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ARTICLE

Self-regulation, learning strategies and reading understanding in Fundamental Education I

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ABSTRACT

This research aimed to verify the internal structure of the Inventory of processes of self-regulation of learning, as well as to evaluate self-regulation, learning strategies and reading comprehension of students in the early years of Elementary School, verifying the relationship between the three variables. 259 students from two public schools located in the state of Paraná participated. The instruments used in the research were the IPAA — Inventory of Learning Self-Regulation Processes, the EAVAP-EF — Scale of Assessment of Learning Strategies for Elementary Education and the Cloze test. The results obtained indicated significant rates of use of self-regulatory strategies with relations of this construct with the metacognitive strategies and level of understanding of instructional reading. The data presented imply directions regarding the teaching action and educational practices in the school context.

KEYWORDS

self-regulatory processes; learning strategies; reading; basic education.

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AUTORREGULAÇÃO, ESTRATÉGIAS DE APRENDIZAGEM E COMPREENSÃO DE LEITURA NO ENSINO FUNDAMENTAL I

RESUMO

Esta pesquisa teve como objetivo verificar a estrutura interna do Inventário de processos de autorregulação da aprendizagem, bem como avaliar a autorregulação, as estratégias de aprendizagem e a compreensão de leitura dos alunos dos anos iniciais do Ensino Fundamental, verificando a relação entre as três variáveis. Participaram 259 alunos de duas escolas públicas situadas no estado do Paraná. Os instrumentos utilizados na pesquisa foram o Inventário de Processos de Autorregulação da Aprendizagem (IPAA), a Escala de Avaliação das Estratégias de Aprendizagem para o Ensino Fundamental (EAVAP-EF) e o teste de *Cloze*. Os resultados obtidos indicaram índices significativos de uso de estratégias autorregulatórias com relações desse construto com as estratégias metacognitivas e nível de compreensão de leitura instrucional. Os dados apresentados implicam em direcionamentos no que tange a ação docente e as práticas educativas no contexto escolar.

PALAVRAS-CHAVE

processos autorregulatórios; estratégias de aprendizagem; leitura; educação básica.

AUTORREGULACIÓN, ESTRATEGIAS DE APRENDIZAJE Y COMPRENSIÓN LECTORA EN EDUCACIÓN FUNDAMENTAL I

RESUMEN

Esta investigación tuvo como objetivo verificar la estructura interna del Inventario de procesos de autorregulación del aprendizaje, así como evaluar la autorregulación, las estrategias de aprendizaje y la comprensión lectora de los estudiantes en los primeros años de la Escuela Primaria, verificando la relación entre las tres variables. Participaron 259 alumnos de dos escuelas públicas ubicadas en el estado de Paraná. Los instrumentos utilizados en la investigación fueron el IPAA — Inventario de Procesos de Autorregulación del Aprendizaje, la EAVAP-EF — Escala de Evaluación de Estrategias de Aprendizaje para Educación Primaria y la prueba Cloze. Los resultados obtenidos indicaron tasas significativas de uso de estrategias de autorregulación con relaciones de este constructo con las estrategias metacognitivas y el nivel de comprensión de la lectura instruccional. Los datos presentados implican orientaciones sobre la acción docente y las prácticas educativas en el contexto escolar.

PALABRAS CLAVE

procesos de autorregulación; aprendiendo estrategias; leyendo; educación básica.

INTRODUCTION

The school is defined as the main form of access to systematized knowledge for the majority of the population, therefore, it expands "[...] the responsibility of the Elementary School in its function of ensuring that everyone learns the curricular contents capable of providing the basic tools for full insertion in the social, economic, and cultural life of the country" (Brasil, 2013, p. 113). It is perceived that the commitment of the Elementary School with the students constitutes an essential role when considering its function regarding the different social groups inserted in the school, by using teaching methods, strategies, and resources that favor the understanding of the individual (Brasil, 2013).

About the teaching objectives that motivate the school's action in this learning stage, the guidelines set out in the National Curriculum Parameters (Parâmetros Curriculares Nacionais) (1997) emphasize the magnitude of the student's constructive participation in the learning moment and clarify the educator's intervention role, which should be to provide and develop the training capabilities of the individual. The objectives and conceptualizations of the meanings expressed in this document adopt this effective participation over the teaching areas, permeated by the protagonism of students and teachers, who also see themselves as subjects of knowledge (Brasil, 1997).

