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Learning Strategies and Emotional Regulation of Pedagogy Students

Denise Bortoletto
Evely Boruchovitch¹

Universidade Estadual de Campinas, Campinas-SP, Brazil

Abstract: The aim of this study was to investigate the learning strategies and emotional regulation of 298 students of private and public university teacher formation courses of a city in Minas Gerais state. The study also examined the joint contribution of emotional regulation, age group and year of the course on the learning strategies scores of the participants. The participants were of both sexes, ranging from 18 to 54 years of age and enrolled in the first to the fourth year of two universities. Data was collected using two Likert type scales for university students: one for the evaluation of learning strategies and the other for the evaluation of emotional regulation strategies. Results showed a positive, significant, moderate correlation between learning strategies and emotional regulation strategies. Emotional regulation, age range and year of the course showed a joint association with learning strategies scores. Data is discussed in terms of its psychoeducational implications.

Keywords: learning, metacognition, self control, teacher education

Estratégias de Aprendizagem e de Regulação Emocional de Estudantes de Pedagogia

Resumo: Este estudo objetivou investigar relações entre as estratégias de aprendizagem e de regulação emocional de 298 alunos do 1º ao 4º anos, de ambos os sexos e idade entre 18 e 54 anos dos cursos de Pedagogia de uma universidade pública e uma particular de uma cidade no interior do Estado de Minas Gerais. Buscou-se também analisar a contribuição conjunta da regulação emocional, da idade e do ano de curso nos escores das estratégias de aprendizagem. Os dados foram coletados por meio de duas escalas para universitários do tipo Likert: uma de estratégias de aprendizagem e outra de regulação emocional. Resultados evidenciaram uma correlação positiva, moderada e significativa entre as estratégias de aprendizagem e as de regulação emocional dos participantes. A regulação emocional, a faixa etária e o ano de curso mostraram-se conjuntamente associadas aos escores das estratégias de aprendizagem. Os dados obtidos são discutidos em termos de suas implicações psicoeducacionais.

Palavras-chave: aprendizagem, metacognição, autocontrole, formação de professores

Estrategias de Aprendizaje y de Regulación Emocional de Estudiantes de Pedagogía

Resumen: Este estudio objetivó investigar relaciones entre las estrategias de aprendizaje y de regulación emocional de 298 alumnos de primer a cuarto año, de ambos sexos y edad entre 18 y 54 años, de los cursos de Pedagogía de una universidad pública y privada de una ciudad de Minas Gerais-Brasil. Se buscó también analizar la contribución conjunta de la regulación emocional, edad y año de curso en los escores de las estrategias de aprendizaje. Los datos fueron recolectados a través de dos escalas Likert para universitarios: una de estrategias de aprendizaje y otra de regulación emocional. Los resultados evidenciaron una correlación positiva, moderada y significativa entre las estrategias de aprendizaje y las de regulación emocional de los participantes. La regulación emocional, el rango de edad y el año del curso se mostraron conjuntamente asociados a los escores de estrategias de aprendizaje. Los datos obtenidos son discutidos en cuanto a sus implicaciones psicoeducacionales.

Palabras clave: aprendizaje, metacognición, autocontrol, formación de profesores

The current educational context requires the student to be able to make informed decisions, as well as to regulate their own learning process. The self-regulation of learning is defined as the ability of the student to be responsible for and manage their own learning process. Thus it involves the mobilization by the students of cognitive, metacognitive, affective, and motivational resources (Zimmerman, 2000; Zimmerman & Schunk, 2011).

Learning strategies play an important role in the acquisition, storage and use of knowledge (Santos & Boruchovitch,

2009; Weinstein, Acee, & Jung, 2011). They can be considered aids in the learning process of the student, as they fulfill the function of supporting the student in the control of their information processing system, constituting resources necessary for academic success and self-regulation of learning (Amado, Freire, Carvalho, & André, 2009; Boruchovitch & Santos, 2006; Kramarski & Michalsky, 2009). Some authors divide them into cognitive and metacognitive strategies (Dembo, 2001; Garner & Alexander, 1989). Cognitive strategies are actions aimed directly at processing information, so that it can be better acquired, stored and used. Whereas, metacognitive strategies are procedures that the individual uses in order to plan, monitor and regulate their own learning (Dembo, 2001). To highlight, to summarize and to annotate are some examples of cognitive strategies. To establish

¹ Correspondence address:

Evely Boruchovitch. Faculdade de Educação da Universidade Estadual de Campinas. Avenida Bertran Russell, 801, Barão Geraldo, Caixa Postal 6120. CEP 13084-100. Campinas-SP, Brazil. E-mail: evely@unicamp.br

targets, to monitor the attention and to reread may, in turn, be considered as examples of metacognitive strategies.

