# TEACHERS' EMOTIONS AND SELF-EFFICACY: A QUANTITATIVE STUDY IN THE BRAZILIAN CONTEXT

## *AS EMOÇÕES DO PROFESSOR E A AUTOEFICÁCIA DOCENTE:UMA INVESTIGAÇÃO QUANTITATIVA NO CONTEXTO BRASILEIRO*

## *EMOCIONES DEL PROFESORADO E AUTOEFICACIA DOCENTE: UNA INVESTIGACIÓN CUANTITATIVA EN EL CONTEXTO BRASILEÑO*


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**ABSTRACT**: The present study aimed to examine the effect of the emotions joy, love, pride, anger, exhaustion, hopelessness, on the six dimensions of self-efficacy related to different teaching tasks (adaptation of teaching to the individual needs of students, teaching, motivation of students, maintenance of student discipline, cooperation with colleagues and students' parents, and ways of dealing with changes). A total of 1263 primary and secondary school teachers participated in the study. The results show that the discrete emotions experienced by the teacher have distinct effects on the various dimensions of teacher self-efficacy. The implications of the study for the school are discussed, in particular the role of managers in the creation of conditions that favor teacher training directed to specific dimensions of the teaching activity, and in the construction of relationships with teachers that favor the experience of emotions with positive valence.

**KEYWORDS**: Emotion. Self-efficacy. Teacher.

***RESUMO***: *O presente estudo teve por objetivo examinar o efeito das emoções alegria, amor, orgulho, raiva, exaustão, desesperança, nas seis dimensões da autoeficácia relacionadas a diferentes tarefas da docência (adaptação do ensino às necessidades individuais dos alunos, ensino, motivação dos discentes, manutenção da disciplina dos alunos, cooperação com os colegas e os pais dos discentes, e formas de lidar com as mudanças). Participaram do estudo 1263 professores do ensino fundamental e médio. Os resultados obtidos mostram que as emoções discretas experimentadas pelo professor têm efeitos distintos nas diversas dimensões da autoeficácia docente. São discutidas implicações do estudo para a escola, em particular o papel dos gestores na criação de condições que favoreçam uma formação de professores direcionada para dimensões específicas da atividade docente, e na construção de relações com os professores que favoreçam a experiência de emoções com valência positiva.*

***PALAVRAS-CHAVE***: *Emoções. Autoeficácia. Professor.*

***RESUMEN***: *El presente estudio tuvo como objetivo examinar el efecto de las emociones, la alegría, el amor, el orgullo, la ira, el agotamiento, la desesperanza, sobre las seis dimensiones de la autoeficacia relacionadas con las diferentes tareas docentes (adaptación de la enseñanza a las necesidades individuales de los estudiantes, enseñanza, motivación de los estudiantes, mantenimiento de la disciplina de los estudiantes, cooperación con colegas y padres de los estudiantes, y formas de enfrentar los cambios). Un total de 1263 profesores de primaria y secundaria participaron en el estudio. Los resultados muestran que las emociones discretas experimentadas por el profesor tienen efectos distintos en las diversas dimensiones de la autoeficacia del profesor. Se discuten las implicaciones del estudio para la escuela, en particular el papel de los gestores en la creación de condiciones que favorezcan la formación docente dirigida a dimensiones específicas de la actividad docente, y en la construcción de relaciones con docentes que favorezcan la vivencia de emociones con valencia positiva.*

***PALABRAS CLAVE***: *Emociones. Autoeficacia. Profesor.*

## Introduction

The teaching profession is marked by numerous challenges that teachers experience in their daily lives, such as lack of adequate conditions to teach classes, rooms with a high number of students (Iaochite, 2007), conflicting situations with parents, colleagues and professionals from the administrative support, in addition to students' indiscipline and low motivation to learn (Skaalvik; Skaalvik, 2017). As a result, some teachers are not satisfied with their profession and face high levels of stress (Burić; Slišković; Penezić, 2019; Skaalvik; Skaalvik, 2017). This dissatisfaction with the profession, combined with the challenges they face, can lead to *burnout* and professional abandonment (Burić; Slišković; Penezić, 2019) and influence the teacher's emotional experiences with effects on the teaching process (Stephanou; Gkavras; Doulkeridou, 2013).

Studies focused on teachers' emotional experiences have revealed a relationship between positive emotions and greater professional satisfaction (Burić; Slišković; Macuka, 2018) and engagement with work (Burić; Macuka, 2018), and between negative emotions and higher levels of *burnout* in teachers (Slišković; Burić; Sorić, 2019). As a result, studying the effects of teacher emotions on different dimensions of teaching has become an important area of research (Chen, 2021). In particular, the relationship between emotions and self-efficacy beliefs is a relevant area of research, as teaching self-efficacy is a central aspect of the teaching process (Zee; Koomen, 2016). In fact, dealing with some everyday school situations, such as indiscipline and students' lack of motivation to learn, requires teachers to present not only didactic and pedagogical skills, but also to believe in their abilities to solve these challenges (Iaochite, 2007), with teachers with lower levels of self-efficacy showing less persistence in the face of difficulties in the teaching process and less commitment (Ware; Kitsantas, 2007). Furthermore, positive self-efficacy beliefs are associated with teacher well-being (Zee; Koomen, 2016) and professional satisfaction (Skaalvik; Skaalvin, 2007; Silva Júnior *et al.,* 2018), and negative self-efficacy beliefs to emotional exhaustion (Zee; Koomen, 2016). Therefore, it seems relevant to investigate the relationship between the teacher's emotions in relation to students and the teaching process and the teacher's beliefs about their ability to carry out the various teaching activities.