In the approach of interest for the development of the subjects' intellectual abilities, the knowledge of self-regulated learning stands out, which highlights the integration of cognitive, metacognitive, affective, motivational, and behavioral factors in the action of learning. The point of view of self-regulated learning defines students as the protagonists of their own learning, strengthening their ability to learn and control their psychological processes in the school stages (Boruchovitch and Gomes, 2019).

Self-regulation is defined as a process by which subjects activate, guide, monitor, and likewise take responsibility for their learning. According to Ganda and Boruchovitch (2018), being self-regulated means acquiring skills that involve factors of self-awareness, self-reflection, thought control, emotional mastery, and behavior change throughout one's life. Thus, the use of self-regulation strategies allows individuals to make use of their psychological processes in a meaningful way, fostering effective learning (Boruchovitch and Gomes, 2019).

Cognitive functioning through self-regulation can be stimulated by abilities to control attention and memory processes, thinking and problem-solving strategies through planning, goal monitoring, and organizing thought and behavior. Another factor, which somehow brings significance to this process, is motivation, which plays a key role in self-regulation and in the development of various forms of voluntary control (Boruchovitch, 2004). The studies by Ganda and Boruchovitch (2018) point out that self-regulation is not an innate characteristic of the individual, but rather a skill developed throughout life by experiences, teachings from other people, and interference from the environment in which the subject is inserted. The authors further organize self-regulatory skills into four basic learning dimensions, namely, the cognitive/metacognitive, the motivational, the emotional/affective, and the social.

Cognitive actions are those that facilitate the storage of information. Metacognitive are procedures directed at planning, monitoring, and regulating the act of learning itself. Motivation is intrinsic, about the personal interest in learning a certain subject, and extrinsic, in the act of learning something through receiving rewards, such as grades or social recognition. The dimension of emotions, which is configured as another factor that runs through all stages of the process of self-regulation of learning, is formed by physiological, cognitive, and behavioral components, thus, they can positively or negatively affect school performance. The regulation of emotions involves the order of recognizing, monitoring, evaluating, and altering emotional responses, which act upon the requirement of the activity or goal to be achieved. As a last dimension, the social one, of relevant significance for self-regulation, addresses the environment as a social dimension with regard to individuals, and in the economic and cultural context, which play their role in this action (Ganda and Boruchovitch, 2018).

According to Zimmerman (1998), the process of self-regulation involves three phases, which point to the planning of the task, its execution through the variables of attention and action, and the self-evaluation by individuals' self-reflection on their performance. The first phase, called prior, refers to the preparation for action by analyzing the task and activating self-motivational beliefs. In the performance phase, the second one established by the researcher, the planning carried out in the previous phase is considered, and through it, learning strategies and techniques that contribute to concentration control and the use of feedbacks that adjust their attitudes when necessary. The third and last phase of self-reflection involves the self-judgment made by individuals at the end of their task. In this phase, emotional and behavioral reactions are accentuated, which justify their successes or failures on the activity.

In 1997, with the intention of acquiring more knowledge about self-regulation, Schunk and Zimmerman (1997), based on the studies of Zimmerman (1989), developed a model of explanation of social origin, initially represented by levels, as the academic skills that become self-regulated. The presentation of this model laid out by the authors was reported in Zimmerman's (2013) studies, which pointed out the model of specific interactions between students and the social context at four important levels, namely, modeling, emulation, self-control, and self-regulation.

According to the author, modeling, the main level of this interaction, highlights the observation of significant people in their context who claim to use self-regulation strategies and practice them in their daily lives. These role models can be parents, teachers, friends or other close people who report using goals, motivation, persistence in effort, among others. The attitudes expressed by these models can reinforce in individuals a positive reflection in the dedication and action of accomplishing their tasks, with influence on motivation, carrying out, in turn, the essential elements for self-regulated learning.

The second level explained by Zimmerman (2013) is that of emulation, since the subject learns not only through observation, but also through practice itself. The skill models observed will be developed through their performance, the use of motivation, and the guidance of people involved in this practice who can provide

support and feedback when needed. The third level, building on the representations already achieved in the previous levels, is that of self-control. This process happens when, through the mental images or verbalizations of the observed model, individuals identify their performance and the use of strategies that correspond to what they have in mind and self-reinforce themselves by applying this action, exercising the activity of self-control.

In the fourth and last level, pointed out by the author points as the self-regulated one, the subject is able to adapt autonomously, and through the necessary demands of transformation, as well as the knowledge and skills acquired. That is, the subjects' actions will be virtually independent of the previously established model, their adaptation and strategies will be motivating to goal orientation, and their self-efficacy beliefs will be strengthened by satisfactory results. The levels described highlight their beginning with deep socially oriented relationships, which diminish as subjects become aware of their learning, that is, self-regulated.

