



Teachers' emotion regulation and related environmental, personal, instructional, and well-being factors: A meta-analysis

Hui Wang¹ · Irena Buric² · Mei-Lin Chang³ · James J. Gross⁴

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Abstract

Teachers experience and express various emotions of different qualities and intensities. They also adopt emotion regulation strategies to increase teaching effectiveness and maintain professionalism. Previous reviews of teachers' emotion regulation have focused on their emotional labor (i.e., deep and surface acting)—a subdimension of emotion regulation. The present review aims to incorporate multiple perspectives and conceptualizations, hence affording a more comprehensive understanding of teachers' emotion regulation by examining antecedent- and response-focused strategies. The present meta-analysis included 87 articles investigating the relationships between teachers' emotion regulation and seven related environmental, personal, instructional, and well-being factors (i.e., work-role interaction expectations, school context, classroom context, personal characteristics, motivation, teaching effectiveness, and teacher well-being). Antecedent-focused strategies demonstrated more adaptive associations with the related factors than response-focused strategies. More specifically, teachers who receive school support, have engaged and disciplined students, and possess favorable personal characteristics (e.g., conscientiousness) tend to adopt antecedent-focused emotion regulation; these teachers also have greater well-being. In contrast, teachers who work at unsupportive schools or who have relatively unfavorable personal characteristics (e.g., neuroticism) tend to use response-focused strategies; these teachers also have poor teaching effectiveness and well-being. Additional moderating analyses found differences concerning the conceptualizations of emotion regulation and cultural backgrounds.

Keywords Meta-analysis · Teachers' emotion regulation · Well-being · Teaching effectiveness, review

1 Introduction

When teaching and interacting with students, teachers experience and express a wide range of emotions of different qualities and intensities. For instance, teachers experience pride when their students succeed, contentment when the class runs smoothly, anger when students misbehave, or hopelessness when they fail despite all efforts. Such emotions impact both teachers and students, as they shape teacher well-being, teaching quality, and student outcomes (Burić et al., 2018a, 2018b; Frenzel et al., 2016, 2021). Even though teachers' emotions can be beneficial in the classroom (e.g., enjoyment displayed as an enthusiastic teaching style may capture students' attention and promote their engagement in learning), if they are of the "wrong" type, come at the "wrong" time, or have an inappropriate intensity, emotions can also be maladaptive (Gross, 1998). In such instances, teachers often try to regulate their emotions by influencing "which emotions they have, when they have them, and how they experience and express these emotions" (Gross, 1998, p. 275).

Teachers' emotion regulation has been predominantly investigated through the lens of emotional labor theory, according to which employees manage their emotions to ensure that they are well aligned with the emotional display rules of their profession (Glomb & Tews, 2004; Hochschild, 1983). For example, teachers are expected to show positive emotions (e.g., enjoyment), hide negative emotions (e.g., anxiety), and maintain the intensity of emotions at moderate levels (Sutton, 2004; Taxer & Frenzel, 2015; Yin & Lee, 2012). To meet these expectations, they engage in *deep acting* (i.e., proactively modifying internal states or feelings by redirecting attention or intentionally internalizing desired emotions by cognitively reappraising the situation or event) or *surface acting* (i.e., behaviorally modifying outward emotional displays by hiding felt emotions and masking or faking unfeared emotions; Grandey, 2000; Grandey & Sayre, 2019). Two recent meta-analyses on teachers' emotional labor confirmed the richness of this line of research. They showed that teachers' emotional labor stems from various individual (e.g., personality, teacher self-efficacy, motivation) and contextual antecedents (e.g., emotional display rules) and has effects on teacher well-being (Wang et al., 2019; Yin et al., 2019).

However, conceptualizing teachers' emotion regulation as an effortful endeavor aimed at conforming with the emotional display rules of the teaching profession might fall short of grasping the complexity and richness of teachers' emotion regulation. More specifically, teachers regulate their emotions for both instrumental (i.e., to raise teaching effectiveness) and hedonic (i.e., to feel internal satisfaction) reasons, and as previous but sparse and primarily qualitative empirical evidence suggests, they use a wide variety of strategies to do so (Burić et al., 2017; Sutton, 2004; Sutton et al., 2009). Indeed, in recent years, scholars have recognized the importance of integrating emotional labor with a broader concept of emotion regulation to include a wider range of emotion regulation goals as well as to explore the relationships between diverse emotion regulation strategies and various affective, cognitive, and social factors (Grandey, 2000; Grandey & Melloy, 2017).

In an attempt to conceptualize emotional labor as a form of emotion regulation that occurs in a work context (Gross, 2013), we used the process model of emotion regulation (Gross, 1998, 2015) as an overarching theoretical framework. According to this model, to impact their emotions, individuals can adopt either *antecedent-focused strategies* that are typically utilized before the full development of the emotion (e.g., redirecting attention, reappraisal) or *response-focused strategies* (e.g., suppression, venting) that are implemented after the emotion is fully developed. It was proposed that deep acting conceptually overlaps with antecedent-focused emotion regulation since these strategies are directed to modifying and internalizing desired emotions before their full development. Likewise, surface acting is similar to response-focused emotion regulation because it focuses on modifying or suppressing emotional expressions (Grandey, 2000, 2015; Grandey & Melloy, 2017).

In the present work, we expanded upon previous meta-analyses on teacher emotional labor, such as those conducted by Wang et al. (2019) and Yin et al. (2019). Our approach involved taking a broader perspective on teachers' emotion regulation. To do this, we examined a wider range of antecedents and outcomes related to emotion regulation strategies. The antecedents we focused on included personal characteristics, school and classroom context, work-role interaction expectations, and motivation. As for outcomes, we explored well-being and teaching effectiveness. We investigated two broad categories of emotion regulation strategies: antecedent-focused and response-focused emotion regulation. These strategies occur at different temporal points following exposure to an emotional stimulus. Furthermore, our study encompassed strategies and tactics that extend beyond deep acting and surface acting, which are commonly examined in previous research.

2 Integrating the emotion regulation and emotional labor perspectives

Gross's (1998, 2013, 2015; Gross & Thompson, 2007) process model of emotion regulation suggests that emotions are generated and regulated through *situation selection*, *situation modification*, *attentional deployment*, *cognitive change/reappraisal*, and *response modulation* processes. *Situation selection* is the emotion regulation process that occurs at the beginning of emotion generation when individuals consciously choose a situation with the expectation of certain subsequent emotions. Teachers may use this strategy by deliberately choosing or avoiding classroom activities that have the potential to trigger negative emotions. For instance, teachers might intentionally select activities that align with their personal interests and preferences to enhance their positive emotions. If the situation is believed to trigger certain emotions, individuals may engage in *situation modification* to change the situation, thus altering the expected emotional experiences. In this sense, teachers may use this strategy to create a positive emotional climate by altering the classroom environment. For instance, if a teacher anticipates that a particular classroom activity may lead to student disruption, they may proactively modify the seating arrangement to minimize potential conflicts.

Once the situation is fixed and cannot be modified, *attentional deployment* can be used to alter one's focus of attention to change emotional experiences. Teachers can use this strategy by redirecting their attention to positive aspects of the classroom situation. For instance, if classroom activities result in disruptions and the teachers are unable to calm students down, they may shift their focus to other students who are following instructions and completing work effectively. This can help reduce teachers' anxiety and anger by avoiding excessive focus on the negative aspects of the situation. Meanwhile, *cognitive change* or *cognitive reappraisal* concerns the appraisal process whereby individuals attempt to change the meaning of the situation. Teachers can use this strategy by reframing their thoughts about a situation in a more positive light. For example, if some students persistently disrupt the class, instead of viewing them as poorly disciplined and deserving punishment, teachers can reframe their thoughts by focusing on the strengths of those students and acknowledging their efforts to learn. All four strategies are antecedent-focused and refer to efforts to alter situations before emotions are entirely generated.

Finally, *response modulation* is the response-focused strategy that involves regulating the emotion after it has been experienced, with individuals attempting to alter their facial, behavioral, or physiological responses to change their emotions. Suppression is an exemplary response modulation strategy utilized after emotion generation whereby individuals try to inhibit emotional displays. Teachers may use this strategy by modeling appropriate emotional expressions in the classroom. For instance, if teachers feel furious, they may take a deep breath or step away from the situation to cool down before addressing the adverse classroom situation. This approach can help prevent teachers from displaying angry outbursts or engaging in aggressive behaviors.

Furthermore, in Grandey's (2000) model of emotional labor as emotion regulation, she connected the two most investigated emotion regulation strategies, namely, reappraisal and suppression, to deep acting and surface acting, respectively. In this model, Grandey mapped deep acting onto reappraisal (since this strategy was directed to changing one's mood and expressions to appear positively) and surface acting onto suppression (since this strategy was directed to modifying the felt emotions to express them in a desirable way). Furthermore, emotional events at the workplace, interaction expectations (e.g., emotional display rules), and individual (e.g., personality) and organizational factors (e.g., job autonomy, supervisor support) were considered antecedents of emotion regulation processes at work, while employees' well-being and performance were positioned in the model as their consequences.

In Grandey's recently refined model of *emotional labor as emotion regulation* (Grandey & Melloy, 2017), researchers are encouraged to investigate broader constructs of antecedent- and response-focused strategies to grasp emotion regulation processes that go beyond deep acting and surface acting. In other words, deep acting is now considered as one of the possible forms of antecedent-focused emotion regulation strategies. Similarly, surface acting is regarded as one of the possible forms of response-focused emotion regulation strategies. In addition, emotional labor involves both the transient emotion regulation processes that

occur within a person from moment to moment, as well as the dynamic processes that change over time and across different situations (Aldao et al., 2016).

3 Differentiating between emotion regulation, emotional intelligence, and coping

The present research focused on teachers' emotion regulation rather than emotional intelligence or coping. Although they share some common features with emotion regulation, emotional intelligence and coping still represent distinctive constructs. More specifically, research on emotion regulation has mainly focused on its *processes*, that is, on how a person can effectively manage their emotions by adopting various strategies at different temporal points. In contrast, research on emotional intelligence has focused on understanding the *competencies* in emotion management, that is, who uses their emotions the most efficiently (Peña-Sarrionandia et al., 2015). Moreover, according to the commonly accepted model of ability-based emotional intelligence, four narrow abilities arranged hierarchically from simple to more complex can be distinguished: emotion perception, emotion facilitation of thought, emotion understanding, and emotion regulation (Elfenbein & MacCann, 2017; Mayer et al., 2016). Thus, emotion regulation is considered only one (albeit the most complex) constituent part of the complex and multifaceted emotional intelligence construct. The two terms also differ in their relative focuses, with emotion regulation focusing more than emotional intelligence on the specific strategies that individuals employ.

Likewise, emotion regulation and coping share several common elements since both constructs entail regulatory processes and controlled, purposeful efforts and may unfold and change over time (Compas et al., 2014). Coping is “constantly changing cognitive and behavioral efforts to manage specific external and internal demands that are appraised as taxing or exceeding the resources of the person” (Lazarus & Folkman, 1984, p. 141). It can be conceptualized as a particular case of emotion regulation under *stress* (Eisenberg et al., 2009). Nonetheless, emotion regulation and coping are still not synonymous—unlike coping, emotion regulation is not triggered only in conjunction with stressful events and circumstances; rather, it encompasses emotion management in a broader range of situations and in reaction to a wider range of emotional stimuli that are not necessarily considered stressful. Moreover, while emotion regulation is primarily concerned with the regulation of the frequency, experience, and expression of emotions, coping includes regulatory efforts in a broader range of functions, including emotions, behaviors, cognition, physiology, and the environment (Compas et al., 2014; Lazarus, 2006). Thus, to ensure conceptual clarity, in the present review, we included only studies investigating constructs that can be undoubtedly considered antecedent- or response-focused strategies directed toward the regulation of emotion and omitted research that more generally examined teachers' coping strategies, which are directed toward regulating external and internal demands.

4 A review of the controversy and consistency of previous findings

In this research, we relied on models of *emotional labor as emotion regulation* (Grandey, 2000; Grandey & Melloy, 2017; Gross, 2013). These models theoretically support our conceptualization of the antecedents and outcomes of teachers' emotion regulation that have been examined in previous research. Specifically, based on Grandey's framework, we examined the work-role interaction expectations (e.g., emotional display rules) and two groups of environmental factors, namely, the classroom context (e.g., relationships with students) and school context (e.g., coworker support), that can shape teachers' emotion regulation. Additionally, we considered two groups of individual factors—personal characteristics (e.g., personality) and teacher motivation (e.g., job commitment)—that can impact teachers' emotion regulation processes. Last, we considered teaching effectiveness and well-being as the two widely acknowledged and investigated outcomes of emotion regulation in the workplace.¹ Hence, the present review focuses on seven environmental, personal, instructional, and well-being factors that are related to teachers' emotion regulation. In the following section, we briefly review the findings of each related factor before the comprehensive meta-analysis is presented. The presentation of ambiguity, controversy, or consistency of previous research findings provides solid empirical evidence for the present synthesis.

5 Antecedents of teachers' emotion regulation

5.1 Work-role interaction expectations

Interpersonal interactions that involve diverse emotions (positive and negative), high job demands, long duration, and high intensity are usually associated with more frequent employment of both antecedent- and response-focused emotion regulation strategies (Grandey & Melloy, 2017). This theoretical assumption has received empirical support in the teaching profession. The results suggested that teachers who perceive higher job demands and more emotional display rules (e.g., express positive emotions and hide negative emotions) are more likely to employ antecedent-focused emotion regulation (e.g., Han et al., 2021; Näring et al., 2012; Sarraf et al., 2017; Tuxford & Bradley, 2015), as well as response-focused emotion regulation (e.g., Chang, 2020; Sarraf et al., 2017; Tuxford & Bradley, 2015).

¹ The selection of the seven factors was based on an integration of Grandey's framework and commonly investigated correlates of teachers' emotion regulation. However, certain factors included in Grandey's framework may not be applicable to the teaching profession, such as *Target Reaction* (mimicry, tips, complain), and were therefore not included in the present review. Conversely, certain factors like *Work Context*, which is included in Grandey's framework, could be further divided into *School Context* and *Classroom Context* to better reflect the reality of teaching profession and improve the accuracy of the review.

5.2 School context

A healthy and positive working environment gives individuals high job autonomy and opportunities for self-fulfillment. Individuals in such an environment also receive social and emotional support from their administrators and coworkers, which fosters adaptive emotion regulation (Grandey & Melloy, 2017). Likewise, a positive school context provides teachers with optimal instructional support and reduces barriers to daily interactions with students. An effective administrative team acknowledges teachers' emotional needs and thus diminishes the necessity for teachers to disguise emotions, leading to improved congruence between experienced and expressed emotions. In contrast, a lack of support for autonomy and sufficient resources from school leaders may intensify negative emotions and stress, exacerbating teachers' burnout and threatening their well-being (Chang et al., 2022b). Empirical findings suggest that teachers with greater school and colleague support than others report employing more antecedent-focused emotion regulation and less response-focused emotion regulation in managing their teaching-related emotions (e.g., Chang et al., 2022b; Han et al., 2021; Mittal & Chhabra, 2011; Wu et al., 2020; Yin et al., 2016).