According to Bandura (1997), emotional states are one of the sources of information that underlie the formation of teaching self-efficacy beliefs. However, according to Chen's (2021) model, if, on the one hand, teachers' emotions affect their professional beliefs, on the other hand, teachers' professional beliefs also elicit different emotions (Burić; Slišković; Sorić,

2020; Chen, 2021). There thus appears to be a complex relationship between emotions and teaching self-efficacy (Chen, 2019), which is necessary to understand (Burić; Slišković; Sorić, 2020; Lee; Van Vlack, 2018; Taxer; Frenzel, 2015). It is also important to note that studies tend to focus on different areas of teaching, with different emotions appearing to have different effects on self-efficacy in relation to classroom management, instructional strategies and student engagement. For example, the results of the study by Lee and van Vlack (2018) indicate a positive relationship between the emotion anger and teaching self-efficacy considering the classroom management dimension; but other studies (Burić; Slišković; Macuka, 2018; Burić; Slišković; Sorić, 2020; Hong *et al.,* 2016) point to a negative relationship between the emotion anger and teacher self-efficacy, considering the dimensions classroom management, strategies instructional and student engagement (eg, Burić; Frenzel, 2019). Therefore, it will also be important to explore how different discrete emotions are associated with different areas of teaching functioning and dimensions of teaching self-efficacy (Almeida; Freire, 2023).

Within the scope of this study, emotion was defined as an episode of interrelated and simultaneous changes in the states of the cognitive, neurophysiological, motivational, motor and affective subsystems. These emotional episodes can involve all or most of these subsystems, in response to the evaluation of an intrinsic or extrinsic stimulus (Scherer, 2005). In this way, the same stimulus can give rise to different emotions in individuals (Schirmer, 2015), depending on their assessment of the stimulus and the subsystems that are activated as a result of this assessment. Furthermore, the discrete perspective was adopted, according to which each emotion is conceptualized as having a specific function (Izard; Ackerman, 1993) and involving distinct cognitive, physiological, expressive and behavioral reactions (Frenzel; Daniels; Burić, 2021). This unobtrusive perspective allows you to provide a more detailed view (Rinas *et al.,* 2020) on the relationship between specific emotions and teaching self-efficacy (Burić; Slišković; Sorić, 2020).

In turn, self-efficacy refers to the beliefs that a person has about their ability to organize and execute courses of actions required to achieve certain results (Bandura, 1997). Taking into account that teacher self-efficacy is a construct of a multidimensional nature, which can be differentiated according to the domain of functioning (Zimmerman, 2000), and that teachers perform multiple tasks in the school environment (from, for example, teaching to collaboration with parents and co-workers) (Skaalvik; Skaalvik, 2007), this study adopted the perspective of Skaalvik and Skaalvik (2007). According to these authors, teaching self-efficacy refers to "individual teachers' beliefs in their own abilities to plan, organize and carry out activities

necessary to achieve specific educational goals" (Skaalvik; Skaalvik, 2007, p. 612, our translation).

Thus, the present research aimed to examine the effect of emotions, joy, love, pride, anger, exhaustion, hopelessness, on the six dimensions of self-efficacy related to different teaching tasks (adaptation of teaching to students' individual needs, teaching, motivation of students, maintaining discipline, cooperating with colleagues and parents, and ways of dealing with change and challenges) (Skaalvik; Skaalvik, 2007). Furthermore, taking into account the literature (eg, Casanova; Azzi, 2015; Iaochite, 2007), we sought to examine the effect of some individual variables (such as professional experience), teaching activity (such as level of preparation) and contextual (such as school infrastructure) in teaching self-efficacy.

Studies suggest that positive emotions, such as joy (Bach; Hagenauer, 2022; Burić; Slišković; Sorić, 2020), love (Burić; Slišković; Sorić, 2020), pride (Burić; Slišković; Sorić, 2020; Hong *et al.,* 2016) have a positive relationship with teaching self-efficacy. Therefore, these emotions are expected to have a positive effect on teaching self-efficacy (Hypothesis 1). Studies also reveal that teachers who experience exhaustion (Burić; Slišković; Sorić, 2020), hopelessness (Burić; Slišković; Sorić, 2020) and anger (Hong *et al.,* 2016; Taxer; Frenzel, 2015) tend to manifest lower levels of teaching self-efficacy. Therefore, a negative effect of these emotions on the level of teaching self-efficacy is expected (Hypothesis 2).

## Method

This research adopted a quantitative approach, which aims to test theoretical models by analyzing the relationships between variables; these variables can be quantified, generally through validated measuring instruments, allowing the analysis of numerical data through statistical analysis (Creswell, 2009). Therefore, taking into account that the present study intends to examine the relationship between variables, specifically between the different dimensions of teaching self-efficacy, different teachers' emotions and individual, teaching activity and contextual variables, this approach presents itself as relevant to achieving the proposed objective.

## Participants

To construct the sample, questionnaires were sent (online) to all teachers in the state education network of Paraná-Brazil, with the final sample consisting of all those who decided to respond to the questionnaire. 1263 teachers from thirty-two regional centers of this education network responded. The majority of participants are female (70.1%), which reflects the overrepresentation of female teachers in this education network. Furthermore, the majority have a lato sensu postgraduate course (71.0%) and have up to 15 years of professional experience (53.6%). Teachers have an average age of 43.5 (SD = 9.08), teach different subjects (such as arts, mathematics, chemistry, Portuguese language, physical education). Furthermore, they work in elementary school I (1st to 5th year) and II (6th to 9th year) and in high school, with 49.5% participants working in elementary school II.

