* ("When preparing for an exam, I create questions that I think might be included"), *Test Strategies* ("In taking tests, writing papers, etc., I find I have misunderstood what is

wanted and lose points because of it"), *Time Management* (*"I find it hard to stick to a study schedule"*)*, and Using Academic Resources* (*"When it is difficult for me to complete a course assignment, I do not ask for help"*). Each scale has 6 items; scale scores can range from 6 to 30. The inventory was translated into Portuguese by three researchers from a public university of the state of São Paulo. They have both proficiency in the English language and knowledge of the theoretical framework which inspired the development of the instrument. Then, it was submitted to back translation procedures, carried out by a translator with PhD in English Language and high fluency in Portuguese. The translation was also revised and validated by one of the authors of the original scale. The internal consistency of the original scale was estimated in large samples of American college students by Cronbach coefficient. Alfa values were high for all of the scales (WEINSTEIN; PALMER; ACEE, 2016).

2.4 Data collection procedures

Initially, the project was submitted to the Ethics Committee of an institution located in the state of São Paulo and was approved under CAAE number 81094017.0.0000.8142. Then, professors were contacted by e-mail to schedule data collection in their classes. Data collection took place online, in the classroom, using the Platform *Autorregular*, developed for the larger research. It always happened in the presence of a specially trained graduate student, who presented and explained the objectives of the study to the other students, leaving them free to take part or not in the research. Soon after, the graduate student made the research link available to participants. Students were required to click the link and register their e-mails. The graduate student then sent another link to students' registered e-mails, with an invitation for them to take part in the research. By accessing the link through their cell phones, laptops, and/or tablets, students were directed to the Platform *Autorregular*, which housed the informal consent form, socio-demographic questions, LASSI (web version). After responding to LASSI, students received, both on their device screen and by e-mail*,* a report in PDF format about their performance on each of the scales, with specific guidelines on how to interpret their scores and determine which areas to target for improvement. In addition, the LASSI report to students included a disclaimer that the LASSI results are based on U.S. norms and may lack accuracy and not necessarily reflect what really happens to Brazilian students (BORUCHOVITCH *et al*., 2019). Data collection lasted about 20-25 minutes.

2.5 Data analysis procedures

Data were analyzed using descriptive and inferential statistics. Means and standard deviations were calculated. Comparative analyses of LASSI responses and the variables age, gender, course, semester, time of the course, type of high school education attended, ethnicity, intention to continue undergraduate studies the following year, and self-perception about academic performance were also carried out. As data was not normally distributed, Mann-Whitney and Kruskal-Wallis tests were employed to compare two and three groups, respectively. To make comparisons more consistent and avoid groups with very small size, variables were grouped into two or more categories, as follows: course (pedagogy, other licentiate degree courses), age (< 20, 20-24, > 25), gender (male, female), ethnicity (white, non-white), intention to continue undergraduate studies the following year (no to moderate intention, strong intention and very strong intention), self-perception of performance (well above average, above average, and below and well below average), type of school (public, private, both public and private), time of the course (full time, morning or afternoon, night), and semester (1st to 3rd, 4th to 7th, 8th to 10th).

3 Results

Table 1 presents LASSI means of total sample and by course, as well as alpha of Cronbach values.

Table 1 – LASSI means of total sample and by course, and alfa values

Scale	Mean	Std. Dev.	Alfa	Course Pedagogy = 48; Others = 115			
				Pedagogy	Others	Z	*p*
1. Anxiety	3.03	0.98	0.843	3.03	3.03	0.23	0.821
2. Attitude	4.02	0.63	0.737	4.11	3.98	1.07	0.286
3. Concentration	3.00	0.80	0.817	2.98	3.00	0.06	0.952
4. Information Processing	3.67	0.72	0.783	3.82	3.60	1.71	0.088
5. Motivation	3.43	0.77	0.717	3.57	3.38	1.29	0.198
6. Selecting Main Ideas	3.52	0.78	0.811	3.55	3.51	0.34	0.732
7. Self-testing	2.41	0.81	0.739	2.47	2.39	0.55	0.585
8. Test Strategies	3.77	0.75	0.741	3.94	3.70	1.76	0.079
9. Time Management	2.70	0.88	0.813	2.78	2.67	0.79	0.429
10. Using Acad. Resources	2.81	0.59	0.386	2.81	2.81	0.05	0.958
Total	3.24	0.46	0.911	3.31	3.21	1.39	0.163

Source: Authors (2019).

