INFLUENCE OF SELF-EFFICACY DIMENSIONS AND FAMILY BACKGROUND OF BRAZILIAN AND PORTUGUESE STUDENTS ON THEIR PERFORMANCE IN THE PISA READING ASSESSMENT

INFLUÊNCIA DAS DIMENSÕES DA AUTOEFICÁCIA E DO BACKGROUND FAMILIAR DOS ESTUDANTES DO BRASIL E DE PORTUGAL NO DESEMPENHO DA AVALIAÇÃO DE LEITURA DO PISA

INFLUENCIA DE LAS DIMENSIONES DE AUTOEFICACIA Y DE LOS ANTECEDENTES FAMILIARES DE ESTUDIANTES BRASILEÑOS Y PORTUGUESES EN SU RENDIMIENTO EN LA EVALUACIÓN DE LECTURA PISA

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ABSTRACT: The objective of this study was to identify the dimensions of self-efficacy and determine the impacts of these dimensions and family background on the reading performance of students from Brazil and Portugal who participated in the PISA 2018. To determine these dimensions (factors), an Exploratory Factor Analysis was performed. The effect of family dimensions and background was measured from a multiple linear regression. The results indicate that self-efficacy can be determined by seven factors related to the student's socio-emotional behavior. Furthermore, it was concluded that both self-efficacy and family background (mother's education) positively affected student performance. Therefore, the importance of developing public policies that promote the socio-emotional development of students is highlighted.

KEYWORDS: Self-efficacy. Family background. Reading performance. Evaluation. PISA.

RESUMO: *O objetivo deste estudo foi identificar as dimensões da autoeficácia e determinar os impactos destas dimensões e do background familiar no desempenho em leitura dos estudantes do Brasil e de Portugal, que participaram da avaliação de leitura do PISA 2018. Para determinar tais dimensões (fatores), realizou-se uma Análise Fatorial Exploratória. Já o efeito das dimensões e do background familiar foi mensurado a partir de uma regressão linear múltipla. Os resultados indicam que a autoeficácia pode ser determinada por sete fatores, relacionados ao comportamento socioemocional do aluno. Além disso, concluiu-se que tanto a autoeficácia quanto o background familiar (escolaridade da mãe) afetaram positivamente o desempenho dos alunos. Logo, ressalta-se a importância do desenvolvimento de políticas públicas que promovam o desenvolvimento socioemocional dos alunos.*

PALAVRAS-CHAVE: *Autoeficácia. Background familiar. Desempenho em leitura. Avaliação. PISA.*

RESUMEN: *El objetivo de este estudio fue identificar las dimensiones de autoeficacia y determinar los impactos de estas dimensiones y antecedentes familiares en el rendimiento lector de estudiantes de Brasil y Portugal que participaron en la evaluación de lectura PISA 2018. Para determinar estas dimensiones (factores), se realizó un Análisis Factorial Exploratorio. El efecto de las dimensiones familiares y los antecedentes se midió a partir de una regresión lineal múltiple. Los resultados indican que la autoeficacia puede ser determinada por siete factores relacionados con el comportamiento socioemocional del estudiante. Además, se concluyó que tanto la autoeficacia como los antecedentes familiares (escolaridad de la madre) afectaron positivamente el rendimiento de los estudiantes. Por lo tanto, se destaca la importancia de desarrollar políticas públicas que promuevan el desarrollo socioemocional de los estudiantes.*

PALABRAS CLAVE: *Autoeficacia. Antecedentes familiares. Rendimiento de lectura. Evaluación. PISA.*

Introduction

In the context of the elaboration and implementation of public policies aimed at socioeconomic development, external evaluations of factors such as academic performance and socioeconomic level are of great relevance (BARROS, 2019; SILVA; TEIXEIRA; COSTA, 2021). Assessments such as the PISA – *Program for International Student Assessment* – help to identify the main advances and gaps in teaching, and because it is an international assessment, its results allow us to verify whether countries with similar development, cultural and linguistic context have presented the same performance (SCHLEIHER, 2019).

According to Jolandek, Pereira and Mendes (2019) and Carvalho (2016), although the PISA assessment does not have the premise of carrying out tests linked to school curricula, it can serve as a reference for plans and actions of a country. Consequently, this assessment can induce and influence changes in the educational system, public policies and curriculum in the country's education system. Fernandes *et al.* (2018) also point out that countries can still use PISA results as a basis for making improvements in education and teaching quality.

Along these lines, Portugal and Brazil made advances in their education programs, such as the universalization and guarantee of basic education, regulating legislation for its financing and the application of investments in terms of percentage of the Gross Domestic Product (GDP), a fact that is still a challenge (AGUIAR, 2019). Regarding the form of investment, in the Portuguese State, the different levels of administration execute their budgets in a decentralized way, while in Brazil, for the States, Municipalities and Union, minimum resources are defined to be used by the federative entities (LIMA; FRANÇA, 2020).