## Measurements

**Teacher Emotion Questionnaire (TEQ)**: To assess the teacher's emotions, the *Teacher Emotion Questionnaire* (Teq; Burić; Slišković; Macuka, 2018) in its translated and adapted version for Brazil (Almeida; Freire, 2021). This multidimensional instrument, composed of 35 items and organized into six subscales, measures six teacher emotions related to the student and teaching, namely, joy (5 items, eg, "I feel happy when I achieve the established teaching objectives"), love (6 items, eg, "I really like my students"), pride (6 items, eg, "Meeting my successful former students makes me proud"), anger (5 items, eg, "The behavior of some students make me so angry that I even get headaches"), exhaustion (7 items, e.g., "When I finish my work, I feel exhausted") and hopelessness (6 items, e.g., "I feel completely incapable when I think about the behavior of some students"). Teachers are instructed to rate their level of agreement with each statement, about how they feel when they are teaching or interacting with students, on a 5-point Likert scale (1=strongly disagree to 5=strongly agree). The choice of this instrument is justified by the fact that it presents adequate psychometric properties (eg, Burić; Slišković; Macuka, 2018; Yurtseven, 2020) and by the fact that, unlike other instruments that assess emotions from a discrete perspective (eg, Frenzel *et al.*, 2016), explore a broader set of emotions. To test and validate the Brazilian version of the TEQ (Almeida; Freire, 2021), a confirmatory factor analysis (CFA) was performed with the statistical software JASP version 0.16.4 (JASP Team, 2022), using the "*diagonally weighted least square"* estimation method.

To evaluate the fit of the model, the following indices and values were used: $\chi^2$ / gl < 0.5; CFI > 0.90; TLI > 0.90; RMSEA < 0.08; SRMR < 0.08 (Byrne, 2012; Hair *et al.,* 2009). Furthermore, the factorial weight of the items was evaluated, with values greater than 0.40 being considered (Hair *et al.,* 2009). The internal consistency of each TEQ dimension was assessed using Cronbach 's Alpha (α), and an instrument is classified as having appropriate reliability when α is at least 0.70 (Nunnally, 1978). However, in some social science research scenarios, an α of 0.60 is considered acceptable as long as the results obtained with that instrument are interpreted with caution and take into account the context in which the index is computed (Devellis, 1991).

First, a confirmatory factor analysis was performed with all 35 TEQ items and six factors, as proposed by Burić, Slišković and Macuka (2018). The tested model did not present a satisfactory result regarding the factorial load of item 32 of the anger factor ("I get frustrated when the class does not go as expected"), as it had a low factorial load (< 0.37). In this way, an alternative factor model with 34 items and six factors was tested. This model presented a better fit than the initial model, as there was an improvement in the fit indices compared to the previous model $\chi^2$/ df = 3.73; CFI= 0.98; TLI= 0.98; RMSEA= 0.05; SRMR= 0.04. The factor loadings of the items ranged from 0.50 to 0.88 and were statistically significant ($p$ < .001). Cronbach 's Alpha values revealed an appropriate internal consistency (> 0.80) for all emotions: joy (α = 0.83); love (α = 0.88); pride (α = 0.84); anger (α = 0.85); exhaustion (α = 0.97), hopelessness (α = 0.85). Overall, the TEQ - Brazilian version (34 items) obtained an internal consistency of 0.87 and presents evidence of validity in the sample of Brazilian teachers.

**Norwegian Teacher Self- Efficacy Scale (NTSES)**: Teaching self-efficacy was measured by the NTSES (Skaalvik; Skaalvik, 2007; Brazilian version, Silva Júnior *et al.,* 2018). In addition to its psychometric properties having been demonstrated in several studies (eg, Avanzi *et al.,* 2013), this instrument has already been translated and validated for the Brazilian population (Silva Júnior *et al.,* 2018) and adopts a multidimensional model of teaching self-efficacy, which was the model assumed in the present study. This scale consists of 24 items and is organized into six dimensions that assess the teacher's teaching self-efficacy (Skaalvik; Skaalvik, 2007): the dimension adapting teaching to the individual needs of students, which refers to the teacher's belief in their ability to teach students according to their individual needs (adaptation); the cooperation dimension with colleagues and students' parents, which refers to the teacher's belief in their ability to cooperate with co-workers and parents, the latter with regard to school tasks and decision-making (cooperation); the maintenance of discipline

dimension, which refers to the teacher's belief in their ability to maintain order and discipline in the classroom (discipline); the teaching dimension, which refers to the teacher's belief in their ability to explain the subject to students, guide them and answer their questions to facilitate their understanding (teaching); the student motivation dimension, which refers to the teacher's belief in their ability to motivate students in the learning process (motivation); the dimension ways of dealing with changes and challenges, which refers to the teacher's belief in their ability to deal with the changes and challenges encountered at work, for example, the imposition of teaching methods by the school director (change) (Skaalvik; Skaalvik, 2007, 2014; Silva Júnior *et al.,* 2018).

Each item is rated on a 7-point Likert scale (1 = not sure at all to 7 = absolutely sure). This version, validated for the Brazilian context, presented an appropriate internal consistency (0.66 to 0.89) (Silva Júnior *et al.,* 2018). To verify its validity, in the sample of the present research, a CFA was carried out in the statistical software JASP version 0.16.4 (JASP Team, 2022), using the "*diagonally weighted least square*" estimation method. The best fitting model was the one that excluded one item from the teaching dimension (item 1): $\chi^2$ / gl = 3.19; CFI= 0.99; TLI= 0.99; RMSEA= 0.04; SRMR= 0.04 (Byrne, 2012; Hair *et al.,* 2009). Cronbach 's Alpha values, in the present study, ranged from 0.75 to 0.88 (adaptation, $\alpha = 0.85$; cooperation, $\alpha = 0.75$; discipline, $\alpha = 0.88$; teaching, $\alpha = 0.79$; motivation, $\alpha = 0.78$; change, $\alpha = 0.79$).