Overall, participants' scores were moderate on each of LASSI scales. The highest mean was in the Attitude scale and the lowest, in Self-testing. No significant differences were detected in LASSI means between students enrolled in the Pedagogy course and those enrolled in other teacher education courses. With regard to the reliability of the LASSI, Cronbach's alpha values were high, ranging from 0.71 to 0.91 in 9 out of 10 scales (PESTANA; GAGEIRO, 2008). The value was low only for "Using Academic Resources", scale ($\alpha = 0.386$), but it could be improved by removing some of its items. However, for now, the decision was not to exclude any item from this scale, because the psychometric properties of the Brazilian version of LASSI are still under study. It would be premature to make decisions on the basis of such a small sample.

Table 2 presents LASSI means in relation to age, gender, semester, time of the course, type of high school, ethnicity, intention to continue undergraduate studies, and self-perception of performance.

Table 2 – LASSI means and sociodemographic and academic life variables

Scale	Age < 20 years = 19; 20-24 years = 99; >= 25 years = 44					Gender Female = 116; Male = 47				Semester 1-3 semester = 33; 4-7 semester = 90; 8-10 semester = 40					Time of the course Full time = 81; Morning/Afternoon = 2; Night = 80				
	< 20	20-24	> 25	χ^2	p	Fem	Male	Z	p	1-3	4-7	8-10	x^2	p	Int	M/A	N	χ^2	P
ANX	3.09	2.86	3.38	6.61	**0.037**	2.88	3.40	2.96	**0.003**	2.88	3.11	2.96	1.24	0.538	3.01	2.33	3.06	1.33	0.514
ATT	4.02	3.97	4.13	3.08	0.215	4.06	3.93	1.03	0.304	3.95	4.06	3.99	1.50	0.473	4.02	4.08	4.02	0.02	0.992
CON	3.00	2.94	3.16	2.26	0.322	2.98	3.03	0.60	0.551	2.95	3.08	2.85	3.72	0.156	2.88	2.92	3.12	2.68	0.261
INP	3.79	3.66	3.63	0.99	0.610	3.67	3.65	0.22	0.827	3.75	3.71	3.49	3.43	0.180	3.71	3.17	3.64	1.48	0.476
MOT	3.68	3.38	3.46	2.14	0.342	3.46	3.36	0.79	0.432	3.47	3.52	3.20	4.62	0.099	3.37	3.67	3.49	0.63	0.728
SMI	3.76	3.46	3.59	3.06	0.217	3.54	3.49	0.47	0.640	3.51	3.52	3.53	0.04	0.979	3.66	3.08	3.39	5.73	0.057
TST	2.57	2.39	2.39	0.97	0.614	2.36	2.54	1.51	0.131	2.56	2.44	2.23	2.80	0.247	2.36	2.17	2.47	0.54	0.764
SFT	3.90	3.75	3.80	0.55	0.759	3.76	3.78	0.04	0.965	3.59	3.88	3.68	3.88	0.144	3.78	3.83	3.76	0.23	0.893
TMT	2.75	2.70	2.73	0.17	0.920	2.70	2.71	0.14	0.892	2.66	2.89	2.33	12.29	**0.002**	2.63	3.17	2.77	1.81	0.405
UAR	3.00	2.76	2.84	2.33	0.312	2.78	2.88	0.89	0.372	2.99	2.74	2.80	4.28	0.118	2.84	2.58	2.79	0.62	0.735
Total	3.36	3.19	3.31	4.15	0.125	3.22	3.28	0.86	0.392	3.23	3.30	3.11	4.64	0.098	3.23	3.10	3.25	0.32	0.851