In addition, in Brazil, in 2018, the National Education Base for basic education was implemented, which sought to guide the educational institutions of the various federal entities and their respective education systems (DECONTO; OSTERMANN, 2021). Notably, it is important to emphasize that updates such as these are based on the analysis of the results of external evaluations, such as PISA (AGUIAR, 2019).

Among the set of topics evaluated in PISA, reading assessment can be highlighted. According to Schleicher (2019), the quality of reading, measured in this test, is important to understand the socio-emotional skills of students, as their results can affect training, critical thinking and academic performance in other areas.

In addition to socio-emotional factors such as determination, persistence, concentration and self-efficacy (CARNOY *et al.,* 2015; UYSAL; ARIKAN, 2018), the students' family *background* and home environment (with regard to human, economic, cultural and social

capital) and the learning environment at school and among peers, which differ from each other, can also affect the results of their reading performance (PINTO; NETO; CARVALHO, 2019; FERNANDES; MACHADO, 2019).

Self-efficacy is related to the beliefs that the student has regarding their abilities to organize thoughts and attitudes, in order to perform daily activities (GAO; IZADPANAH, 2023; BANDURA, 1977). The family *background* is represented by the level of parental education and family income, which provide access to basic elements for a dignified life, in addition to the relationships that occur within the family environment, which the student brings with him to the school environment (ALMEIDA; CASSUCE; CIRINO, 2016).

Academic performance can be affected by the perception of socioeconomic factors that the student has access to, the way in which he feels supported and welcomed by teachers, classmates and family members, in addition to access to public policies aimed at training, education and youth development (FERNANDES *et al.,* 2018). Socioeconomic factors are related to economic activities in the country or region, level of family income, education, gender, color or race inequalities, access to basic sanitation, among others (FERREIRA JÚNIOR; BAPTISTA; LIMA, 2004; ALVES; SOARES; XAVIER, 2014).

Studies show evidence of a positive correlation between students' academic performance and socio-emotional skills (persistence, concentration, motivation, determination and self-efficacy) and a negative correlation with anxiety (SASSAKI *et al*., 2018; *MIRANDA* et *al.,* 2015). In this sense, Abed (2016) emphasizes the importance of developing socio-emotional skills in pedagogical practices in the school environment to improve students' academic performance and strengthen self-efficacy.

Regarding the influence of self-efficacy on academic performance, Uysal and Arıkan (2018) highlight, based on the 2012 PISA assessment, that verbal/social persuasion and a sense of belonging to the school environment were positively correlated with performance on the math test. In the same direction, Sassaki *et al.* (2018) highlighted the correlation between socio-emotional skills (self-efficacy, persistence, concentration and determination) with correct questions during the PISA test.

According to Jerrim and Vignoles (2016), in a study carried out with students from Singapore, they point out that students with greater self-efficacy and motivation showed better results in the PISA mathematics assessment. Kalaycioglu (2015) highlights in his study that self-efficacy in carrying out tasks in the mathematics discipline, for Dutch students, in the PISA

assessment, is related to the low level of student anxiety, thus having a positive impact on performance.

Although the relevance of the test structure has been highlighted in the literature (SASSAKI *et al.,* 2018), social aspects and psychological skills (UYSAL; ARIKAN, 2018; PINTO; NETO; CARVALHO, 2019) and the relationship of student self-efficacy with performance on the math test (UYSAL; ARIKAN, 2018), no studies were found with the defined dimensions of self-efficacy of Brazilian and Portuguese students, as well as studies that evaluate the effect of these dimensions on the PISA reading assessment, given the importance of reading for the student's academic development, their ability to understand, reflect, use and engage with texts to achieve a goal, build potential knowledge and interact in society (SOARES; CANDIAN, 2007).

It is also observed that understanding the effects of students' personalities, the school and family environment, teaching and pedagogical support on students' performance are important for the assertive implementation of public policies in education. That said, this study sought to identify the dimensions of self-efficacy and also to determine the impacts of these dimensions and family *background* on the reading performance of students from Brazil and Portugal who participated in the PISA 2018 reading assessment. The choice of countries Brazil and Portugal for this study is due to the fact that they are the nations that participated in the PISA 2018 assessment that have Portuguese as their mother tongue.

Literature review

The Pisa

The PISA – *Program for International Student Assessment* – is a triennial external assessment, applied to students who are 15 years old at the time of application of the test, and who, although these students are in the same age group, may be in different grades at school (CARNOY *et al.,* 2015). This program was created by the *Organization for Economic Cooperation and Development* (OECD) with the first round held in 2000, and in the 2018 edition the participation of 79 countries in the program, including Brazil and Portugal, both countries whose mother tongue is Portuguese, reason for choosing these nations for the present study (SOARES; CANDIAN, 2007).

The PISA assessment seeks to measure students' proficiency in three fundamental domains of competence – reading, mathematics and science –, one of which, the so-called main

domain, is rotated at each round: on average 63% of the items are considered as curricular material standard (SCHLEIHER, 2019). They are carried out using computers and last 2 hours (COSTA; AFONSO, 2009).