However, inconsistent results have been observed regarding teachers' antecedent-focused emotion regulation. Although it involves minimal emotional dissonance, teachers who conduct antecedent-focused emotion regulation, such as cognitive reappraisal, still need to invest substantial effort to internalize the desired emotions. This internalization process can still be so laborious that it consumes teachers' cognitive resources and drains their cognitive energy (Wang et al., 2019). Hochschild's (1983) original model of emotional labor refers to this process as *emotional estrangement*. Research findings in the school context have suggested that, on the one hand, a more supportive school provides teachers with great social and emotional support that encourages adaptive emotion regulation (e.g., cognitive reappraisal). On the other hand, a supportive school also provides a satisfying working condition to the extent that teachers no longer need to conduct cognitive reappraisal; hence, they can save more cognitive energy to focus on pursuing their teaching goals (Näring et al., 2006).

5.3 Classroom context

A supportive classroom environment is usually reflected by strong student engagement, high student satisfaction, positive relationships with teachers, and minimal disruption. Teachers with positive relationships with students without disruptive classroom issues are more likely than others to employ antecedent-focused emotion regulation strategies (Jeon et al., 2016; Tsouloupas et al., 2010). However, studies have also found that these teachers are also more willing than teachers with less engaged students to use response-focused emotion regulation, such as faking positive emotions (e.g., showing more enthusiasm and enjoyment; Burić & Frenzel, 2020) and hiding negative emotions in the classroom (e.g., hiding anger or

disappointment; Donker et al., 2020; Jeon et al., 2016). Such findings suggest that when teachers perceive a supportive classroom environment, they tend to be more willing to express preferable emotions in front of their students, even at the cost of their own intense experiences of emotional dissonance (e.g., response modulation).

In addition, teachers do not always regulate emotions for just their engaged students; they do so for their disengaged students as well. The findings suggest that teachers are more likely to employ response-focused emotion regulation, such as faking a negative emotion when they see their students as disengaged (Taxer & Gross, 2018; Wang et al., 2021). These findings imply the strategic use of emotion in the social dynamics of the classroom environment so that teachers can adopt various emotion regulation strategies intentionally according to the specific teaching and learning context. Without investigating the nuances of classroom events, researchers often find the classroom context and teachers' emotion regulation strategies to be only weakly and nonsignificantly related (e.g., between classroom context and cognitive reappraisal: Braun et al., 2020; Burić & Frenzel, 2020; Donker et al., 2020; Karabay, 2019; between classroom context and response modulation: Taxer & Frenzel, 2015; Tsouloupas et al., 2010).

5.4 Personal characteristics

Researchers have looked into teacher traits associated with teaching effectiveness in recent decades. Findings suggest that teachers who hold favorable personalities (i.e., being rated high on conscientiousness, extraversion, openness, emotional stability, and agreeableness; Kim & Klassen, 2019), who experience positive emotions and few negative emotions (e.g., Wang et al., 2017), and who are efficacious (Klassen et al., 2009), emotionally intelligent (e.g., Yin et al., 2019), and psychologically resilient (Huang et al., 2015) tend to teach effectively (e.g., greater creativity and innovation) and experience occupational well-being (e.g., high job satisfaction, low burnout). Empirical studies have also found that teachers with these personal characteristics are more likely than others to use antecedent-focused strategies and less likely to adopt response-focused strategies (Lavy & Eshet, 2018; Lee & van Vlack, 2018; Lee et al., 2016; Mankin, 2019; Yin et al., 2013). However, these findings have been inconsistent. Teachers with favorable personal characteristics, such as those who are emotionally intelligent, resilient, and conscientious, have also been found to fake positive and hide negative emotions (response-focused emotion regulation) to achieve instructional goals (e.g., Alazmi & Salem, 2021; Fu, 2015; Wu et al., 2020; Zhao & You, 2021).

5.5 Motivation

Teachers driven by strong motivation are more dedicated to their students, school communities, and the teaching profession. These teachers are more intrinsically motivated (and less extrinsically motivated); more socially, emotionally, and behaviorally engaged; more organizationally and publicly committed (Klassen et al., 2009); and demonstrate a stronger commitment to the teaching profession. Research

findings have suggested that motivated teachers are more likely than others to employ antecedent-focused strategies (e.g., Tsouloupas et al., 2010; Sezen-Gultekin et al., 2021; Xuan & Park, 2012; Zheng et al., 2020) and are less likely to use response-focused strategies (e.g., faking and hiding emotions; Burić et al., 2018b, 2021; Mahoney et al., 2011; Philipp & Schüpbach, 2010; Tsouloupas et al., 2010).

However, again, the findings remain inconsistent. Researchers have also argued that motivated teachers are inclined to express what they believe to be “appropriate” emotions, which will inevitably result in them faking many unfelt emotions (e.g., enthusiasm) and suppressing many felt but “inappropriate” emotions (e.g., boredom, anxiety). For example, both Akin’s (2021) and Çetin’s (2019) studies among Turkish teachers found that teachers who were committed to their schools tended to conduct response-focused emotion regulation (e.g., surface acting). Furthermore, prior research has also pointed out the importance of differentiating between the subtypes of teacher commitment, as their relationships with teachers’ emotion regulation strategies differ. More specifically, teachers who were superficially committed to their school solely by obeying or complying with organizational rules have been found to conduct less antecedent-focused emotion regulation (e.g., deep acting; Akin, 2021), whereas only those who were affectively or cognitively committed (e.g., emotionally bonded to their schools; perceive a strong sense of belonging) reported greater employment of antecedent-focused emotion regulation (Çetin, 2019).

6 Outcomes of teachers’ emotion regulation

6.1 Teaching effectiveness

Teachers usually conduct emotion regulation to manage certain emotions with the purpose of further engaging students or reducing their disengagement. Therefore, teachers’ emotion regulation strategies are assumed to correspond with their instructional effectiveness, including their instructional behaviors and teaching quality. However, scholars have found mixed results on the relationships between teachers’ emotion regulation and teaching effectiveness in empirical research. On the one hand, some studies have revealed that teachers who employ antecedent-focused strategies tend to teach more effectively. More specifically, teachers who adopt cognitive reappraisal tend to provide more expressive encouragement and social guidance to their students (Jeon et al., 2016). These teachers know how to use humor in teaching (Liao et al., 2020), provide greater autonomy support to their students, and conduct better-structured lessons (Moè & Katz, 2021).

On the other hand, a few other studies did not support a positive link between teachers’ adoption of antecedent-focused strategies and teaching effectiveness; instead, they found this relationship to be negative. For example, Brown et al. (2018) argued that deep acting is an arduous process. Teachers occupied by managing and internalizing desired emotions are less cognitively available and hence less effective in managing classroom behaviors. Hülshager et al. (2010) found that German novice teachers who reported a stronger tendency to employ antecedent-focused

emotion regulation than others, in fact, had poorer job performance (i.e., teachers' self-reports of their supervisors' or mentors' earlier ratings).

Concerning response-focused emotion regulation, more consistent results have been observed. Teachers who employ response-focused strategies tend to provide poor emotional and instructional support to their students (e.g., adverse classroom climate and poor concept development instruction; Brown et al., 2018). These teachers have also reported poor classroom management and course design (Han et al., 2021) and are less creative in their teaching (Dewaele & Wu, 2021). Moreover, these teachers struggle to provide positive encouragement and social guidance to their students (Jeon et al., 2016) and tend to use controlling and demanding teaching styles in their instruction (e.g., telling students that they must follow the rules; Moè & Katz, 2021). These teachers generally have poor teaching performance (Hülshéger et al., 2010).

6.2 Well-being

With teachers' deep acting (a subtype of antecedent-focused emotion regulation) reducing emotional dissonance on the one hand and consuming teachers' cognitive capacity on the other hand, it is not surprising to see its relationships with teachers' well-being outcomes to be mixed. One group of researchers has found antecedent-focused emotion regulation to be associated with greater teacher well-being, such as greater job satisfaction, low emotional exhaustion, and low depersonalization (e.g., Akin et al., 2014; Basim et al., 2013; Burić et al., 2017; Peng et al., 2019; Xie et al., 2022; Yin, 2015; Yin et al., 2012, 2013). However, another group of researchers found the opposite results, suggesting that antecedent-focused emotion regulation corresponds with poor well-being in teachers (Moè & Katz, 2021; Park et al., 2014; Philipp & Schüpbach, 2010; Zhu et al., 2021). Moreover, a nonsignificant relationship has also been observed repeatedly across multiple studies (e.g., Çukur, 2009; Dias & Bhadra, 2014; Qi et al., 2017; Zhang et al., 2022). Wang et al.'s (2019) meta-analysis eventually found a nonsignificant relationship between teachers' deep acting and well-being across 28 studies to synthesize some of these inconsistent findings.

Prior studies have predominantly found a negative association between response-focused strategies and teacher well-being. More specifically, teachers who reported employing more response-focused strategies by faking or suppressing emotions tended to be less satisfied with their jobs and were more likely to burn out than others (Apsara & Arachchige, 2016; Arshadi & Piyaei, 2016; Burić et al., 2021; Chang, 2013; Chang et al., 2022b). Wang et al.'s (2019) meta-analytic review has shown similar findings that teachers who conduct surface acting more often than others report poorer psychological well-being. More nuanced investigations of the subtypes of response-focused emotion regulation suggest that faking positive and hiding negative emotions are actions that are particularly maladaptive for teachers' psychological well-being (Mahoney et al., 2011; Taxer & Frenzel, 2015; Wang et al., 2021) and that faking negative emotions and hiding positive emotions can be nonsignificantly related to teacher well-being (Taxer & Frenzel, 2015; Wang et al., 2021). Finally, almost all studies on teachers' well-being focus on their psychological well-being,

particularly job satisfaction and burnout. The only study that focused on teachers' physical health (Qi et al., 2017) found teachers who more frequently adopted response-focused emotion regulation strategies (i.e., surface acting) than others to have higher cortisol levels (an indicator of high stress).

7 Moderating factors

Despite the urge to integrate emotion regulation theory with the emotional labor construct (Grandey, 2000; Gross, 2013), there is no perfect overlap between emotional labor and emotion regulation (Grandey & Melloy, 2017). Specifically, emotional labor is primarily performed as part of a work role and to align emotional experiences and expressions with socially expected ones, while emotion regulation strategies in a broader sense are implemented for hedonic and instrumental reasons (Grandey & Melloy, 2017; Taxer & Gross, 2018). Moreover, items measuring deep acting are overly general. They do not distinguish between various types of antecedent-focused strategies, such as situation selection, attentional deployment, or reappraisal, while items measuring surface acting typically refer to both suppressing and faking emotions (Dieffendorff et al., 2008; Mikolajczak et al., 2009). Such fuzziness and lack of clarity in the conceptualization and operationalization of the two constructs could be responsible for the discrepant findings concerning the relationships between emotional labor/emotion regulation and their various affective, cognitive, motivational, and behavioral correlates across the literature (Mikolajczak et al., 2009; Webb et al., 2012). Therefore, to provide more accurate insights into the origins and outcomes of teachers' emotion regulation, we examined whether the conceptualization of emotion regulation constructs moderates the examined relationships. Such analysis can provide more precise information about the functional properties of specific teachers' emotion regulation strategies and help with the empirical integration of the two complementary but mostly independent lines of research.

Moreover, empirical evidence suggests that associations between emotion regulation and its correlated factors can be moderated by culture (e.g., collectivistic vs. individualistic; Western vs. non-Western); employees in Western cultures tend to be more sensitive than those from non-Western cultures to the negative consequences of emotional labor and hence more likely to be influenced by it (Humphrey, 2021; Mastracci & Adams, 2019). However, other research has shown similar experiences of emotional labor across cultures (Lu & Guy, 2019). Considering previous inconsistent findings and a lack of such research among teachers, we tested the moderating role of culture to examine whether the relationships between emotion regulation strategies and the related factors that were analyzed were similar among teachers from Western and non-Western cultures.²

Finally, we included the grade level at which teachers taught as another possible moderator. Care and concern for students and the emotional management undertaken

² We decided to classify the origins of studies into Western and non-Western countries/regions to include an acceptable number of studies in each group, thus allowing a valid comparison between the two groups. More nuanced classification will result in extremely small numbers of studies in each group, hampering valid comparisons.

to ensure and maintain student success are integral parts of the teaching job. It was proposed that if teachers regulate their emotions for the benefit of students rather than the school or themselves, their regulatory efforts might be less taxing (Oplatka, 2009). Moreover, caring is conceptualized as the heart of teaching, especially when working with young children at primary grade levels (Hansen & Mulholland, 2005; Nias, 1999). Bearing in mind that teachers of different grade levels could distinctively view efforts to regulate the internalization of socially expected emotional experiences and expressions, we also investigated whether the educational level moderates the relationships between antecedents and outcomes of teachers' emotion regulation strategies. Overall, the moderating factors were selected based on a combination of previous reviews (e.g., Wang et al., 2019) and an investigation into the sources of heterogeneity between previous studies that aimed to explain differences in effect sizes.

8 The rationale for the present review

Teachers' emotion regulation is becoming a vibrant research field. Thus, robust empirical evidence on individual and contextual determinants of antecedent- and response-focused strategies and the impact such strategies have on teacher well-being and effectiveness is advantageous for both theory and practice. In comparison with previous meta-analyses on teacher emotional labor (Wang et al., 2019; Yin et al., 2019), the present research emphasizes the broader concept of emotion regulation. We integrate findings from prior literature that separated the concept of teacher emotional labor from emotion regulation and investigate a broader range of correlates, including environmental, personal, instructional, and well-being factors.

More importantly, the present review aims to synthesize previous research findings that are largely inconsistent or controversial, hence presenting a clear and comprehensive portrait of teachers' emotion regulation. It aims to provide an overall conclusion regarding the nature of the relationships between the antecedents and outcomes of comprehensive emotion regulation of teachers by using the classifications that stem from firm theoretical frameworks (Grandey, 2000; Grandey & Melloy, 2017). In addition, the results of such studies can help provide guidelines for recruiting (future) teachers based on their personal characteristics (e.g., motivation, key values; Klassen & Kim, 2019), developing training that focuses on specific strategies, and shaping teachers' work environment to promote reliance on the types of emotion regulation that would be beneficial for teachers, students, and schools in general.

Finally, as emphasized earlier, the two constructs are not perfectly matched despite the similarities that emotional labor and emotion regulation share. Therefore, this study aims to expand on the work of Wang et al. (2019) and Yin et al. (2019) on teachers' emotional labor. Specifically, it seeks to provide new insights into how the relationship between teachers' emotion regulation, its antecedents, and outcomes can vary depending on two different theoretical conceptualizations, namely, emotion regulation and emotional labor. Finally, the present study also investigates the moderating effect of culture by comparing the results of studies conducted in Western

and non-Western cultures and with participants teaching at different grade levels. The two research questions are as follows:

1. What are the relationships between teachers' emotion regulation strategies and (1) work-role interaction expectations, (2) school context, (3) classroom context, (4) personal characteristics, (5) motivation, (6) teaching effectiveness, and (7) well-being³?
2. Are the relationships between teachers' emotion regulation strategies and related factors moderated by (1) conceptualization, (2) culture, or (3) teaching grade level?