**Questionnaire characterizing the participant and their teaching activity**: To characterize the teachers, the questionnaire characterizing the participant and their teaching activity was applied (Iaochite, 2007), which collects information on individual aspects (gender and age), aspects related to teaching activity (years of professional experience, postgraduate training, level of preparation and satisfaction with the profession); and aspects related to the context of professional activity (weekly working hours, class size, assessment of the school's infrastructure for the development of teaching activities, perception of support received from the school's administrative body, perception of support received from colleagues work and perception of freedom to express their ideas in the school environment, for example, class council (Iaochite, 2007). To measure the level of preparation for teaching, the level of satisfaction with the profession and the variables related to the perception in the context of action, only one direct question was asked, evaluated on a 4-point Likert scale (1 = insufficient/not at all sufficient and 4 = more than sufficient/very sufficient) (Iaochite, 2007). The remaining variables were treated as *dummy*: gender, years of professional experience, postgraduate training, working hours, and class size.

## Procedures

The self-administered questionnaire, composed of the three instruments, was applied online through the Survey platform Monkey® . The invitation to participate in the research was made by the Paraná State Department of Education (SEED), which forwarded the invitation with the questionnaire *link* to the teachers' institutional email. In the questionnaire *link*, participants had access to the free and informed consent form, with the following information: initial information about the research; research objectives; voluntary participation; anonymity and data privacy; benefits of the study. After reading, teachers had to tick the box about their consent to participate in the research. They only had access to the questionnaire with the instruments, after checking this option. This research was approved by the National Ethics and Research Commission of Brazil (opinion number: 4.050.413 and CAAE: 27729420.6.0000.5539). Data was collected between the months of October 2021 and January 2022.

## Data analysis

The data was analyzed in *Statistical Package for the Social Sciences* (SPSS), version 26.0. Initially, a descriptive analysis of the data was carried out and, subsequently, six multiple linear regression models were tested, having as dependent variables each of the six dimensions of teaching self-efficacy and as predictor variables, the individual variables, teaching activity and perception the context of action, as well as emotions. The assumptions for the regression analysis were verified and met, regarding the linearity of the phenomenon; independence from errors; normal distribution of errors; homogeneity of error distribution and multicollinearity; Furthermore, the existence of outliers or influential cases was not identified (Field, 2009).

## Results

## Descriptive analysis

The majority of participants have a weekly work schedule of more than 20 hours (81.2%). Regarding the number of students per class, 56.3% stated they had up to 34 students. Teachers, on average, perceive themselves as prepared to carry out teaching activities (M = 3.32; SD = 0.60), but tend to be less satisfied with their professional activity (M = 2.72; SD = 0.85). Regarding the assessment of the school context in which they work, teachers tend, on

average, to feel little supported by their co-workers (M = 2.83; SD = 0.74) and by the administrative staff (M = 2.96; SD = 0.75), feeling little freedom to express ideas in the school environment (M = 2.83; SD = 0.74) and considering the school's infrastructure to be insufficient for the development of teaching activities (M = 2.15; SD = 0.72) (M = 2.15; SD = 0.72) (Table 1).

**Table 1** – Descriptive statistics of the participants' teaching activity and contextual variables

| | | Mean (SD) | % |
|---|---|---|---|
| **Teaching activity** | Level of preparation | 3.32 (0.60) | |
| | Level of satisfaction | 2.72 (0.85) | |
| | Weekly workload | | |
| | Up to 20 hours per week | | 18.8 (%) |
| | More than 20 hours per week | | 81.2 (%) |
| **Context of professional performance** | Class size | | |
| | Up to 34 students | | 56.3 (%) |
| | More than 35 students | | 43.7 (%) |
| | Infrastructure assessment | 2.15 (0.72) | |
| | Perception of support received from colleagues | 2.83 (0.74) | |
| | Perception of support received by the administrative body | 2.96 (0.75) | |
| | Perception of freedom to express ideas | 2.88 (0.79) | |

Source: Prepared by the authors

With regard to emotions, teachers tend to report higher levels of joy (M = 4.67), pride (M = 4.46) and love (M = 4.04) and, on average, lower levels of anger (M = 2.78) and hopelessness (M = 2.90) With regard to teaching self-efficacy, teachers tend to reveal, on average, positive self-efficacy beliefs in all dimensions considered, with the discipline and motivation dimensions being those with the lowest values (respectively, 4.83 and 4.89) (Table 2).

**Table 2 –** Descriptive statistics of teacher emotion levels and teaching self-efficacy

| **Emotions** | Mean (SD) | **Dimensions of teaching self-efficacy** | Mean (SD) |
|---|---|---|---|
| Happiness | 4.67 (0.40) | Adaptation | 5.23 (1.27) |
| Love | 4.04 (0.67) | Cooperation | 5.20 (1.16) |
| Pride | 4.46 (0.49) | discipline | 4.83 (1.32) |
| Anger | 2.78 (1.02) | Teaching | 6.04 (1.07) |
| Exhaustion | 3.37 (0.90) | Motivation | 4.89 (1.17) |
| Hopelessness | 2.90 (0.86) | Change | 5.31 (1.15) |

Source: Prepared by the authors

## Effect of teacher emotions, individual variables, teaching activity and contextual variables on teaching self-efficacy

All models tested are significant, even though they present low levels of adjustment, with adjusted $R^2$ varying between 0.124 and 0.246, in particular the models for the teaching and change dimensions which explain, respectively, only 12.4% and 17.7% of the variance (Table 3).