Studies also reveal that the emotions exercise important influences on school and academic learning, making it easier or hindering it (Costa & Boruchovitch, 2009; Cruvinel & Boruchovitch, 2011; Dell'Agli, 2008; Kavasoglu, 2009; Knight, 2010; Pekrun, Goetz, Frenzel, Barchfeld, & Perry, 2011; Raftery & Bizer, 2009; Turner & Husman, 2008). There are various emotions that are associated with academic and school performance. Among the most studied is anxiety about tests. However, studies show the need to investigate other emotions that relate to achievements in the educational context, especially those most commonly experienced by individuals such as happiness, anger and sadness, among others (Pekrun et al., 2011; Pekrun, Goetz, Titz, & Perry, 2002).

Therefore, students also knowing how to regulate their emotions is equally important for the learning process (Pekrun et al., 2011; Zimmerman & Schunk, 2011). For Kopp (1989), emotional regulation consists of intra and extrapsychic factors, which guarantee the confrontation, redefinition, control, modification or modulation of the affective activity, to ensure the adaptive functioning of the person. It is a complex process that involves the use, by the individual, of a range of emotional regulation strategies, also called coping strategies. In reality, these strategies are constituted by actions performed by the subjects, consciously or not, to maintain, increase, decrease or modify one or more components of an emotional response (Gross, 1998; Gross, Richards, & John, 2006; Skinner, Kindermann, & Furrer, 2009; Zimmer-Gembeck, Lees, & Skinner, 2011). Among the emotional regulation strategies most frequently used by people, the following may be cited: suppression of emotional expression, acceptance, disguise of emotion, externalization, self-blame, positive reappraisal of the situation, rumination, emotional inhibition, removal from the situation, seeking social support and information, taking responsibility for the other, and involvement with other tasks, among others (Garnefski, Kraaij, & Spinhoven, 2001).

Studies with university students reveal that most entered Higher Education with little knowledge about the appropriate use of learning strategies or about how to learn (Kramarski & Michalsky, 2009; Pintrich, 2002). Studies also suggest that the majority of people do not deal satisfactorily with their emotions (DeCuir-Gunby, Aultman, & Schultz, 2009; Del Prette & Del Prette, 2005; Garnefski & Kraaij, 2007; Gross, 1998; Lopes & Loureiro, 2007). These problems seem to also be present in teacher formation courses (Amado et al., 2009; Kavasoglu, 2009).

Considering the importance of learning strategies and emotional regulation, and the lack of studies investigating the combination of these variables, in our context, the aim of this study was to investigate relationships between the learning strategies and the emotional regulation of 298 students. They were in the 1st to 4th year of the Pedagogy course in one public and one private university of a city in the state

of Minas Gerais, of both sexes and aged between 18 and 54 years. It was also sought to analyze the joint contribution of emotional regulation, age and year of course on the learning strategies scores.

Method

Participants

The sample consisted of 298 students of a Pedagogy course of one public and one private institution of a city in Minas Gerais state, with 286 students (96%) being female and 12 (4%) male. The ages of the participants ranged between 18 and 54 years, with a mean age of 28.31 years and a standard deviation of 8.72 years. Regarding the year of the course, 76 students (25.5%) were attending the 1st year, 72 (24.1%) the 2nd, 64 (21.5%) the 3rd, and 86 (28.9%) were in the 4th year. It was a convenience sample, which included only those students who agreed to participate in the study.

Instruments

The following instruments were used: Learning Strategies Scale for University Students (EEA-U) (Santos & Boruchovitch, 2008) and the Emotional Regulation Strategies Scale for Adults, developed by the authors for this study.