When considering the subject's protagonism in learning, Boruchovitch (2001) points out that some theorists (Pozo, 1996; Boruchovitch, 1999; Polydoro and Azzi, 2009; Frison and Simão, 2014; Machado and Boruchovitch, 2018; Ganda and Boruchovitch, 2018) have emphasized the importance of developing students' awareness of learning processes. Thus, for the advancement of these self-regulated skills, the use of learning strategies is considered as a way to contribute to the student's learning to learn, since they are evidenced as techniques or methods used by the subject to acquire, store, and use information (Dembo, 2000).

Learning strategies denote relevance by highlighting human learning in the school environment. They are conceptualized as actions that facilitate the process of knowledge acquisition and are classified as cognitive or metacognitive, considering the action performed by the student. However, both are intentional attitudes with the goal of performing better in school (Prates, Lima and Ciasca, 2016; Costa and Boruchovitch, 2019).

In the studies by Dembo (1994), Garner and Alexander (1989), and Boruchovitch (1999), two groups of learning strategies were presented: cognitive and metacognitive. The group of cognitive strategies are revealed as certain behaviors and thoughts that contribute to the storage of information through rehearsal, elaboration, and organization. Rehearsal is characterized by the attitudes of repeating, copying, and underlining. Elaboration, by the use of summaries, analogies, and answering questions. And organization, by selecting ideas and building schemes and maps. The group of metacognitive strategies highlights actions such as planning, regulation, control, and execution of the process that, through the highest degree of precise complexity, permeates the awareness necessary for its use (Oliveira, Santos and Inácio, 2017).

When grouped into cognitive and metacognitive strategies, there are several factors that can be involved in these actions. According to Suehiro, Boruchovitch, and Schelini (2018), the use of learning strategies involves motivation and control of emotions, characteristics that enable the development of self-regulation in the individual. This self-regulated learning emphasizes self-knowledge by employing appropriate learning strategies, motivation in actions, and control of emotions in the

face of the challenges of the school environment. Through the understanding and relevance of emotions at the time of learning, it can be named emotion self-regulation, since it involves processes of how to deal with high levels of emotions, both positive and negative, linked to the academic goal that one intends to obtain.

For Boruchovitch (1999), learning strategies allow learners to stay motivated and perform well. The importance of the appropriation, monitoring, and regulation of learning is directly related to the motivation in the act of learning and processing these attitudes that significantly contribute to the improvement of school performance (Costa, Oliveira and Scacchetti, 2015). Thus, considering learning strategies as cognitive and metacognitive resources, it is essential to relate them to the motivation and willingness of these subjects in the development of the activities. And that by recognizing, using, and presenting great mastery of these actions, these individuals facilitate their relationship with school tasks (Santos and Boruchovitch, 2011).

Teaching learning strategies implies cognitive, motivational, and affective relationships in the learning outcomes, as mentioned before. They can contribute to students' self-regulation and to their ability to cope with different learning situations by controlling their motivation and emotions. In this way, strategies such as underlining relevant parts of the text, rereading, questioning for understanding, summarizing, and more, can be learned and carried out in the school environment itself (Costa and Boruchovitch, 2015; Prates, Lima and Ciasca, 2016).

Learning strategies, like the new culture of learning, point out the relevance of controlling our learning processes. One must learn to manage and regulate their own action in the face of cognitive processes and get used to reflecting on their knowledge. This transition in the individual's attitudes indicates changes from a passive learner to an active and constructive learner, supported by metacognitive and controlled learning (Pozo, 1996).

According to Dembo (1994), metacognitive strategies are shown to be more complex attitudes, since they involve the subjects self-knowledge in planning, monitoring, and regulating their thinking, the identification of tasks to be accomplished, and the recognition of the most appropriate strategies to develop such knowledge. By planning their actions, individuals exhibit significant behaviors when setting goals for their studies. Monitoring then occurs through awareness of the knowledge acquired and the ways in which they can best be performed. Thus, regulation strategies imply the act of observing the actual monitoring performed, enabling pertinent changes in strategies if the ones applied are not effective for the understanding of the activity.

Costa and Boruchovitch (2015) discuss the concern of researchers in recent decades for the numerous investigations directed at how to teach students to efficiently use learning strategies. The studies suggest the importance of showing commitment and dedication, done over longer periods of time, by both students and teachers. The use of learning strategies should be developed gradually and always linked to practical experiences related to the activities offered in the classroom.