In Brazil, PISA is used by Inep - National Institute of Educational Studies and Research Anísio Teixeira - as an epistemological and statistical standard of the Brazilian educational system (VILLANI; OLIVEIRA, 2018). According to Costa and Afonso (2009), the results of PISA contribute to the creation of parameters on the quality of education, to help management bodies, developers and regulators of public policies aimed at education.

For example, in Brazil, in 2007, the Education Development Index (Ideb) was created within the framework of the PDE (Education Development Plan), serving as a guideline for planning and guiding public education policies and financing (OLIVEIRA; JORGE, 2015). With Ideb having a direct impact on the results of the SAEB, evaluation of the Basic Education Assessment System, and the Prova Brasil, standardizing student results, regulating management planning, teaching practices, curricular arrangements, school organizations with setting goals and achieving parameters (VILLANI; OLIVEIRA, 2018).

While Portugal had its public education policies outlined before the creation of PISA, since the publication of the Lei de Bases do Sistema Educativo (LBSE) in 1986, with educational public policies that have been in force in recent years and achieving good performances in the proficiency scales (FERNANDES *et al.,* 2022).

Among them, we can highlight: appreciation of science and technology, diversified offer of education, training and flexibility of the respective curricula, professional appreciation of teachers and understanding of assessment as part of the learning process, prevention of school dropout and promotion of success (FERNANDES; GONÇALVES, 2018).

Reading Performance and the Pisa Assessment

As highlighted, the use of external evaluations such as PISA and Ideb are important to guide and update public actions and programs, public policies aimed at education (LIMA; FRANÇA, 2020; DA SILVA CAMILLO; DE CASTRO FILHO, 2020). In summary, these assessments seek to quantify school performance in metrics and indicators (VILLANI; OLIVEIRA, 2018).

However, such indicators are usually associated only with students' cognitive ability (thinking, memorizing and processing), without considering other important factors, such as self-regulated learning, motivation and achievement emotions (FERACO *et al*., *2023*; OLIVIER *et al.,* 2019). Consequently, the indicators derived from the PISA and Ideb Assessment focus only on a part of the factors that compose and determine school performance, therefore, although they are important instruments for education, these indicators generally quantify only partially the performance and student learning (FERNANDES *et al.,* 2022).

In this sense, according to Esteban (2000) and Fonseca (2019), academic performance is related to the degree of knowledge that students have and the way in which the individual manages and faces their emotions, which are influenced by the process of emotional regulation, and can affect the academic performance of students seeking to achieve their academic and professional goals.

For Sassaki *et al.* (2018), the student's grade may be related to determination, organization and mastery of behavior. In this sense, Miranda *et al.* (2015), Tarbone, Ferreira and Pavão (2018) highlight, for example, income and performance in reading, which is directly linked to the subject's action when performing a certain activity, it is the measure of the evaluation process, which is described in the form of grades and grades achieved by the student.

Related to the factors that contribute to the student's reading performance, Pinto, Neto and Carvalho (2019) point out that the availability of books during the student's education positively influences their skills and taste for reading. Miranda *et al.* (2015) and Abbas and Lopes (2020), point out that in addition to the family *background*, the personal characteristics of the students (gender, age, whether they have a working day, hours of extracurricular study and family income) can also influence the performance and I like reading.

In the same direction, Salokangas and Kauko (2015) point out that the educational system, teacher training and the cultural context surrounding the school influence student performance. Similarly, the school structure (MATOS; FERRÃO, 2016), access to teaching materials, the school environment and current educational practices (BARTHOLOMEU *et al.,*

2016) are factors associated with the school and that can positively or negatively affect the teaching-learning process and, consequently, the student's school performance. With regard to personal characteristics, the student's ability to face challenging situations to integrate into the school can influence student performance (FERACO *et al.,* 2023; MATOS; FERRÃO, 2016).

Measuring reading performance helps in the elaboration of public policies, such as the development of programs aimed at the continuous training of teachers, combating inequalities, social construction of the curriculum (FERNANDES; GONÇALVES, 2018). Furthermore, performance measurement serves as an instrument and support tool for public managers in the formulation of public policies aimed at Education (LIMA; FRANÇA, 2020). Therefore, it is a good indicator of present development and future potential (CARVALHO, 2016).

According to Fernandes, Gonçalves, (2018), since its first participation in PISA, in 2000, Portugal has achieved better results in each edition, having started with an average lower than that of the OECD. In the first edition of PISA in 2000, in which the OECD average was 499 points, Brazil obtained an average of 396 points and Portugal 470 points; in the 2018 edition, in which the OECD average was 487 points, Brazil reached 413 points, while Portugal reached 497 points, both in reading literacy (OECD, 2001; SCHLEICHER, 2019).