Learning Strategies Scale for University Students (EEA-U) (Santos & Boruchovitch, 2008). This is a Likert type scale consisting of 49 closed items, grouped in three subscales designed to evaluate cognitive and metacognitive strategies and the absence of dysfunctional metacognitive learning strategies. It has four response options ranging from never (1) to always (4). These values are inverted in the items that correspond to negative or dysfunctional metacognitive strategies, so that the higher the score achieved by the student, the more strategic their learning is reported to be. The total score can range from 49 to 196 points. As examples of items of the scale the following may be cited: "Do you ever write in full the explanations of the teacher?" (cognitive strategies subscale); "Do you usually plan your study activities?" (metacognitive strategies subscale) and "Do you usually eat while studying or doing the work?" (absence of dysfunctional metacognitive strategies subscale). Preliminary analyzes with university students revealed high internal consistency for the scale as measured by the Cronbach's alpha ($\alpha = .85$), by the Guttman Split-half ($\alpha = .74$) and by the Spearman Brown ($\alpha = .74$) (Boruchovitch & Santos, 2011).

Emotional Regulation Strategies Scale for Adults (developed by the authors of this study). This is a Likert-type scale consisting of 92 closed items, grouped in three subscales designed to assess the perception of the emotions sadness, anger, happiness and the use of emotional regulation strategies. These emotions were selected because they are associated with the educational context (Pekrun et al., 2002; Pekrun et al., 2011). It presents four response options

ranging from “It has nothing to do with me” (1) to “It describes me very well” (4). The closer the answer choice is to the number 4, the more the statement describes what the person does to cope with that emotion. In each subscale, the items that refer to the strategies considered less adaptive to human functioning, according to the literature of the area, have this score reversed, so that the higher the total score obtained by the respondent, the more adaptive are their strategies for regulating the emotions. The total score of the scale can range from 92 to 378. In the application, the participants were asked to think, for each of the emotions covered in the scales, of a situation where they had experienced this emotion during the previous two weeks, and answer the questions relating to that. As examples of items of the scale the following may be cited: “I keep my sadness to myself” (sadness subscale); “I verbally attack people when I am angry” (anger subscale), “When I am happy, I do enjoyable activities to maintain my happiness” (happiness subscale). Statistical analyzes, based on the sample of this study, revealed high internal consistency for the total scale, measured by Cronbach’s alpha ($\alpha = .82$), acceptable levels for the anger ($\alpha = .69$) and happiness ($\alpha = .61$) subscales and very close to acceptable for the sadness subscale ($\alpha = .58$), according to the literature (Dansey & Reidy, 2006; Prieto & Muñiz, 2000).

Procedure

Data collection. Before starting the study, contact was made with the coordinators of the Pedagogy courses of the participating institutions, in order to present the aims of the study. In addition, the consent and authorization of each institution to carry out the research was requested. Subsequently, the students enrolled in each year of the Pedagogy Course were invited to participate in the study. Initially, a good rapport was established with the participants in order to clarify the aims and ethical aspects of this research. The students who agreed to participate were asked to fill in two copies of the Terms of Free Prior Informed Consent. It was also stated that the identification of the institutions and the participating students would be kept confidential and that the adherence of the students would be voluntary and if they did not wish to participate this would not be prejudicial to their academic activities. The data collection was carried out collectively in a single step, outside of the class time of the students, previously scheduled for the period most convenient for both the students and for each institution, during the months of April and May 2010. The application time was approximately 40 minutes.

Data analysis. The data from the scales were analyzed quantitatively through descriptive and inferential statistical procedures. The relationship between the variables of interest was estimated using Spearman’s correlation coefficient due to the absence of normal distribution of the variables, detected using the Shapiro-Wilk test. With the aim of analyzing the combined influence of the

demographic variables (age group and year of course) and the scores of emotional regulation strategies on the learning scores, linear regression analysis was used with a multivariate model and Stepwise criteria for the selection of variables. The significance level adopted for the statistical tests was 5%, i.e., $p < .05$.

Ethical Considerations

Regarding ethical issues, this study followed the guidelines provided by Resolution No. 196/96 of the National Health Council. The collection of data was only carried out after approval from the Research Ethics Committee of the School of Medical Sciences of UNICAMP (Protocol No. 1231/2009).