Scale	Type of High School Public = 93; Private = 69; Both = 1					Ethnicity White = 111; Non-white = 52				Intention to Continue No* = 21; Strong = 32; Very strong = 110					Self-perception of performance Well above = 41; Above = 78; Below/Well below = 44				
	Pub	Priv	Both	χ^2	p	Wh.	N-wh.	Z	p	No	St	V St.	χ^2	p	Well	Abov.	B/W	χ^2	P
ANX	3.00	3.09	1.83	1.73	0.421	2.98	3.13	0.94	0.345	2.84	2.98	3.08	0.97	0.617	3.28	3.08	2.71	1.25	**0.044**
ATT	4.04	4.01	3.50	2.42	0.299	4.03	4.01	0.05	0.960	3.59	3.78	4.18	15.20	**0.001**	4.15	4.13	3.71	1.25	**< 0.001**
CON	3.05	2.93	2.33	1.61	0.446	2.90	3.20	2.18	**0.029**	2.84	2.89	3.06	2.25	0.324	3.15	3.12	2.63	1.25	**0.002**
INP	3.75	3.54	4.17	3.79	0.150	3.67	3.66	0.18	0.854	3.51	3.42	3.77	6.39	**0.041**	3.72	3.71	3.53	1.25	0.306
MOT	3.44	3.42	3.50	0.28	0.868	3.41	3.47	0.51	0.614	3.11	3.18	3.57	10.20	**0.006**	3.73	3.53	2.98	1.25	**< 0.001**
SMI	3.47	3.59	3.50	0.49	0.784	3.54	3.49	0.39	0.700	3.51	3.30	3.59	3.04	0.219	3.94	3.49	3.20	1.25	**< 0.001**
TST	2.44	2.36	2.67	0.85	0.654	2.39	2.45	0.52	0.606	2.40	2.03	2.53	9.03	**0.011**	2.52	2.41	2.30	1.25	0.554
SFT	3.72	3.84	3.00	2.90	0.234	3.80	3.71	0.76	0.449	3.66	3.49	3.87	6.70	**0.035**	4.16	3.87	3.22	1.25	**< 0.001**
TMT	2.71	2.70	2.67	0.01	0.996	2.65	2.83	1.29	0.197	2.30	2.51	2.84	9.62	**0.008**	2.93	2.80	2.32	1.25	**0.002**
UAR	2.80	2.83	1.83	2.34	0.311	2.81	2.81	0.29	0.775	2.75	2.90	2.80	0.82	0.664	2.66	2.86	2.86	1.25	0.198
Total	3.24	3.23	2.90	0.97	0.616	3.22	3.28	1.05	0.296	3.05	3.05	3.33	13.82	**0.001**	3.43	3.30	2.95	1.25	**< 0.001**

Caption: ANX = anxiety; ATT = attitude; CON = concentration; INP = information processing; MOT = motivation; SMI = selecting main ideas; SFT = Self-testing; TST = test strategies; TMT = time management; UAR = using academic resources. Significant p values are in bold. * No to moderate intentions

Source: authors (2019).

The comparison of LASSI means by age group suggested that older students (over 25) had significantly higher scores on coping with test-related anxiety than the other age groups ($\chi^2 = 6.61$; $p = 0.037$); also, men reported significantly higher scores on coping with anxiety than women ($Z = 2.96$; $p = 0.003$). Significant differences were found on the time management scale for students of different semesters. Students from the 4th to the 7th semesters reached the highest mean ($\chi^2 = 12.29$; p=0.002) in this scale when compared to groups from other semesters. Participants from other ethnicities (brown, black, oriental, and indigenous) reported significantly higher use of concentration strategies compared to white students ($Z = 2.18$; $p = 0.029$). Moreover, students who reported strong intentions to continue their undergraduate studies had significantly lower scores than those who reported having very strong intentions on the scales of Attitude ($\chi^2 = 15.20$; $p < 0.001$), Information Processing ($\chi^2 = 6.39$; $p = 0.041$), Self-testing ($\chi^2 = 9.03$; $p = 0.011$), Test Strategies, and Total LASSI scores ($\chi^2 = 13.82$; p = 0.001). Students who reported very strong intention to continue their undergraduate studies the following year tended to have better attitudes toward study and learning, and more information processing, self-testing, and test taking strategies. They also seemed able to manage their time better and to be more strategic students in general than those who reported strong intention. Moreover, students who reported very strong intention to continue their undergraduate studies the following year also reported significantly more attitude ($\chi^2 = 15.20$; $p < 0.001$), more motivation ($\chi^2 = 10.20$; $p = 0.006$), better time management ($\chi^2 = 9.62$; $p = 0.008$), and higher scores in Total LASSI scales ($\chi^2 = 13.82$; $p = 0.001$) than students with no to moderate intention to continue.