Self-efficacy and reading performance

Notably, the socioeconomic context in which the student is immersed, that is, the family and cultural context, the study environment (school) and access to quality education are important to determine their performance in reading (CARNOY *et al.,* 2015; PINTO; NETO; CARVALHO, 2019). In addition, it is emphasized that the teaching-learning process is also influenced by the engagement of projects and actions aimed at student training (KAMASAK *et al.,* 2022; PONS-SALVADOR *et al.,* 2022; GROSELJ *et al.,* 2022). Furthermore, this engagement and the existence of an appropriate and affective learning climate between teachers and students favors the student's learning process and, consequently, their performance (BOELENS; DE WEVER; VOET, 2017).

Notably, both the teaching-learning process and the performance evaluation and measurement itself are complex, as they involve different aspects of the environment and the individual (student). From this set, those related to the student's self-efficacy stand out. For example, for Miranda *et al.* (2015) and Tarbone, Ferreira and Pavão (2018), the influence of environmental and structural factors of the school, community and student's residence on their performance may be conditioned to the inherent abilities of each individual, that is, to the

student's cognitive abilities when perform certain tasks. According to Dos Santos, Berlingeri and De Braga (2017), cognitive skills encompass constructs such as cooperation, responsibility and persistence.

Among the different factors inherent to cognitive abilities, self-efficacy can be highlighted, considering that, for Pajares (2002) and Soares and Oliveira (2011), it is related to behaviors that individuals develop and how they think about the reflex of their acts, and thus develop beliefs of their conditions, of performing subsequent behaviors and in similar tasks behave in accordance with such beliefs. In this sense, according to Miranda *et al.* (2015), the beliefs constructed by students about their abilities help them to use the acquired skills and knowledge, and in this way, their academic performance becomes a reflection of what they believe they have developed or are able to develop.

According to Araújo and Moura (2011), self-efficacy is related to what the student thinks about their conditions to perform certain tasks, organizing thoughts and attitudes consistent with practices to be performed. For Soares and Oliveira (2011), it acts as a key element in human competence and determines, to a large extent, the ability to carry out activities, motivation, effort and persistence in the face of difficulties, as well as patterns of thought and associated emotional responses.

Taufiq-Hail, Sarea and Hawaldar (2021) point out that individuals with a high sense of self-efficacy tend to increase their socio-cognitive functioning in many domains and approach difficult tasks, perceiving them as changeable and non-threatening, dedicating great interest, commitment and investment of effort in the face of difficulties and setbacks. While Araújo and Moura (2011) point out that low self-efficacy is associated with anxiety, pessimistic thoughts and depression, and these factors act as obstacles to the cognitive processes that lead to positive results in academic performance and in other contexts, including academic achievement, taken decision-making and social relations.

It is observed that self-efficacy arises in study situations based on four sources: 1) main mastery experiences; 2) vicarious learning; 3) verbal/social persuasion; 4) physical and emotional states.

These processes, according to Teixeira and Costa (2018), Usher and Pajares (2009) and Bandura (1977), are defined as: main mastery experiences, refer to contact with practical and theoretical situations with formative experiences; vicarious learning, refers to learning developed from observing the behavior of a given social model, in which the performance is successful and this model is reproduced with the aim of achieving goals and strengthening self-

efficacy; verbal/social persuasion, comprises the different stimuli coming from other people or from the context in which the student is; physical and emotional states are related to the student's ability to deal with stress, anxiety and pessimistic thoughts, constantly having a perception of self-efficacy.

According to the literature, self-efficacy can be segmented into five dimensions: emotional thoughts, which are related to the student's feelings regarding their achievements and the management of their activities (UYSAL; ARIKAN, 2018; PINTO; NETO; CARVALHO, 2019), determination, which seeks to capture the student's motivation and satisfaction in achieving better results, the commitment of effort, which aims to capture students' dedication to academic activities (CARNOY *et al*., 2015; UYSAL; ARIKAN, 2018; PINTO; NETO; CARVALHO, 2019), the self-concept, which seeks to capture what students think about themselves (BANDURA, 1977; ARAÚJO; MOURA, 2011; USHER; PAJARES, 2009) and the verbal/social persuasion dimension, which seeks to obtain the influences of the environment in which the student is immersed (SELAU *et al.,* 2018).

Based on the above, the following hypothesis is presented:

Hypothesis 1: The factors related to the dimensions of self-efficacy positively influence the reading performance of students in Brazil and Portugal.

Reading performance and family *background*

According to Miranda *et al.* (2015), the family *background* is crucial for students' reading performance, as the relationships that occur in the students' homes influence their seriousness, dedication, commitment and commitment during study time. In this line, Almeida, Cassuce and Cirino (2016) point out that the family *background* is represented by the level of education of the parents and the family income, which provide access to basic elements for a dignified life, and serve as an incentive, favoring the academic life and reading performance of the student. While Oliveira, Hornung and Wisniewski (2019) point out that the family *background* is composed of characteristics influenced by relationships in the home environment, which the student brings with him to the school environment.