**Table 3** – Result of the multiple regression analysis for the six dimensions of teaching self-efficacy

| **Dimensions – teaching self-efficacy** | **Adaptation** | **Cooperation** | **discipline** | **Teaching** | **Motivation** | **Change** |
|---|---|---|---|---|---|---|
| **Predictors** | **β** | **β** | **β** | **β** | **β** | **β** |
| Individuals | | | | | | |
| Gender (Fem =0; Mas=1) | -0.024 | -0.034 | -0.002 | 0.020 | -0.009 | -0.017 |
| Age | 0.005 | 0.029 | 0.034 | -0.036 | -0.008 | 0.003 |
| Professional experience (more than 16 years = 0; up to 15 years = 1) | 0.013 | -0.025 | -0.009 | 0.001 | 0.001 | 0.005 |
| Training – postgraduate | | | | | | |
| Stricto sensu (reference) | - | - | - | - | - | - |
| None | 0.031 | 0.013 | 0.009 | -0.001 | 0.031 | 0.006 |
| Lato sensu | 0.063* | 0.074** | 0.030 | 0.009 | 0.062* | 0.040 |
| Teaching activity | | | | | | |
| Level of preparation | 0.138** | 0.124** | 0.141*** | 0.134** | 0.148** | 0.172** |
| Level of satisfaction | 0.010 | -0.036 | 0.013 | -0.104** | -0.008 | -0.023 |
| Context of professional activity | | | | | | |
| Weekly working hours (up to 20 hours= 0; more than 20 hours= 1) | -0.012 | -0.023 | 0.023 | 0.022 | -0.016 | 0.003 |
| Class size (up to 34 students= 0; more than 35 students=1) | 0.038 | 0.026 | 0.022 | 0.007 | 0.051* | 0.053* |
| Assessment of school infrastructure | 0.059* | 0.079** | 0.070** | 0.007 | 0.053* | 0.105** |
| Perception of support received from colleagues | 0.017 | 0.033 | -0.008 | 0.010 | -0.008 | -0.027 |
| Perception of support received by the administrative body | 0.041 | 0.046 | 0.028 | 0.046 | -0.002 | 0.069 |
| Perceived freedom to express ideas | -0.059 | 0.018 | 0.011 | 0.011 | -0.020 | 0.012 |
| Emotions | | | | | | |
| Happiness | 0.002 | 0.068* | -0.004 | 0.239** | -0.015 | 0.058 |
| Love | 0.164** | 0.176** | 0.168** | 0.063 | 0.205** | 0.071 |
| Pride | 0.179** | 0.178** | 0.064 | 0.054 | 0.206** | 0.173** |
| Anger | 0.071 | 0.050 | -0.042 | -0.008 | 0.052 | 0.022 |
| Exhaustion | 0.055 | 0.099** | 0.100** | 0.065 | 0.072 | 0.045 |
| Hopelessness | -0.232** | -0.156** | -0.309** | -0.077 | -0.238** | -0.145*** |
| adjusted R2 | 0.203 | 0.230 | 0.246 | 0.124 | 0.236 | 0.177 |
| F | F(19.1239)= 17.913*** | F(19.1239)= 20,796*** | F(19.1239)= 22.630*** | F(19.1239= 10,382*** | F(19,1239= 21,440*** | F(19.1239)= 15.249*** |

Notes: β= standardized estimates; * $p < 0.05$, ** $p < .01$, *** $p < .001$.
Source: Prepared by the authors

In the dimension of adaptation of teaching to the individual needs of students of teacher self-efficacy (adaptation), the results indicate that teachers with a *lato sensu graduate degree* tend to reveal higher average levels of self-efficacy (β = 0.063). In addition, the perceived level of preparation (β = 0.138), as well as the positive evaluation of infrastructures for the development of teaching activity (β = 0.059), have a positive effect in this dimension. In terms of emotions, only the emotions love (β = 0.164), pride (β = 0.179) and hopelessness (β = - 0.232) have a significant effect on the adaptation dimension. It should be noted that hopelessness, a predictor with a greater effect on this dimension of teacher self-efficacy, has a negative effect, i.e., the higher the average level of hopelessness, the lower the belief in their ability to adapt to the individual needs of students (Table 3).

For the cooperation dimension, the results point to a positive effect of lato sensu postgraduate studies on the level of cooperation, and, on average, teachers who attended lato sensu postgraduate courses tend to have a higher belief in their ability to cooperate with coworkers and parents (β = 0.074). Likewise, the predictors perception of the level of professional preparation and assessment of infrastructure have a positive effect on cooperation (respectively, β = 0.124 and β = 0.079). With regard to emotions, all of those that have been studied have a significant effect on the cooperation dimension, with the exception of the emotion anger. The emotions love (β = 0.176) and pride (β = 0.178) are those with a greater effect on this dimension of teaching self-efficacy; the emotion hopelessness negatively predicts this dimension (β = - 0.156) (Table 3).

The model tested for the maintenance of discipline dimension indicates that the higher the level of perception regarding the level of professional preparation, the more positive the belief in one's ability to maintain order and discipline (β = 0.141) and that the assessment of school infrastructure for the development of teaching activities also has a positive effect on this dimension of teaching self-efficacy (β = 0.070). With regard to emotions, hopelessness is the one with the greatest effect on this dimension of teacher self-efficacy (β = - 0.309), suggesting that the more teachers report despair, the less able they feel to deal with discipline in the classroom. On the contrary, the emotions love (β = 0.168) and exhaustion (β = 0.100) have a positive association with the discipline dimension (Table 3).