Self-perception of performance was significantly associated with 8 out of the 10 LASSI scales. Significant differences were found in the scales of Anxiety ($\chi^2 = 1.25$; $p = 0.044$), Attitude ($\chi^2 = 1.25$; $p < 0.001$), Concentration ($\chi^2 = 1.25$; $p = 0.002$), Motivation ($\chi^2 = 1.25$; $p < 0.001$), Selecting Main Ideas ($\chi^2 = 1.25$; $p < 0.001$), Test Taking Strategies ($\chi^2 = 1.25$; p < 0.001), Time Management ($\chi^2 = 1.25$; $p = 0.002$), and Total LASSI scores ($\chi^2 = 1.25$; $p < 0.001$). Students who see themselves as having above-average grades in their class seem to cope better with anxiety, to be more capable of selecting main ideas, employ test strategies, have more favorable attitudes towards studying and learning, have better concentration, motivation, and time management, as well as to be more strategic compared to students of groups with average, below, and well below average self-perceptions of performance. No significant differences were found between LASSI scores and the following variables: time of the course and type of high school attended.

4 Discussion

This study mainly aimed to identify the learning and study strategies of Brazilian university students enrolled in teacher education courses of a public institution in the state of São Paulo and to analyze them in relation to students' sociodemographic variables, persistence intentions, and self-perception of course performance.

The LASSI data provided important information about how Brazilian university students study and learn. Among them, we highlight the fact that students who aspire to be teachers seem to use study and learning strategies. However, as their average scores were near the midpoint, this finding suggests that they do have room to improve their use of learning strategies (BEMBENUTTY; CLEARY; KITSANTAS, 2012; MARINI; BORUCHOVITCH, 2014). Overall, participants revealed positive attitudes regarding studying, learning, university, and concerning what should be done to achieve success in school. The attitude scale has the highest mean when compared to other scales in all the variables under investigation. On the other hand, the results of our study seem to point out that students do not consistently use strategies that lead them to test what they are learning, as the lowest means were found in the Self-testing scale. These data are in line with studies of Bartalo and Guimarães (2008) and Endo, Miguel and Kienen (2017), but differ from those of Iqbal, Sohail and Shahzad (2010), with Pakistan university students, and Ganda (2016), with Brazilian Pedagogy students.

Iqbal, Sohail, and Shahzad (2010), in their research with students from the University of Punjab/Pakistan, found that they did not have adaptive or positive attitudes towards the university. Their results showed that the sample's lowest mean was in the Attitude scale and the highest, in Self-testing. These researchers believe that the highest means in Self-testing scale results can be attributed to the use of formative assessment as evaluation method at University of Punjab, which requires students to monitor their learning in order to achieve academic goals. In Ganda's (2016) research, the highest mean was found in Information Processing scale and the lowest, in Motivation. These results, although divergent from those found in the present research, reveal possible sensitives to different cultures and assessment methods. They also point out the need to better understand the strengths and the weaknesses of the learning and study strategies of Brazilian future teachers, as well as the factors associated with their engagement in strategic behavior, academic achievement, and persistence in college.

As expected, variables such as age, semester, gender, ethnicity, intention to continue their undergraduate studies, and self-perception of course performance were significantly associated with differences in LASSI means. In this study, we found that older (≥ 25 years old) and male students reported better coping with anxiety than younger student groups. Research shows developmental and gender differences in dealing with emotions (BORTOLETTO; BORUCHOVITCH, 2013; PEKRUN *et al.,* 2011). This result regarding age possibly emerged because, as schooling progresses, students learn and acquire more strategies to better control emotions. The relationship between anxiety and gender is in general less conclusive, but data from our study were in line with those of Bartalo and Guimarães (2008) and Lins (2013), which indicate men are better prepared to deal with anxiety at the university. This finding can also be discussed in terms of the importance students of different sexes assign to grades. In this sense, one can hypothesize that female students tend to worry more and give more importance to their grades, which possibly makes them feel more anxious when taking tests than their male counterparts.

Contrary to the expectations that students of more advanced semesters would report better study and learning strategies, but in line with the findings of Endo, Miguel, and Kienen (2017), we found that, in the Time Management scale, students in the fourth and seventh semesters surpassed those in more advanced ones (eighth and tenth). It is possible that students in more advanced semesters are more acquainted to their study routine and may not see as much need to manage their time as systematically as students in early or intermediate semesters do. The finding that self-declared non-white students cope better with their concentration than the self-declared white was another interesting result that emerged in our study and deserves further investigation.

