

Self-Efficacy in Classroom Management, Classroom Disturbances, and Emotional Exhaustion: A Moderated Mediation Analysis of Teacher Candidates

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While the roles of student misbehavior and teacher self-efficacy in teacher burnout have been investigated, there is still a pressing need to determine the processes involved and the degree to which these generalize across early career teachers. The present research integrates findings on teacher self-efficacy, occupational stressors, and emotional exhaustion. A moderated mediation model is hypothesized where self-efficacy in classroom management predicts emotional exhaustion via classroom disturbances, but the strength of this whole mediation process is moderated by teachers' level of self-efficacy in classroom management. A sample of 1,227 German teacher candidates was used to test this hypothesis in 2 complementary studies. Study 1, based on the whole sample, utilized latent modeling and latent interactions, while Study 2 was based on a random longitudinal subsample of Study 1. The results generally supported our assumptions; the proposed moderated mediation model proved to be statistically significant, even when introducing background covariates into the model to control for pre-existing differences. Thus, self-efficacy in classroom management predicted emotional exhaustion via classroom disturbances only when self-efficacy in classroom management was low. Implications for teacher preservice training, based on the results, are discussed.

Keywords: moderated mediation, self-efficacy, classroom management, teacher stress

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Teacher burnout, which reflects a prolonged and occupational specific form of strain as the result of repeated long-term exposure to stressors, is the focus of considerable research and policy in almost all Western countries (Boyle, Borg, Falzon, & Baglioni, 1995; Organisation for Economic Cooperation and Development

[OECD], 2005). Compared with those in other occupations (e.g., Grosch & Murphy, 1998), teachers report the highest levels of self-perceived workplace stress of any profession (Hakanen, Bakker, & Schaufeli, 2006; Schaufeli, 2003; Smith, Brice, Collins, Matthews, & McNamara, 2000; Unterbrink et al., 2007). The

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causes of this high level of perceived stress are many, but research suggests that student misbehavior and disengagement are some of the most critical factors reported by teachers (Bakker, Hakanen, Demerouti, & Xanthopoulou, 2007; Boyle et al., 1995; Evers, Tomic, & Brouwers, 2004; Friedman, 2006). The issue of student misbehavior and disengagement is particularly pertinent for young teachers who lack classroom experience and who thus do not have well-developed coping strategies in place (Evertson & Weinstein, 2006; Friedman, 2000; Jones, 2006). For such teachers, faced with the realities of the classroom, self-efficacy becomes a critical protective factor (Friedman, 2000). While the roles of student misbehavior and of teacher self-efficacy, which reflects the beliefs in one's own ability to manage challenging situations, have been investigated thoroughly in regard to teacher burnout (see Brouwers & Tomic, 1999), there is still a pressing need to determine the processes by which they influence teacher stress and the degree to which these processes generalize across early career teachers.

Currently there is still some disagreement about the causal ordering of teachers' self-efficacy, occupational stress, and burnout. While reciprocal relationships are likely (Bandura, 1997; Brouwers & Tomic, 2000), in the present research we utilize self-efficacy theory and empirical findings by Schwarzer and Hallum (2008) to hypothesize that teachers' self-efficacy in managing a classroom leads to fewer classroom disturbances and subsequently decreases emotional exhaustion (see Figure 1a). Using the mediation model as a basis, we additionally consider in the present studies the degree to which this process is equally important for all teachers, based on their levels of self-efficacy in classroom management. This moderation is based on assumptions of the job demands resources (JD-R) model (Bakker & Demerouti, 2007) and conservation of resources theory (COR; Hobfoll, 1989, 2001). Hence, we extend previous research by closely examining the role of self-efficacy in classroom management as a predictor of the development of emotional exhaustion, via classroom disturbances, and simultaneously as a moderator that influences the strength of the implied indirect effect. This moderated mediation (Muller, Judd, & Yzerbyt, 2005; Preacher, Rucker, & Hayes, 2007) is examined in two complementary studies: one large cross-sectional study and a smaller sequential study of teachers over two time waves. We predicted, based on the findings of Schwarzer and Hallum (2008), that the level of self-efficacy in classroom

management interacts with the proposed mediation of self-efficacy in classroom management and emotional exhaustion via classroom disturbances such that teachers with low self-efficacy in classroom management are more susceptible to this mediation (see Figure 1b).