9 Method

9.1 Literature search

We conducted a systematic literature search using multiple strategies. The literature search and review started in early 2021 and was completed in early 2022. First, we conducted an electronic search in three databases, including PsycINFO, ProQuest, and Web of Science. To ensure that the search results were reproducible, transparent, and thorough (Booth et al., 2016), our search terms followed Peña-Sarrionandia et al.'s (2015) comprehensive list of keywords that have similar meanings to emotion regulation. More specifically, we included broad terms such as "emotion regulation" or "emotional labor," and we also included more detailed terms referring to specific emotion regulation strategies such as "reappraisal" or "deep acting." The search terms used were "teacher" OR "instructor" OR "educator" AND "emotion* regulat*" OR "situation selection" OR "situation modification" OR "attention deployment" OR "reappraisal" OR "response modulation" OR "emotion* manag*" OR "emotion* control" OR "affect regulat*" OR "mood regulat*" OR "stress management" OR "emotion* labor" OR "emotion* labour" OR "emotion* dissonance" OR "emotion* authenticity." We used no restrictions on the articles' publication years (i.e., from any time/year up until the time when the review was conducted) or on whether they were peer-reviewed.⁴

Second, we hand-searched the reference lists of existing reviews on teachers' emotional labor (Wang et al., 2019 and Yin et al., 2019) and included all the articles that were used in those two previous reviews. Third, we emailed the authors of relevant studies to request statistical information that was not presented in the published articles (e.g., correlations between variables). Fourth, we searched for ongoing special issues that focused on teachers' emotion regulation, contacted the guest

³ In this review, we considered multiple aspects of teacher well-being, including psychological, occupational, and physical well-being, and studied teacher well-being as an overarching correlate of teacher emotion regulation. For a detailed exploration of how teacher emotion regulation relates to the specific subdimensions of teacher well-being, such as burnout and job satisfaction, please refer to Wang et al. (2019) and Yin et al. (2019).

⁴ We included dissertations that were not peer-reviewed in our search to increase the comprehensiveness of the current review.

editors, and asked for articles that were most recently accepted or published in their special issues.

9.2 Search results

An electronic search of the databases returned 4968 results. After a manual search of existing review articles and journal special issues, 136 results were added. We conducted the first round of screening for the total number of 5104 articles by reviewing their titles and abstracts. Articles that were duplicated were removed. This first round of screening resulted in 4805 articles being excluded.

Then, we conducted a second round, full-manuscript screening for the remaining 299 articles. More specific inclusion and exclusion criteria were adopted in this process (see Table 1). As the purpose of the current review was to examine teachers' emotion regulation and its associations with other criteria, we set our selection criteria accordingly based on the articles' (1) focus, (2) sample, (3) aim, (4) specific design, (5) sufficient reporting, (6) full-text availability, and (7) language. After the second screening, a total of 87 articles were retained and hence included in our meta-analysis (see Fig. 1 for more details). Information on this set of articles is presented in Table 2.

9.3 Coding

We developed a coding procedure to analyze the included articles. One author and a research assistant jointly developed a coding protocol based on Gross's and Grandey's theoretical frameworks. More specifically, the two researchers first

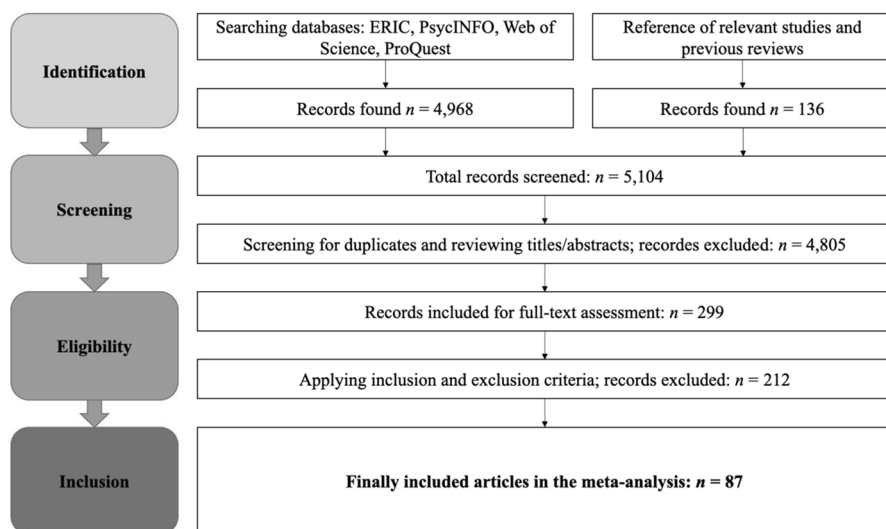


Fig. 1 Flow chart

Table 1 Inclusion and Exclusion Criteria

Criterion	Inclusion criteria	Exclusion criteria
Focus	Studies that focus on the specific strategies teachers use to manage their teaching-related emotions	Studies that do not focus on the specific strategies that teachers use in managing their emotions, such as their emotion regulation abilities (i.e., emotional intelligence), their efficacy levels in managing emotions Studies were also excluded if they focused on the strategies teachers use to manage stress (i.e., stress coping), which is not exactly the same as emotion regulation
Sample	Studies that focus on kindergarten, primary, secondary, and post-secondary classroom teachers	Teaching professionals who might not have classroom teaching experiences, student teachers, teaching assistants, school counsellors, or school psychologists
Aim	The studies included have to examine the relationships between teachers' emotion regulation and the seven related factors including one or a few of the following: (1) Work-role interaction expectations (e.g., job demands, display rules), (2) school context (e.g., principal support, school autonomy), (3) classroom context (e.g., student engagement, classroom disruption), (4) personal characteristics (e.g., personality, trait emotions, psychological capital, emotional intelligence), (5) teacher motivation and engagement (e.g., occupational commitment, quitting intentions, organizational engagement), (6) well-being of teachers (e.g., occupational, psychological, physical), or (7) teaching effectiveness (e.g., instructional strategies, teaching performance)	Studies that do not investigate specific relationships between teachers' emotion regulation or any of the seven related factors listed in the Inclusion Criteria, but instead, investigate, for example, (1) the effectiveness of an intervention program (e.g., mindfulness or stress coping interventions), (2) the relationships between teachers' emotion regulation and parents'/other school personnel's outcomes, (3) students' perceptions of their teachers' emotion regulation, or (4) the structure, the review, or the theorization of teachers' emotions or emotion regulation
Research design	Studies that include a quantitative component in which teachers' emotion regulation and its related factors are assessed by valid and reliable scales	Studies that do not have a quantitative component (e.g., reports of interviews, focus groups, classroom observations), reviews of previous findings, or theories/frameworks of teachers' emotion regulation
Sufficient reporting	Articles that provide specific correlations between teachers' emotion regulation and the seven related factors of interest	Articles that do not include essential information concerning the correlations between study variables or do not clearly describe the factors that are assessed
Peer-review availability	Articles with full texts available	Articles that do not have full text available
Language	Articles published in English	Articles published in other languages other than English

discussed and determined the basic (inclusion) criteria for each of the seven factors related to teachers' emotion regulation: work-role interaction expectations, school context, student context, personal characteristics, motivation, teaching effectiveness, and well-being. Then, they independently coded 20 articles (22%) and agreed on 98% of the categorizations. They then held follow-up discussions to resolve any disagreements. After the initial coding, the researchers developed a comprehensive list of criteria that categorized the included articles and their investigated variables into the corresponding seven related factors. These factors are listed below, with more detailed information presented in Table 2 and Fig. 2⁵:

1. Work-role interaction expectations include variables such as (1) job demands and (2) emotional display rules.
2. School context includes variables such as (1) school social support, (2) emotional support, (3) coworker support, (4) principal support, (5) colleague trust, (6) job autonomy support, (7) teaching support, and (8) satisfying working conditions.
3. The classroom context includes variables such as (1) student engagement (cognitive, behavioral, emotional), (2) student disaffection, (3) student misbehaviors, (4) student–teacher relationships, (5) student well-being, and (6) classroom disruption.
4. Personal characteristics include variables such as (1) personality (e.g., agreeableness, conscientiousness, etc.), (2) emotional intelligence, (3) dispositional affectivity (e.g., trait emotions), (4) psychological capital (e.g., hope, resiliency, optimism), and (5) self-efficacy.
5. Motivation includes variables such as (1) extrinsic/intrinsic motivation in teaching, (2) occupational/organizational/student commitment, (3) engagement/disengagement, (4) turnover intentions, and (5) public service motivation.
6. Well-being includes variables such as (1) job/life satisfaction, (2) burnout (e.g., emotional exhaustion, depersonalization), (3) occupational well-being, (4) physical health, and (5) stress.
7. Teaching effectiveness includes variables such as (1) instructional strategies (e.g., humor, autonomy-supportive teaching style, cognitive activation, clarity, expressive encouragement, game style) and (2) instructional quality (e.g., teaching performance, pedagogical innovation, quality of feedback).

9.4 Calculating effect sizes

The meta-analysis software Comprehensive Meta-Analysis (Borenstein et al., 2009) was used to calculate the effect sizes based on Pearson correlations between teachers' emotion regulation and the related environmental, personal, instructional, and well-being factors (i.e., the seven related factors). As the relationships between teachers' emotion regulation and the correlated factors varied across studies, we used the random-effects statistical model and assumed heterogeneity of study populations. The

⁵ Three studies included in the current review are dissertations and they are articles #13, #42, and #50 as presented in Table 2.

random-effects model preserves more data in making statistical estimations, hence presenting more accurate and reliable results compared to a fixed-effects model that assumes homogeneity across samples and studies (Borenstein et al., 2009, 2010). If a study reported multiple effect sizes that fell within our review scope, we included all of them in our data entry. Additionally, when studies presented multiple correlations under the same factor (for example, a positive correlation between cognitive reappraisal and positive emotions and a negative correlation with negative emotions), we calculated the average effect size instead of treating them as two different effect sizes. This approach helped us address the issue of independence (e.g., Lipsey & Wilson, 2001). Articles that used the same datasets were treated as one study. A total of 858 correlations were entered into our database.

The Pearson r was first transformed during data entry into Fisher's z (Borenstein et al., 2009), which was then used in the meta-analysis. Afterward, Fisher's z was converted back to Pearson r (with z scores) and used in our results reports. Finally, we reverse-coded certain variables to ensure that all variables and their averaged scores had the same directionality. More specifically, we reverse coded (1) students' disaffection, (2) misbehaviors/disruptions, (3) negative emotions, (4) teacher burn-out, (5) stress, (6) disengagement, and (7) turnover intentions. After reverse coding, higher scores on these factors mean that students are less disruptive and more engaged; teachers are more motivated, effective, and psychologically and physically healthy. Finally, according to Kim et al. (2019), teachers who are high in conscientiousness, extraversion, openness, emotional stability, and agreeableness have better teaching effectiveness, motivation, and well-being. Therefore, a high score in the factor of personal characteristics means that teachers present a favorable personality for the teaching profession, experience more positive emotions during teaching and are more self-efficacious and psychologically resilient.

9.5 Analysis procedures

We first started with the main analyses, investigating the relationships between teachers' emotion regulation and related antecedents and consequences as suggested in Grandey's (2000; Grandey & Melloy, 2017) theoretical models. Then, we assessed the publication bias of existing studies. Finally, we conducted moderator analyses on the conceptualizations of teachers' emotion regulation (based on the framework of emotional labor and Gross' process model of emotion regulation), the origin of study sites (Western vs. non-Western), and the samples' teaching grade levels (mixed, kindergarten, primary, secondary, or postsecondary).

10 Results

10.1 Descriptive findings

The 87 reviewed articles represent 82 independent studies. A summary of the reviewed articles is reported in Table 2. All articles were published between 2006

Table 2 Summary of reviewed articles/studies

Article	N	Grade level	Country/Region	Emotion regulation strategies				Correlated related factors							
				Deep acting	Surface acting	Reappraisal	Suppress	Work-role interaction	School context	Class context	Pers. char	Motivation	Instruction	Well-being	
1 Akin et al. (2014)	370	P	Turkey	✓	✓										✓
2 Akin (2021)	375	M	Turkey	✓	✓				✓					✓	✓
3 Alazmi and Salem (2021)	1103	M	Kuwait			✓	✓							✓	✓
4 Amani et al. (2021)	300	M	Iran			✓	✓							✓	
5 Anonmeze et al. (2016)	323	S	Nigeria	✓	✓										✓
6 Apsara and Arachchige (2016)	120	M	Sri Lanka	✓	✓										✓
7 Arshadi and Pryaei (2016)	150	S	Iran	✓	✓										✓
8 Barber et al. (2011)	659	M	US	✓	✓					✓					✓
9 Basim et al. (2013)	798	M	Turkey	✓	✓										✓
10 Berkovich and Eyal (2021)	113	M	Israel			✓	✓								✓
11 Braun et al. (2020) Δ	15	P	Canada			✓	✓				✓				
12 Brown et al. (2018)	123	K	US	✓	✓					✓				✓	
13 Brown (2011)+	468	M	US	✓	✓					✓					✓

Table 2 (continued)

Article	N	Grade level	Country/Region	Emotion regulation strategies			Correlated related factors									
				Deep acting	Surface acting	Reappraisal	Suppress	Work-role interaction	School context	Class context	Pers. char	Motivation	Instruction	Well-being		
14 Buetner et al. (2016)	1129	K	US			✓										✓
15 Burić and Frenzel (2020)	95	S	Croatia	✓	✓				✓						✓	
16 Burić and Momar (2022) Δ	3010	M	Croatia	✓	✓								✓			
17 Burić et al. (2017)	309	P	Croatia			✓		✓					✓			✓
18 Burić et al. (2018b) Δ	2022 ^a	M	Croatia	✓	✓								✓			
19 Burić et al. (2021)	2002 ^a	M	Croatia	✓	✓								✓			✓
20 Çetin (2019)	370	M	Turkey	✓	✓					✓						✓
21 Chang et al. (2022b)	284	M	US			✓							✓			✓
22 Chang (2013)	492	M	US			✓							✓			✓
23 Chang (2020)	561	M	US			✓							✓			✓
24 Cheung and Lun (2015a)	262 ^b	M	China	✓	✓				✓							✓
25 Cheung et al. (2011)	264 ^b	M	China	✓	✓								✓			✓
26 Cheung and Lun (2015b)	264 ^b	M	China	✓	✓										✓	
27 Çukur (2009)	190	S	Turkey	✓	✓					✓						✓

Table 2 (continued)

Article	N	Grade level	Country/Region	Emotion regulation strategies			Correlated related factors									
				Deep acting	Surface acting	Reappraisal	Suppress	Work-role interaction	School context	Class context	Pers. char	Motivation	Instruction	Well-being		
28 Dewaele and Wu (2021)	596	M	China		✓								✓			
29 Dias and Bhadra (2014)	75	M	Sri Lanka	✓	✓											✓
30 Donker et al. (2020)	94	S	Netherlands			✓		✓			✓					✓
31 Fu (2015)	385	K	Taiwan	✓	✓								✓			✓
32 Ghanizadeh and Royaei (2015)	125	M	Iran	✓	✓	✓		✓								✓
33 Han et al. (2021)	643	PS	China	✓	✓				✓		✓					
34 Huang et al. (2019)	1788	P & S	China	✓	✓											✓
35 Hülshöger et al. (2010)	151	M	Germany	✓	✓									✓		✓
36 Jeon and Ardeleanu (2020)	1129 ^c	K	US			✓		✓		✓	✓					✓
37 Jeon et al. (2016)	1129 ^c	K	US			✓		✓		✓	✓					✓
38 Kafetsios and Loumakou (2007)	485	S	Greece			✓		✓					✓			✓
39 Karabay (2019)	94	K	Turkey			✓		✓		✓	✓					✓