Results

The results in Table 1 show that the scores of the learning strategies total scale and its subscales presented significant positive correlation with the emotional regulation total scale and all of its subscales. The learning strategies total scale presented positive moderate correlations with the emotional regulation total scale and the sadness and anger

Table 1
Correlations Between Learning Strategies and Emotional Regulation Strategies of the Total Sample

	Sadness total	Happiness total	Anger total	Emotional regulation total
Learning strategies total				
<i>r</i>	.32267	.18289	.39910	.39586
<i>p</i>	< .0001	.0058	< .0001	< .0001
<i>n</i>	289	287	285	283
Cognitive strategies total				
<i>r</i>	.23609	.11198	.32947	.30279
<i>p</i>	< .0001	.0577	< .0001	< .0001
<i>n</i>	290	288	286	284
Metacognitive strategies total				
<i>r</i>	.32637	.19700	.38126	.39193
<i>p</i>	< .0001	.0007	< .0001	< .0001
<i>n</i>	293	291	289	287
Absence of dysfunctional metacognitive strategies total				
<i>r</i>	.15809	.10209	.11511	.15250
<i>p</i>	.0175	.1808	.0121	.0080
<i>n</i>	292	290	288	286

Note. *r* = Spearman’s correlation coefficient; *p* = Value-*p*; *n* = number of subjects.

subscales. The learning strategies total scale and the happiness subscale presented a positive correlation, however, the magnitude was weak (Dansey & Reidy, 2006).

The cognitive learning strategies correlated significantly, positively and moderately with the emotional regulation total scale and the anger subscale. Significant positive correlations

between the cognitive strategies total scale and the sadness subscale were also observed, however, the magnitude was weak. In the metacognitive learning strategies subscale positive significant and moderate correlations were found with the emotional regulation total scale and the sadness and anger subscales. There was a significant but weak correlation between the happiness subscale and the metacognitive strategies subscale. Furthermore, the metacognitive strategies subscale presented significant, weak, negative correlations with the sadness and anger subscales and also with the learning strategies total scale. With regard to the absence of dysfunctional metacognitive strategies, positive, weak correlations were observed with the emotional regulation total scale and the sadness subscale. In general, the

results suggest that the greater the use of cognitive and metacognitive learning strategies, the more it seems that the students have control of their emotions and vice versa.

In order to better understand which significant factors may jointly explain the scores of the total, cognitive and metacognitive learning strategies and the absence of dysfunctional metacognitive strategies, multivariate analyzes including the demographic variables age group and year of course, with Stepwise variable selection criteria were performed, as shown in Table 2. The variables emotional regulation of anger and age group were selected as factors significantly related to the total scores of learning strategies. Thus, the participants with higher total learning strategy scores were those who presented

Table 2

Multivariate Linear Regression Analysis for the Total Learning Strategies Score

Selected Variables	Categories	Beta* (SE)	p-value	Partial R ²
Emotional regulation anger	Continuous variable (score)	0.41 (0.08)	< .001	.1404
Age group	20-29 years (ref.)	—		
	< 20 years	3.53 (3.12)	.258	
	30 years or more	6.51 (1.79)	.003	.0501

Note. Beta*: value of the estimate or slope of the regression line; SE: standard error of beta. R²: coefficient of determination. Stepwise variable selection criteria. R² Total = .1942; Intercept (SE) = 119.16 (5.91); $p < .001$.

higher scores in the anger subscale. In addition, the students who were 30 years of age or over reported greater control of this emotion when compared with their younger colleagues.

With regard to the cognitive strategies, it was found

that the variables emotional regulation of anger and age group were selected as factors significantly related to the cognitive learning strategies scores. Thus, the university students with higher scores in the cognitive learning

Table 3

Multivariate Linear Regression Analysis for the Cognitive Learning Strategies Score

Selected Variables	Categories	Beta* (SE)	p-value	Partial R ²
Emotional regulation total	Continuous variable (score)	0.13 (0.04)	< .001	.0891
Age group	20-29 years (ref.)	—		
	< 20 years	1.54 (1.44)	.286	
	30 years or more	2.86 (0.83)	< .001	.0359

Note. Beta*: value of the estimate or slope of the regression line; SE: standard error of beta. R²: coefficient of determination. Stepwise variable selection criteria. R² Total = .1703; Intercept (SE) = 45.62 (3.08); $p < .001$.

strategies subscale were those with higher emotional regulation scores in the anger subscale and who were 30 years of age or over (Table 3).