Theoretical Background

Teacher Stress and Strain

Teacher attrition rates, particularly for beginning teachers, are a worldwide issue (Jalongo & Heider, 2006; Organisation for Economic Cooperation and Development [OECD], 2005). Indeed, from an international perspective more than one third of beginning teachers leave the profession within their first 5 years (see Chang, 2009; Hong, 2010; Ingersoll, 2012). To Friedman (2000), this phenomenon is caused by burnout as a result of a discrepancy between the expected and the observed professional self-efficacy of beginning teachers, which he describes as "shattered dreams of idealistic performance" (p. 595). A large part of this attrition has been attributed to high levels of stress, burnout, and the demands inherent in teaching. In the present research, we focused on *emotional exhaustion*, meaning feelings of being emotionally drained and fatigued (Maslach, Jackson, & Leiter, 1996; see also Maslach, 1999). Emotional exhaustion is regarded by several authors (see Cropanzano, Rupp, & Byrne, 2003; Klusmann, Kunter, Trautwein, Lüdtke, & Baumert, 2008; Peterson et al., 2008; Schaufeli & Enzmann, 1998) as the central dimension of burnout, which reflects a prolonged and occupation specific form of strain as the result of repeated exposure to stressors (Byrne, 1999; Farber, 1991).

Considerable research has explored the factors that give rise to strain and emotional exhaustion both in early-career teachers and in the teaching profession more generally. In their study of teacher burnout, Parker, Martin, Colmar, and Liem (2012) identified two types of research in this area: research that focuses on the context in which strain occurs, and research that focuses on the processes by which strain develops. *Context research*, which in their definition focuses on the external causes of burnout and well-being, has been studied in extensive detail (see Vandenberghe & Huberman, 1999).

Context Theories and the Prominence of Classroom Disturbances

Kyriacou and Sutcliffe's (1977) review of research on teacher stress provided a detailed account of the job-related stressors that are most prevalent among teachers. Since this research, a growing number of studies have focused on those factors that teachers typically identify as their main stressors (Boyle et al., 1995; Farber, 1991; Guglielmi & Tatrow, 1998; Hakanen et al., 2006; Krause, 2003; Kyriacou, 2001; Rothland, 2007). So-called stressor "laundry lists" from such research typically identify four major dimensions of teachers' perceived stressors: student misbehavior, time/resource difficulties, professional recognition needs, and poor colleague relations (Borg & Riding, 1991). From this list, Boyle et al. (1995) found that only student misbehavior had a significant predictive effect on teacher stress. In addition, international researchers investigating teachers emphasize that classroom disrupt-

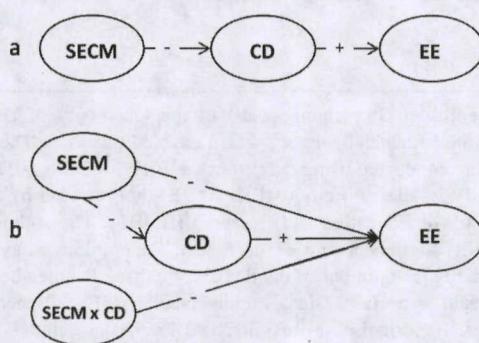


Figure 1. Proposed process model of stress development: (a) mediation and (b) moderated mediation. SECM = self-efficacy in classroom management; CD = classroom disruptions; EE = emotional exhaustion; + = proposed positive predictor; - = proposed negative predictor.

tions and disruptive students are a major predictor of teacher strain (Bakker et al., 2007; Boyle et al., 1995; Chang & Davis, 2009; Evers et al., 2004; Ferguson, Frost, & Hall, 2012; Friedman, 2006; Krause, 2004). Indeed, Friedman's (2006) review of teacher stress indicated that burnout does not arise from instructional teaching problems (e.g., low academic student achievement, difficulty in teaching new material) but rather from social-psychological aspects of teaching, classroom management issues, and problematic teacher-student relationships. Inexperienced teachers are particularly vulnerable and perceive student discipline as their most serious teaching challenge, and one they often feel unprepared to cope with (Evertson & Weinstein, 2006; Jones, 2006). In the present research, we therefore regarded classroom disturbances as a major teacher stressor. While there has been extensive research on the context of teacher burnout, Vandenberghe and Huberman (1999) suggested that a major research priority is the study of process variables that link stressors and the experience of stress-related outcomes like emotional exhaustion and burnout experienced by the individual.