Table 2 (continued)

Article	N	Grade level	Country/Region	Emotion regulation strategies				Correlated related factors						
				Deep acting	Surface acting	Reappraisal	Suppress	Work-role interaction	School context	Class context	Pers. char	Motivation	Instruction	Well-being
40 Karim and Weisz (2011)	210	PS	Pakistan	✓	✓				✓					✓
41 Keller et al. (2014)	39	M	Germany		✓				✓					✓
42 Kim (2016) +	152	S	South Korea	✓	✓									✓
43 Lavy and Eshet (2018)	62	M	Israel	✓	✓				✓					✓
44 Lee and van Vliak (2018)	127	M	South Korea	✓	✓				✓					✓
45 Lee et al. (2016)	189	S	Germany	✓	✓	✓	✓							✓
46 Li and Wang (2016)	317	M	China	✓	✓					✓				✓
47 Liao et al. (2020)	302	P	Taiwan	✓	✓							✓		✓
48 Ma et al. (2021)	511	K	China	✓	✓									✓
49 Mahoney et al. (2011)	598	PS	US	✓	✓					✓				✓
50 Mankin (2019) + Δ	380, 1717	P	US			✓	✓				✓			✓
51 Mittal and Chhabra (2011)	115	M	India	✓	✓				✓					✓
52 Moè and Katz (2021)	290	S	Italy			✓	✓					✓		✓

Table 2 (continued)

Article	N	Country/ Region	Grade level	Emotion regulation strategies				Correlated related factors								
				Deep acting	Surface acting	Reapp- raisal	Suppress	Work-role interaction	School context	Class context	Pers. char	Motivation	Instruction	Well- being		
53	Näring et al. (2006)	Netherlands	S	✓	✓		✓			✓						✓
54	Näring et al. (2012)	Belgium	S	✓	✓		✓		✓							✓
55	Noor and Zaimuddin (2011)	Malaysia	M	✓	✓											✓
56	Park et al. (2014)	US	M	✓	✓								✓			✓
57	Peng et al. (2019)	China	K	✓	✓							✓				✓
58	Pervaz et al., (2019)	Pakistan	S	✓	✓							✓				✓
59	Philipp and Schupbach (2010) Δ	Germany	M	✓	✓								✓			✓
60	Qi et al. (2017)	China	K	✓	✓											✓
61	Retowski and Fila-Jankowska (2013)	Poland	M	✓	✓											✓
62	Sarraf et al. (2017)	Iran	S	✓	✓					✓				✓		✓
63	Sezen-Gultekin et al. (2021)	Turkey	M	✓									✓			✓

Table 2 (continued)

Article	N	Grade level	Country/Region	Emotion regulation strategies			Correlated related factors								
				Deep acting	Surface acting	Reappraisal	Suppress	Work-role interaction	School context	Class context	Pers. char	Motivation	Instruction	Well-being	
64 Taxer and Frenzel (2015)	266	S	US	✓	✓			✓			✓				✓
65 Truta (2014)	118	M	Romania	✓	✓			✓						✓	✓
66 Tsouloupas et al. (2010)	610	M	US		✓	✓								✓	✓
67 Tuxford and Bradley (2015)	556	P	Australia	✓	✓			✓						✓	✓
68 Wang et al., (2021) Δ	1086	M	Canada	✓	✓						✓				✓
69 Wróbel (2013)	209	M	Poland	✓	✓									✓	✓
70 Wu et al. (2020)	439	S	China	✓	✓			✓						✓	✓
71 Xie et al. (2022)	308	PS	China			✓								✓	✓
72 Xuan and Park (2012)	504	PS	China	✓	✓			✓							✓
73 Yao et al. (2015)	703	S	China	✓	✓			✓							✓
74 Yilmaz et al. (2015)	410	M	Turkey	✓	✓										✓
75 Yin et al. (2013)	128 ^{1d}	M	China	✓	✓										✓
76 Yin et al. (2016)	1115 ^c	P	Hong Kong SAR			✓		✓							✓

Table 2 (continued)

Article	N	Grade level	Country/Region	Emotion regulation strategies			Correlated related factors					Well-being					
				Deep acting	Surface acting	Reappraisal	Suppress	Work-role interaction	School context	Class context	Pers. char		Motivation	Instruction			
77 Yin et al. (2017)	1115 ^c	P	Hong Kong SAR	✓	✓			✓									
78 Yin et al. (2018)	1656 ^c	M	Hong Kong SAR			✓	✓										
79 Yin (2012)	648 ^d	M	China	✓	✓												✓
80 Yin (2015)	1281 ^d	M	China	✓	✓												✓
81 Zhang and Zhu (2008)	164	PS	China	✓	✓			✓									✓
82 Zhang et al. (2022)	467	M	China	✓	✓					✓							✓
83 Zhang (2021)	450	M	China	✓	✓												✓
84 Zhao and You (2021)	796	S	China	✓	✓												✓
85 Zheng et al. (2018)	1026	M	China	✓	✓												✓
86 Zheng et al. (2020)	419	P	China	✓	✓									✓			
87 Zhu et al. (2021)	3312	M	China	✓	✓												✓

The 87 articles represent 82 independent studies. Grade level: M = mixed; K = kindergarten; P = primary level; S = secondary level; PS = postsecondary; P & S = primary and secondary teachers reported separately in the article

a,b,c,d,e = Articles with the same superscripts mean that they belong to the same study; they were analyzed as the same study in the meta-analysis to address independence issues

+Master's or doctoral thesis

ΔLongitudinal studies. For these studies with multiple data collection points, the sample size for the first time (the largest) was presented

and 2022. A total of 58 studies (70.7%) adopted the conceptualization of emotional labor (i.e., deep acting and surface acting), 20 studies (24.4%) were based on the process model of emotion regulation (e.g., cognitive reappraisal and suppression; Gross, 1998), and four studies (4.9%) adopted both conceptualizations. Most of the studies were conducted in Mainland China (20), followed by the US (15), Turkey (8), Germany (4), Iran (4), Croatia (4), Sri Lanka (2), South Korea (2), Poland (2), Pakistan (2), the Netherlands (2), Israel (2), Canada (2), Hong Kong SAR (2), Taiwan (2), Romania (1), Nigeria (1), Italy (1), Kuwait (1), India (1), Greece (1), Belgium (1), Malaysia (1), and Australia (1). The sample sizes of the reviewed research ranged from 15 to 3312, $M = 523$, $SD = 584.60$. Moreover, most of the studies investigated mixed teaching grade level ($k = 40$, 48.8%), whereas the rest investigated teachers who only taught at kindergartens ($k = 10$; 12.2%), primary schools ($k = 9$; 11.0%), secondary schools ($k = 17$; 20.7%), or postsecondary schools ($k = 6$; 7.3%). Among the 58 studies that adopted the conceptualization of emotional labor, 51 studied both deep acting and surface acting, with one study (Sezen-Gultekin et al., 2021) focusing only on deep acting and six studies on surface acting. Among the 20 studies based on the process model of emotion regulation, only one (Burić et al., 2017) studied strategies other than cognitive reappraisal and suppression (i.e., situation selection, situation modification, attention deployment).

10.2 Meta-analysis

We conducted 14 independent meta-analyses concerning the relationships between teachers' emotion regulation (antecedent-focused and response-focused strategies) and their corresponding antecedents (work-role expectation interaction, school context, classroom context, personal characteristics, and motivation) and consequences (teacher well-being and teaching effectiveness; the seven related factors; see Fig. 2 for more details). These results suggest that teachers who perceived high work-role interaction expectations (e.g., high perceived job demands and emotional display rules) tended to adopt antecedent-focused strategies ($k = 12$, $r = .201$, $p = .003$) and response-focused strategies ($k = 12$, $r = .230$, $p = .002$). Teachers who perceived a more supportive school context (e.g., colleague and principal support) were more likely than others to adopt antecedent-focused strategies ($k = 12$, $r = .161$, $p = .006$) and less likely to use response-focused strategies ($k = 12$, $r = -.209$, $p < .001$). Teachers with more engaged students and less disruptive classes were more likely than others to adopt antecedent-focused strategies ($k = 7$, $r = .064$, $p = .037$). Moreover, teachers who were endowed with more favorable personal characteristics (e.g., favorable personality, positive emotionality, psychological resilience, self-efficacy) were also more likely than others to use antecedent-focused strategies ($k = 34$, $r = .176$, $p < .001$) and less likely to use response-focused strategies ($k = 36$, $r = -.083$, $p = .024$). Finally, motivated and committed teachers tended to adopt antecedent-focused strategies ($k = 13$, $r = .206$, $p < .001$).

Concerning the possible consequences of teachers' emotion regulation, meta-analysis results suggest that teachers who adopted response-focused emotion regulation strategies more often than others tended to have poorer teaching effectiveness

Table 3 Meta-correlations between Study Variables

Emotion regulation	Related construct	<i>k</i>	<i>r</i>	<i>p</i>	95% CI (LL, UL)	Heterogeneity		τ	τ^2	
						<i>Q</i>	<i>I</i> ²			
Antecedent-focused emotion regulation	Work-role interaction expectations	12	.201	.003	(.327, .069)	335.876	<.001	97.725	.232	.054
	School context	12	.161	.006	(.047, .272)	237.188	<.001	95.362	.198	.039
	Classroom context	7	.064	.037	(.004, .123)	11.480	.075	47.733	.050	.002
	Personal characteristics	34	.176	<.001	(.124, .227)	479.913	<.001	93.124	.149	.022
	Motivation	13	.206	<.001	(.125, .285)	127.416	<.001	90.582	.143	.020
	Teaching effectiveness	9	.089	.196	(-.046, .220)	105.094	<.001	92.388	.194	.038
Response-focused emotion regulation	Well-being	58	.075	.003	(.026, .123)	998.060	<.001	94.289	.179	.032
	Work-role interaction expectations	12	.230	.002	(.368, .083)	425.041	<.001	97.412	.262	.069
	School context	12	-.209	<.001	(-.290, -.124)	132.285	<.001	91.685	.145	.021
	Classroom context	9	-.046	.062	(-.094, .002)	15.784	.046	49.314	.047	.002
	Personal characteristics	36	-.083	.024	(-.155, -.011)	966.823	<.001	96.380	.213	.045
	Motivation	13	-.096	.104	(-.208, .020)	253.842	<.001	95.273	.203	.041
Teaching effectiveness	Teaching effectiveness	10	-.147	.034	(-.278, -.011)	150.082	<.001	94.003	.210	.044
	Well-being	62	-.227	<.001	(-.275, -.178)	1189.398	<.001	94.871	.192	.037

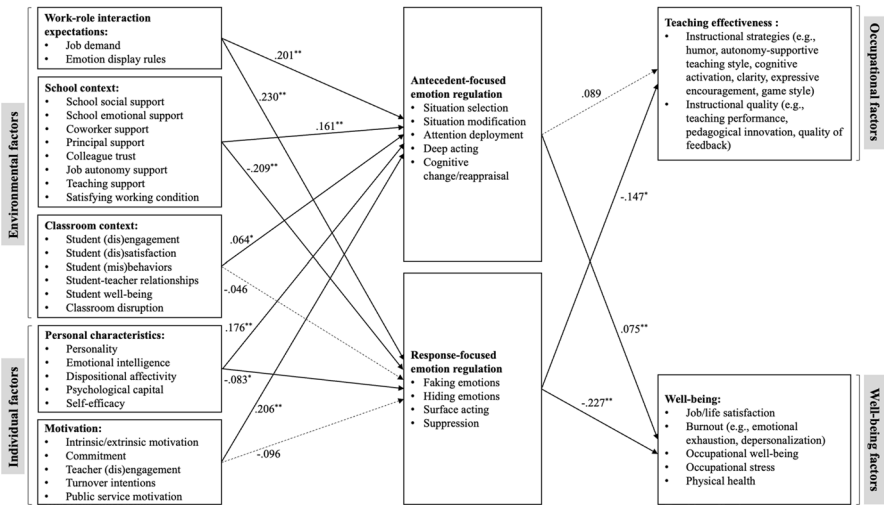


Fig. 2 Meta-analytical Relationship between Teachers' Emotion Regulation and Related Environmental, Personal, Instructional, and Well-Being Factors. *Note.* Dashed lines = nonsignificant paths; solid lines = significant paths

($k = 10, r = -.147, p = .034$). Finally, teachers who adopted more antecedent-focused strategies ($k = 58, r = .075, p = .003$) and fewer response-focused strategies ($k = 62, r = -.227, p < .001$) than others reported greater well-being (Table 3; Fig. 2).

10.3 Publication bias

Four criteria were used to assess the publication bias of the reviewed studies. First, Rosenthal's (1979) fail-safe N test calculated the number of studies with nonsignificant findings that were additionally needed to reduce the effects of our observed relationships and bring them to nonsignificant levels. This calculation was not conducted if the original meta-analysis results already showed nonsignificant relationships (e.g., between antecedent-focused strategies and teaching effectiveness). Second, a nonsignificant Egger's regression test indicated minimal publication bias (Harbord et al., 2006). Third, a nonsignificant Kendall's tau indicated a small publication bias (McLeod, 2005). Finally, the symmetrical funnel plots also showed a small publication bias (Steme & Egger, 2001). To comprehensively assess the publication bias of the reviewed studies, we considered all four tests. When all four tests were satisfied (large Rosenthal's fail-safe N score, nonsignificant Egger's regression test, nonsignificant Kendall's tau, and symmetrical funnel plot), we concluded that the publication bias was minimal.

Table 4 shows the results of the publication bias assessment. Among the 14 evaluations for publication bias, nine met the qualifications for all four tests. Three of them had initial nonsignificant meta-analysis findings; hence, they did not have a Rosenthal's fail-safe N , but they nevertheless met all three other test

Table 4 Assessment of publication bias

Emotion regulation	Related factors	Rosenthal's fail-safe <i>N</i>	Egger's regression		Kendall's tau			
			Intercept	<i>t</i> (<i>df</i>)	<i>tau</i>	<i>z</i>	<i>p</i>	
Antecedent-focused emotion regulation	Work-role interaction expectations	1083	9.740	2.204 (10)	.052	-.031	0.137	.891
	School context	522	-1.000	0.204 (10)	.842	-.076	0.343	.732
	Classroom context	8	-.749	0.760 (5)	.481	.048	0.150	.881
	Personal characteristics	4960	.514	0.320 (32)	.751	.066	0.549	.583
	Motivation	861	-.298	0.130 (11)	.899	-.064	0.305	.760
	Teaching effectiveness	-	-2.438	0.795 (7)	.453	-.250	.938	.348
	Well-being	2935	-.091	0.074 (56)	.942	-.145	1.603	.109
Response-focused emotion regulation	Work-role interaction expectations	1217	3.506	0.589 (10)	.569	.123	0.549	.583
	School context	786	-2.345	0.654 (10)	.528	-.106	0.480	.631
	Classroom context	-	1.568	2.000 (7)	.086	.417	1.564	.118
	Personal characteristics	908	.712	0.343 (34)	.734	-.057	0.490	.624
	Motivation	-	1.483	0.458 (11)	.656	.000	0.000	1.000
	Teaching effectiveness	187	-.300	0.085 (8)	.935	-.022	0.894	.939
	Well-being	8936	0.863	0.690 (60)	.493	-.178	2.041	.041

qualifications. Therefore, the publication bias was also minimal for those non-significant meta-correlations.