Regarding the teaching dimension, only three predictors have a significant effect on this dimension of teaching self-efficacy. The level of preparation has a positive effect on the teaching dimension (β = 0.134), as well as the emotion joy (β = 0.239); on the contrary, the level of satisfaction with the profession has a negative effect (β = - 0.104) (Table 3).

The regression results for the motivation dimension reveal that, on average, teachers with a lato sensu postgraduate degree (β = 0.062) and those who teach in larger classes (β = 0.051) tend to show a more positive belief in its ability to motivate students. Furthermore, the assessment of school infrastructure also positively predicts this dimension of teacher self-efficacy (β = 0.053). Finally, hopelessness is the emotion with the greatest effect on the motivation dimension (β = - 0.238), however, this effect is negative. On the contrary, the emotions pride and love have a positive effect on this dimension of self-efficacy (respectively, β = 0.206, β = 0.205) (Table 3).

Finally, the model tested for the change dimension of self-efficacy identifies as positive predictors the level of preparation perceived by the teacher (β = 0.172), the assessment of infrastructure (β = 0.105) and class size, with teachers with larger classes tend to present, on average, a more positive belief regarding their ability to deal with change. In terms of emotions, pride has a positive effect on this dimension of teaching self-efficacy (β = 0.071), with the emotion hopelessness having a negative effect (β = - 0.145) (Table 3).

## Discussion

This research sought to examine the effect of a set of individual variables, teaching activity, the context of the teacher's work and discrete emotions (joy, love, pride, anger, exhaustion and hopelessness) on the six dimensions of teaching self-efficacy. To examine this effect, a cross-sectional survey was carried out. Although several studies have explored the relationship between teacher emotions and three dimensions of teacher self-efficacy (eg, Bach; Hagenauer, 2022), our study innovates by investigating six dimensions of teacher self-efficacy and, particularly, in the context of Brazilian education. Based on Bandura 's theory (1997) and the model proposed by Chen (2021), we expected that the discrete emotions experienced in the teaching context and related to students would have a significant relationship with the various dimensions of teaching self-efficacy.

In particular, when teachers experience positive emotions, they tend to evaluate their abilities more optimistically, leading to the development of higher levels of self-efficacy (Uzuntiryaki-Kondakci *et al.,* 2022). Consistently, the results of this study show that positively emotions had a positive effect on several dimensions of teacher self-efficacy. However, it was mainly the emotions love and pride, which were positively associated with most dimensions of teaching self-efficacy (with the exception of the emotion pride in relation to the teaching and discipline dimensions, and the emotion love in relation to the teaching and change dimensions);

the emotion joy was associated in the expected direction only with the cooperation and teaching dimensions of teacher self-efficacy. Thus, hypothesis 1 was only partially confirmed, with the results suggesting that different positive emotions have different effects on different dimensions of teaching self-efficacy. This result is consistent with the theoretical models adopted in this study.

In fact, on the one hand, a discrete perspective of emotions was assumed, according to which each emotion has a specific function (Izard; Ackerman, 1993) and involves distinct cognitive, physiological, expressive and behavioral reactions, in response to an evaluation about an event perceived as important for the individual (Scherer, 2005). On the other hand, a multidimensional model of teaching self-efficacy was adopted (Skaalvik; Skaalvik, 2007), which is based on the idea that teaching encompasses several tasks and that, with self-efficacy being specific to the situation (Pajares, 1996; Zimmerman, 2000), this may vary within the same teacher according to the task performed (Skaalvik; Skaalvik, 2007). Thus, different emotions may play different roles in the construction of self-efficacy beliefs in relation to different dimensions of teaching action, as demonstrated in the present study. In fact, each emotion has distinct characteristics and effects, being unique in its origins and results (Lench; Flores; Bench, 2011) and, therefore, can impact the dimensions of teaching self-efficacy in different ways.

It is also important to note that, according to Bandura 's model (1997), teaching self-efficacy beliefs are constituted from different sources of information (such as direct experience, vicariousness and verbal persuasion), with emotional states being one of these sources. Thus, for example, with regard to the teaching dimension, which relates to the teacher's belief in his or her ability to facilitate students' understanding, explain the content, guide them and answer their questions, only the emotion joy demonstrated have a significant effect. It is possible that other sources of information, such as direct experience, are more relevant to this dimension of teacher self-efficacy than emotional experiences. And in fact, practical experience in teaching, acquired through real achievements in the classroom with students, is an important source for the teaching dimension of teacher self-efficacy (Tschannen-Moran; Woolfolk Hoy, 2007). It will be important in future studies to include the analysis of other sources of self-efficacy, namely, the assessment that teachers make of their experience and their ability to achieve the objectives they have defined.

The differential effect of emotions on the different dimensions of teaching self-efficacy was also found for emotions with a negative valence. The emotion hopelessness revealed an association, in the expected direction, with all dimensions of teaching self-efficacy, with the

exception of the teaching dimension, having been presented as the strongest predictor with regard to the adaptation, discipline and motivation dimensions. However, exhaustion only had an effect on the dimensions of cooperation, discipline and motivation, and not in the expected direction, that is, it had a positive effect on these dimensions of teaching self-efficacy, and anger did not reveal a relationship with any dimension of teaching self-efficacy. Therefore, the second study hypothesis, according to which the emotions of anger, hopelessness, and exhaustion would have a negative effect on teaching self-efficacy, was only partially confirmed.

