

# Joy, anger, and anxiety during the teaching practicum: how are these emotions related to dimensions of pre-service teachers' self-efficacy?

Andreas Bach  · Gerda Hagenauer 

Received: 17 January 2022 / Revised: 5 June 2022 / Accepted: 8 June 2022 / Published online: 30 June 2022  
© The Author(s) 2022

**Abstract** According to research relating to the sources of teacher self-efficacy, the relationship between emotions and self-efficacy beliefs has primarily been studied with a focus on negative emotions. Additionally, studies have utilized scales that only distinguish between positive and negative affect and do not allow for differentiation between emotions. Furthermore, the significance of distinct emotions has been inadequately addressed, although more detailed knowledge is needed to better understand the formation of self-efficacy beliefs. Based on a sample of pre-service teachers during their teaching practicum at an Austrian university and with the use of latent regression models, we examined the relationship between three concrete emotions (joy, anger, anxiety) and self-efficacy beliefs related to instructional strategies, classroom management, and student engagement. Findings indicated different associations: joy was positively associated with self-efficacy beliefs in all domains, while anger was negatively related to self-efficacy beliefs for student engagement. Anxiety was found to be negatively related to self-efficacy beliefs for classroom management and, in particular, instructional strategies. In conclusion, the results demonstrate significant relationships between both negative and positive emotions and pre-service teachers' self-efficacy beliefs in the practicum.

**Keywords** Self-efficacy · Sources of self-efficacy · Emotions · Practicum · Pre-service teachers

---

Assoz. Prof. Dr. Andreas Bach (✉)  
Fachbereich Erziehungswissenschaft, Abteilung Bildungswissenschaft, Schulforschung und Schulpraxis, Paris Lodron Universität Salzburg, Erzabt-Klotz-Straße 1, 5020 Salzburg, Austria  
E-Mail: [Andreas.bach@plus.ac.at](mailto:Andreas.bach@plus.ac.at)

## Freude, Ärger und Angst im Unterrichtspraktikum: Wie hängen diese Emotionen mit den Dimensionen der Selbstwirksamkeit von Lehramtsstudierenden zusammen?

**Zusammenfassung** In der Forschung zu den Quellen von Selbstwirksamkeit von Lehrpersonen wurde die Beziehung zwischen Emotionen und Selbstwirksamkeitsüberzeugungen vor allem mit einem Schwerpunkt auf negativen Emotionen und mit Skalen untersucht, die keine Differenzierung zwischen verschiedenen Emotionen zulassen, sondern lediglich zwischen positivem und negativem Affekt unterscheiden. Auch die Bedeutung unterschiedlicher Emotionen wurde in bisherigen Studien nur unzureichend analysiert, obwohl genauere empirische Erkenntnisse erforderlich sind, um die Entstehung von Selbstwirksamkeit besser zu verstehen. Anhand einer Stichprobe von Lehramtsstudierenden während ihres Unterrichtspraktikums an einer österreichischen Universität und unter Verwendung latenter Regressionsmodelle untersuchte die Studie die Zusammenhänge zwischen drei zentralen emotionalen Zuständen (Freude, Ärger, Angst) und der Selbstwirksamkeit bezogen auf Unterrichtsstrategien, Classroom Management und Engagement von Schülerinnen und Schülern. Die Ergebnisse verweisen auf unterschiedliche Zusammenhänge: Freude war mit der Selbstwirksamkeit in allen drei untersuchten Dimensionen assoziiert, während Ärger negativ mit der Selbstwirksamkeit in Bezug auf das Engagement von Schülerinnen und Schülern zusammenhing. Angst stand in einem negativen Zusammenhang insbesondere mit der Selbstwirksamkeit in Bezug auf Classroom Management und Unterrichtsstrategien. Die Ergebnisse belegen somit bedeutende Beziehungen zwischen sowohl negativen als auch positiven Emotionen und der Selbstwirksamkeit von Lehramtsstudierenden im Praktikum.

**Schlüsselwörter** Selbstwirksamkeit · Quellen von Selbstwirksamkeit · Emotionen · Praktikum · Lehramtsstudierende

### 1 Introduction

Self-efficacy beliefs can be defined as the subjective assessment of being able to successfully accomplish certain tasks based on one's abilities even under difficult conditions (Bandura 1997). These subjective assessments are embedded in Bandura's social-cognitive theory (Bandura 1986) and are applied as a key motivational construct in many domains of human functioning (Bandura 1997). In the teaching profession, high self-efficacy is an essential personal resource for coping with professional challenges and is related to teaching quality as well as student learning and motivation. This has been demonstrated in many studies, particularly in relation to self-efficacy for instructional strategies, classroom management, and student engagement (for an overview, see Bach 2022; Zee and Koomen 2016).

Given the importance of the construct, it is important to understand how self-efficacy beliefs are developed in teacher education programs. According to Bandura (1997), self-efficacy beliefs are based on the cognitive processing of information from various sources. For example, physiological and emotional states are one source

of information from which inferences are made about one's ability to cope with similar tasks and demands in the future. In relation to teaching, there are only a few quantitative studies that consider sources in general, and physiological and emotional states in particular (for an overview, see Bach 2022; Lazarides and Warner 2020; Morris et al. 2017). Notably, the source was also usually examined with a focus on negative emotions as an overall indicator reflecting negative affect (e.g., stress, anxiety, nervousness, and other negative emotions conceptualized as one general factor (Bach 2022; Hascher and Hagenauer 2016; Pfitzner-Eden 2016; van Rooij et al. 2019)). Consequently, the source of information from which self-efficacy is based has rarely been identified and measured as distinct emotions such as joy, anger, and anxiety, all of which are experienced by pre-service teachers during a practicum. Due to the limitations of previous research, it is unclear how specific emotions relate to varying self-efficacy beliefs experienced during teaching practicums. The present study addresses this pressing issue by examining pre-service teachers' self-efficacy beliefs for instructional strategies, classroom management, and student engagement in relation to emotional states, specifically joy, anger, and anxiety.

## 2 Theoretical and empirical background

### 2.1 Pre-service teachers' emotions and their role in the practicum

Pre-service teachers experience a variety of positive and negative emotions during a practicum (Hascher and Waber 2020). Previous research has repeatedly revealed the importance of these emotions through demonstrations of strong relationships between teachers' well-being, instructional practice, and professional development (Frenzel 2014; Hagenauer and Hascher 2018; Hascher and Krapp 2014; Schutz 2014; Sutton and Wheatley 2003). However, to date, research on pre-service teachers' emotions during their practicum and their correlates is scarce (for exceptions, see Anttila et al. 2016, 2017; Arnold et al. 2011; Hascher and Hagenauer 2016; Timoštšuk et al. 2016; Waber et al. 2021). Overall, current research indicates that, compared to negative emotions, positive emotions seem to dominate during teaching practicums (Bach and Hagenauer 2021; Hascher and Hagenauer 2016). However, anxiety has also been identified as prevalent during teaching practicums (for example, due to assessment situations or difficulties in classroom management; Morton et al. 1997; Porsch and Gollub 2018).