Process Theories: Teacher Self-Efficacy

In research on stress development, it is critical when analyzing occupational settings to examine possible resources that could prevent or buffer strain or even foster motivation (Bakker, Demerouti, & Euwema, 2005). Put simply, what are the processes and variables that prevent ongoing stressors from causing emotional exhaustion?

Parker et al. (2012) suggested that teachers' self-beliefs are the critical underlying factor in understanding the development of teacher burnout. In particular, positive self-beliefs represent the central resource that drives teacher perceptions of stressors and the strategies they employ in attempting to manage them. Self-efficacy is a critical self-belief that relates to individuals' perceptions of their capabilities to successfully undertake the actions required to complete a given task (Bandura, 1997). For Bandura, the expectations of personal efficacy, rather than the level of skill, determine whether certain behaviors are initiated, how much effort is invested, and how long the effort is sustained in the face of obstacles and aversive experiences (Bandura, 1977). If setbacks do occur, people with high self-efficacy recover more quickly than those with low self-efficacy (Schwarzer & Hallum, 2008). This means that the probability of a teacher acting to resolve the situation is low if he or she lacks belief in his or her capability to manage classroom disturbances effectively.

Critical, however, is the nature of self-efficacy as domain specific (O'Mara, Marsh, Craven, & Debus, 2006). Thus, when assessing self-efficacy, a domain-specific rather than a global measure, directly reflecting the targeted performance with which it is compared, should be used (Bandura, 1997; Bong & Skaalvik, 2003; Pajares & Schunk, 2001). This would suggest that when considering the role of teacher self-efficacy in classroom disturbances and the subsequent effect on emotional exhaustion, research should focus on self-efficacy related to managing the classroom, rather than a general teacher self-efficacy measure. Self-efficacy in classroom management is "defined as teachers' beliefs in their capabilities to organize and execute the courses of action required to maintain classroom order" (Brouwers & Tomic, 2000, p. 242) and represents a distinct domain of teacher self-

efficacy (O'Neill & Stephenson, 2011). This domain plays a significant role in relation to the development of teacher stress and burnout (Schwarzer & Greenglass, 1999; Schwarzer & Hallum, 2008) especially for teacher candidates (Klassen & Chiu, 2011). Klassen and Chiu (2010) showed a curvilinear relationship between teachers' self-efficacy and years of teaching experience, with self-efficacy increasing in early- and mid-career, levelling out in mid-career, and then declining in later career stages; this underlines the importance of self-efficacy for beginning teachers.

Combining Process and Context Research: The Relationship of Self-Efficacy in Classroom Management, Classroom Disturbances, and Burnout

While Parker et al. (2012) suggested that research has typically focused either on process or context research, it is clear that this distinction is somewhat artificial, as stress development processes occur within and in response to a particular teaching context, and individual differences can affect the type and level of stressors emerging from the teaching context. The relationships of self-efficacy (in classroom management), classroom disturbances, and burnout have been investigated thoroughly (see Brouwers & Tomic, 1999). However, the results are inconsistent. Self-efficacy predicts performance (as reflected by, e.g., classroom disturbances as a result of this performance), but a major source of self-efficacy is mastery experience, which means to perceive one's own behavior as successful (Bandura, 1997). This reciprocal aspect of the relationship is very likely and has found some support (e.g., Brouwers & Tomic, 1999; Maslach, 1999; Skaalvik & Skaalvik, 2007). However, Bandura stressed the predictive value of self-beliefs on performance rather than vice versa (for an overview, see Bandura, 1997). To Bandura, although efficacy beliefs are partly formed by actual skills and knowledge, they independently contribute to performance, even when variations in past performance are taken into account and are controlled for (Bandura, 1997, 1986). In brief, high efficacy enables better performance (Bandura, 1977). Further, the level of self-efficacy influences how individuals deal with drawbacks and how they judge their own behavior, which provides further evidence for the leading role of self-efficacy (Bandura, 1997). These assumptions can be transferred to the specific teaching context in which teacher self-efficacy affects behavioral outcomes such as teacher practice and teacher behavior in the classroom and, thus, student behavior and classroom management success (for an overview, see Bandura, 1997; Pajares, 1992; Poulou, 2007; Tschanne-Moran et al., 1998; Woolfolk & Hoy, 1990). Put simply, teachers who are more efficacious are likely to perceive the classroom as less threatening, implement better strategies, and thus have more positive classroom experiences and fewer disturbances.