Students' intention to continue their undergraduate course studies is undoubtedly an essential factor for them to employ or not study and learning strategies**.** Intentions to stay in college have long been studied as an outcome variable in research on college student retention, and studies have consistently shown that intention to drop out is among the strongest predictors of actual attrition (BEAN, 1982). In this study, students' intention to continue their undergraduate studies was closely associated with many of the LASSI scales. The greater the intention to continue with the undergraduate course, the more the students reported using information processing, self-testing, and test strategies. They also reported better attitudes towards university, more effective time management, and higher overall

LASSI scores. These findings align with American meta-analytic research that has shown that motivation and study-skills factors significantly predict students' retention above and beyond student background characteristics and prior performance in high school and on standardized tests (ROBBINS *et al.*, 2004). Our results reinforce the crucial role that cognitive, motivational, and self-regulatory learning strategies may play in students' engagement and persistence in their studies. Evidence shows that, for students to focus and use learning and study strategies, they must be motivated to learn (BEMBENUTTY; CLEARY; KITSANTAS, 2012; BZUNECK; BORUCHOVITCH, 2019). Likewise, students' effective and efficient use of learning strategies related to multiple areas of the LASSI could help strengthen their intentions to go on with their academic studies. Having the intention to persist with undergraduate studies is, therefore, a key variable to academic success that must not only be encouraged in the educational environment, but also more investigated.

We also found that students with higher perceptions of course performance had higher scores on most of the LASSI scales. This relationship is somehow reciprocal (SCHUNK, 1991), strategic learning behaviors beget perceived competence, and higher perceived competence begets improved strategic learning. In addition, the literature shows that self-perception of competence is positively associated with better academic achievement (AZZI; POLYDORO, 2010; PAJARES; OLAZ, 2008). Regardless of students' real course performance, those who believe to be doing well at university tend to have characteristics that favor successful performance, which may, in fact, motivate them to struggle and not give up when facing difficulties. This in turn contributes to their success (BZUNECK, 2009; PAJARES; OLAZ, 2008).

As in the studies by Bartalo and Guimarães (2008) and Lins (2013), no significant relationships were found between different courses (Pedagogy or others), time of the course (morning, night, or full time), and type of high school attended (public, private, or both). However, the results obtained by Endo, Miguel, and Kienen (2017) differed from those found in this study and in previous researches. In their study, students who attended public high school obtained significantly higher averages in Attitude, Time Management, and Concentration scales than those from private ones. The impact of previous school attendance on shaping strategic behavior should also be further investigated.

5 Final Considerations

The results of the present research give us, on one hand, a brief overview of how Brazilian university students, enrolled in teacher education courses, report dealing with their learning. This study points out the need of teaching self-testing scales for the students in this sample, since it was the scale they scored lowest followed by time-management. As self-testing and time management are highly important for learning, intervention programs should take these findings into account. The present study also highlights the importance of sociodemographic, affective, and motivational variables in strategic behavior. Age and gender were relevant for understanding academic anxiety, showing the need for younger and female students to be targets for intervention concerning this variable. The need for white students to strengthen their ability to concentrate, as well as for advancing the understanding of the relationship between ethnicity and study and learning strategies were also identified. Strong intention to persist with undergraduate studies and more positive self-perception of performance were very valuable for understanding participants' outcomes in the LASSI scales. They were significantly associated with higher scores in most of LASSI scales. Therefore, interventions to improve these variables are essential, as well as future research that considers reciprocal relationships among these variables, that is, how academic strategic behaviors may both influence and be influenced by intentions and self-perceptions. Furthermore, the internal consistencies obtained in 9 out of the 10 LASSI scales can be considered as preliminary indicators that this inventory is reliably measuring the proposed variables in Brazilian context, as well.

On the other hand, data gathered in the present study, although promising, should be interpreted with caution, due to some limitations of the present research. The small sample size, the facts that the inventory is still being initially studied in Brazil and that the research was based only on self-report measures are major issues that should be overcome by future investigations. Moreover, the variable self-perception of performance, compared to the participants' real performance, could also bring more accurate data and calibrated information, which should be sought in further investigations.

Finally, considering the relevance of identifying how future teachers learn and think about their learning – so that they can not only become better students, but can also foster self-regulatory processes in their future students – we recommend further research to be conducted using LASSI in broader and more diverse nationwide samples. We also highlight

the need for a deeper examination of the psychometric properties of LASSI in the Brazilian context, as well as for other psychological variables to be included in future research designs.

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