Two points of caution were noted. The first concerns a marginally significant Kendall's tau value concerning the relationship between teachers' response-focused strategies and well-being. However, Egger's regression test was nonsignificant. Rosenthal's fail-safe N test showed that an additional 8936 studies with nonsignificant findings would be needed to bring the observed significant relationship between teachers' response-focused emotion regulation and well-being to a nonsignificant level, and the funnel plots nevertheless also indicated acceptable asymmetry for the studies reviewed. Therefore, we have enough evidence to conclude that the publication bias for this relationship would also be considered relatively minor.

Another observation was a small Rosenthal's fail-safe N for the relationship between classroom context and antecedent-focused strategies. Although Egger's regression test and Kendall's tau were nonsignificant, indicating small publication bias, Rosenthal's fail-safe N test showed that only eight studies with nonsignificant findings were further needed to bring the current significant results to a nonsignificant level. Considering that the current observed relationship was also weak with a small effect size, this significant relationship observed in the meta-analysis should be interpreted with caution.

10.4 Moderation analyses

Moderation analyses were conducted to further explore the relationships between teachers' emotion regulation and related factors. Three moderators were used: (a) the conceptualization on which the studies were based (emotional labor or emotion regulation: deep acting vs. reappraisal; surface acting vs. suppression), (b) the studies' place of origin (Western vs. non-Western), and (c) the samples' teaching grade level (mixed, kindergarten, primary, secondary, and postsecondary).

10.4.1 Conceptualization

Table 5 shows the moderation analysis results with emotion regulation conceptualization as the moderator. Although deep acting and cognitive reappraisal represent similar emotion regulation strategies, their relationships with teachers' motivation differ. More specifically, deep acting ($k=11$, $r=.233$, $p<.05$) was found to be more strongly associated with teachers' motivation than cognitive reappraisal ($k=2$, $r=.080$, $p<.05$; $Q=9.254$, $p=.002$). Moreover, a nonsignificant relationship was observed between teachers' deep acting and well-being ($k=40$, $r=.029$, $p>.05$). A significant and positive relationship was found between teachers' cognitive reappraisal and well-being ($k=17$, $r=.156$, $p<.05$). The two constructs significantly differ concerning their relationships with teacher well-being ($Q=9.733$, $p=.002$).

Table 5 Emotion regulation conceptualization as the moderator

Variable	<i>k</i>	<i>r</i>	95% CI (LL, UL)	<i>Q</i>	<i>p_Q</i>
<i>Antecedent-focused emotion regulation</i>					
Work-role interaction expectations					
Cognitive reappraisal	1*				
Deep acting	10	.185	(.042, .320)		
School context				.118	.731
Cognitive reappraisal	2	.192	(.141, .242)		
Deep acting	9	.163	(.000, .317)		
Classroom context					
Cognitive reappraisal	6	.065	(-.001, .130)		
Deep acting	1*				
Personal characteristics					
Cognitive reappraisal	11	.191	(.121, .260)		
Deep acting	21	.175	(.099, .249)		
Motivation					
Cognitive reappraisal	2	.080	(.033, .127)	9.254	.002
Deep acting	11	.233	(.147, .315)		
Teaching effectiveness					
Cognitive reappraisal	3	.107	(.057, .157)	.029	.864
Deep acting	6	.087	(-.136, .302)		
Well-being					
Cognitive reappraisal	17	.156	(.116, .194)	9.733	.002
Deep acting	40	.029	(-.040, .098)		
<i>Response-focused emotion regulation</i>					
Work-role interaction expectations					
Suppression	1*				
Surface acting	9	.150	(.050, .247)		
School context				5.539	.019
Suppression	2	-.075	(-.200, .052)		
Surface acting	8	-.264	(-.354, -.168)		
Classroom context					
Suppression	6	-.059	(-.123, .005)	.605	.437
Surface acting	3	-.021	(-.091, .049)		
Personal characteristics					
Suppression	11	-.142	(-.311, .035)	1.000	.317
Surface acting	23	-.043	(-.124, .039)		
Motivation					
Suppression	2	-.007	(-.144, .129)	1.137	.286
Surface acting	11	-.113	(-.245, .024)		
Teaching effectiveness					
Suppression	3	-.074	(-.124, -.023)	1.171	.279
Surface acting	7	-.187	(-.372, .013)		
Well-being					
Suppression	16	-.118	(-.174, -.062)	13.364	<.001
Surface acting	44	-.274	(-.333, -.212)		

Table 5 (continued)

*Moderator analyses with an extremely small sample size ($k=1$) were not conducted

Concerning the comparison between surface acting and suppression, our moderator analyses showed the two terms to significantly differ in their relationships with school context and teacher well-being. More specifically, a nonsignificant relationship was found between teachers' perceived school support and their adoption of suppression ($k=2$, $r=-.075$, $p>.05$), and a significant relationship was found between teachers' perceived school support and surface acting ($k=8$, $r=.264$, $p<.05$); such a difference was found to be statistically significant ($Q=5.539$, $p=.019$). Moreover, although both suppression and surface acting were associated with poor teacher well-being ($k=16$, $r=-.118$, $p<.05$ and $k=44$, $r=-.274$, $p<.05$, respectively), surface acting was found to be significantly more maladaptive than suppression ($Q=13.364$, $p<.001$). No other significance was observed when the conceptualization of emotion regulation was used as the moderator. Analyses with an extremely small sample size ($k=1$) were not conducted.

10.4.2 Place of origin

Table 6 shows the moderation analysis results with the place of origin as the moderator. We further divided the studies' place of origin into two categories, Western and non-Western, according to the World Population Review's definition of the Western world. Moderation analyses did not find any significance between studies conducted in Western cultures or non-Western cultures concerning the relationships between teachers' emotion regulation strategies and the seven related factors, except for the relationship between teachers' perceived work-role interaction expectations and their antecedent-focused strategies. More specifically, although both Western and non-Western teachers who perceived more substantial work-role interaction expectations tended to report greater adoption of antecedent-focused strategies ($k=7$, $r=.083$, $p<.05$ and $k=5$, $r=.350$, $p<.05$, respectively), such a relationship was found to be significantly stronger among non-Western teachers than Western teachers ($Q=10.656$, $p<.001$).

10.4.3 Teaching grade levels

Table 7 shows the moderation analysis results with teaching grade levels as the moderator. The moderation analyses for teaching grade levels were only conducted with two related factors with relatively larger sample sizes—personal characteristics and well-being—to allow each teaching grade level to include more than one study. No significant results were found in the analyses, except for a marginal significance between teachers' personal characteristics and antecedent-focused strategies. More specifically, this relationship was found to be nonsignificant among kindergarten teachers ($k=4$, $r=.236$, $p>.05$) but positively significant among teachers teaching at other grade levels (primary, secondary, postsecondary, mixed; $Q=9.081$, $p=.059$).

Table 6 Place of origin the moderator

Variable	<i>k</i>	<i>r</i>	95% CI (LL, UL)	<i>Q</i>	<i>p_Q</i>
<i>Antecedent-focused emotion regulation</i>					
Work-role interaction expectations				10.656	<.001
Non-western cultures	5	.350	(.197, .486)		
Western cultures	7	.083	(.048, .118)		
School context				1.458	.227
Non-western cultures	8	.205	(.051, .350)		
Western cultures	4	.072	(-.083, .223)		
Classroom context					
Non-western cultures	1*				
Western cultures	6	.070	(.006, .133)		
Personal characteristics				2.509	.113
Non-western cultures	20	.208	(.128, .286)		
Western cultures	14	.128	(.067, .188)		
Motivation				3.562	.059
Non-western cultures	9	.256	(.146, .360)		
Western cultures	4	.086	(-.055, .224)		
Teaching effectiveness				1.877	.171
Non-western cultures	4	.201	(-.059, .435)		
Western cultures	5	.004	(-.108, .115)		
Well-being				.085	.770
Non-western cultures	35	.069	(.007, .144)		
Western cultures	34	.082	(.034, .130)		
<i>Response-focused emotion regulation</i>					
Work-role interaction expectations				.809	.368
Non-western cultures	5	.152	(-.009, .305)		
Western cultures	7	.285	(.034, .503)		
School context				2.069	.150
Non-western cultures	8	-.247	(-.344, -.145)		
Western cultures	4	-.132	(-.251, -.010)		
Classroom context					
Non-western cultures	1*				
Western cultures	8	-.049	(-.099, .001)		
Personal characteristics				.300	.584
Non-western cultures	20	-.066	(-.192, .063)		
Western cultures	16	-.104	(-.157, -.051)		
Motivation				2.170	.141
Non-western cultures	8	-.033	(-.210, .146)		
Western cultures	5	-.183	(-.269, -.094)		
Teaching effectiveness				.087	.768
Non-western cultures	5	..158	(-.398, .103)		
Western cultures	5	..118	(-.186, -.048)		
Well-being				1.783	.182
Non-western cultures	35	-.251	(-.326, -.174)		
Western cultures	27	-.189	(-.237, -.140)		

Table 6 (continued)*Moderator analyses with an extremely small sample size ($k = 1$) were not conducted**Table 7** Teaching grade level as the moderator

Variable	<i>k</i>	<i>r</i>	95% CI (LL, UL)	<i>Q</i>	<i>p_Q</i>
<i>Antecedent-focused emotion regulation</i>					
Personal characteristics				9.081	.059
Mixed	16	.123	(.067, .179)		
Kindergarten	4	.236	(.086, .513)		
Primary	4	.198	(.085, .306)		
Secondary	7	.234	(.085, .372)		
Post-secondary	2	.294	(.188, .393)		
Well-being				7.628	.106
Mixed	24	.055	(-.006, .115)		
Kindergarten	8	.175	(.096, .251)		
Primary	8	.133	(.040, .224)		
Secondary	15	.006	(-.153, .164)		
Post-secondary	3	.166	(-.130, .435)		
<i>Response-focused emotion regulation</i>					
Personal characteristics				1.699	.791
Mixed	17	-.122	(.232, -.008)		
Kindergarten	4	.004	(-.226, .234)		
Primary	4	-.095	(-.182, -.007)		
Secondary	8	-.013	(-.220, .195)		
Post-secondary	2	-.149	(-.366, .083)		
Well-being				7.057	.133
Mixed	27	-.218	(-.273, -.161)		
Kindergarten	7	-.071	(-.204, .064)		
Primary	8	-.175	(-.286, -.059)		
Secondary	16	-.318	(-.446, -.178)		
Post-secondary	4	-.218	(-.281, -.153)		

11 Discussion

In the present review, we systematically investigated the relationship between teachers' emotion regulation and seven related environmental, personal, instructional, and well-being factors based on Grandey and Melloy's (2017) theoretical framework, namely, work-role interaction expectations, school context, classroom context, personal characteristics, motivation, teaching effectiveness, and well-being.

First, the results from our review suggested that antecedent-focused emotion regulation strategies showed adaptive patterns of relationships, while response-focused strategies showed less adaptive patterns of relationships. More specifically, the current review indicates that teachers who receive more support from schools,

have more engaged and disciplined students, and possess more favorable personal characteristics (e.g., conscientiousness, extraversion, openness) tend to adopt more antecedent-focused emotion regulation strategies. These teachers who adopt antecedent-focused strategies more often than others also have better well-being. In contrast, teachers who work at less supportive schools or with less favorable personal characteristics (e.g., neuroticism) tend to use response-focused strategies to a greater extent. These teachers were also found to have poorer teaching effectiveness and well-being. Therefore, although inconsistent findings have been reported in prior studies concerning antecedents and outcomes of teachers' emotion regulation, the present meta-analytic review provided a general synthesis suggesting that antecedent-focused strategies are related to more favorable contextual and personal factors. In contrast, response-focused strategies are related to less favorable ones.

However, it is still important to note that emotion regulation strategies are not inherently good or bad; instead, their effectiveness depends upon the context and momentary situations in which they are used (Frenzel et al., 2021). For example, a specific emotion regulation strategy might be harmful to teachers' occupational well-being if it is used habitually (e.g., faking enthusiasm or hiding anger leads to higher burnout; Wang et al., 2019), but a daily or temporary adoption of such a strategy for a particular event (e.g., increasing student interest in one lesson) might in fact temporarily increase teacher effectiveness (Hagenauer & Volet, 2014; Taxer & Gross, 2018). The studies reviewed in the current paper primarily only considered teachers' trait-like emotion regulation. Hence, the relationships found could only inform trait emotion regulation, rather than state, daily, or temporary emotion regulation, which might demonstrate very different patterns of results.

Second, our results suggested that teachers who perceive greater work-role interaction expectations (e.g., the perception that they must always express desired emotions and suppress undesired emotions in their jobs) tend to adopt both antecedent-focused *and* response-focused emotion regulation strategies more often than teachers who perceive fewer such expectations. Such results suggest that although antecedent-focused and response-focused emotion regulation strategies are usually considered contrasting or even opposite strategies, with the former associated with more favorable outcomes (e.g., better personal well-being) and the latter related to less favorable outcomes (e.g., poorer teaching quality), our review results nevertheless imply that they may also be positively associated with each other. Teachers who believe that they should regulate their emotions for professional reasons to a greater extent may, in fact, adopt both adaptive and maladaptive strategies.

Third, the results from the present review suggest that among the seven related factors, individual differences (e.g., personal characteristics and motivation) are more important for antecedent-focused strategies, and school context is a stronger correlate for teachers' response-focused strategies. Such results imply that improving teachers' personal characteristics (e.g., self-efficacy) might promote adaptive strategies such as reappraisal, while enhancing the social and school context might help reduce maladaptive strategies such as suppression. While personal characteristics are unlikely to be improved or changed in a short period or by conducting a few intervention sessions, schools may consider reviewing and revising their teacher recruitment policies and procedures by incorporating the assessments of teacher

candidates' motivation and teaching values, thus recruiting teacher candidates with the strongest potential to adopt more antecedent-focused strategies and enjoy greater occupational well-being later on (see Klassen & Kim, 2021). Indeed, teacher selection and recruitment processes are highly underexplored, but educational researchers have recently realized how an effective and efficient selection system can improve teacher quality. Therefore, educators globally have recently called for valid, systematic teacher selection practices (Klassen & Kim, 2021) that incorporate the assessment of teacher background, knowledge, and, most importantly, motivation and key values in teacher recruitment processes. The results from the current review supported the necessity of optimizing teacher selection and recruitment procedures to hire candidates with the best suitability and potential to enhance instructional quality and improve student learning (Bardach et al., 2021; Klassen & Kim, 2019). Furthermore, schools may consider providing teachers with support to help them use beneficial antecedent-focused emotion regulation strategies (e.g., supporting teachers' pedagogical autonomy, promoting mentorship programs on campus to strengthen colleague relationships, and providing guidance to novice teachers).

Fourth, the relationships between teachers' emotion regulation and well-being are more robust than those between their emotion regulation and teaching effectiveness. Moreover, response-focused strategies reduce teaching effectiveness significantly, but antecedent-focused strategies are not associated with teaching performance. Teachers' antecedent-focused strategies are often used to alter emotions before their full development; hence, they are not expected to interfere with instructional quality or teaching performance. However, suppressing an emotion demands constant monitoring, which reduces teachers' cognitive capacities for efficient and effective teaching (Taxer & Gross, 2018).