According to Flores (2017), reading performance may be correlated with *background* family life and satisfaction with life related to parenting style, which is linked to the degree of seriousness, communication and sense of humor, the way in which relationships between parents and children develop, and parental support in relation to tasks school. According to Oliveira, Hornung and Wisniewski (2019), parents are fundamental in transmitting the

behavioral, emotional and cognitive characteristics of their children, and these characteristics are directly linked to the way in which children are educated in the home environment, with establishments of rules and limits that guide the relationships between parents and children, and they influence the development of self-efficacy and favor reading performance.

background factors related to children's reading performance, Palermo, Silva and Novellino (2014) point out that financial income exerts less influence than the level of maternal education, and this relationship is even closer when comparing levels of paternal instruction with maternal instruction. The family *background* can influence access to education at the right age for children, favoring continuous school attendance and reading performance, since children of less educated parents and socially from lower classes are less likely to ascend to high levels of trajectory student, compared to children of parents with better incomes and who have an academic education (CRAHAY; BAYE, 2013).

The level of education and the father's presence in the education of children, according to Aunola and Nurmi (2005), Bornstein (2015) and Alharthi (2023), constitute a model of behavior, organization and source of meanings, in addition to acceptance in the face of threats and external factors, such as violence and pressure from induction groups. And the father's presence in the home space influences the selection and construction of the environment for the children, according to values and principles, and is related to the students' reading performance (BARROS, 2006).

In this line, Sampaio *et al.* (2011), Senkevics and Carvalho (2015) and Da Costa, Da Silva and Da Silva Souza (2019) consider that family *background* favors students' reading performance, since students who are influenced by their parents have a high rate of school attendance and have access to greater opportunities due to the knowledge of their parents. Furthermore, it is observed that the presence of parents can help in the development of aptitudes, capacities and social and professional skills (YILDIRIM; BLAKE; ROOPNARINE, 2023; HOISL; KONGSTED; MARIANI, 2023; SORIA; LAWTON, 2023).

Almeida, Cassuce and Cirino (2016) also highlight the existence of a significant correlation between family *background* and reading performance. In particular, the authors point to the fact that, the higher the maternal educational level and high financial income presented by the students' parents, the better the results presented by the children, when compared to children of mothers with lower educational level and low financial income.

Based on the above, the following hypothesis is raised:

Hypothesis 2: Family *background* positively influences the reading performance of students from Brazil and Portugal.

Socioeconomic development and reading performance

The socioeconomic context in which the student finds himself, according to Guimarães and Arraes (2010), Gomes (2023), can affect self-efficacy and reading performance, since the seriousness, dedication and commitment that the student delivers in moments of studies are influenced by these relationships. According to Ferreira Júnior, Baptista and Lima (2004) and Alves, Soares and Xavier (2014), the socioeconomic variables are represented by the economic activities of the country or region, by the level of family income, by education, by inequalities of sex, color or race, for access to basic sanitation, these characteristics being important in the segmentation of class occupations and responsible for persistence and commitment in student life, and can have a strong influence on students' self-efficacy and reading performance.

Costa and Arraes (2007) point out that private schools, located in more developed regions, offer more favorable conditions for school development and, consequently, for students' self-efficacy and reading performance; also highlight the contribution of family *background* to reading and academic performance in general.

While Pinto, Neto and Carvalho (2019), point out that male Brazilian and Portuguese students have better academic performance than female ones, and even though local cultural factors, such as school peculiarities, educational principles and family background, are those that most influence the results of students' academic performance. In this direction, Velloso (2006) underlines that students with high socioeconomic selectivity and family *background* have great competitiveness, occupy highlights in undergraduate courses with greater relevance and have good academic performance and high self-efficacy.

Based on the above, the following hypothesis is raised:

Hypothesis 3: Portuguese students have, on average, lower performance in reading than Brazilian students.

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Methodology

To achieve the proposed objective, that is, to identify the dimensions of self-efficacy and, also, to determine the impacts of these dimensions and family *background* on the reading performance of students from Brazil and Portugal, who participated in the reading assessment of PISA 2018, carried out a quantitative, descriptive and cross-sectional study of the database was carried out. The target audience of this research were 15-year-old students participating in the 2018 PISA.

The initial total sample is 10691 Brazilian students and 5932 Portuguese students. This number of students represents 0.51% of the total number of Brazilian students and 6.01% of eligible Portuguese students who could participate in the assessment (SCHLEICHER, 2019). After removing the *miss values,* the final sample was reduced to 3460 Brazilian students and 4111 Portuguese students. The methodological model employed, in the contextual questionnaire from which the variables were extracted, allowed the student to leave items without answers, a fact that reduced to approximately 46% the data of the base that was used in the present work.

The program used in all estimations was STATA version 17.0. Exploratory Factor Analysis (EFA) was used using the principal components method with varimax rotation and Kaiser normalization, with the aim of determining self-efficacy factors that influence reading performance, based on questions from the PISA 2018 contextual questionnaire answered by Brazilian and Portuguese students.

Chart 01 - Description of research variables derived from the PISA 2018 OECD Contextual Questionnaire

Description:	Description:
ST188Q01HA	I generally manage my activities.
ST188Q02HA	I feel proud of having accomplished things.
ST188Q03HA	I feel like I can handle many things at once.
ST188Q06HA	My belief in myself gets me through difficulties.
ST188Q07HA	When I'm in a difficult situation, I usually find a way out.
ST034Q01TA	I feel like an outsider at school.
ST034Q02TA	I make friends easily at school.
ST034Q03TA	I feel like I belong at the school.