As can be seen in Table 4, for the metacognitive

strategies, the multivariate analysis indicated that the emotional regulation total scale and age group variables were selected as factors significantly related to the score of this type of strategy. Thus, the participants with higher scores in

Table 4

Multivariate Linear Regression Analysis for the Metacognitive Learning Strategies Score

Selected Variables	Categories	Beta* (SE)	p-value	Partial R ²
Emotional regulation total	Continuous variable (score)	0.12 (0.02)	< .001	.1439
Age group	20-29 years (ref.)	—		
	< 20 years	2.16 (1.64)	.188	
	30 years or more	3.30 (0.94)	< .001	.0470

Note. Beta*: value of the estimate or slope of the regression line; SE: standard error of beta. R²: coefficient of determination. Stepwise variable selection criteria. R² Total = .2069; Intercept (SE) = 46.21 (4.70); $p < .001$.

metacognitive learning strategies were those with the highest total score for emotional regulation and were 30 years of age or over.

Regarding the dysfunctional metacognitive strategies,

the multivariate analysis showed that the variables year of the course and the sadness emotion were selected as factors significantly related to the score in this subscale. The university students of the first year presented

Table 5

Multivariate Linear Regression Analysis for the Absence of Dysfunctional Metacognitive Learning Strategies Score

Selected Variables	Categories	Beta* (SE)	p-value	Partial R ²
Emotional regulation sadness	Continuous variable (score)	0.06 (0.02)	.011	.0273
Year	1 st year (ref.)	-		
	2 nd year	-0.46 (0.56)	.415	
	3 rd year	-0.33 (0.57)	.571	
	4 th year	-1.14 (0.53)	.033	.0168

Note. Beta*: value of the estimate or slope of the regression line; SE: standard error of beta. R²: coefficient of determination. Stepwise variable selection criteria. R² Total = .0457; Intercept (SE) = 21.48 (1.35); $p < .001$.

higher scores in the absence of dysfunctional metacognitive learning strategies and in the sadness subscale of emotional regulation (Table 5).

Discussion

The aim of this study was to investigate the relationships between the learning strategies and emotional regulation of 298 students between 18 and 54 years of age, of both sexes, from the 1st to 4th years of Pedagogy courses at one public and one private university of a city in the state of Minas Gerais. Furthermore, it was sought to examine the joint contribution of emotional regulation, age and year of course on the learning strategy scores.

Relationships between learning strategies and emotional regulation were found. Although there are few studies on emotional regulation, this result was expected, since the literature shows that emotions play an important role in school and academic learning (Costa & Boruchovitch, 2009; Cruvinel & Boruchovitch, 2011; Dell'Agli, 2008; Raftery & Bizer, 2009; Turner & Husman, 2008). In addition, the students who can act on their emotions, trying to control them, tend to present better academic performance (Pekrun, 2006; Pekrun et al., 2011).

The international and national studies have suggested that the ability to control the emotions is important in the adaptive processes and also has a major impact on information processing and learning (Costa & Boruchovitch, 2009; Cruvinel & Boruchovitch, 2011; Dell'Agli, 2008; Gross et al., 2006; Turner & Husman, 2008).

A study conducted by Turner and Husman (2008) revealed that the use of learning strategies and emotional regulation for the control of the emotions can support self-regulation of the stressful emotions and also provide ways of preventing school failure. Pekrun et al. (2002, 2011) showed that various emotions are related to the essential components of the self-regulation of learning, such as interest, motivation, and learning strategies, among others. DeCuir-Gunby et al. (2009) found that low academic productivity of university students seems to be related to the use of emotional regulation strategies

that do not favor adaption, for example, not facing up to the situation, rumination or isolation.

Although there is consensus among researchers that the cognitive and affective aspects are related to learning, they indicate the need for future investigations to be conducted in order to examine in more depth the relationship between these two aspects in the school and academic context (DeCuir-Gunby et al., 2009; Kesici & Erdogan, 2009; Pekrun et al., 2002; Raftery & Bizer, 2009).