That said, interventions such as help in the teaching context, application of curriculum content related to school motivation, teaching of learning strate-

gies, among others, become essential for the student to be successful in the use of strategies in their school practice and have active participation at the time of acquisition of new knowledge (Costa and Boruchovitch, 2015). In turn, it is not enough just to know the learning strategies, but also to know how to use them to improve school performance, linked to affective support strategies that control anxiety levels, self-efficacy, among others (Boruchovitch, 1999).

In this context, it is considered that, through the use of learning strategies, students can overcome difficulties and obtain significant school performance in their trajectory. To this end, by recognizing the various skills that subjects can develop in their school life, reading is presented as a domain that stands out when it comes to the subjects' success in schooling. According to Santos and Oliveira (2009), it is through reading that individuals attribute meanings to understand others and the environment in which they are inserted. Thus, this action is defined as fundamental in the education of people. For this competence to be developed, it will depend on several abilities, such as the reader's ability to create strategies that enable an understanding of what is being read, by means of the characteristics presented in the text (Boruchovitch, 2001).

For Guidetti and Martinelli (2007), there are several definitions about the skills needed for reading through the different positions in the scientific literature on the topic. Researches show an agreement in relation to the complexity involved in the critical and creative construction of the subject in the act of reading. Thus, Joly and Istome (2008) define reading as a complex skill for the subject, which requires the signification of a graphic register through a reflective analysis that results in comprehension. The use of strategies, such as mental schema with previous schemas, becomes indispensable for the relationship with what is being read and the recognition of some meaning.

Reading is considered one of the most significant pieces of knowledge, since it develops skills for understanding everyday life. Thus, its systematization, which should enable knowledge of the world, takes place in a more elaborate way in school institutions. The school must provide the students with texts in several genres, which enable the acquisition of reading and its comprehension, aiming at the promotion of the individuals' reflexive and critical actions in their social performance. The learning of this relevant knowledge is configured by Elementary School, enabling the achievement of these skills by means of the levels of schooling covered by the individual (Mendonça, 2010; Oliveira *et al*., 2012; Oliveira, Santos and Rosa, 2016).

In the National Common Curricular Core (Base Nacional Comum Curricular, BNCC) (2017), the purpose of the specific competencies in reading in Elementary School I refers to the recognition of texts as a form of manifestation and expression of meanings, values, and ideologies. In other words, the selection of texts and books is made by means of the objectives, interests, and projects to be achieved, and the involvement in literary reading practices tends to contribute to the transformation and humanization of the experiences with literature in playful, imaginary, and enchanting dimensions. With these goals, it is considered that reading strategies can expand literacy in this cycle of schooling, considering different genres and progressive levels of complexity (Brasil, 2017).

Reading comprehension involves several cognitive processes, which, when interrelated, constitute meaning. These processes include basic reading systems, knowledge of the meaning of the words expressed in the text, the ability to perform inferences, language skills, memory skills, among others (Suehiro and Boruchovitch, 2016). In this way, considering cognition through new knowledge, when retained in the memory, this experience can be used in other contexts, reinforcing the idea that the understanding of a text will be more relevant according to the previous knowledge that the reader has about the topic (Santos and Oliveira, 2010).

In order to read and write, it is necessary that the subject has the ability to decode and understand, visual and auditory memory, and mastery of the lexical perceptual processes, including visual, phonological, and syntactic mechanisms, which require the ability to mentally operate on the mechanisms responsible for the representation of words, and semantic, which give meaning to what is read or written. Guidetti and Martinelli (2007) consider reading and writing to be two interdependent actions, showing that the basic linguistic and cognitive skills are varied and complex at the time of learning which may lead to difficulties in acquiring knowledge.

Within this perspective, the reading objectives are diverse and for this reason they are formed as guiding characteristics of interpretation. For each reading purpose, there is a need for a set of specific strategies, since these purposes formulate the construction of meaning according to the reading objective. Comprehension strategies are essential attitudes for learners to be able to understand texts of various genres, and for this domain to be effective, readers must practice self-questioning about their understanding, making meaningful connections between new knowledge and what has been previously acquired, in addition to generalizing this learning in other situations (Solé, 1998).

For Cunha and Capellini (2016), reading is only effective when there is an understanding of what is being read. The cognitive processes involved in reading comprehension are high-level, as they include working memory, stored knowledge, monitoring, information integration, and inferences. Linguistic processes, also considered relevant in reading, encompass syntactic, semantic, lexical, and decoding skills. But it is through the combination of the literal content of the text and prior knowledge that reading and comprehension occur, as it is in this way that the inference happens, through the explicit information in the text with implicit information that requires the individual's prior knowledge, thus, the inference activity contributes to the construction of the mental representation of the text.