However, importantly, although some meta-correlations observed in the current review reached statistical significance, they were small in magnitude. For example, the meta-correlations between personal characteristics and response-focused strategies ($r = -.083$) and between well-being and antecedent-focused strategies ($r = .075$) were both small. The significance of these correlations may be due to the relatively large pool of studies included in the review (e.g., $k_s = 36$ and 58 , respectively), which increases the likelihood of finding statistically significant results. Conversely, some meta-correlations with relatively larger effect sizes were not found to be statistically significant, likely due to a limited number of studies investigating these relationships. Thus, it is important to consider the number of studies included in the investigation when interpreting effect sizes and their significance levels.

Moreover, our analyses of the moderators also show interesting findings. Teachers who are more motivated in teaching report greater deep acting (a subtype of emotional labor) but not greater cognitive reappraisal (a subtype of emotion regulation). As deep acting and cognitive reappraisal represent two similar yet still distinguishable constructs, with the former encompassing more varied antecedent-focused strategies (e.g., strategies other than reappraisal, such as situation selection or situation modification) and the latter suggesting only a cognitive change in the perception of the situation or event, our findings thus imply that other, more varied antecedent-focused strategies may be more critical for teacher motivation. In contrast, cognitive reappraisal is more important than deep acting regarding teacher well-being. Such

results suggest that diverse and more diffuse strategies entailed in the deep acting or antecedent-focused emotion regulation construct might be less critical for teacher well-being than cognitive reappraisal strategies. In addition, surface acting is more strongly related to impaired teacher well-being than suppression. Indeed, suppression only includes hiding, whereas surface acting encompasses both hiding *and* faking aspects, with faking arguably more effortful and exhausting than hiding (Taxer et al., 2015; Wang et al., 2019). Therefore, the degree of inauthenticity should be even greater in surface acting than in suppression, yielding even poorer individual well-being.

In conclusion, our comparisons between the two conceptualizations of emotion regulation indicate that they indeed share many similarities but are also distinct. They overlap substantially concerning the strategies involved (e.g., cognitive reappraisal and deep acting vs. suppression and surface acting), but their differences are also unignorable, especially concerning their relationships with teacher well-being and motivation. Therefore, it is crucial to take a fine-grained approach to understand teachers' emotion regulation and explore a wide range of specific regulation strategies and their relations with various antecedents and outcomes. These results add value to the existing reviews (i.e., Wang et al., 2019; Yin et al., 2019) by systematically comparing different conceptualizations of teachers' emotion regulation and exploring how these conceptualizations can contribute to differences in the relationships between teachers' emotion regulation and its broad range of environmental, personal, instructional, and well-being correlates.

Although teachers from Western and non-Western cultures were not significantly different in most comparisons, cultural differences were observed concerning the relationship between work-role interaction expectations and antecedent-focused emotion regulation. More specifically, such a relationship is significantly stronger among teachers from non-Western cultures than among those from Western cultures. These results possibly reveal the individualist characteristics of teachers from Western cultures, implying that teachers from Western cultures might regulate or express their emotions according to their professional standards rather than complying with group or role expectations. They may also prefer to regulate or express their emotions according to the specific instructional context or event (e.g., express genuine anger when they perceive it is crucial to do so) rather than conforming to emotional display rules (e.g., it is unprofessional to express negative emotions in front of students).

11.1 Limitations of existing studies and future directions

During the review, we noticed a few limitations of prior studies. First, the majority of studies that we reviewed adopted a cross-sectional design, with only a few longitudinal studies. We could not determine the predictive relationships between teachers' emotion regulation and the related factors with only cross-sectional study findings. We could, therefore, interpret the results based only on the theoretical underpinnings, which indicate that work-role interaction expectations, social context

(e.g., school and classroom), and individual differences (e.g., personal characteristics, motivation) are the antecedents of emotion regulation, and well-being and job performance (e.g., teaching effectiveness) are often the outcomes of one's emotion regulation (Grandey, 2000; Grandey & Melloy, 2017). However, the relationships between emotion regulation and the related factors are more likely to be reciprocal than unidirectional. For example, although predominant studies suggest that emotion regulation impacts teacher job satisfaction and emotional exhaustion, Wang et al.'s (2021) recent longitudinal study found that teachers who were already burnt out (e.g., emotionally exhausted) or were unsatisfied with their jobs were more likely to employ response-focused strategies. Such findings provide evidence for the reciprocal relationship between emotion regulation and well-being. Unsatisfied and burnt-out teachers tend to adopt more maladaptive emotion regulation strategies (e.g., surface acting) to superficially manage their emotional expressions, with more faked and hidden emotional expressions resulting in even poorer job satisfaction and higher burnout.

Similarly, motivation (e.g., intrinsic motivation, commitment, engagement), as an essential aspect of individual differences, has often been argued to be associated with teachers' emotion regulation (e.g., more committed teachers adopt more antecedent-focused strategies). However, the reversed path may also occur, so antecedent-focused strategies help diminish teachers' negative emotions in the early stages of their development, which promotes and preserves teachers' approach tendencies (an individual's inclination or desire to achieve a positive outcome or goal), yielding greater commitment and engagement. Therefore, future longitudinal studies are warranted to investigate the predictive relationships between teachers' emotion regulation and its related factors (e.g., the seven factors based on Grandey and Melloy's theoretical model).

Second, prior studies rely heavily on teachers' self-reports, which unavoidably inflate the empirical relations between emotion regulation and the related factors due to common method bias that may further threaten the reliability of study findings (Podsakoff et al., 2003). To address this problem, future research is needed that incorporates research protocols demonstrating greater ecological validity, such as daily diary methods (de Ruiter et al., 2021; Lavy & Eshet, 2018; Wang & Burić, 2023; Wang et al., 2023), experience sampling methods (e.g., Keller et al., 2014), or adopting other-reported study designs (e.g., student-perceived teacher instructional quality; principal's or teacher mentor's ratings of teaching performance; Hülshöger et al., 2010) to more closely investigate teachers' trait and state emotion regulation and their respective associations with the related factors.

Third, it is worthwhile to note that the sample sizes of some meta-analyses were relatively small. For example, only seven studies were found concerning the relationship between classroom context and teachers' antecedent-focused strategies, and only nine studies were found concerning the relationship between classroom context and response-focused strategies. Many prior studies have been conducted on the relationships between teachers' personal characteristics and emotion regulation, as well as between their emotion regulation and well-being. Future studies should focus more on the related factors that are relatively under-investigated (e.g., classroom context, teaching effectiveness), affording better statistical power for future

meta-analyses. Moreover, as the moderating analyses were conducted by splitting existing studies into even smaller groups (e.g., Western vs. non-Western; specific teaching grade levels), some of the analyses, in fact, could not be conducted due to the minimal number of articles that met category qualifications (i.e., $k > 1$). Future studies adopting various conceptualizations/frameworks from diverse cultural backgrounds and at different teaching grade levels are thus still needed to afford larger sample sizes for future comparisons.

Finally, the current review reveals that only one study (Burić et al., 2017; out of 20 relevant studies) has examined antecedent emotion regulation strategies that are not reappraisal. According to the process model of emotion regulation, using strategies that rely on situation selection or modification may be less cognitively or emotionally taxing than employing reappraisal and suppression (Gross, 2015). Given the potential benefits of using these alternative strategies, future studies are warranted to explore their effectiveness for teachers to regulate emotions in the classroom. Specifically, there is a need to investigate how teachers can use these strategies more effectively and how they can be integrated into emotion regulation programs for teachers (Chang et al., 2022a). This research could provide valuable insights into the development of effective emotion regulation interventions for teachers and ultimately improve their well-being and job performance in the classroom.

11.2 Conclusion

Emotions and the regulatory efforts that impact their occurrence, intensity, and duration are integral to teachers' professional lives. The current review investigates teachers' emotion regulation as a fine-grained construct encompassing antecedent-focused and response-focused strategies. The present meta-analyses revealed the relationships between teachers' emotion regulation and seven related environmental, personal, instructional, and well-being factors, namely, work-role interaction expectations, school context, classroom context, personal characteristics, motivation, teaching effectiveness, and well-being. The results suggest that teachers' antecedent-focused strategies demonstrate more adaptive associations with the related factors, whereas response-focused strategies show more maladaptive associations. Moderating analyses further indicate that the findings can significantly differ based on the conceptualizations of emotion regulation and the cultural background.

Declarations

Conflict of interest The authors declare no conflict of interest.

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References

*Represents the articles that are included in the review.

- *Akin, U. (2021). Exploring the relationship between emotional labor and organizational commitment levels of teachers. *Eurasian Journal of Educational Research*, 9(1), 61–82. <https://doi.org/10.14689/ejer.2021.91.4>
- *Akin, U., Aydin, İ.B., Erdoğan, Ç., & Demirkasimoğlu, N. (2014). Emotional labor and burnout among Turkish primary school teacher. *The Australian Educational Researcher*, 41(2), 155–169. <https://doi.org/10.1007/s13384-013-0138-4>
- *Alazmi, S. N., & Salem, A. A. (2021). The role of emotional regulation, teacher burnout, personality traits, & internet addiction among Kuwaiti teachers. *North American Journal of Psychology*, 23(3), 325–360.
- Aldao, A., Gee, D. G., Reyes, A. D. L., & Seager, I. (2016). Emotion regulation as a transdiagnostic factor in the development of internalizing and externalizing psychopathology: Current and future directions. *Development and Psychopathology*, 28, 927–946. <https://doi.org/10.1017/S0954579416000638>
- *Amani, R., Nooreini, S. N., & Farhadi, M. (2021). The structural model of emotional divorce based on neuroticism through the mediating role of coping strategies and emotional regulation. *Journal of Divorce & Remarriage*, 62(3), 227–246. <https://doi.org/10.1080/10502556.2021.1871833>
- *Anomneze, E. A., Ugwu, D. I., Enwereuzor, I. K., & Ugwu, L. I. (2016). Teachers' emotional labour and burnout: Does perceived organizational support matter? *Asian Social Science*, 12(2), 9–22. <https://doi.org/10.5539/ass.v12n2p9>
- *Apsara, P. H., & Arachchige, B. J. H. (2016). The relationship between emotional labour and job satisfaction: A study of senior teachers in selected international schools in Colombo District Sri Lanka. *Human Resource Management Journal*, 4(1), 1–12. <https://doi.org/10.31357/hrmj.v4i1.2857>
- *Arshadi, N., & Piryaei, S. (2016). The mediating role of emotional dissonance in the relationship of teacher's emotional labor strategies with occupational well-being. *International Journal of Psychology*, 10(1), 15–33.
- *Barber, L. K., Grawitch, M. J., Carson, R. L., & Tsouloupas, C. N. (2011). Costs and benefits of supportive versus disciplinary emotion regulation strategies in teachers. *Stress and Health*, 27(3), e173–e187. <https://doi.org/10.1002/smi.1357>
- Bardach, L., Klassen, R. M., & Perry, N. E. (2021). Teachers' psychological characteristics: Do they matter for teacher effectiveness, teachers' well-being, retention, and interpersonal relations? An integrative review. *Educational Psychology Review*, 34(1), 259–300. <https://doi.org/10.1007/s10648-021-09614-9>
- *Basim, H. N., Begenirbas, M., & Can Yalçın, R. (2013). Effects of teacher personalities on emotional exhaustion: Mediating role of emotional labor. *Educational Sciences: Theory and Practice*, 13(3), 1488–1496.
- *Berkovich, I., & Eyal, O. (2021). Teachers' big five personality traits, emotion regulation patterns, and moods: Mediation and prototype analyses. *Research Papers in Education*, 36(3), 332–354. <https://doi.org/10.1080/02671522.2019.1677758>
- Booth, A., Noyes, J., Flemming, K., Gerhardus, A., Wahlster, P., van der Wilt, J., Mozygemba, K., Refolo, P., Sacchini, D., Tummers, M., & Rehfuess, E. (2016). Guidance on choosing qualitative evidence synthesis methods for use in health technology assessments of complex interventions. *INTEGRATE-HTA*
- Borenstein, M., Hedges, L. V., Higgins, J., & Rothstein, H. R. (2009). *Introduction to meta-analysis*. John Wiley & Sons Publishing.
- Borenstein, M., Hedges, L. V., Higgins, J. P., & Rothstein, H. R. (2010). A basic introduction to fixed-effect and random-effects models for meta-analysis. *Research Synthesis Method*, 1(2), 97–111. <https://doi.org/10.1002/jrsm.12>

- *Braun, S. S., Schonert-Reichl, K. A., & Roeser, R. W. (2020). Effects of teachers' emotion regulation, burnout, and life satisfaction on student well-being. *Journal of Applied Developmental Psychology, 69*, 101151. <https://doi.org/10.1016/j.appdev.2020.101151>
- *Brown, E. L. (2011). *Emotion matters: Exploring the emotional labor of teaching* (3471910) [Doctoral dissertation, University of Pittsburgh]. ProQuest.
- *Brown, E. L., Vesely, C. K., Mahatmya, D., & Visconti, K. J. (2018). Emotions matter: The moderating role of emotional labour on preschool teacher and children interactions. *Early Child Development and Care, 188*(12), 1773–1787. <https://doi.org/10.1080/03004430.2017.1286336>
- *Buettner, C. K., Jeon, L., Hur, E., & Garcia, R. E. (2016). Teachers' social-emotional capacity: Factors associated with teachers' responsiveness and professional commitment. *Early Education and Development, 27*(7), 1018–1039. <https://doi.org/10.1080/10409289.2016.1168227>
- *Burić, I., & Mornar, M. (2022). Teacher dispositional affectivity, emotional labor, and self-efficacy: A longitudinal analysis. *Current Psychology, 31*(12), 12144–022-03029-7. <https://doi.org/10.1007/s12144-022-03029-7>
- *Burić, I., & Frenzel, A. C. (2020). Teacher emotional labour, instructional strategies, and students' academic engagement: A multilevel analysis. *Teachers and Teaching: Theory and Practice, 27*(5), 335–352. <https://doi.org/10.1080/13540602.2020.1740194>
- *Burić, I., Penezić, Z., & Sorić, I. (2017). Regulating emotion in the teachers' workplace: Development and initial validation of the teacher emotion-regulation scale. *International Journal of Stress Management, 24*(3), 217–246. <https://doi.org/10.1037/str0000035>
- Burić, I., Slišković, A., & Macuka, I. (2018a). A mixed-method approach to the assessment of teachers' emotions: Development and validation of the teacher emotion questionnaire. *Educational Psychology, 38*(3), 325–349. <https://doi.org/10.1080/01443410.2017.1382682>
- *Burić, I., Slišković, A., & Penezić, Z. (2018b). A two-wave panel study on teachers' emotions and emotional-labour strategies. *Stress and Health, 35*(1), 27–38. <https://doi.org/10.1002/smi.2836>
- *Burić, L., Kim, L. E., & Hodis, F. (2021). Emotional labor profiles among teachers: Associations with positive affective, motivational, and well-being factors. *Journal of Educational Psychology, 113*(6), 1227–1243. <https://doi.org/10.1037/edu0000654>
- *Četin, S. K. (2019). Examination of the relationship between emotional labour and organizational cynicism levels of teachers. *Croatian Journal of Education, 21*(2), 567–598. <https://doi.org/10.15516/cje.v21i2.3014>
- *Chang, M.-L. (2013). Toward a theoretical model to understand teacher emotions and teacher burnout in the context of student misbehavior: Appraisal, regulation and coping. *Motivation and Emotion, 37*(4), 799–817. <https://doi.org/10.1007/s11031-012-9335-0>
- *Chang, M.-L. (2020). Emotion display rules, emotion regulation, and teacher burnout. *Frontiers in Education, 5*, 90. <https://doi.org/10.3389/educ.2020.00090>
- *Chang, M.-L., Burić, I., & Wang, H. (2022). Editorial: Teachers' emotion regulation and emotional labor: Relationships with teacher motivation, well-being, and teaching effectiveness. *Frontiers in Education, 7*:1062498
- *Chang, M.-L., Gaines, R. E., & Mosley, K. C. (2022b). Effects of autonomy support and emotion regulation on teacher burnout in the era of the COVID-19 pandemic. *Frontiers in Psychology, Educational Psychology, Online First*. <https://doi.org/10.3389/fpsyg.2022.846290/full>
- *Cheung, F., & Lun, V. M. (2015a). Emotional labor and occupational well-being: A latent profile analytic approach. *Journal of Individual Differences, 36*(1), 30–37. <https://doi.org/10.1027/1614-0001/a000152>
- *Cheung, F., & Lun, V. M. (2015b). Relation between emotional labor and organizational citizenship behavior: An investigation among Chinese teaching professionals. *The Journal of General Psychology, 142*(4), 253–272. <https://doi.org/10.1080/00221309.2015.1091764>
- *Cheung, F., Tang, C. S., & Tang, S. (2011). Psychological capital as a moderator between emotional labor, burnout, and job satisfaction among school teachers in China. *International Journal of Stress Management, 18*(4), 348–371. <https://doi.org/10.1037/a0025787>
- Compas, B. E., Jaser, S. S., Dunbar, J. P., Watson, K. H., Bettis, A. H., Gruhn, M. A., & Williams, E. K. (2014). Coping and emotion regulation from childhood to early adulthood: Points of convergence and divergence. *Australian Journal of Psychology, 66*(2), 71–81. <https://doi.org/10.1111/ajpy.12043>
- *Çukur, C. Ş. (2009). The development of the teacher emotional labor scale (TELS): Validity and reliability. *Educational Sciences: Theory and Practice, 9*(2), 559–574.