The result regarding the emotion hopelessness is consistent with the results of a longitudinal research by Burić, Slišković and Sorić (2020), in which hopelessness was the only discrete emotion, out of six emotions investigated, that had a reciprocal relationship with teaching self-efficacy: higher levels of hopelessness negatively influenced future levels of teaching self-efficacy, and low teaching self-efficacy beliefs were associated with the experience of more emotions of hopelessness in the future (Burić; Slišković; Sorić, 2020). In the present study, the emotion of hopelessness, which emerges when faced with situations of lack of success or the certainty of failure (Pekrun, 2006), was an important source for teachers to assess their abilities to teach students in accordance with their individual needs, to cooperate with co-workers and parents, to maintain order and discipline in the classroom and motivate students in the learning process, and to deal with changes and challenges encountered at work. This result highlights the importance of educational managers talking to teachers about how they evaluate their actions and the way in which the educational context affects their educational activities (Stipek, 2012), as well as their needs, namely professional development, in order to create an educational context that reduces the experience of the emotion of hopelessness in the educational process (Fackler; Malmberg; Sammons, 2021; Huang, 2022).

With regard to exhaustion, this emotion had a positive effect on two dimensions of teaching self-efficacy, suggesting that the higher the level of exhaustion, the higher the teaching self-efficacy in the cooperation and discipline dimensions. This result is not in line with other studies, which revealed a negative relationship between exhaustion and teaching self-efficacy (eg, Burić; Slišković; Macuka, 2018; Burić; Slišković; Sorić, 2020); however, these studies explored self-efficacy from a unidimensional perspective. Furthermore, it should be noted that in the present study, exhaustion presented, on average, higher values than all other negative emotions (although lower than positive emotions) and that, on average, the teachers in the present study presented higher levels of exhaustion than in other studies (eg, Burić; Slišković; Macuka, 2018).

The fact that data collection took place during the COVID-19 pandemic may explain the higher levels of exhaustion experienced by the teachers in this study. In effect, the increase in teachers' workload during the pandemic (Costa *et al.,* 2022), as a consequence of the increased demand for teachers, for example, in terms of learning new technologies, teaching face-to-face classes and, simultaneously, serving students in remote learning may explain higher levels of exhaustion reported by teachers. Responding to these demands may have required extra effort from teachers (associated with the experience of exhaustion); but at the same time, teachers may have had positive experiences, feeling that they are able to respond to these same demands. And in fact, the perception of competence is a fundamental aspect associated with self-efficacy (Woolfolk Hoy; Spero, 2005), with direct experience being one of the most important sources of self-efficacy (Bandura, 1997). Thus, the effort to respond to demands in all areas of teaching functioning (eg, adaptation, cooperation, discipline, teaching, motivation and change) and, simultaneously, the perception of being able to achieve their objectives, may explain the association positive finding between exhaustion and teaching self-efficacy. This is a provisional explanation, and in future studies it may also be important to collect information on how teachers evaluate their teaching performance and how the perception of competence interacts with the experience of negative emotions in the construction of self-efficacy beliefs in relation to different dimensions of teaching.

With regard to the emotion anger, there was no relationship between this emotion and the different dimensions of teaching self-efficacy. A social desirability effect may be a possible explanation for this result (Lee; Van Vlack, 2016). Although the questionnaire was anonymous, teachers may not want to show that they feel angry towards students. Some studies reveal that the suppression of negative emotions, such as anger, is an emotional strategy that teachers commonly use in their daily lives (Burić; Slišković; Penezić, 2019; Taxer; Frenzel, 2015). However, it is important to note that in the present study, the emotion anger presents, on average, values close to 3 (M = 2.78; SD = 1.02); and in other studies, this emotion presents, on average, lower values (< 2) (e.g., Frenzel *et al.*, 2016).

Therefore, another explanation is needed for the absence of a relationship between the emotion anger and teacher self-efficacy, and the level of specificity of the different dimensions of self-efficacy and emotions may explain this result. In effect, the items on the self-efficacy scale are formulated globally in terms of tasks, without specifying a class or group of students (eg, I am able to manage my classes, regardless of the way the classes are organized, for example, classes composed of different ages); on the contrary, the emotions scale is formulated

with a greater level of specificity, directing the teacher to respond with certain students in mind (eg, some students' behavior makes me so angry that I even get a headache). So, the teacher may report emotions in relation to "some students", but this emotional experience does not affect the overall assessment he makes of their ability to achieve the educational objectives he has set. Knowing that the emotion anger depends on specific situations (eg, Kring, 2000), it will be important in the future to explore this emotion taking into account different situations (eg, the classroom; in relation to colleagues), seeking to also explore its relationship with the different domains of self-efficacy.

In terms of individual variables, the results indicate that only the lato sensu postgraduate variable had a positive effect on teaching self-efficacy taking into account the adaptation, cooperation and motivation dimensions. With regard to variables related to teaching activity, the level of preparation perceived by teachers had a positive effect on all dimensions of teaching self-efficacy. On the contrary, satisfaction with teaching had a negative effect on teaching self-efficacy, but only with regard to the teaching dimension. As for contextual variables, in general, infrastructure was a positive predictor of all dimensions of teaching self-efficacy, with the exception of the teaching dimension. Furthermore, class size was a positive predictor of the motivation and change dimensions of teaching self-efficacy, that is, there was an association between teaching in larger classes (ie, more than 35 students) and more positive beliefs regarding the ability to motivate students and deal with changes and challenges.