By relying on several aspects for the development of reading and comprehension, the interrelation of cognitive and linguistic processes become essential (Cunha and Capellini, 2016). However, successful comprehension is only effected through learning and specific, explicit instructions. The recognition of the elements in the text and their analysis perform the process of meaning construction, resulting in comprehension. Thus, at school, teachers must use different strategies that can develop these reading skills and, consequently, the students' comprehension domain (Braz and Guimarães, 2019).

Braz and Guimarães (2019) highlight the importance of permeating the explicit teaching of reading comprehension through the teaching of reading strategies to students. As for the readers, they must assume their role by creating meaning from the text based on the knowledge they already have, performing a meaningful interpretation and validating the use of strategies that benefit the recognition of the text studied in a more effective way. Furthermore, the strategies used during reading can also contribute to the learner's ability to identify and solve problems during the comprehension process.

The research developed focused on the relationship of self-regulation, learning strategies, and reading comprehension, the latter item being one of the essential skills as an educational goal, and which at the same time constitutes an obstacle to learning precisely because it is a specific component that goes beyond the subject's cognitive development (Cunha and Capellini, 2014). For this investigation, the internal structure of the Inventory of Learning Self-Regulation Processes was studied so that, afterward, the indices of the three variables studied could be evaluated.

This research aimed to verify the internal structure of the Inventory of Learning Self-Regulation Processes, as well as to assess self-regulation, learning strategies, and reading comprehension of students in the early years of Elementary School, verifying a correlation among the three variables.

METHOD

PARTICIPANTS

A total of 259 students from the 2nd to 5th grades of Elementary School I, from two public schools located in northern Paraná, participated in the research. There were 122 (46.9%) participants of gender 1 (female) and 137 (52.7%) of gender 2 (male), considering that one student did not answer the gender (n=1, 0.4%). The average age of the students was 10 years (SD = 1.42), with 7 years as the minimum age and 14 years as the maximum age. According to the distribution of students by grade, there were 55 (21.2%) 2nd graders, 54 (20.8%) 3rd graders, 58 (22.4%) 4th graders, 92 (35.5%) 5th graders.

INSTRUMENTS

Three instruments were used to measure the data, which point to self-regulation, learning strategies, and reading comprehension, respectively.

Inventory of Self-Regulated Learning Processes (Inventário de Processos de Autorregulação da Aprendizagem — IPAA): The IPAA was developed in Portugal, in 2006, with the purpose of investigating the self-regulatory processes in their different dimensions and was designed for students in the final years of Elementary School. It consists of a questionnaire with 9 items in a Likert format indicating never (1), a few times (2), sometimes (3), often (4), and always (5). An example of an item would be: "I try to understand the meaning of the subjects I am learning". The total coefficient is obtained by the sum of all items

divided by nine. It was validated and applied to Portuguese students by Lourenço (2008), with a Cronbach's alpha of 0.87. These same psychometric properties are also found in studies by Costa (2007) and Rosário *et al*. (2009). In the Brazilian context, the original version was adapted in the research conducted by Polydoro, Rosário, Sampaio and Freitas (2011), in which an item was excluded from the inventory through factor analysis, consisting of eight items grouped into a single factor-dimension, and by the psychometric analysis its total index became the result of the sum of all items divided by eight. The Cronbach's alpha obtained for this scale was 0.75. The version adapted by Polydoro, Rosário, Sampaio and Freitas (2011) concerns the model used in this research.

It is worth mentioning that the IPAA instrument has psychometric properties for its applicability in students from the 6th to the 9th grade of Elementary School. However, it was decided to be used in this research because of the lack of resources that provide mapping of self-regulatory processes for Elementary School I students. Thus, it is understood that this study may even add validity evidence for its use with the sample of these students. This is because the data provided were satisfactory for this school stage and there was no difficulty in understanding the items and applying the instrument, in general.

Scale of Assessment of Learning Strategies for Elementary School (Escala de Avaliação das Estratégias de Aprendizagem para o Ensino Fundamental — EAVAP-EF): the EAVAP-EF is an instrument based on the information processing theory, which was designed by Boruchovitch and Santos (2004) and validated by Oliveira (2008), with the purpose of assessing the cognitive and metacognitive learning strategies of students from the states of São Paulo and Minas Gerais. The research included a total of 815 Elementary School participants, aged 7 to 16, males (48.5%) and females (51.3%), from public (83%) and private (17%) schools. The instrument has 31 questions, whose answers are given on a Likert scale with the variables "always", "sometimes", and "never", with respective scores of 2, 1 and 0 points for each question. As an example of the items, there are: "Do you usually underline the important parts of the text to learn better?" (Cognitive strategy); "When you study, do you usually realize that you are not understanding what you are studying?" (Metacognitive strategy); "Do you usually give up when an assignment is difficult or boring?" (Dysfunctional metacognitive strategy).