Moreover, classroom disturbances are not merely a result of teachers' behavioral classroom management abilities and can also be regarded as a typical occupational stressor for teachers. Thus, as described in detail earlier, we assumed that classroom disturbances are the major predictor of emotional exhaustion (Bakker et al., 2007; Boyle et al., 1995; Chang & Davis, 2009; Evers et al., 2004; Friedman, 2006; Krause, 2004). Taken together, these processes suggest a mediation in which self-efficacy in classroom management predicts emotional exhaustion via classroom disturbances. These assumptions are in line with prior studies that provide best

evidence to date that teacher self-efficacy predicts burnout (e.g., Schwarzer & Hallum, 2008; Skaalvik & Skaalvik, 2007; Wudy & Jerusalem, 2011) and that this relationship is mediated by teacher-specific stressors such as student misbehavior, workload, or role ambiguity (Betoret, 2009; Schwarzer & Hallum, 2008). Schwarzer and Hallum (2008) found strong empirical evidence for this mediated relationship using longitudinal data. In practical applications, this implies that a high level of self-efficacy leads to fewer disturbances that in turn leads to less emotional exhaustion.

While this shows that much research has focused on the process of burnout, other research and theories provide clear evidence in favor of the moderating role of personal resources (e.g., self-efficacy) in the stress process. Especially the JD-R model (Bakker & Demerouti, 2007; Bakker, Demerouti, De Boer, & Schaufeli, 2003) and the COR theory (Hobfoll, 1989, 2001) take into account how the effect of stressors on strain experienced by the individual is not the same for everyone even when facing objectively similar demands. This suggests that there are characteristics of the individuals that moderate the effect of stressors on the strain experienced by the individual. The JD-R model states interaction effects of job demands on motivation and job resources on strain (Bakker & Demerouti, 2007). If job resources are high, the effect of high job demands related to high strain is "buffered." This buffering effect can result from various types of resources (Bakker et al., 2005). Further, COR theory implies that individuals with greater resources are less vulnerable to resource loss (Hobfoll & Shirom, 1993), also implying individual differences in the development of stress being affected by the level of available resources. Self-efficacy in classroom management is a personal resource that buffers the negative effect of job demands (classroom disturbances) on emotional exhaustion. Thus, the level of self-efficacy influences the strength of the relationship between disturbances and emotional exhaustion. Findings from studies of Jex and Bliese (1999) confirmed the buffering effect of self-efficacy on the relationship between stress and strain.

Integration Model

An important research question is whether these assumed processes of mediation and moderation are mutually exclusive or can be integrated. Thus, "it is often of critical interest to determine whether a mediation effect remains constant across different contexts, groups of individuals, and values of the independent variable" (Preacher et al., 2007, p. 186). In an integration model, both processes would be combined, resulting in a significant conditional indirect effect, where the proposed mediation, in which self-efficacy predicts emotional exhaustion via classroom disturbances, would vary in strength conditionally on the value of self-efficacy in classroom management (moderator; Preacher et al., 2007). If they can be integrated, the question arises as to the role of self-efficacy as a resource, and what substantive and applied implications such a model has for teacher education.