ST034Q04TA	I feel awkward and out of place at my school.
ST034Q05TA	Other students seem to like me.
ST034Q06TA	I feel lonely at school.
ST182Q04HA	Once I start a task, I persist until it's finished.
ST182Q05HA	Part of the pleasure I get from making things is when I improve my acting.
ST208Q01HA	My goal is to learn as much as possible.
ST208Q02HA	My goal is to fully master the material presented in my classes.
ST208Q04HA	My goal is to understand the content of my classes thoroughly.
ST182Q03HA	I find satisfaction in working hard.
ST181Q02HA	I enjoy working in situations that involve competition with others.
ST181Q03HA	It is important to me to perform better than other people on a task.
ST181Q04HA	I try harder when I'm competing with other people.
ST184Q01HA	Your intelligence is something you cannot change.
ST185Q01HA	My life has a clear meaning or purpose.
ST185Q02HA	I discovered a satisfying meaning in life.
ST185Q03HA	I have a clear sense of what gives meaning to my life.
ST182Q06HA	If I'm not good at something, I'd rather keep fighting to master it than move on to something I might be good at.
ST183Q01HA	When I'm failing, I worry about what others think of me.

Source: Prepared by the author

To assess the adequacy of the EFA regarding the sampling data, the Kaiser-Meyer-Olkin measure (KAISER, 1970) was performed, according to the literature by Hongyu (2018), which for the sample was 0.787. Bartlett's sphericity test was also proposed (BARTLETT, 1950). According to the literature by Hair *et al.* (2009), p value <0.050 indicates that there is a sufficient relationship between the variables to apply the EFA, and for the sample the value was p<0.001. And to verify the reliability of the new factors created, the Cronbach alpha test (CRONBACH, 1951) was needed, where Pestana and Gageiro (2005) and Marôco and Garcia-Marques (2006) suggest that values above 0.7 are considered valid, convergent and discriminant, which for the sample was 0.74.

Then, to determine the effect of self-efficacy and family *background factors*, a multiple linear regression with robust errors was estimated. This estimation was based on three

specifications. In the first, we sought to observe only the effect of self-efficacy factors on the students' reading performance, while the second sought to determine the effect of family *background.* Finally, an estimation containing all relevant aspects was performed.

Discussion of results

Sample Description

The results of the present study show that 54.30% of the total sample is from Portugal, 30.39% of the mothers have a degree, while this percentage is 6.18% for the fathers. 76.15% of children were enrolled in daycare at the right age, and the percentage in Brazil is higher than in Portugal for students who were enrolled in elementary school at the right age.

Of the total, 378 students had at least one failure in elementary school, which corresponds to 4.99% of the total sample of countries, of which 159 were Brazilian students (corresponding to 4.60% of the sample of Brazilian students) and 219 students Portuguese (corresponds to 5.33% of the sample of Portuguese students). In addition, it was found that 110 students had at least one failure in high school, which corresponds to 1.45% of the total sample. Of this total, we have 4 Brazilian students (which corresponds to 0.12% of the sample in Brazil) and 106 Portuguese students (which corresponds to 2.58% of the sample in Portugal).

Multivariate analysis

In turn, the determination of the factors that make up the self-efficacy of Brazilian and Portuguese students was based on a total of 26 questions of the contextual questionnaire composed of 62 questions, with varying numbers of sub-items, which showed some association with self-efficacy. These questions were grouped based on the application of Exploratory Factor Analysis. The results of factor rotation, obtained by Kaiser's Varimax method (1958).

Chart 2 presents the seven factors (dimensions) that make up the self-efficacy of Brazilian and Portuguese students, namely: School relationships (composed of factors associated with the school environment and peer relationships); Self-concept (composed of the dimensions of self-concept in relation to the purpose and meaning of life); Learning goals (composed of factors related to the achievement of learning goals); Motivation (composed by the dimensions of commitment, effort and determination); Emotional thinking (composed of factors that influence students' behavior); Effort commitment (comprised of factors associated

with carrying out activities); influence of the environment (comprised of the variables of the dimension verbal/social persuasion and self-concept).

For Luo *et al.* (2011), Wong and Liem, (2021) and Tuominen *et al.* (2020), the school context in which the student is inserted, relationships between peers, teaching materials, study routine and the value attributed by him to teachers and the school influence the motivational engagement of students and their beliefs about their abilities (self-concept and self-efficacy). In addition, students with positive self-perceptions persist in trying to perform activities according to their own perceptions (ZAMBON; ROSE, 2012). According to Perassinoto, Boruchovitch and Bzuneck (2013), the motivation to perform tasks is related to the goals that the student aims to achieve.