Overall, these results are in line with previous studies that highlight the significant effect of individual, teaching activity and contextual variables on levels of teaching self-efficacy. For example, teachers who evaluate the school infrastructure as adequate for the development of teaching activities (Iaochite, 2007) tend to reveal higher levels of teaching self-efficacy. In this sense, Sabia and Sordi (2021) emphasize that the success of the teaching-learning process is the result of the interaction of several factors necessary for its effectiveness. These factors include the presence of a highly qualified teaching staff, as well as the availability of appropriate school resources and infrastructure, such as teaching materials, equipment and adequate physical facilities. According to the authors, when the support necessary to carry out a teacher's activities is not adequately provided, their performance is impaired, which compromises their educational potential. Therefore, the importance of institutional support as a basis for teachers to effectively play their role in promoting education becomes evident (Sabia; Sordi, 2021), with effects on their assessment of their capabilities to carry out different educational tasks.

## Limitations

The results of this study should be interpreted with caution due to its limitations. First, although the models for the six dimensions of teacher self-efficacy are significant, the adjusted $R^2$ are low (0.124 - 0.246), suggesting that other variables may be equally important for understanding teacher self-efficacy beliefs. Therefore, firstly, although the predictors addressed in the regression models are relevant to explain the various dimensions of teacher self-efficacy, other predictors should also be considered in future studies, for example, the perception of performance in different domains of functioning and the assessment of its importance for the teacher (eg, Woolfolk Hoy; Spero, 2005).

Secondly, the sample was composed of teachers from only one location in Brazil (Paraná), and as such, the generalization of these results to other teacher populations must be done with caution. The state of Paraná is among the states that have the best Basic Education Development Index (IDEB), which is an indicator of the quality of education in schools in the Brazilian context (Mello; Bertagna, 2016). Other states, however, have a low IDEB index, and contextual factors can influence this result (Mello; Bertagna, 2016). In this way, taking into account that context variables also have an effect on both emotions (Chen, 2021) and teaching self-efficacy (Avanzi *et al.,* 2013), it is suggested that studies be carried out with samples of teachers from other states.

Thirdly, to measure teacher emotions and teaching self-efficacy, self-report instruments were used, which can cause artificial covariance of responses and, therefore, bias in the results (Podsakoff *et al.,* 2003). Therefore, it is suggested that future studies may use other data collection methods, such as interviews or observations to understand in more depth the nature of this relationship. Qualitative research presents itself as a relevant type of research, which can help to understand, in a more comprehensive way, the teacher's educational work by accompanying him in his daily life, allowing us to understand the complexity of teaching work and the wide range of emotions that teachers experience in the educational context (Sutton; Wheatley, 2007), as well as how these affect teachers' assessment of their abilities in relation to different educational tasks. To illustrate, conducting interviews would allow a deeper understanding of the school context and the aspects that may be related to teaching self-efficacy, exploring the meanings that teachers attribute to their emotional experiences and the way they interpret the context of their professional performance.

Finally, the research is cross-sectional in nature, meaning it does not allow establishing a cause-effect relationship on the teacher's discrete emotions and teaching self-efficacy. And in

fact, as predicted in Chen's (2019) model, emotions can be both antecedents and consequences of teaching self-efficacy and Burić Slišković and Sorić (2020) identified an asymmetric relationship between some teacher emotions (such as joy, love, anger, exhaustion) and teacher self-efficacy. In this sense, it may be important to develop longitudinal studies in order to examine their reciprocal relationships in different populations of teachers.

## Final remarks

Despite the limitations, the present study makes an important contribution to this area of study. The results obtained support the multidimensional model of teacher self-efficacy, according to which teachers present different self-efficacy beliefs according to the task/function performed (Avanzi *et al.,* 2013) and support the idea that the different emotions experienced by the teacher, even presenting the same valence (eg, positive) can impact differently on the different dimensions of self-efficacy. That said, deepening the study of teachers' emotions under a discrete approach and their relationship with teacher self-efficacy presents itself as a relevant area of study, as it could make an important contribution to improving not only the educational process, but also of teachers' well-being.

A deeper understanding of the aspects that affect teaching self-efficacy is even more relevant in the case of Brazilian teachers, as are the TALIS (*Teaching and Learning International Survey*) reveal that they have below average levels of teaching self-efficacy (OECD, 2014) and that this is associated with indiscipline in the classroom and stress at work (OECD, 2020). It is also worth mentioning that when teachers experience more positive emotions and fewer negative emotions, they tend to reveal higher levels of well-being (Chen, 2021); Furthermore, teachers with higher levels of self-efficacy tend to experience greater satisfaction, at the same time as they are less likely to be affected by *burnout* (Skaalvik; Skaalvik, 2007; Zee; Koomen, 2016), highlighting the importance of self-efficacy teacher for teacher well-being (OECD, 2020). Therefore, it seems relevant to investigate the relationship between the teacher's emotions in relation to students and the teaching process and the teacher's beliefs about their ability to carry out teaching activities, in the Brazilian context.

The results of this study also have implications for practice and for schools, highlighting the importance of the role of school managers in creating conditions that favor teacher training and professional development that is more targeted towards certain dimensions of teaching activity, depending on specific needs of teachers (Fackler; Malmberg; Sammons, 2021). And the importance of managers fostering a relationship with teachers based on support,

encouragement and recognition in order to see their concerns validated, feel recognized as professionals and experience positive emotions, due to the effect on their well-being, but also to strengthen their beliefs in their ability to achieve success in the different dimensions of teaching (Stipek, 2012).

Finally, it should be noted that this study validated the TEQ - Brazilian version (Almeida; Freire, 2021), being a reliable instrument that presented adequate psychometric qualities to measure teacher emotions in the Brazilian context.

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