Cloze Test: The Cloze technique was created by Wilson Taylor in 1953 to determine the readability of printed texts (Sõhngen, 2002). These experiments resulted in the Cloze test in 1956, which consists of a text containing approximately 200 words that, in Taylor's original proposal, always omits the fifth word to measure the reader's level of comprehension of the text (Santos *et al.*, 2002; Oliveira, Boruchovitch and Santos, 2007). The text used in this study was developed by Santos (2005) and presents evidence of validity in Brazilian studies (Molina, 1979) as a measure of text intelligibility, and for standing out as an indicator of reading skills (Santos *et al.*, 2002). Entitled "The Princess and the Ghost", the text features 15 omissions for students to fill in.

PROCEDURES

All the necessary ethical processes for the research were used, and through Resolution 466/2012 and 510/2016 of the National Health Council and complementary, it was registered and approved under opinion n. 3.562.461.

For data collection, the parents or guardians of the participating students signed the Informed Consent. After this procedure, data collection was performed in a single application with the three instruments: IPAA, EAVAP-EF, and the Cloze Test. This occurred collectively, in the classroom, on a day and time set by the educational institutions. In one of the schools, the application occurred in the afternoon period and in the other in the morning, without changes in the school organization of the classes, that is, with schedules made available by the teachers of the subjects of the curriculum.

DATA ANALYSIS

For data analysis, IPAA's Confirmatory Factor Analysis (CFA) was used, with Weighted Least Square (WLSMV) estimation method, based on the polychoric correlation matrix. The rotation was Oblique (Geomin). The model was tested using the indices recommended by Hu and Bentler (1999), namely: chi-square per degrees of freedom ($\chi 2/df < 3$); Comparative Fit Index (CFI), greater than or equal to 0.95 (optimal) or 0.90 (acceptable); Tucker-Lewis Index (TLI), greater than or equal to 0.95 (optimal) or 0.90 (acceptable); and, Root Mean Square Error of Approximation (RMSEA), less than or equal to 0.06 (optimal) or 0.08. CFA was chosen due to the fact that it is most appropriate when there are already hypotheses about the structure of an instrument. This analysis was performed using the MPlus 7.3 software (Muthén and Muthén, 2012).

The internal consistency of the scale was estimated using Cronbach's alpha and ascertained by the Statistical Package for Social Sciences software (SPSS; version 22.0). Furthermore, descriptive and inferential statistics (Analysis of Variance — Anova and Simple Linear Regression Analysis — Enter Method) were used in order to meet the proposed objectives.

RESULTS

To meet the first objective, that is, to study the internal structure of the IPAA, CFA was used, since the instrument in question has a theoretical organization established in the scientific literature. In this study, as is observed in Chart 1, the model tested indicated the following fit indices, all of which were considered adequate: $\chi^2 = 2.34$; CFI = 0.932; TLI = 0.908; RMSEA = 0.72; WRMR = 0.73.

To meet the second objective, that is, to assess self-regulation, learning strategies, and reading comprehension in Elementary School I students, descriptive statistics was used. Chart 2 presents the mean scores, standard deviation, maximum and minimum scores of IPAA, EAVAP-EF, and the Cloze Test.

In the case of Learning Strategies, the subscales have different numbers of items. For this purpose, the average weighted by the number of items of each subscale was also used. In the Absence of Dysfunctional Metacognitive Strategies subscale, the mean, considering the number of items, was M = 0.85; in the Cognitive

Strategies subscale, the mean was 0.81, and in the case of the Metacognitive Strategies subscale, the mean was 1.10. Thus, it appears that the participating students did better on the metacognitive strategies subscale.

To meet the third specific objective, which is to verify the possible dependency relationship between self-regulation, learning strategies, and reading comprehension, a Simple Linear Regression analysis by the Enter method was used. According to Chart 3, data revealed that there was a dependency relationship between self-regulation only with Cognitive Strategies. The same was not observed with the other factors of the learning strategies, nor with the Cloze score.

Chart 1 – Factor Loadings of the Confirmatory Factor Analysis and Commonality of the items of the Inventory of Self-Regulatory Processes of Learning.