According to an appraisal-theoretical approach, emotions develop due to the evaluation of respective situations (Ellsworth and Scherer 2003). This approach implies that different teachers can evaluate the same or similar situations differently leading to a variety of emotions. For instance, if students engage well in the classroom, pre-service teachers might feel proud because they attribute the engagement to their teaching approach. In contrast, other teachers may feel joy because they enjoy observing evidence of their students' positive development.

Moreover, emotions are understood as a multicomponent phenomenon consisting of affective, cognitive, motivational, expressive, and physiological components (Scherer 2009). For example, if pre-service teachers experience joy during

a practicum, they feel joy (affective component), feel motivated to teach (approach tendency; motivational component), judge the situation positively (cognitive component), may show a slight smile (expressive component), and exhibit physiological responses (e.g. a relatively low pulse rate).

Furthermore, if we investigate the emotions of pre-service teachers, we must distinguish between state and trait emotions. While state emotions are emotions that are experienced in concrete situations (e.g. a teacher feels angry because a student yells in their classroom), trait emotions are the ‘judgments regarding “typical” levels of their emotional experiences’ (Frenzel et al. 2016, p. 149). In the present study, we focus on pre-service teachers’ trait emotions, as trait emotions are expected to be connected more strongly to teachers’ professional development and instructional quality (Frenzel et al. 2016). For example, if pre-service teachers generally feel anxious while teaching, it is likely that they avoid applying more student-centred instruction (due to their perceived lack of control) and are less inclined to engage in professional development activities (due to avoidance action tendencies triggered by anxiety). Thus, high levels of negative trait emotions in teaching are likely to be detrimental to professional practice and development (Hascher and Krapp 2014). Based on this argumentation, it seems necessary to expand our knowledge about pre-service teachers’ emotions during a particularly crucial element of initial teacher training: the first teaching experiences that are typically made during a teaching practicum as a core opportunity in pre-service teachers’ professional development (Hascher and Waber 2020).

## 2.2 Emotional states as sources of teachers’ self-efficacy beliefs

Research on the sources of teachers’ self-efficacy beliefs (Morris et al. 2017) is largely based on the social cognitive perspective of self-efficacy theory (Bandura 1997). Studies mainly focus on pre-service teachers during their teaching practicum, as it is assumed that self-efficacy beliefs are most likely to be modifiable early and through personal experience (Klassen and Durksen 2014; Pfitzner-Eden 2016). According to Bandura (1997), individuals form their self-efficacy beliefs by interpreting information about their abilities from four major sources: mastery experiences, vicarious experiences, verbal persuasions, and physiological and affective states (Morris et al. 2017). The fourth source is also referred to as *emotional states* (Bach 2022) and is the relevant theoretical background for this study: Individuals draw conclusions about their abilities based on physiological and affective arousal (e.g., stress, anxiety) they experience while performing tasks. Bandura (1997) stressed the cognitive processing that determines what information is considered, how it is weighed, and what information is integrated into self-efficacy judgments. The perceived source and the level of activation, as well as construal biases, can have an influence (Bandura 2009; Ciani et al. 2009). For example, pre-service teachers who sweat during teaching will interpret this physiological response differently if they attribute the sweating to the excessively high temperature in the classroom than if stress is assumed to be the cause (Weiner 1985). In stressful situations, negative emotions can be interpreted as incompetence, which can negatively affect self-efficacy beliefs (Usher and Pajares 2008).

There are additional contexts and existing self-efficacy beliefs that may also influence cognitive processing (Morris et al. 2017). For instance, individuals with low self-efficacy beliefs are likely to be more sensitive to their emotional states in behavioural domains where they distrust their ability to accomplish a task (Bandura 1997). Furthermore, demanding tasks (e.g., the first lessons taught during practicum) or past failures lead individuals to be particularly affected by the source. However, the impact of the source tends to diminish with increasing success and professional experience (Bandura 1997; O'Neill and Stephenson 2012).

Overall, there is a complex relationship between self-efficacy beliefs and the sources of information from which individuals collect and interpret information. Notably, the same emotional state can thus be interpreted differently depending on the perceived situational conditions and cognitive processing (Bandura 1997). For pre-service teachers, and thus novices, the source seems to be especially influential. The empirical results presented in the following section support this assumption.

### 2.3 Empirical findings on emotional states as sources of self-efficacy beliefs

Interestingly, few scholars of teacher education investigate the sources of self-efficacy beliefs even though it is consistently highlighted as a key research problem (Bach 2022; Fives and Buehl 2016; Lazarides and Warner 2020; Morris et al. 2017). Given the predictive power of self-efficacy beliefs, more information about the formation of these beliefs is needed (Pfitzner-Eden 2016). In fact, it is remarkable that emotional states as a source are at times even neglected. This may be partly due to the assumption that emotional states are more relevant in a clinical context, or because emotional states are considered to be the weakest source of self-efficacy after mastery experiences, vicarious experiences, and verbal persuasion (Bandura 1997; Labone 2004). However, emotional states are particularly relevant in behavioural domains where coping with stressors plays an important role (Bandura 1997). This is precisely the case for the emotional nature of teaching, especially regarding early teaching experiences, which are challenging for novices (Klassen and Durksen 2014). Accordingly, findings from most studies demonstrate statistically significant effects of emotional states on pre-service teachers' self-efficacy beliefs (Bach 2022; Bach and Hagenauer 2021; O'Neill and Stephenson 2012; Pfitzner-Eden 2016; van Rooij et al. 2019). Very few studies have failed to find support for a relationship between emotions and self-efficacy beliefs (DeMauro and Jennings 2016; Poulou 2007). Furthermore, quantitative studies of pre-service teachers indicate that emotional states could be even more influential in the practicum than other sources of information, such as vicarious experiences (Bach 2022; Pfitzner-Eden 2016; van Rooij et al. 2019).

Nonetheless, as previously stated, few quantitative studies have been conducted that investigate emotions as a source of self-efficacy beliefs. Furthermore, when emotions are studied, the focus has mostly been on negative emotional states (Oh 2011; O'Neill and Stephenson 2012; Pfitzner-Eden 2016; Poulou 2007). This may be explained by Bandura's (1997) primary theoretical and empirical focus on negative physiological and affective states such as stress or anxiety as a source of self-efficacy beliefs in a clinical context. This is conspicuous because teaching also

evokes positive emotions; during the teaching practicum, positive emotions even predominate (Bach and Hagenauer 2021; Hascher and Hagenauer 2016). Unfortunately, most instruments measuring pre-service teachers' sources of self-efficacy beliefs only capture negative emotions, although there have been some exceptions (for an overview, see Bach 2022; Morris et al. 2017). Positive emotional states have therefore rarely been studied as a relevant source of self-efficacy beliefs (Bach 2022; van Rooij et al. 2019). In contrast, some research has been conducted that examined relationships between in-service teachers' positive emotions and self-efficacy (Burić and Moè 2020; Burić et al. 2020; Lohbeck and Frenzel 2019). Of the few studies that have been conducted explicitly in the context of a teaching practicum (Bach 2022; Bach and Hagenauer 2021; Hascher and Hagenauer 2016; Chen 2019; van Rooij et al. 2019), results confirm that positive emotions are associated with pre-service teachers' self-efficacy beliefs, particularly self-efficacy related to student engagement (Bach and Hagenauer 2021). Changes in pre-service teachers' self-efficacy beliefs could also be indirectly predicted by emotional states via mastery experiences (Bach 2022).