With regard to the relationship between emotional thinking and the influences of the environment, Zambon and Rose (2012) highlighted that the quality of the influence of the environment affects the student's interaction with the school environment, the classroom, and their engagement, reflecting in learning and reading performance. Pintrich (2003) points out that when the student achieves good academic performance, he believes that his behavior and beliefs help him in his success, and he feels more motivated.

Chart 02 - Summary of factor analysis

	Variables	F1	F2	F3	F4	F5	F6	F7	Singularities
F1 - School Relations	ST034Q03TA	**-0.7263**	-0.0898	-0.0845	-0.0549	-0.0432	-0.0341	-0.0045	0.4512
	ST034Q04TA	**0.6718**	-0.0222	0.0953	0.0285	0.0129	-0.0475	-0.0497	0.5334
	ST034Q05TA	**-0.6823**	-0.0508	0.0171	-0.0626	-0.0927	-0.0344	0.0011	0.5179
	ST034Q06TA	**0.6719**	0.0002	0.0347	0.0116	0.0837	-0.0453	-0.0440	0.5363
	ST034Q02TA	**-0.5714**	-0.1281	0.0442	-0.0364	-0.1167	-0.1063	0.0791	0.6226
F2 - Self-Concept	ST185Q01HA	0.0836	**0.7902**	0.0898	0.1373	0.0582	0.0389	-0.0060	0.3367
	ST185Q02HA	0.0967	**0.8092**	0.0653	0.1150	0.1186	0.0410	-0.0537	0.2997
	ST185Q03HA	0.0735	**0.7921**	0.0190	0.0646	0.1195	-0.0042	-0.0224	0.3478
F3 - Learning goals	ST208Q01HA	0.0580	0.0296	**0.7592**	0.0983	0.1090	0.0261	-0.0155	0.3970
	ST208Q02HA	0.0582	0.0605	**0.8394**	0.1437	0.0508	0.0233	0.0049	0.2646
	ST208Q04HA	0.0251	0.0542	**0.8529**	0.1394	0.0263	0.0222	-0.0125	0.2482
F4 - Motivation	ST182Q03HA	0.0461	0.0260	0.1673	**0.6702**	0.0435	0.0541	0.0186	0.5149

	ST182Q04HA	0.0231	0.1641	0.0630	**0.6365**	0.1055	-0.0052	-0.0655	0.5481
	ST182Q05HA	0.0616	-0.0181	0.0814	**0.6972**	0.0639	0.0478	0.0439	0.4948
	ST182Q06HA	0.0407	0.1061	0.0507	**0.6221**	0.0847	0.0287	-0.0729	0.5841
F5 - Emotional Thinking	ST188Q02HA	0.1269	0.0068	0.1630	0.1846	**0.4292**	-0.0108	0.1108	0.7266
	ST188Q01HA	0.0936	-0.0164	0.0130	0.0426	**0.6708**	0.0264	-0.0163	0.5381
	ST188Q03HA	-0.0233	0.0710	-0.0003	0.0229	**0.6024**	0.1078	0.0424	0.6176
	ST188Q06HA	0.1115	0.2969	0.0486	0.1321	**0.4782**	0.1202	-0.2671	0.5651
	ST188Q07HA	0.1257	0.1259	0.0414	0.0573	**0.6589**	-0.0110	-0.1205	0.5145
F6 - Effort	ST181Q02HA	0.0757	0.0183	0.0123	0.0120	0.1646	**0.7209**	-0.0742	0.4413
	ST181Q03HA	-0.0238	0.0845	0.0638	0.0868	-0.0154	**0.6611**	0.0996	0.5335
	ST181Q04HA	0.0137	-0.0380	-0.0141	0.0156	0.0297	**0.7717**	0.0413	0.3997
F7 - Influence of the environment	ST184Q01HA	-0.0598	0.2133	-0.1095	-0.0881	-0.0345	-0.0141	**0.2876**	0.8470
	ST183Q01HA	-0.0162	-0.0212	0.0123	-0.0191	0.0032	0.1125	**0.8061**	0.3363
	ST183Q03HA	-0.0839	-0.1550	0.0575	0.0309	-0.0394	-0.0127	**0.7940**	0.3326

Caption: School relationships: comprises factors associated with the school environment and peer relationships; Self-concept: comprises the dimensions of self-concept in relation to the purpose and meaning of life; Learning goals: comprises factors related to the achievement of learning goals; Motivation: consists of the dimensions of commitment, effort and determination; Emotional thinking: composed of factors that influence students' behavior; Effort commitment: composed of factors associated with carrying out activities; influence of the environment: composed of the variables of the dimension verbal/social persuasion and self-concept. The variables are the selected question codes from the PISA 2018 contextual questionnaire.
Source: Prepared by the author

Analysis of the determinants of student performance in reading

In Chart 3, the estimates of models 1, 2 and 3 are presented. Based on the results, it is observed that all models were statistically significant (p<0.001), and the coefficient of determination of the models (R^2) were, respectively, 14.8%, 26.6% and 35.57%. The VIF values were, respectively, 1.00, 1.05 and 1.05, indicating that there was no multicollinearity between the independent variables:

Chart 03 - Results of regression models

Dependent variable – log Read performance	Model 1	value p*	Model 2	value p*	Model 3	value p*
School Relations	0.0255	< 0.001			0.0122	< 0.001
Self-Concept	-0.0637	< 0.001			-0.0519	< 0.001
Learning Goals	0.0200	< 0.001			0.0239	< 0.001
Motivation	0.0042	0.064			0.0079	< 0.001
Emotional Thinking	0.0227	< 0.001			0.0842	< 0.001
Commitment Of Effort	0.0015	0.460			0.0016	0.372
Influence Of The Environment	0.0051	0.015			0.0031	0.085
Country (Portugal)			-0.1082	< 0.001	-0.1112	< 0.001
grad. maternal			0.0708	< 0.001	0.0603	< 0.001
Mat. age cer. nursery			-0.0169	< 0.001	-0.0142	< 0.001
Mat. age certificate fund			-0.0687	< 0.001	-0.0587	< 0.001
Rep. Teaching Fund1			-0.2391	< 0.001	-0.2006	< 0.001
Rep. Teaching Average			-0.1051	< 0.001	-0.0823	< 0.001
Constant	6.1709	< 0.001	6.2517	< 0.001	6.2497	< 0.001
Number of observations:	7,571		7,571		7,571	
R2:	14.8%		26.6%		35.57%	
prob>F:	**< 0.001**		**< 0.001**		**< 0.001**	
VIF:	1.00		1.05		1.05	

Note:(1) Log Reading performance is the logarithm of the arithmetic mean of the scores obtained by students in the 60 items that make up the PISA 2018 reading assessment.
Source: Prepared by the author

Based on the observed results, it was found that Effort alone was not statistically significant in any of the models. Of the set of variables (factors) that make up self-efficacy, only self-concept did not show the expected sign. Furthermore, the presented results corroborate the literature. In particular, it is inferred that School Relations (SENA; MURGO, 2021; TEIXEIRA; COSTA, 2018), Learning Goal (BOELENS; DE WEVER; VOET, 2017), Motivation (PINTO; NETO; CARVALHO, 2019), Emotional Thinking (ZAMBON; ROSE, 2012) and Environmental Influence (SELAU *et al.,* 2018) positively affect student performance on the Reading Test.

Notably, it was possible to confirm hypothesis H1, that is, self-efficacy positively affects students' performance in the Pisa Reading test. In addition, the results also confirm hypotheses H2 and H3. Therefore, it was also possible to infer that family *background* is an important factor in determining student performance. In particular, it was observed, as well as in studies by Borges (2021), Oliveira, Hornung and Wisniewski (2019) and Flores (2017), that the

mother's education positively affected student performance. Finally, it was also possible to verify that the relative performance of students from Portugal, once the other determinants of reading performance were controlled, was statistically lower than the performance of Brazilian students. This relative difference in student achievement corroborates studies by De Souza, De Sousa, Marques (2020), which highlight the importance of socioeconomic variables, such as socioeconomic development, as determinants of student performance.

Conclusion

In this study, we sought to identify the dimensions of self-efficacy and determine how these dimensions, together with family *background*, impact the reading performance of Brazilian and Portuguese students who participated in the PISA 2018 assessment. Understanding how students' reading performance is affected by their personal characteristics and the environment (school and family) is important, since the ability to interact with society, understand and critically reflect on texts and information is directly associated with reading performance.

Based on the analyzes carried out (Exploratory Factor Analysis), it was concluded that students' self-efficacy can be defined based on seven dimensions (factors) related to relationships developed at school (School relationships), emotional behavior (Emotional thinking), beliefs in relation to their purpose and life (Self-concept), effort (Effort commitment) and motivation (Motivation) to carry out activities presented by the students, as well as their relationship with the environment (Environment Influence) and with the achievement of goals (learning goals).

That said, it was inferred that the dimensions of self-efficacy, with the exception of Effort, were important to explain the reading performance of Brazilian and Portuguese students in PISA 2018. Concomitantly, it was observed the importance of the family background to understand this performance, that is, the importance of the influence of educational references (mother's level of education) in student life.

Such results underscore the importance of developing public policies aimed at the promotion and socio-emotional development of students, both in the school and family environment. Specifically, the development of activities and disciplines, with regard to the school curriculum, that encourage socio-emotional skills, can result in better results in students' reading performance and, consequently, in their formation as individuals.

However, although the findings of the work advance the literature by empirically determining the dimensions of self-efficacy and its importance for students' reading performance, as well as in practical terms, it was not possible to consider the effect of self-efficacy on students' academic development in other fields of education. In addition, given the impossibility of identifying the schools and regions where students are inserted, the effects of school structure and school community on student performance cannot be included in the analyses.

Consequently, for future studies, it is suggested the development of researches that analyze specific cases so that the variables that represent the environment in which the student is inserted are included and developed in a more robust way. Furthermore, it is important to consider the temporal development of these students, so that it is possible to follow their development over time, and the effect of their reading performance on other areas of knowledge.

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