Items	Factor loading	Commonality
I1	0.54	0.30
I2	0.56	0.32
I3	0.54	0.29
I4	0.53	0.28
I5	0.59	0.34
I6	0.43	0.18
I7	0.53	0.28
I8	0.52	0.27
Cronbach's alpha=0.725		

Source: Prepared by the authors, 2020.

Chart 2 – Mean scores, standard deviation, maximum and minimum scores from the IPAA, EAVAP-EF, and the Cloze test.

Measures	M	SD	Maximum Score	Minimum Score
Self-regulation	18.92	6.21	32.0	0.0
Absence of DMS	11.10	4.62	23.0	0.0
Cognitive Strategies	8.93	4.18	22.0	0.0
Metacognitive Strategies	9.09	2.23	14.0	1.0
Strategies Total	29.06	6.7	47.0	10.0
Cloze Total	7.72	3.07	13.0	0.0

DMS: Dysfunctional Metacognitive Strategies.
Source: Prepared by the authors, 2020.

Chart 3 – Simple Linear Regression for the cognitive strategies subscale.

Independent Variable	R	Adjusted R^2	F	$Beta_z$	T	P
Self-regulation	0.448	0.197	6.630	0.448	7.787	0.001

Source: Prepared by the authors, 2020.

DISCUSSION

Based on the results, it was evident that the study of the internal structure of the IPAA showed that the 8 items of the instrument had a factor loading greater than 0.40, ranging from 0.43 to 0.59. Item 5 had the highest commonality, with 34% of the variability explained by the factor. In addition, all the fit indices of the CFA were found to be adequate. The data allow the inference that this is a complete instrument, composed of the three phases of Zimmerman's (2000) model. The data indicated by this research reveal similar results to the studies of Polydoro *et al*. (2019) with regard to the IPAA instrument. It is worth mentioning, as explained in the method of this research, that the instrument was used with a different sample of students than the one proposed in its psychometric studies. Thus, the data make it possible to add validity evidence for its use with the sample of Elementary School I students.

It was revealed that, through the IPAA, the indicators of self-regulation showed M = 18.92, indicating signs of an action that, as Rosário (2004) mentions, is a dynamic process, which implies situations in which the subjects determine their own learning goals to be achieved by monitoring, regulating, and controlling cognitions, motivations, and behaviors in an active and organized role. As for the learning strategies, in which the parameters of the EAVAP-EF were used, it was observed that, in face of the subscales, participants showed better performance in metacognitive strategies M = 1.10 and in the absence of dysfunctional metacognitive strategies M = 0.85, and lower performance in cognitive strategies M = 0.81.

The sample evidenced a more frequent use of metacognitive strategies which, in turn, involve actions of planning, monitoring, and regulation of the learning process by means of established academic goals, and making little use of dysfunctional metacognitive strategies that represent self-damaging strategies of learning, such as postponing tasks, stress and anxiety levels, lack of attention during class, among others (Boruchovitch and Santos, 2004).

Regarding the use of cognitive strategies, with the use of techniques that facilitate the learning of new knowledge through testing, elaboration, and organization (Oliveira, Santos and Inácio, 2017), the indicators pointed out that the participants, who are students from 2nd to 5th grade, do not use them as often. Through the results shown, it is assumed that these students do not have the habit of frequently performing some actions, such as repeating, copying, and underlining information, preparing summaries, making analogies, answering questions, selecting ideas, and building schemes and maps, among other techniques that enable a better understanding of the new knowledge.

With this, the results exposed in this research corroborate with the studies of Trassi (2016) who, by measuring the use of learning strategies and other variables, such as intellectual styles, verbal reasoning, and reading comprehension, also evidenced more use of metacognitive strategies and less use of cognitive strategies and dysfunctional strategies. Considering the importance of learning strategies, both cognitive and metacognitive, they correspond to the actions that enable motivation and better student performance, since their appropriation, monitoring, and regulation can facilitate the relationship with school activities (Santos and Boruchovitch, 2011).

As for the data obtained by the Cloze test, the results showed a minimum score of 0 and a maximum of 13, with M = 7.72 correct answers, which, according to the reading comprehension levels presented by Bormuth (1968), correspond to the instructional level, indicating that the reading done by the participants happens with sufficient abstraction of meaning to understand the text. In the context of scientific literature, several researches, such as that of Cunha and Santos (2010); Santos and Oliveira (2010); Suehiro and Magalhães (2014); Lúcio *et al.* (2018), among others, are grounded by the investigation of reading comprehension in children in the early years of Elementary School. Approximate evidence is shown in the study by Beluce *et al.* (2018), regarding the level of instrumental reading comprehension that is noted by the authors. It is worth noting that the aforementioned research also used other variables, however, what shows pertinence in highlighting it is the result of the reading comprehension level found.