Another important finding of this study refers to the metacognitive learning strategies that correlated positively, significantly and moderately, with all the emotional regulation variables. It could be said that this was also expected because, according to the study of Kopp (1989), emotional regulation and metacognition are composed of cognitive processes that include planning, organization and monitoring. This suggests that the more the students use metacognitive strategies, i.e., plan, monitor and regulate their learning, the greater their possibilities to control their emotions seem to be and vice versa.

When analyzing the relationship between learning strategies and emotional regulation, it was observed that the anger emotion and age group were found to be factors significantly associated with the score of the learning strategies total scale and with the cognitive and metacognitive strategy subscales. It is therefore possible to suggest that the students 30 years of age and over who reported greater use of learning strategies are those that appeared to present greater control of anger. Furthermore, it is possible to hypothesize that the more these individuals use cognitive and metacognitive strategies, the more they seem to have control over their emotions. Similar results were obtained by Pekrun et al. (2002) and Turner and Husman (2008).

Furthermore, it was noted that the 1st year students reported less use of strategies unfavorable to their learning, and even claimed to exert greater control over their sadness emotion. The impact of the year of the course on the affective, cognitive and metacognitive regulation should be further examined in future studies.

In general, it can be said that the university students

who reported being more strategic in performing their academic activities also appeared to be more able to control their emotions of sadness and anger and maintain their happiness. However, it is noteworthy that, with regard to the cognitive strategies subscale, only moderate positive correlations were obtained with the age group and the emotional regulation anger subscale. In addition, the absence of dysfunctional metacognitive learning strategies subscale correlated with the year of course and anger regulation. The metacognitive learning strategies were associated with the emotional regulation total scale and with the age group. These data are relevant to the extent that students, according to the research, when becoming more strategic in their learning and when coping better with their emotions, may also present better academic performance (DeCuir-Gunby et al., 2009; Kesici & Erdogan, 2009; Pekrun et al., 2002, 2011; Raftery & Bizer, 2009).

It should also be mentioned that one of the limitations of this study is related to the fact that it employed only the report of the use of learning strategies and emotional regulation. Using the self-report as the research instrument, it was not possible to affirm whether the students really did use the strategies evaluated in the instruments. Furthermore, there is no certainty that the students were really able to maintain good control of their emotions. Thus, it is recommended that further studies be conducted in order to verify the individual's use of learning strategies and control of emotions, not only from the self-report.

Final Considerations

The studies increasingly recognize the ability that humans have to exert conscious control over their own mental states and processes. They also confirm that the adequate use of learning strategies facilitates the acquisition of knowledge and provides improvements in the academic performance of students (Costa & Boruchovitch, 2009; Kavasoglu, 2009; Kramarski & Michalsky, 2009; Pekrun, 2006; Pekrun et al., 2011; Singleton & Newman, 2009). Furthermore, the studies suggest that, as well as promoting experiences that encourage student awareness regarding their cognitive and metacognitive processes, the motivational and affective aspects should be equally considered in the course of formal schooling (Amado et al., 2009; Boruchovitch et al., 2006; Pekrun et al., 2011; Pintrich, 2002; Santos & Boruchovitch, 2009). Thus, it becomes essential to comprehend the nature of a wider range of emotions and the ways students control them in the academic and school context. This highlights the need for instruction, allied to the contents, regarding the emotional aspects to be considered by teachers, and that the specific teaching strategies that assist in regulating emotions are fostered in the educational context (Cagnin, 2008; Coats & Blanchard-Fields, 2008; DeCuir-Gunby et al., 2009; Ochsner & Gross, 2005).

It is believed that this study has contributed to greater clarity regarding the knowledge and use of learning strategies and emotional regulation by students of the teacher formation course. The results are relevant because they provide

reflections on the inter-relationship of the cognitive and affective components in academic learning. There is also the expectation that the results of this study may contribute to the improvement of pedagogic practices, by improving the quality of the formation courses for teachers and consequently education. It is also hoped that future studies will advance the investigation into the relationships between learning strategies and emotional regulation, verifying their real use by Higher Education students, as well as refining the instruments for measuring these variables in our context.

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Denise Bortoletto has a Master's in Education from the Universidade Estadual de Campinas.

Evely Boruchovitch is Full Professor of the Departamento de Psicologia Educacional of the Faculdade de Educação da Universidade Estadual de Campinas.

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