Another inadequacy of the research that identifies pre-service teachers' sources of self-efficacy beliefs is how emotional states are often assessed by combining multiple emotions into one broad construct without differentiating between distinct emotions (Bach 2022; Bach and Hagenauer 2021; Pfitzner-Eden 2016; van Rooij et al. 2019). Thus, no conclusions can be drawn about the meaning of specific emotions for various dimensions of self-efficacy beliefs. It can be assumed that emotions such as joy, anger, and anxiety are related in varying degrees to self-efficacy beliefs in behavioural domains such as instructional strategies, classroom management, and student engagement. For example, anxiety might be particularly associated with self-efficacy for classroom management. However, empirically sound statements cannot be made due to a lack of more comprehensive investigations. Consequently, more research is needed to increase our understanding of the relationship between pre-service teachers' emotional states and self-efficacy beliefs.

### 3 Research questions and hypotheses

The present study addresses the shortcomings of previous research by examining both negative and positive emotions in relation to pre-service teachers' self-efficacy beliefs. Specifically, we examined the question of how student teachers' emotions of joy, fear, and anger experienced during their practicum were related to self-efficacy beliefs in the domains of instructional strategies, classroom management, and student engagement. We focused on these three emotions because they are considered relevant emotions during teaching (Frenzel 2014). More concretely, Frenzel et al. (2016) argue that enjoyment and anger are emotions frequently felt by all human beings, including teachers. In addition, anxiety has a crucial function for teacher well-being and thus, can be regarded as an important emotion. Moreover, previous research has revealed that these emotions are also prevalent during teaching practicums (Hascher and Hagenauer 2016; Sutton and Wheatley 2003; Timoššuk and Ugaste 2012).

By focusing on these emotions, our study aims to gain more accurate insights into the relationship between specific emotions that pre-service teachers experience in a teaching practicum and their self-efficacy beliefs. We focus on self-efficacy beliefs related to three generic dimensions of teaching quality: instructional strategies, classroom management, and student engagement (Praetorius et al. 2018). These areas are related to tasks that pre-service teachers often experience in a teaching practicum (Bach and Hagenauer 2021) and, accordingly, they are frequently studied by teacher education scholars (for an overview, see Bach 2022), which increases the comparability of results. Although Bandura (1997) understood emotions and self-efficacy to be reciprocal, a large part of self-efficacy theory is devoted to emotions as antecedents of self-efficacy, in that they are a source for the formation of self-efficacy beliefs. Therefore, research that explicitly addresses the sources of self-efficacy, conceptualizes emotions as independent variables (e.g., Bach 2022; Pfitzner-Eden 2016; van Rooij et al. 2019). Our study draws on this theoretical and empirical perspective. Based on the findings of previous studies (Bach 2022; Bach and Hagenauer 2021; Chen 2019; Hascher and Hagenauer 2016; van Rooij et al. 2019), we believe that negative emotions are negatively associated, and positive emotions are positively associated with pre-service teachers' self-efficacy beliefs during teaching practicums. The following hypotheses are proposed:

**H1** Joy is positively related to pre-service teachers' self-efficacy in relation to classroom management, instructional strategies, and student engagement.

**H2** Anger is negatively related to pre-service teachers' self-efficacy in relation to classroom management, instructional strategies, and student engagement.

**H3** Anxiety is negatively related to pre-service teachers' self-efficacy in relation to classroom management, instructional strategies, and student engagement.

## 4 Method

### 4.1 Study design and participants

A total of 449 pre-service teachers participated in the study. They completed an online questionnaire that was administered by trained staff during courses at a university. Of the participating pre-service teachers, 66.6% ( $n=299$ ) were female, 33.0% ( $n=148$ ) were male, and two pre-service teachers identified themselves as diverse. The mean age was 23.38 years ( $SD=4.17$ ). The majority of the pre-service teachers (72.6%,  $n=302$ ) were in their fifth semester of undergraduate study, where they typically attend the second school practicum after having attended an introductory practicum during the second semester. All pre-service teachers were studying teacher education for secondary education in Austria (lower secondary education: grades 5–8 and upper secondary education: grades 9–12). In so doing, pre-service teachers typically study two different subjects. Hence, the range of studied subjects was very broad. The most dominant subjects were the main school subjects

in Austria: mathematics, German, and English (as the first foreign language). The teaching practicum investigated in this study lasted from October to January. The students completed the practicum in parallel with their studies on differing days of the week. Without considering extreme values ( $\geq 100$ ), the mean value of the pre-service teachers' teaching experience (independent teaching) was 3.5 lessons.

## 4.2 Measures

### 4.2.1 Pre-service teachers' emotions during instruction

Frenzel et al.'s (2016) questionnaire on teachers' emotions was adapted to the context of teacher education. Three different emotions that have been identified as highly significant in teaching were measured: *joy* (four items; e.g. During my previous practical experience of teaching in school, I generally enjoyed teaching;  $\alpha=0.80$ ); *anger* (four items; e.g. During my previous practical experience of teaching in school, I often had reasons to be angry while teaching;  $\alpha=0.77$ ); and *anxiety* (e.g. four items; During my previous practical experience of teaching in school, I generally felt tense and nervous while teaching;  $\alpha=0.78$ ). We used a four-point response scale ranging from 1 = "strongly disagree" to 4 = "strongly agree". Results of a confirmatory factor analyses showed an acceptable model fit for a three-dimensional model ( $\chi^2=136.54$ ;  $df=51$ ;  $p<0.001$ ; CFI=0.944; RMSEA=0.061; SRMR=0.048). The model fit indices for an alternatively specified general factor model indicated an un-acceptable fit of the model to the data ( $\chi^2=892.47$ ;  $df=54$ ;  $p<0.001$ ; CFI=0.451; RMSEA=0.186; SRMR=0.122). We also tested a 2-factor model with one factor for joy and a second factor for negative emotions. Model fit was not acceptable ( $\chi^2=481.44$ ;  $df=53$ ;  $p<0.001$ ; CFI=0.719; RMSEA=0.112; SRMR=0.134), which aligns with the theoretical assumption.