With the inferred results and the concepts covered in the research, one can hypothetically identify the existing relationships between self-regulation, learning strategies, and reading and comprehension of texts in terms of recognizing the use of metacognitive learning strategies, which showed better indicators and which perform actions that develop self-regulated learning, and consequently, the ability to read and understand texts.

On the connection between self-regulation and metacognitive strategies, Pintrich (1989) points out that metacognitive strategies involve not only aspects of cognition, but the control and regulation of that cognition, which, through planning, monitoring, and self-regulation, develop the general processes of control. Such understanding enabled the similarity with the study of authors Oliveira and Stein (2018) who, related to other variables and interventional action, ascertained, through teaching and self-regulation processes, the significant link also with metacognitive strategies for good academic performance (Merett, 2018; Oliveira *et al.*, 2019).

The existing link between learning strategies and the development of reading and text comprehension skills are presented in several researches (Brandão and Ribeiro, 2009; Maciel, 2012; Carrilho, 2016; Cunha, Santos and Oliveira, 2018), verifying results of promotion in the academic achievement of Elementary School students. Regarding these variables and the results found in this research, previous studies (Arana, Cadena and Reina, 2006; Piovezan and Castro, 2008) corroborate the proposal that evidences metacognitive strategies in their results, thus proving the effectiveness of better comprehension skills through the use of these learning strategies.

Regarding the dependency relationship between self-regulation, learning strategies, and reading comprehension, by means of linear regression analysis, the inferred results indicated that the score obtained in self-regulation is able to predict, to some extent, the score obtained in cognitive strategies alone. Thus, it is evident that self-regulatory strategies predict to some extent that of cognitive strategies. Regarding the result found in the research, previous studies (Inácio, 2017) identified similar levels, regarding linear regression questions for cognitive strategies.

With regard to the dependence relationship expressed in the results of this research, it can be said that skills with cognitive strategies are also factors that significantly contribute to the self-regulation of student learning in the early years of Elementary School. According to Dembo (1994), cognitive strategies demand attitudes that allow students to

learn, remember, and understand the content, thus, according to current teaching practices, it is possible to understand that the sample proved such a relationship, because they are actions most recognized by students in the daily routine of school learning.

Given the three aspects exposed in this research, no studies investigating this particular relationship were found in the Brazilian scientific literature. Taking into account the indicators presented, it is possible to identify these connections based on the importance that metacognitive strategies have in the development of self-regulation, given the phases of planning activities, their execution with monitoring of attention and action, and self-evaluation (Zimmerman, 1998), as well as in reading skills and text comprehension, by covering memory, monitoring, inferences and mental images (Spinillo, 2013). Both need voluntary and conscious actions to be effective.

FINAL CONSIDERATIONS

The sample of the analysis showed considerable points that can contribute to the teaching and learning process in a preventive way and to the reduction of school failure. The results projected through validation instruments can offer favorable possibilities for practical changes in the various aspects in which they are used. With regard to this research, the instruments used were significant, as they present notable evidence of the use of learning strategies among the initial years of Elementary School, which can foster pertinent discussions regarding the form of teaching at the school level involved in the study.

According to the indicators, such as those of the research, the teaching work can be permeated by possibilities of new reflections and teaching perspectives that effect changes in strategies and that develop significant skills in the students' school performance. The current educational goals aim at the need for practices that stimulate the students' protagonism in their school life. Therefore, psychoeducational evidence can contribute and should be used more often by teachers of Basic Education as a subsidy for more effective learning actions.

In view of this quest to promote the academic success of students in Elementary School I, ascertaining their way of learning through learning strategies, it should be noted that the actions conducted by teachers, as proposed in the classroom, should aim at motivated, active, participatory, and consequently successful students. Regarding the skill of reading and text comprehension, in the context of a specific intervention with students in the early years of Elementary School, it is convenient to work with a diversity of texts, considering their characteristics and reading preparation activities, individual and shared reading, scripts for the identification of the main idea, development of literal and inferential questions, among others.

In general, the scope of the study was achieved, showing relevant results that can contribute to future research that seeks to identify the use of learning strategies by students in the early years of Elementary School in Brazil. To date, there have been no national studies that have indicated results involving the constructs mentioned. This contributes to the research presenting pertinent points for advances in the area. It is hoped that further studies can be developed in order to present solid data that will foster and contribute to better teaching practices in Brazilian schools.

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