- de Ruiter, J. A., Poorthuis, A. M., & Koomen, H. M. (2021). Teachers' emotional labor in response to daily events with individual students: The role of teacher-student relationship quality. *Teaching and Teacher Education*, *107*, 103467. <https://doi.org/10.1016/j.tate.2021.103467>
- *Dewaele, J., & Wu, A. (2021). Predicting the emotional labor strategies of Chinese English foreign language teachers. *System*, *103*, 102660. <https://doi.org/10.1016/j.system.2021.102660>
- *Dias, N. N. P., & Bhadra, J. H. A. (2014). Using a double-edged sword: Emotional labour and the well-being of teachers in a national school in Sri Lanka. In *11th International Conference on Business Management* (pp. 330–343). <http://www.dr.lib.sjp.ac.lk/handle/123456789/1610>
- Diefendorff, J. M., Richard, E. M., & Yang, J. (2008). Linking emotion regulation strategies to affective events and negative emotions at work. *Journal of Vocational Behavior*, *73*(3), 498–508. <https://doi.org/10.1016/j.jvb.2008.09.006>
- *Donker, M. H., Erisman, M. C., Van Gog, T., & Mainhard, T. (2020). Teachers' emotional exhaustion: Associations with their typical use of and implicit attitudes toward emotion regulation strategies. *Frontiers in Psychology*, *11*, 867. <https://doi.org/10.3389/fpsyg.2020.00867>
- Eisenberg, N., Valiente, C., & Sulik, M. J. (2009). How the study of regulation can inform the study of coping. In E. A. Skinner & M. J. Zimmer-Gembeck (Eds.), *Coping and the development of regulation. New directions for child and adolescent development* (Vol. 124, pp. 75–86). Jossey-Bass.
- Elfenbein, H. A., & MacCann, C. (2017). A closer look at ability emotional intelligence (EI): What are its component parts, and how do they relate to each other? *Social and Personality Psychology Compass*, *11*(7), 1–13. <https://doi.org/10.1111/spc3.12324>
- Frenzel, A. C., Daniels, L., & Burić, I. (2021). Teacher emotions in the classroom and their implications for students. *Educational Psychologist*, *56*(4), 250–264. <https://doi.org/10.1080/00461520.2021.1985501>
- Frenzel, A. C., Pekrun, R., Goetz, T., Daniels, L. M., Durksen, 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>
- *Fu, C. (2015). The effect of emotional labor on job involvement in preschool teachers: Verifying the mediating effect of psychological capital. *The Turkish Online Journal of Educational Technology*, *14*(3), 145–156.
- *Ghanizadeh, A., & Royaei, N. (2015). Emotional facet of language teaching: Emotion regulation and emotional labor strategies as predictors of teacher burnout. *International Journal of Pedagogies and Learning*, *10*(2), 139–150. <https://doi.org/10.1080/22040552.2015.1113847>
- Glomb, T. M., & Tews, M. J. (2004). Emotional labor: A conceptualization and scale development. *Journal of Vocational Behavior*, *64*(1), 1–23. [https://doi.org/10.1016/S0001-8791\(03\)00038-1](https://doi.org/10.1016/S0001-8791(03)00038-1)
- Grandey, A. A. (2000). Emotional regulation in the workplace: A new way to conceptualize emotional labor. *Journal of Occupational Health Psychology*, *5*(1), 95–110. <https://doi.org/10.1037/1076-8998.5.1.95>
- Grandey, A. A. (2015). Smiling for a wage: What emotional labor teaches us about emotion regulation. *Psychological Inquiry*, *26*(1), 54–60. <https://doi.org/10.1080/1047840X.2015.962444>
- Grandey, A. A., & Melloy, R. C. (2017). The state of the heart: Emotional labor as emotion regulation reviewed and revised. *Journal of Occupational Health Psychology*, *22*(3), 407–422. <https://doi.org/10.1037/ocp0000067>
- Grandey, A. A., & Sayre, G. M. (2019). Emotional labor: Regulating emotions for a wage. *Current Directions in Psychological Science*, *28*(2), 131–137. <https://doi.org/10.1177/0963721418812771>
- Gross, J. J. (1998). The emerging field of emotion regulation: An integrative review. *Review of General Psychology*, *2*(3), 271–299. <https://doi.org/10.1037/1089-2680.2.3.271>
- Gross, J. J. (2013). Conceptualizing emotional labor: An emotion regulation perspective. In A. A. Grandey, J. M. Diefendorff, & D. E. Rupp (Eds.), *Emotional labor in the 21st century: Diverse perspectives on emotion regulation at work* (pp. 288–294). Routledge/Taylor & Francis Group.
- Gross, J. J. (2015). The extended process model of emotion regulation: Elaborations, applications, and future directions. *Psychological Inquiry*, *25*(1), 130–137. <https://doi.org/10.1080/1047840X.2015.989751>
- Gross, J. J., & Thompson, R. A. (2007). Emotion regulation: Conceptual foundations. In J. J. Gross (Ed.), *Handbook of emotion regulation* (pp. 3–24). The Guilford Press.
- Hagenauer, G., & Volet, S. E. (2014). "I don't hide my feelings, even though I try to": Insight into teacher educator emotion display. *The Australian Educational Researcher*, *41*, 261–281. <https://doi.org/10.1007/s13384-013-0129-5>

- *Han, J., Yin, H., Yang, X., & Wang, F. (2021). Does emotional labor matter for university teaching? Examining the antecedents and consequences of university teachers' emotional labor strategies. *Frontiers in Psychology, 12*, 731099. <https://doi.org/10.3389/fpsyg.2021.731099>
- Hansen, P., & Mulholland, J. A. (2005). Caring and elementary teaching: The concerns of male beginning teachers. *Journal of Teacher Education, 56*(2), 119–131. <https://doi.org/10.1177/0022487104273761>
- Harbord, R. M., Egger, M., & Sterne, J. A. (2006). A modified test for small-study effects in meta-analyses of controlled trials with binary endpoints. *Statistics in Medicine, 25*(20), 3443–3457. <https://doi.org/10.1002/sim.2380>
- Hochschild, A. R. (1983). *The managed heart*. University of California Press.
- Huang, H., Liu, L., Hsieh, H., & Chang, C. (2015). Relationships among physical education teachers' psychological capital, work stress, and creative teaching. *Journal of Baltic Science Education, 14*(6), 744–752. <https://doi.org/10.33225/jbse/15.14.744>
- *Huang, S., Yin, H., & Han, J. (2019). Do Chinese teachers perform emotional labor equally? Multi-group comparisons across genders, grade levels and regions. *Frontiers in Psychology, 10*, 190. <https://doi.org/10.3389/fpsyg.2019.00190>
- *Hülshager, U. R., Lang, W. B., & Maier, G. W. (2010). Emotional labor, strain, and performance: Testing reciprocal relationships in a longitudinal panel study. *Journal of Occupational Health Psychology, 15*(4), 505–521. <https://doi.org/10.1037/a0021003>
- Humphrey, N. M. (2021). Emotional labor and employee outcomes: A meta-analysis. *Public Administration*. <https://doi.org/10.1111/padm.12818>
- *Jeon, L., & Ardeleanu, K. (2020). Work climate in early care and education and teachers' stress: Indirect associations through emotion regulation. *Early Education and Development, 31*(7), 1031–1051. <https://doi.org/10.1080/10409289.2020.1776809>
- *Jeon, L., Hur, E., & Buettner, C. K. (2016). Child-care chaos and teachers' responsiveness: The indirect associations through teachers' emotion regulation and coping. *Journal of School Psychology, 59*, 83–96. <https://doi.org/10.1016/j.jsp.2016.09.006>
- *Kafetsios, K., & Loumakou, M. (2007). A comparative evaluation of the effects of trait: Emotional intelligence and emotion regulation on affect at work and job satisfaction. *International Journal of Work Organisation and Emotion, 2*(1), 71–87. <https://doi.org/10.1504/IJWOE.2007.013616>
- *Karabay, S. O. (2019). Emotion regulation, teaching beliefs and child-teacher relationships from the perspectives of pre-school teachers. *International Journal of Primary, Elementary and Early Years Education, 47*(1), 101–115. <https://doi.org/10.1080/03004279.2017.1405057>
- *Karim, J., & Weisz, R. (2011). Emotional intelligence as a moderator of affectivity/emotional labor and emotional labor/psychological distress relationship. *Psychological Studies, 56*(4), 348–359. <https://doi.org/10.1007/s12646-011-0107-9>
- *Keller, M. M., Chang, M., Becker, E. S., Goetz, T., & Frenzel, A. C. (2014). Teachers' emotional experiences and exhaustion as predictors of emotional labor in the classroom: An experience sampling study. *Frontiers in Psychology, 5*, 1442. <https://doi.org/10.3389/fpsyg.2014.01442>
- *Kim, Y. (2016). *Emotional labour and burnout among public middle school teachers in South Korea* (201604262318) [Master's thesis, University of Jyväskylä]. JYX Digital Repository.
- Kim, L. E., Jörg, V., & Klassen, R. M. (2019). A meta-analysis of the effects of teacher personality on teacher effectiveness and burnout. *Educational Psychology Review, 31*(1), 163–195. <https://doi.org/10.1007/s10648-018-9458-2>
- Klassen, R. M., & Kim, L. E. (2021). *Teacher selection: Evidence-based practices*. Springer.
- Klassen, R. M., Foster, R. Y., Rajani, S., & Bowman, C. (2009). Teaching in the Yukon: Exploring teachers' efficacy beliefs, stress, and job satisfaction in a remote setting. *International Journal of Educational Research, 46*(6), 381–394. <https://doi.org/10.1016/j.ijer.2010.04.002>
- Klassen, R. M., & Kim, L. E. (2019). Selecting teachers and prospective teachers: A meta-analysis. *Educational Research Review, 26*, 32–51. <https://doi.org/10.1016/j.edurev.2018.12.003>
- *Lavy, S., & Eshet, R. (2018). Spiral effects of teachers' emotions and emotion regulation strategies: Evidence from a daily diary study. *Teaching and Teacher Education, 73*, 151–161. <https://doi.org/10.1016/j.tate.2018.04.001>
- Lazarus, R. S. (2006). Emotion and interpersonal relationships: Toward a person-centered conceptualization of emotions and coping. *Journal of Personality, 74*(1), 9–46. <https://doi.org/10.1111/j.1467-6494.2005.00368.x>
- Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. Springer.

- *Lee, M., Pekrun, R., Taxer, J. L., Schutz, P. A., Vogl, E., & Xie, X. (2016). Teachers' emotions and emotion management: Integrating emotion regulation theory with emotional labor research. *Social Psychology of Education, 19*(4), 843–863. <https://doi.org/10.1007/s11218-016-9359-5>
- *Lee, M., & van Vlack, S. V. (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>
- *Li, M., & Wang, Z. (2016). Emotional labour strategies as mediators of the relationship between public service motivation. *International Journal of Psychology, 51*(3), 177–184. <https://doi.org/10.1002/ijop.12114>
- *Liao, Y., Luo, S., Tsai, M., & Chen, H. (2020). An exploration of the relationships between elementary school teachers' humor styles and their emotional labor. *Teaching and Teacher Education, 87*, 102950. <https://doi.org/10.1016/j.tate.2019.102950>
- Lipsey, M. W., & Wilson, D. B. (2001). *Practical meta-analysis*. Sage Publications.
- Lu, X., & Guy, M. E. (2019). Emotional labor, performance goal orientation, and burnout from the perspective of conservation of resources: A United States/China comparison. *Public Performance & Management Review, 42*(3), 685–706. <https://doi.org/10.1080/15309576.2018.1507916>
- *Ma, Y., Wang, F., & Cheng, X. (2021). Kindergarten teachers' mindfulness in teaching and burnout: The mediating role of emotional labor. *Mindfulness, 12*(3), 722–729. <https://doi.org/10.1007/s12671-020-01538-9>
- *Mahoney, K. T., Buboltz, W. C., Buckner, J. E., & Doverspike, D. (2011). Emotional labor in American professors. *Journal of Occupational Health Psychology, 16*(4), 406–423. <https://doi.org/10.1037/a0025099>
- *Mankin, A. (2019). *A longitudinal examination of teacher stress, emotion regulation, and self efficacy* (22587265) [Doctoral dissertation, Temple University]. ProQuest.
- Mastracci, S., & Adams, I. (2019). Is emotional labor easier in collectivist or individualist cultures? An east–west comparison. *Public Personnel Management, 48*(3), 325–344. <https://doi.org/10.1177/0091026018814569>
- Mayer, J. D., Caruso, D. R., & Salovey, P. (2016). The ability model of emotional intelligence: Principles and updates. *Emotion Review, 8*(4), 290–300. <https://doi.org/10.1177/1754073916639667>
- McLeod, A. I. (2005). Kendall rank correlation and Mann–Kendall trend test. *R Package Kendall*.
- Mikolajczak, M., Tran, V., Brotheridge, C. M., & Gross, J. J. (2009). Using an emotion regulation framework to predict the outcomes of emotional labor. In C. E. J. Härtel, M. Neal, & W. J. Zerbe (Eds.), *Emotions in groups, organizations and cultures (research on emotion in organizations)* (Vol. 5, pp. 245–273). Emerald Group Publishing Limited.
- *Mittal, M., & Chhabra, S. (2011). A study of emotional labour and burnout symptoms in teachers. *Global Management Review, 5*(4), 55–67.
- *Moè, A., & Katz, I. (2021). Emotion regulation and need satisfaction shape a motivating teaching style. *Teachers and Teaching, 27*(5), 370–387. <https://doi.org/10.1080/13540602.2020.1777960>
- *Näring, G., Briët, M., & Brouwers, A. (2006). Beyond demand-control: Emotional labour and symptoms of burnout in teachers. *Work & Stress, 20*(4), 303–315. <https://doi.org/10.1080/02678370601065182>
- *Näring, G., Vlerick, P., & Van de Ven, B. (2012). Emotion work and emotional exhaustion in teachers: The job and individual perspective. *Educational Studies, 38*(1), 63–72. <https://doi.org/10.1080/03055698.2011.567026>
- Nias, J. (1999). Teachers' moral purposes: Stress, vulnerability, and strength. In R. Vanderberghe & A. M. Huberman (Eds.), *Understanding and preventing teacher burnout: A sourcebook of international research and practice* (pp. 223–237). Cambridge University Press.
- *Noor, N. M., & Zainuddin, M. (2011). Emotional labor and burnout among female teachers: Work-family conflict as mediator. *Asian Journal of Social Psychology, 14*(4), 283–293. <https://doi.org/10.1111/j.1467-839X.2011.01349.x>
- Oplatka, I. (2009). Emotion management and display in teaching: Some ethical and moral considerations in the era of marketization and commercialization. In P. A. Shutz & M. Zembylas (Eds.), *Advances in teacher emotion research* (pp. 55–71). Springer.
- *Park, H. I., O'Rourke, E., & O'Brien, K. E. (2014). Extending conservation of resources theory: The interaction between emotional labor and interpersonal influence. *International Journal of Stress Management, 21*(4), 384–405. <https://doi.org/10.1037/a0038109>