### 4.2.2 Pre-service teachers' self-efficacy beliefs

The *Scale for Teacher Self-Efficacy* (STSE; Pfitzner-Eden et al. 2014) was used to measure pre-service teachers' self-efficacy beliefs. The scale is an adapted version of the commonly used *Ohio State Teacher Efficacy Scale* (OSTES; Tschannen-Moran and Woolfolk Hoy 2001) and has been validated for pre-service teachers. The instrument comprises three subscales: (1) Instructional Strategies (e.g. How certain are you that you can adjust lessons to the proper level for individual students?; 4 items;  $\alpha=0.66$ ), (2) Classroom Management (e.g. How certain are you that you can control disruptive behaviour in the classroom?; 4 items;  $\alpha=0.87$ ) and (3) Student Engagement (e.g. How certain are you that you can motivate students who show low interest in schoolwork?; 4 items;  $\alpha=0.74$ ). We used a five-point response scale ranging from 1 = "not at all certain can do" to 5 = "absolutely certain can do". Results of confirmatory factor analyses indicated that a three-dimensional model represented the data well ( $\chi^2=91.41$ ;  $df=51$ ;  $p<0.001$ ; CFI=0.973; RMSEA=0.042; SRMR=0.040). Model fit of an alternatively specified general factor model was not acceptable ( $\chi^2=442.03$ ;  $df=54$ ;  $p<0.001$ ; CFI=0.737; RMSEA=0.127; SRMR=0.095).



### 4.2.3 Covariates

Because self-efficacy and emotion are related to teachers' personal characteristics such as gender and teaching experience (Burić et al. 2020; Fackler and Malmberg 2016; Klassen and Durksen 2014), pre-service teacher's gender, number of hours taught in practicum, and number of hours observed in school were included as covariates in the analyses.

## 4.3 Analysis

All major analyses were conducted using structural equation modelling (SEM) techniques with Mplus 8.5 (Muthén and Muthén 1998–2017). Parameter estimates were based on the maximum likelihood robust method (MLR), which provides correct parameter estimates even for variables that are not normally distributed (see Geiser 2013), as in the case of our data (see distributions for all items in table 1 in the supplemental materials). As a first step, all variables were tested to determine whether missing data were completely at random using Little's MCAR test (Little 1988). The results showed that the MCAR assumption needs to be rejected ( $\chi^2 = 650.45$ ;  $df = 502$ ;  $p < 0.001$ ). Nevertheless, the full information maximum likelihood (FIML) procedure was used to deal with missing values because alternative methods are not better even for the MAR (missing at random) and MNAR (missing not at random) condition (Enders 2001; Lüdtke and Robitzsch 2011). The proportion of missing values was also low in the study (between 0 and 2.0% at item level).

To test our hypotheses, joy, anger, and anxiety were modelled as latent independent variables according to the self-efficacy theory of the sources of self-efficacy beliefs (Bandura 1997). The self-efficacy beliefs entered the analyses as latent dependent variables. The associations between emotions on self-efficacy beliefs were then specified including covariates (gender, number of hours taught in the practicum, and number of hours observed in school). SEM allows regression analyses to be specified at the latent level and has the advantage of explicitly accounting for measurement error for both the independent and dependent variables (Geiser 2013). Goodness of model fit was evaluated through  $\chi^2/df$ , *Comparative Fit Index* (CFI), *Root Mean Square Error of Approximation* (RSMEA), and *Standardized Root Mean Square Residual* (SRMR). CFI values  $\geq 0.90$  and RSMEA and SRMR values  $\leq 0.08$  reflect an acceptable model fit; a good model fit is indicated by CFI values  $\geq 0.95$  and RSMEA and SRMR values  $\leq 0.05$  (Geiser 2013; Hu and Bentler 1999).

## 5 Results

### 5.1 Descriptives

Descriptive statistics and latent correlations of the studied variables are presented in Table 1. On average, pre-service teachers experienced mostly joy ( $M = 3.44$ ;  $SD = 0.55$ ), and reported lower intense anger ( $M = 1.31$ ;  $SD = 0.43$ ) and anxiety ( $M = 2.18$ ;  $SD = 0.69$ ) during the practicum. Their self-efficacy beliefs were all above

**Table 1** Descriptive Statistics and Latent Intercorrelations of Variables

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5
1. Joy	3.44	0.51	1	–	–	–	–
2. Anger	1.31	0.43	–0.42***	1	–	–	–
3. Anxiety	2.18	0.69	–0.51***	0.31***	1	–	–
4. Self-Efficacy for Instructional Strategies	3.79	0.57	0.49***	–0.27*	–0.54***	1	–
5. Self-Efficacy for Classroom Management	3.54	0.80	0.40***	–0.23***	–0.56***	0.61***	1
6. Self-Efficacy for Student Engagement	3.89	0.63	0.59***	–0.41***	–0.38***	0.81***	0.50***

Emotions were measured on a four-point scale (1 = “strongly disagree” to 4 = “strongly agree”). Self-efficacy beliefs were measured on a five-point scale (1 = “not at all certain can do” to 5 = “absolutely certain can do”)

\*  $p < 0.05$ , \*\*\*  $p < 0.001$

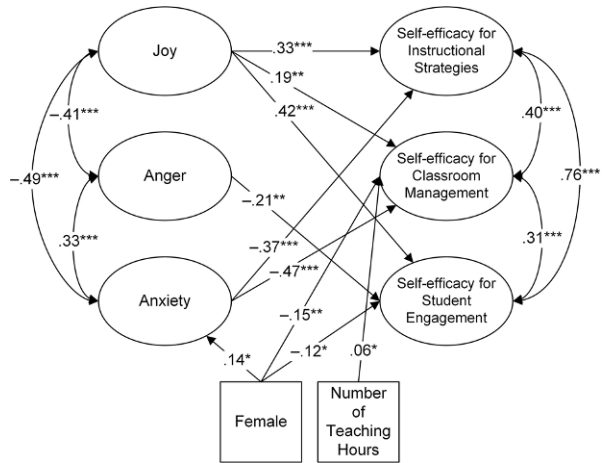
the mean of the response scale, with the highest mean found for student engagement ( $M = 3.89$ ;  $SD = 0.63$ ) and the lowest mean for classroom management ( $M = 3.54$ ;  $SD = 0.80$ ). Thus, pre-service teachers rated themselves as self-efficacious in all dimensions. The intercorrelations of the variables were all significant and ranged mostly from moderate to strong. Joy correlated positively with self-efficacy beliefs, most strongly with self-efficacy beliefs for student engagement ( $r = 0.59$ ,  $p < 0.001$ ). Anger and anxiety were correlated negatively with all dimensions of self-efficacy beliefs, with anger correlating most strongly with self-efficacy for student engagement ( $r = -0.41$ ,  $p < 0.001$ ) and anxiety correlating most strongly with self-efficacy for classroom management ( $r = -0.56$ ,  $p < 0.001$ ).

## 5.2 Effects of emotions on pre-service teachers’ self-efficacy beliefs

The specified model of the relationship between joy, anger, anxiety, and self-efficacy beliefs is shown in Fig. 1. Model fit was acceptable to good, with  $\chi^2 = 488.11$ ,  $df = 297$ ,  $p < 0.001$ , CFI = 0.948, RMSEA = 0.038, SRMR = 0.045.

As expected, joy was positively related to all dimensions of pre-service teachers’ self-efficacy beliefs. The strongest association was found for student engagement ( $\beta = 0.42$ ;  $SE = 0.08$ ;  $p < 0.001$ ), followed by instructional strategies ( $\beta = 0.33$ ;  $SE = 0.09$ ;  $p < 0.001$ ) and classroom management ( $\beta = 0.19$ ;  $SE = 0.06$ ;  $p = 0.001$ ). Anger was negatively and weakly associated with self-efficacy for student engagement ( $\beta = -0.21$ ;  $SE = 0.08$ ;  $p = 0.006$ ). A statistically significant relationship was not found between anger and the other two dimensions (instructional strategies:  $\beta = -0.03$ ;  $SE = 0.10$ ;  $p = 0.787$ ; classroom management:  $\beta = -0.01$ ;  $SE = 0.06$ ;  $p = 0.915$ ). Finally, anxiety was negatively related to self-efficacy for instructional strategies ( $\beta = -0.37$ ,  $SE = 0.08$ ,  $p < 0.001$ ) and for classroom management ( $\beta = -0.47$ ,  $SE = 0.06$ ,  $p < 0.001$ ). No statistically significant association was observed between anxiety and self-efficacy for student engagement ( $\beta = -0.12$ ,  $SE = 0.08$ ,  $p = 0.144$ ). Regarding covariates, gender was positively related to anxiety ( $\beta = 0.14$ ,  $SE = 0.06$ ,  $p = 0.013$ ), and negatively related to self-efficacy for classroom management

**Fig. 1** Structural Model of the Relationship Between Joy, Anger, Anxiety, and Self-efficacy Beliefs (Standardised parameter estimates; only statistically significant paths are shown. \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ )



( $\beta = -0.15$ ,  $SE = 0.05$ ,  $p = 0.002$ ) and self-efficacy for student engagement ( $\beta = -0.12$ ,  $SE = 0.05$ ,  $p = 0.018$ ), indicating that female pre-service teachers reported higher anxiety and lower self-efficacy. The number of hours taught in the practicum was positively related to self-efficacy for classroom management ( $\beta = 0.06$ ,  $SE = 0.03$ ,  $p = 0.020$ ). Additionally, 38% of the variance in self-efficacy for instructional strategies, 38% of the variance in self-efficacy for classroom management, and 38% of the variance in self-efficacy for student engagement could be explained in the model.

## 6 Discussion

Based on the framework of self-efficacy theory (Bandura 1997), this study examined relationships between pre-service teachers' joy, anger, and anxiety and their self-efficacy beliefs regarding classroom management, instructional strategies, and students' engagement in a teaching practicum. Thus, this study contributes to the existing literature on the sources of self-efficacy (Morris et al. 2017) by analysing the role of distinct emotions for different facets of self-efficacy in a specific teaching setting, namely the school practicum. We expected pre-service teachers' emotions of joy, anger, and anxiety during the practicum to be positively (joy) and negatively (anger, anxiety) associated with self-efficacy beliefs. Beyond previous research with global measures of pre-service teachers' emotions (positive vs. negative affect), our analysis, which is based on structural equation modelling, revealed that each emotion was associated with pre-service teachers' self-efficacy beliefs.

Joy was relevant for all domains of self-efficacy, but especially with regard to student engagement and instructional strategies. Hypothesis 1 could thus be confirmed. The more joy pre-service teachers experienced in the practicum, the stronger they rated their ability to perform specific tasks in these behavioural domains. Anger was only weakly and negatively related to the student engagement dimension, indicating that the angrier pre-service teachers were, the lower they judged their ability

to motivate students during their practicum. Therefore, hypothesis 2 (anger is negatively related to pre-service teachers' self-efficacy) could be partially confirmed. The missing link between anger and the other dimensions of self-efficacy beliefs may be explained by the fact that anger is not only attributed to oneself, but also to other people. Anxiety, in turn, was negatively associated with self-efficacy for classroom management and slightly weaker with self-efficacy for instructional strategies. Hypothesis 3 could thus also be partially confirmed. The more anxiety pre-service teachers experienced in the practicum, the lower they rated their ability to deal with classroom disruptions and use of instructional strategies.

These results are mainly consistent with theoretical assumptions and previous findings showing the same pattern: that positive emotions are positively correlated with self-efficacy beliefs (Bach 2022; Bach and Hagenauer 2021; Morris et al. 2017; van Rooij et al. 2019), while negative emotions are negatively associated with ability judgments (Bach 2022; Oh 2011; O'Neill and Stephenson 2012; Pfitzner-Eden 2016). Regarding the three dimensions of self-efficacy, prior findings indicated that classroom management self-efficacy is particularly affected by negative emotions (Bach 2022; Oh 2011; O'Neill and Stephenson 2012). Our analyses support this evidence by demonstrating that anxiety, in particular, plays an important role. Classroom management is challenging and often associated with anxiety concerning not being able to control the students of the class (Lee and van Vlack 2018; McCarthy et al. 2015). Thus, in the cognitive processing of efficacy information (Bandura 1997; Morris et al. 2017), anxiety experienced during a teaching practicum seems to be a strong indicator for pre-service teachers to doubt their ability to cope with these challenges. Anger in the teaching practicum, in turn, can possibly diminish self-efficacy beliefs in terms of student engagement. Therefore, when pre-service teachers experience that they are not able to motivate students to learn as well as expected, this may lead them to question their self-efficacy in this behavioural domain.

Our findings related to positive emotions are in line with previous research indicating positive relationships between positive emotions and self-efficacy beliefs (Bach 2022; Bach and Hagenauer 2021; van Rooij et al. 2019). However, studies of the sources of teacher self-efficacy have provided little empirical evidence of how specific positive emotions, such as joy, are related to self-efficacy beliefs in terms of different teaching domains. Our study demonstrates that joy, as a key emotion in teaching, is associated with pre-service teachers' confidence in their ability to teach across all three self-efficacy dimensions examined, particularly in relation to instructional strategies and student engagement. It can be assumed that pre-service teachers who succeed in teaching and engaging students gain positive thoughts and are likely to experience joy as a central positive emotion (Yang 2019). This strengthens their self-efficacy to be equally successful in their future teaching experiences (Bach 2022; Pfitzner-Eden 2016).