- Peña-Sarrionandia, A., Mikolajczak, M., & Gross, J. J. (2015). Integrating emotion regulation and emotional intelligence traditions: A meta-analysis. *Frontiers in Psychology, 6*, 160. <https://doi.org/10.3389/fpsyg.2015.00160>
- *Peng, J., He, Y., Deng, J., Zheng, L., Chang, Y., & Liu, X. (2019). Emotional labor strategies and job burnout in preschool teachers: Psychological capital as a mediator and moderator. *Work, 63*(3), 335–345. <https://doi.org/10.3233/WOR-192939>
- *Pervaiz, S., Ali, A., & Asif, M. (2019). Emotional intelligence, emotional labor strategies and satisfaction of secondary teachers in Pakistan. *International Journal of Educational Management, 33*(4), 721–733. <https://doi.org/10.1108/IJEM-12-2017-0350>
- *Philipp, A., & Schüpbach, H. (2010). Longitudinal effects of emotional labour on emotional exhaustion and dedication of teachers. *Journal of Occupational Health Psychology, 15*(4), 494–504. <https://doi.org/10.1037/a0021046>
- Podsakoff, P. M., MacKenzie, S. B., Lee, J., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review literature and recommended remedies. *Journal of Applied Psychology, 88*(5), 879–903. <https://doi.org/10.1037/0021-9010.88.5.879>
- *Qi, X., Ji, S., Zhang, J., Lu, W., Sluiter, J. K., & Deng, H. (2017). Correlation of emotional labor and cortisol concentration in hair among female kindergarten teachers. *International Archives of Occupational and Environmental Health, 90*(1), 117–122. <https://doi.org/10.1007/s00420-016-1179-6>
- *Retowski, S., & Fila-Jankowska, A. (2013). Emotional labour and indirectly measured attitude towards occupation in explaining employee well-being. *Polish Psychological Bulletin, 44*(2), 165–175. <https://doi.org/10.2478/ppb-2013-0019>
- Rosenthal, R. (1979). The “file drawer problem” and tolerance for null results. *Psychological Bulletin, 85*(3), 638–641.
- *Sarraf, M., Talepasand, S., Rahimianboogar, I., Mohammadyfar, M., & Najafi, M. (2017). Emotional labor as a mediator for the structural relationship between emotional job demands, teaching satisfaction and performance: The moderating role of emotional intelligence. *International Journal of Behavioral Sciences, 10*(4), 137–146.
- *Sezen-Gultekin, G., Bayraktı, M., & Limon, I. (2021). The mediating role of organizational commitment on the relationship between emotional labor and work engagement of teachers. *Frontiers in Psychology, 12*, 648404. <https://doi.org/10.3389/fpsyg.2021.648404>
- Sterne, J. A., & Egger, M. (2001). Funnel plots for detecting bias in meta-analysis: Guidelines on choice of axis. *Journal of Clinical Epidemiology, 54*(10), 1046–1055. [https://doi.org/10.1016/S0895-4356\(01\)00377-8](https://doi.org/10.1016/S0895-4356(01)00377-8)
- Sutton, R. E. (2004). Emotional regulation goals and strategies of teachers. *Social Psychology of Education, 7*(4), 379–398. <https://doi.org/10.1007/s11218-004-4229-y>
- Sutton, R. E., Mudrey-Camino, R., & Knight, C. C. (2009). Teachers’ emotion regulation and classroom management. *Theory into Practice, 48*(2), 130–137. <https://doi.org/10.1080/00405840902776418>
- *Taxer, J. L., & Frenzel, A. C. (2015). Facets of teachers’ emotional lives: A quantitative investigation of teachers’ genuine, faked, and hidden emotions. *Teaching and Teacher Education, 49*, 78–88. <https://doi.org/10.1016/j.tate.2015.03.003>
- Taxer, J. L., & Gross, J. J. (2018). Emotion regulation in teachers: The “why” and “how.” *Teaching and Teacher Education, 74*, 180–189. <https://doi.org/10.1016/j.tate.2018.05.008>
- *Truta, C. (2014). Emotional labor and motivation in teachers. *Procedia-Social and Behavioral Sciences, 127*, 791–795. <https://doi.org/10.1016/j.sbspro.2014.03.356>
- *Tsoloupas, C. N., Carson, R. L., Matthews, R., Grawitch, M. J., & Barber, L. K. (2010). Exploring the association between teachers’ perceived student misbehaviour and emotional exhaustion: The importance of teacher efficacy beliefs and emotion regulation. *Educational Psychology, 30*(2), 173–189. <https://doi.org/10.1080/01443410903494460>
- *Tuxford, L. M., & Bradley, G. L. (2015). Emotional job demands and emotional exhaustion in teachers. *Educational Psychology, 35*(8), 1006–1024. <https://doi.org/10.1080/01443410.2014.912260>
- Wang, H., & Burić, I. (2023). A diary investigation of teachers’ emotional labor for negative emotions: Its associations with perceived student disengagement and emotional exhaustion. *Teaching and Teacher Education, 127*, 104117. <https://doi.org/10.1016/j.tate.2023.104117>
- Wang, H., Chiu, M.-M., & Hall, N. C. (2023). Teacher anger as a double-edged sword: Contrasting trait and emotional labor effects. *Motivation and Emotion. https://doi.org/10.1007/s11031-023-10027-0*
- Wang, H., Hall, N. C., Goetz, T., & Frenzel, A. C. (2017). Teachers’ goal orientations: Effects on classroom goal structures and emotions. *British Journal of Educational Psychology, 87*(1), 90–107. <https://doi.org/10.1111/bjep.12137>

- *Wang, H., Hall, N. C., & King, R. B. (2021). A longitudinal investigation of teachers' emotional labor, well-being, and perceived student engagement. *Educational Psychology, 41*(10), 1319–1336. <https://doi.org/10.1080/01443410.2021.1988060>
- Wang, H., Hall, N. C., & Taxer, J. L. (2019). Antecedents and consequences of teachers' emotional labor: A systematic review and meta-analytic investigation. *Educational Psychology Review, 31*(3), 663–698. <https://doi.org/10.1007/s10648-019-09475-3>
- Webb, T. L., Miles, E., & Sheeran, P. (2012). Dealing with feeling: A meta-analysis of the effectiveness of strategies derived from the process model of emotion regulation. *Psychological Bulletin, 138*(4), 775–808. <https://doi.org/10.1037/a0027600>
- *Wróbel, M. (2013). Can empathy lead to emotional exhaustion in teachers? The mediating role of emotional labor. *International Journal of Occupational Medicine and Environmental Health, 26*(4), 581–592. <https://doi.org/10.2478/s13382-013-0123-1>
- *Wu, T., Wang, L., Gao, J., & Wei, A. (2020). Social support and well-being of Chinese special education teachers—An emotional labor perspective. *International Journal of Environmental Research and Public Health, 17*(18), 6884. <https://doi.org/10.3390/ijerph17186884>
- *Xie, S., Wu, D., & Li, H. (2022). The relationship between Chinese teachers' emotional labor, teaching efficacy, and young children's social-emotional development and learning. *Sustainability, 14*(4), 2205. <https://doi.org/10.3390/su14042205>
- *Xuan, J., & Park, D. S. (2012). Effects of psychological contract on organizational citizenship behavior: The mediating role of professors' emotional labor strategy. *African Journal of Business Management, 6*(24), 7184–7197. <https://doi.org/10.5897/AJBM12.756>
- *Yao, X., Yao, M., Zong, X., Li, Y., Li, X., Guo, F., & Cui, G. (2015). How school climate influences teachers' emotional exhaustion: The mediating role of emotional labor. *International Journal of Environmental Research and Public Health, 12*(10), 12505–12517. <https://doi.org/10.3390/ijerph121012505>
- *Yilmaz, K., Altinkurt, Y., Güner, M., & Şen, B. (2015). The relationship between teachers' emotional labor and burnout level. *Eurasian Journal of Education Research, 15*(59), 75–90.
- *Yin, H. (2012). Adaptation and validation of the teacher emotional labour strategy scale in China. *Educational Psychology, 32*(4), 451–465. <https://doi.org/10.1080/01443410.2012.674488>
- *Yin, H., Huang, S., & Chen, G. (2019). The relationships between teachers' emotional labor and their burnout and satisfaction: A meta-analytic review. *Educational Research Review, 28*, 100283. <https://doi.org/10.1016/j.edurev.2019.100283>
- Yin, H. (2015). The effect of teachers' emotional labour on teaching satisfaction: Moderation of emotional intelligence. *Teachers and Teaching: Theory and Practice, 21*(7), 789–810. <https://doi.org/10.1080/13540602.2014.995482>
- *Yin, H., Huang, S., & Lee, J. C. K. (2017). Choose your strategy wisely: Examining the relationships between emotional labor in teaching and teacher efficacy in Hong Kong primary schools. *Teaching and Teacher Education, 66*, 127–136. <https://doi.org/10.1016/j.tate.2017.04.006>
- *Yin, H., Huang, S., & Lv, L. (2018). A multilevel analysis of job characteristics, emotion regulation, and teacher well-being: A job demands-resources model. *Frontiers in Psychology, 9*, 2395. <https://doi.org/10.3389/fpsyg.2018.02395>
- *Yin, H., Huang, S., & Wang, W. (2016). Work environment characteristics and teacher well-being: The mediation of emotion regulation strategies. *International Journal of Environmental Research and Public Health, 13*(9), 907. <https://doi.org/10.3390/ijerph13090907>
- Yin, H. B., & Lee, J. C. K. (2012). Be passionate, but be rational as well: Emotional rules for Chinese teachers' work. *Teaching and Teacher Education, 28*(1), 56–65. <https://doi.org/10.1016/j.tate.2011.08.005>
- *Yin, H., Lee, J. C. K., Zhang, Z., & Jin, Y. (2013). Exploring the relationship among teachers' emotional intelligence, emotional labor strategies and teaching satisfaction. *Teaching and Teacher Education, 35*, 137–145. <https://doi.org/10.1016/j.tate.2013.06.006>
- *Zhang, Y. (2021). The relationship between online education pre-school teachers' personality traits and job satisfaction during the COVID-19: The mediation of emotional labour. In *5th International Conference on Digital Technology in Education*, (pp. 53–60)
- *Zhang, Q., & Zhu, W. (2008). Exploring emotion in teaching: Emotional labor, burnout, and satisfaction in Chinese higher education. *Communication Education, 57*(1), 105–122. <https://doi.org/10.1080/03634520701586310>
- *Zhang, Y., Tsang, K. K., Wang, L., & Liu, D. (2022). Emotional labor mediates the relationship between clan culture and teacher burnout: An examination on gender difference. *Sustainability, 14*, 2260. <https://doi.org/10.3390/su14042260>

- *Zhao, X., & You, X. (2021). The impact of psychological capital on vocational well-being: The mediation effect of emotional labor and its invariance across ethnicities. *Current Psychology*, *40*(1), 102–112. <https://doi.org/10.1007/s12144-019-00287-w>
- *Zheng, X., Shi, X., & Liu, Y. (2020). Leading teachers' emotions like parents: Relationships between paternalistic leadership, emotional labor and teacher commitment in China. *Frontiers in Psychology*, *11*, 519. <https://doi.org/10.3389/fpsyg.2020.00519>
- *Zheng, X., Yin, H., & Wang, M. (2018). Leading with teachers' emotional labour: Relationships between leadership practices, emotional labour strategies and efficacy in China. *Teaching and Teaching: Theory and Practice*, *24*(8), 965–979. <https://doi.org/10.1080/13540602.2018.1508432>
- *Zhu, X., Tian, G., Yin, H., & He, W. (2021). Is familism a motivator or stressor? Relationships between Confucian familism, emotional labor, work-family conflict, and emotional exhaustion among Chinese teachers. *Frontiers in Psychology*, *12*, 766047. <https://doi.org/10.3389/fpsyg.2021.766047>

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Hui Wang is an Assistant Professor at the Education University of Hong Kong. Her research focuses on teacher motivation, emotions, emotion regulation, and occupational well-being. Dr. Wang also examines the impact of teacher motivation and emotions on students' motivational, behavioral, and achievement outcomes. Her research sheds light on the complex interactions between teachers and their students.

Irena Burić is a Professor at the University of Zadar in Croatia, where she teaches courses on basic and advanced statistics as well as educational psychology. Her research adopts longitudinal and multilevel designs to investigate teachers' personality traits, well-being, motivation, emotions, and instructional effectiveness.

Mei-Lin Chang is a Professor at Kennesaw State University, USA. Her research focuses on the social and emotional factors that influence teacher emotions, motivation, and student engagement in the classroom.

James J. Gross is the Ernest R. Hilgard Professor of Psychology at Stanford University and the Director of the Stanford Psychophysiology Laboratory. His research focuses on understanding the cognitive and physiological processes of emotion regulation, as well as the effects of emotion regulation on mental and physical health. Dr. Gross is also known for developing several influential models of emotion regulation, including the widely recognized process model of emotion regulation.

Authors and Affiliations

Hui Wang¹  · Irena Burić² · Mei-Lin Chang³ · James J. Gross⁴

✉ Hui Wang
hwang@eduhk.hk

¹ Department of Special Education and Counselling, Faculty of Education and Human Development, The Education University of Hong Kong, Hong Kong, China

² Department of Psychology, University of Zadar, Zadar, Croatia

³ Department of Secondary and Middle Grades Education, Kennesaw State University, Kennesaw, USA

⁴ Department of Psychology, Stanford University, Stanford, USA