Overall, our study highlights relationships of both negative and positive emotions with pre-service teachers' self-efficacy beliefs, especially joy and anxiety. The comprehensive analysis related to different emotions and different domains of self-efficacy is a major strength of the present study.

Regarding covariates, our results support other studies' findings related to how female teachers report lower self-efficacy related to classroom management (Klassen

and Chiu 2010). In addition, female teachers exhibited higher anxiety in relation to classroom management. The findings in terms of gender and emotions are heterogeneous. For example, while Burić et al. (2020) found that female (in-service) teachers experience more joy and pride, they also experience more hopelessness when teaching. In contrast, Hagenauer et al. (2015) and Lee and van Vlack (2018) found no gender differences. Similarly, Lohbeck et al. (2018) reported no gender differences either. However, once they controlled for teachers' self-concept, the anxiety levels of female teachers were significantly higher compared to male teachers. Thus, possible gender differences regarding teachers' emotions need further exploration. This could be done by including covariates and systematic differentiation of teaching domains (e.g., classroom management).

We also found gender differences related to self-efficacy for student engagement, which is not consistently supported by other studies (Klassen and Chiu 2010; Sarfo et al. 2015). Overall, the evidence for gender effects on teacher self-efficacy is mixed (Lauermann and König 2016). In terms of hours of teaching in the practicum and the positive association with classroom management self-efficacy, it can be hypothesized that more teaching should lead to more mastery experiences that strengthen self-efficacy beliefs, especially when dealing with challenging tasks such as classroom management (Bandura 1982, 1997). However, it is important to keep in mind that objective indicators such as hours of teaching can have varying effects depending on how these experiences are cognitively processed (Bandura 1997). This could also explain the inconsistent effects of work experience on teachers' self-efficacy beliefs (for an overview, see Bach 2022).

## 6.1 Limitations and directions for future research

Some limitations must be taken into account. First, the results rely on cross-sectional data that limit causal conclusions. In our case, self-efficacy theory (Bandura 1997) postulates that emotional states are primarily a cause of self-efficacy beliefs and thus independent variables, which supports the structural equation modelling undertaken in this study. Nevertheless, Bandura (1997) also stressed that self-efficacy, conversely, plays a role in regulating emotional states. Highly self-efficacious pre-service teachers have more positive performance expectations and are consequently less worried about not being able to cope with demands (in the sense of secondary appraisal; Frenzel 2014), which should result in fewer negative and more positive emotions. Thus, emotions may not only be a cause but also a consequence of self-efficacy beliefs (Chen 2019). Further longitudinal studies—as for example conducted by Burić et al. (2020) for in-service teachers—are necessary to investigate the reciprocal relationships between these constructs more precisely. Second, the four sources of self-efficacy (mastery experiences, vicarious experiences, verbal persuasions, emotional states) are interdependent (Bandura 1997). In particular, mediating and moderating effects between the sources can occur in the cognitive processing of efficacy information (Bach 2022; Pfitzner-Eden 2016). These relationships have not been studied extensively and could be a promising focus of future analyses, possibly also by including other emotions (such as enthusiasm, nervousness, or worry). Third, pre-service teachers in this sample had little practical teaching experience,

and the results are embedded in a specific context and thus cannot be generalised. It would be interesting to replicate the analyses with pre-service teachers who are more advanced in their studies or even with in-service teachers. Based on the teaching routine, it might be assumed, for example, that the relationship between anxiety and self-efficacy is lower among experienced teachers than among inexperienced teachers as more experienced teachers may have a higher potential to cope with anxiety. Another limitation relates to self-reported data, which are limited in terms of validity. Objective indicators (e.g. heart rate, cortisol level as stress indicator; cf. Schwerdtfeger et al. 2008) could be a promising extension to investigate emotional experiences from a multimethod perspective. In addition, the Cronbach's alpha for self-efficacy of instructional strategies was low, possibly due to the limited teaching experience of the sample. Finally, the study did not take into account the hierarchical data structure (pre-service teachers are nested in seminars at universities or in practicum schools), which may cause some bias in the results.

## 6.2 Conclusion and implications

The study contributes to a better understanding of the relationship between pre-service teachers' emotions and their specific self-efficacy beliefs in the practicum. The study highlights the relevance of both positive and negative emotions for pre-service teachers' self-efficacy beliefs. This perspective should also be considered in future research as well as in initial teacher education, where, for example, self-regulation strategies could be systematically implemented into mentoring processes to support pre-service teachers in managing their emotions during the practicum. Furthermore, in reflective discussions during the practicum, causes of emotional states and their appraisals can also be discussed, which can lead to more accurate self-efficacy judgments. However, since moderate levels of activation are most conducive to self-efficacy beliefs (Bandura 1997), it is important to reduce overly strong emotions, such as intense anxiety. A sense of security can be supported by joint planning and reflection of goals, sufficient support, and constructive handling of mistakes during the practicum.

**Supplementary Information** The online version of this article (<https://doi.org/10.1007/s35834-022-00343-9>) contains supplementary material, which is available to authorized users.

**Funding** Open access funding provided by Paris Lodron University of Salzburg.

**Open Access** This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by/4.0/>.

## References

- Anttila, H., Pyhälö, K., Soini, T., & Pietarinen, J. (2016). How does it feel to become a teacher? Emotions in teacher education. *Social Psychology of Education, 19*(3), 451–473. <https://doi.org/10.1007/s11218-016-9335-0>.
- Anttila, H., Pyhälö, K., Soini, T., & Pietarinen, J. (2017). From anxiety to enthusiasm: emotional patterns among student teachers. *European Journal of Teacher Education, 40*(4), 447–464. <https://doi.org/10.1080/02619768.2017.1349095>.
- Arnold, K.-H., Hascher, T., Messner, R., Niggli, A., Patry, J.-L., & Rahm, S. (2011). *Empowerment durch Schulpraktika*. Bad Heilbrunn: Klinkhardt.
- Bach, A. (2022). *Selbstwirksamkeit im Lehrberuf. Entstehung und Entwicklung sowie Effekte auf Gesundheit und Unterricht*. Pädagogische Psychologie und Entwicklungspsychologie, Vol. 101. Münster: Waxmann.
- Bach, A., & Hagenauer, G. (2021). Emotionen im Praktikum als Quelle der Selbstwirksamkeitsüberzeugungen von Lehramtsstudierenden. In M. Carmignola & D. Martinek (Eds.), *Persönlichkeit – Motivation – Entwicklung. Festschrift für Ao. Univ. Prof. Dr. Franz Hofmann* (pp. 227–244). Hamburg: Verlag Dr. Kovač.
- Bandura, A. (1982). Self-efficacy mechanism in human agency. *American Psychologist, 37*, 122–147. <https://doi.org/10.1037/0003-066X.37.2.122>.
- Bandura, A. (1986). *Social foundations of thought and action: a social cognitive theory*. Upper Saddle River: Prentice-Hall.
- Bandura, A. (1997). *Self-efficacy. The exercise of control*. New York: Freeman.
- Bandura, A. (2009). Cultivate self-efficacy for personal and organizational effectiveness. In E. A. Locke (Ed.), *Handbook of principles of organization behavior. Indispensable knowledge for evidence-based management* (2nd ed., pp. 179–200). New York: Wiley.
- Burić, I., & Moè, A. (2020). What makes teachers enthusiastic: the interplay of positive affect, self-efficacy and job satisfaction. *Teaching and Teacher Education, 89*, 103008. <https://doi.org/10.1016/j.tate.2019.103008>.
- Burić, I., Slišković, A., & Sorić, I. (2020). Teachers' emotions and self-efficacy: a test of reciprocal relations. *Frontiers in Psychology, 11*, 1650. <https://doi.org/10.3389/fpsyg.2020.01650>.
- Chen, J. (2019). Efficacious and positive teachers achieve more: examining the relationship between teacher efficacy, emotions, and their practicum performance. *Asia-Pacific Education Researcher, 28*(4), 327–337. <https://doi.org/10.1007/s40299-018-0427-9>.
- Ciani, K. D., Easter, M. A., Summers, J. J., & Posada, M. L. (2009). Cognitive biases in the interpretation of autonomic arousal: a test of the construal bias hypothesis. *Contemporary Educational Psychology, 34*, 9–17.
- DeMauro, A. A., & Jennings, P. A. (2016). Pre-service teachers' efficacy beliefs and emotional states. *Emotional and Behavioural Difficulties, 21*(1), 119–132. <https://doi.org/10.1080/13632752.2015.1120057>.
- Ellsworth, P. C., & Scherer, K. R. (2003). Appraisal processes in emotion. In R. Davidson, K. R. Scherer & H. H. Goldsmith (Eds.), *Handbook of affective sciences* (pp. 572–595). Oxford: Oxford University Press.
- Enders, C. K. (2001). The impact of nonnormality on full information maximum-likelihood estimation for structural equation models with missing data. *Psychological Methods, 6*(4), 352–370. <https://doi.org/10.1037/1082-989X.6.4.352>.
- Fackler, S., & Malmberg, L.-E. (2016). Teachers' self-efficacy in 14 OECD countries: teacher, student group, school and leadership effects. *Teaching and Teacher Education, 56*, 185–195. <https://doi.org/10.1016/j.tate.2016.03.002>.
- Fives, H., & Buehl, M. M. (2016). Teachers' motivation and beliefs. In K. R. Wentzel & D. B. Miele (Eds.), *Handbook of motivation at school* (2nd edn., pp. 340–360). London: Routledge.
- Frenzel, A. C. (2014). Teacher emotions. In R. Pekrun & L. Linnenbrink-Gracia (Eds.), *International handbook of emotions in education* (pp. 494–519). Abingdon: Taylor & Francis.
- Frenzel, A. C., Pekrun, R., Goetz, T., Daniels, L. M., Durkson, T. L., Becker-Kurz, B., & Klassen, R. M. (2016). Measuring teachers' enjoyment, anger, and anxiety: The teacher emotions scales (TES). *Contemporary Educational Psychology, 46*, 148–163. <https://doi.org/10.1016/j.cedpsych.2016.05.003>.
- Geiser, C. (2013). *Data analysis with Mplus*. New York: Guilford.

- Hagenauer, G., & Hascher, T. (2018). Bedingungsfaktoren und Funktionen von Emotionen von Lehrpersonen im Unterricht. *Unterrichtswissenschaft*, 46, 141–164. <https://doi.org/10.1007/s42010-017-0010-8>.
- Hagenauer, G., Hascher, T., & Volet, S.E. (2015). Teacher emotions in the classroom: associations with students' engagement, discipline in the classroom and the interpersonal teacher-student relationship. *European Journal of Psychology of Education*, 30(4), 385–403. <https://doi.org/10.1007/s10212-015-0250-0>.
- Hascher, T., & Hagenauer, G. (2016). Openness to theory and its importance for pre-service teachers' self-efficacy, emotions, and classroom behaviour in the teaching practicum. *International Journal of Educational Research*, 77, 15–25. <https://doi.org/10.1016/j.ijer.2016.02.003>.
- Hascher, T., & Krapp, A. (2014). Forschung zu Emotionen von Lehrerinnen und Lehrern. In E. Terhart, H. Bennewitz & M. Rothland (Eds.), *Handbuch der Forschung zum Lehrerberuf* (2nd ed., pp. 676–697). Münster: Waxmann.
- Hascher, T., & Waber, J. (2020). Emotionen. In C. Cramer, J. König, M. Rothland & S. Blömeke (Eds.), *Handbuch Lehrerinnen- und Lehrerbildung* (pp. 819–824). Bad Heilbrunn: Klinkhardt.
- Hu, L. T., & Bentler, P.M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives. *Structural Equation Modeling*, 6(1), 1–55. <https://doi.org/10.1080/10705519909540118>.
- Klassen, R. M., & Chiu, M. M. (2010). Effects on teachers' self-efficacy and job satisfaction: teacher gender, years of experience, and job stress. *Journal of Educational Psychology*, 102, 741–756. <https://doi.org/10.1037/a0019237>.
- Klassen, R. M., & Durksen, T.L. (2014). Weekly self-efficacy and work stress during the teaching practicum: a mixed methods study. *Learning and Instruction*, 33, 158–169. <https://doi.org/10.1016/j.learninstruc.2014.05.003>.
- Labone, E. (2004). Teacher efficacy: maturing the construct through research in alternative paradigms. *Teaching and Teacher Education*, 20(4), 341–359. <https://doi.org/10.1016/j.tate.2004.02.013>.
- Lauermann, F., & König, J. (2016). Teachers' professional competence and wellbeing: understanding the links between general pedagogical knowledge, self-efficacy and burnout. *Learning and Instruction*, 45, 9–19. <https://doi.org/10.1016/j.learninstruc.2016.06.006>.
- Lazarides, R., & Warner, L.M. (2020). Teacher self-efficacy. In G. W. Noblit (Ed.), *Oxford research encyclopedia*. Oxford: Oxford University Press.
- Lee, M., & van Vlack, S. (2018). Teachers' emotional labour, discrete emotions, and classroom management self-efficacy. *Educational Psychology*, 38(5), 669–686. <https://doi.org/10.1080/01443410.2017.1399199>.
- Little, R.J.A. (1988). A test of missing completely at random for multivariate data with missing values. *Journal of the American Statistical Association*, 83(404), 1198–1202. <https://doi.org/10.1080/01621459.1988.10478722>.
- Lohbeck, A., & Frenzel, A.C. (2019). Bereichsspezifität und Korrelate von Lehrerselbstwirksamkeit-süberzeugungen hinsichtlich der Förderung des Schülerengagements. *Empirische Pädagogik*, 33(2), 195–211.
- Lohbeck, A., Hagenauer, G., & Frenzel, A.C. (2018). Teachers' self-concepts and emotions: conceptualization and relations. *Teaching and Teacher Education*, 70, 111–120. <https://doi.org/10.1016/j.tate.2017.11.001>.
- Lütke, O., & Robitzsch, A. (2011). Umgang mit fehlenden Daten in der empirischen Bildungsforschung. In S. Maschke & L. Stecher (Eds.), *Enzyklopädie der Erziehungswissenschaft Online (EEO)*. Weinheim: Juventa.
- McCarthy, C., Lineback, S., & Reiser, J. (2015). Teacher stress, emotion, and classroom management. In E. T. Emmer & E. J. Sabornie (Eds.), *Handbook of classroom management* (2nd ed., pp. 301–321). Hillsdale: Erlbaum.
- Morris, D.B., Usher, E.L., & Chen, J.A. (2017). Reconceptualizing the sources of teaching self-efficacy: a critical review of emerging literature. *Educational Psychology Review*, 29(4), 795–833. <https://doi.org/10.1007/s10648-016-9378-y>.
- Morton, L. L., Vesco, R., Williams, N.H., & Awender, M.A. (1997). Student teacher anxieties related to class management, pedagogy, evaluation, and staff relations. *British Journal of Educational Psychology*, 67(1), 69–89. <https://doi.org/10.1111/j.2044-8279.1997.tb01228.x>.
- Oh, S. (2011). Preservice teachers' sense of efficacy and its sources. *Psychology*, 2(3), 235–240. <https://doi.org/10.4236/psych.2011.23037>.



- O'Neill, S. C., & Stephenson, J. (2012). Exploring Australian pre-service teachers sense of efficacy, its sources, and some possible influences. *Teaching and Teacher Education*, 28(4), 535–545. <https://doi.org/10.1016/j.tate.2012.01.008>.
- Pfitzner-Eden, F. (2016). Why do I feel more confident? Bandura's sources predict preservice teachers' latent changes in teacher self-efficacy. *Frontiers in Psychology*, 7, 1486. <https://doi.org/10.3389/fpsyg.2016.01486>.
- Pfitzner-Eden, F., Thiel, F., & Horsley, J. (2014). An adapted measure of teacher self-efficacy for preservice teachers: exploring its validity across two countries. *Zeitschrift Für Pädagogische Psychologie*, 28(3), 83–92. <https://doi.org/10.1024/1010-0652/a000125>.
- Porsch, R., & Gollub, P. (2018). Veränderungen von Angst zu unterrichten bei Lehramtsstudierenden nach einem schulpraktischen Aufenthalt. Ergebnisse der InPraxis-Studie zum Praxissemester in Nordrhein-Westfalen. In N. Hericks (Ed.), *Hochschulen im Spannungsfeld der Bologna-Reform. Erfolge und ungewollte Nebenfolgen aus interdisziplinärer Perspektive* (pp. 239–256). Wiesbaden: Springer VS.
- Poulou, M. (2007). Personal teaching efficacy and its sources: student teachers' perceptions. *Educational Psychology*, 27(2), 191–218. <https://doi.org/10.1080/01443410601066693>.
- Praetorius, A.-K., Klieme, E., Herbert, B., & Pinger, P. (2018). Generic dimensions of teaching quality: The German framework of Three Basic Dimensions. *ZDM*, 50, 407–426. <https://doi.org/10.1007/s11858-018-0918-4>.
- van Rooij, E. C. M., Fokkens-Bruinsma, M., & Goedhart, M. (2019). Preparing science undergraduates for a teaching career: sources of their teacher self-efficacy. *The Teacher Educator*, 54(3), 270–294. <https://doi.org/10.1080/08878730.2019.1606374>.
- Sarfo, F. K., Amankwah, F., Sam, F. K., & Konin, D. (2015). Teachers' self-efficacy beliefs: the relationship between gender and instructional strategies, classroom management and student engagement. *GJDS*, 12, 19–32. <https://doi.org/10.4314/gjds.v12i1-2.2>.
- Scherer, K. R. (2009). The dynamic architecture of emotion: evidence for the component process model. *Cognition and Emotion*, 23, 1307–1351. <https://doi.org/10.1080/0269930902928969>.
- Schutz, P. A. (2014). Inquiry on teachers' emotions. *Educational Psychologist*, 49(1), 1–12. <https://doi.org/10.1080/00461520.2013.864955>.
- Schwerdtfeger, A., Konermann, L., & Schönhofen, K. (2008). Self-efficacy as a health-protective resource in teachers? A biopsychological approach. *Health Psychology*, 27(3), 358–368. <https://doi.org/10.1037/0278-6133.27.3.358>.
- Sutton, R. E., & Wheatley, K. F. (2003). Teachers' emotions and teaching: a review of the literature and directions for future research. *Educational Psychology Review*, 15(4), 327–358. <https://doi.org/10.1023/A:1026131715856>.
- Timošćuk, I., & Ugaste, A. (2012). The role of emotions in student teachers' professional identity. *European Journal of Teacher Education*, 35(4), 421–433. <https://doi.org/10.1080/02619768.2012.662637>.
- Timošćuk, I., Kikas, E., & Normak, M. (2016). Student teachers' emotional teaching experiences in relation to different teaching methods. *Educational Studies*, 42(3), 269–286. <https://doi.org/10.1080/03055698.2016.1167674>.
- Tschannen-Moran, M., & Woolfolk Hoy, A. (2001). Teacher efficacy. Capturing an elusive construct. *Teaching and Teacher Education*, 17(7), 783–805. [https://doi.org/10.1016/S0742-051X\(01\)00036-1](https://doi.org/10.1016/S0742-051X(01)00036-1).
- Usher, E. L., & Pajares, F. (2008). Sources of self-efficacy in school: critical review of the literature and future directions. *Review of Educational Research*, 78, 751–796. <https://doi.org/10.3102/0034654308321456>.
- Waber, J., Hagenauer, G., Hascher, T., & de Zordo, L. (2021). Emotions in social interactions in pre-service teachers' team practica. *Teachers and Teaching: Theory and Practice*, 27(6), 520–541. <https://doi.org/10.1080/13540602.2021.1977271>.
- Weiner, B. (1985). An attributional theory of achievement motivation and emotion. *Psychological Review*, 92, 548–573. <https://doi.org/10.1037/0033-295X.92.4.548>.
- Yang, H. (2019). The nexus between pre-service teachers' emotional experience and cognition during professional experience. *The Australian Educational Researcher*, 46, 799–825.
- Zee, M., & Koomen, H. M. Y. (2016). Teacher self-efficacy and its effects on classroom processes, student academic adjustment, and teacher well-being: a synthesis of 40 years of research. *Review of Educational Research*, 86(4), 981–1015. <https://doi.org/10.3102/0034654315626801>.