Schwarzer and Hallum (2008) have proposed such an integrative model, applying a slightly different moderated mediation model than that of the present studies. Schwarzer and Hallum (2008) showed that age moderates their proposed mediation of self-efficacy predicting burnout via general stress, revealing that the mediation effect tended to be stronger for younger teachers. But more important, their cross-sectional results revealed that this

mediation of teacher self-efficacy on burnout via general teacher stress is moderated by general self-efficacy. Contrary to the Schwarzer–Hallum study, in the present research we applied a moderated mediation model in which the predicting variable itself functions as moderator of the mediation, thereby investigating the dual predicting and moderating effect of self-efficacy in classroom management. Despite the theoretical advancements made by Schwarzer and Hallum (2008), their study does have a few limitations that we expanded by considering the following aspects. First, we extended the model in the realm of stress factors by focusing on classroom disturbances as a specific stressor, thereby avoiding the high risk of conceptual overlap of general "stress" and emotional exhaustion that Schwarzer and Hallum's (2008) research implied. Second, we applied a domain-specific self-efficacy approach, assessing the specific domain of self-efficacy in classroom management rather than a general concept. Thus, we followed recommendations that the assessed self-efficacy domain should directly reflect the targeted performance with which it is compared, due to the stronger relation of self-efficacy to a particular outcome when it is measured at the same domain specificity (Bandura, 1997; Bong & Skaalvik, 2003; Pajares & Schunk, 2001; O'Mara et al., 2006). Third, as Schwarzer and Hallum (2008) analyzed their proposed moderated mediation model at a manifest level only, we extended this approach by the use of latent variables and latent interactions in Study I (see Marsh, Hau, Wen, Nagengast, & Morin, 2013; Marsh, Wen, Hau, & Nagengast, 2013; Nagengast et al., 2011, for a review). To our knowledge, the present article is the first in which moderated mediation has been applied to latent variables and their interaction.

Research Hypotheses

There is strong evidence in favor of the mediation of self-efficacy on burnout via stressors, as well as for the moderating effect of self-efficacy on the relationship of stressors and burnout. Thus, the natural question is to consider whether both processes can be successfully integrated into a single model for analyses in order to further investigate the important role of self-efficacy as a resource and individual differences within stress development processes. Hence, in the present studies, we hypothesized that this mediation process is conditional on the level of teachers' self-efficacy in classroom management. Based on the findings of Schwarzer and Hallum (2008), this conditional indirect effect should be negative since, in individuals with low self-efficacy, their lack of self-belief has a stronger influence on classroom disturbances and subsequently has a greater effect on their experience of emotional exhaustion. Put simply, we expected the indirect effect would be stronger in teachers with lower self-efficacy and weaker in teachers with high self-efficacy.

We employed two complementary studies in order to investigate our proposed stress process. Study 1 was based on a large sample, enabling latent modeling (including interactions) and group comparisons through sufficient amount of power. Thus, Study 1 utilized cutting-edge statistics as we were the first (to our knowledge) to model the moderated mediation model on a latent basis. However, causal ordering is a problem as all variables were collected cross sectionally. Study 2 was based on a smaller sample and lower covariance coverage due to our matrix design; therefore, it does not have sufficient power to test for latent interactions. Neverthe-

less, in Study 2 we used a longitudinal subsample of Study 1, which allowed us to provide further evidence of prior self-efficacy in classroom management predicting later classroom disturbances. For this purpose, self-efficacy in classroom management was measured at a first time wave, while classroom disturbances and emotional exhaustion were measured approximately 1 year later in a second time wave. However, this design is not fully longitudinal. Thus, results do not allow for causal interpretations. Both studies should reveal that the conditional indirect effect is statistically significant at the mean of self-efficacy and below but not above the mean. Taken together, one study corrects for the weakness in the other; so both studies together complement each other.

Based on our theoretical assumptions, we hypothesized the following processes:

Hypothesis 1: Self-efficacy in classroom management will predict emotional exhaustion, but this prediction will also be mediated via classroom disturbances (partial mediation; indirect effect). Self-efficacy in classroom management will be negatively related to classroom disturbances, which are in turn positively related to emotional exhaustion.

Hypothesis 2: This mediation will be moderated by levels of self-efficacy in classroom management (moderated mediation; conditional indirect effect). The conditional indirect effect will be statistically significant for teachers with lower levels of self-efficacy in classroom management.

Study I

Aim

In Study 1, we aimed to investigate if the prediction of emotional exhaustion via classroom disturbances by self-efficacy in classroom management depends on the level of self-efficacy in classroom management. Due to a large sample size, we were able to test our model on a latent level. In contrast to manifest variable modeling, latent modeling does not assume tau equivalence. This allows factor loadings to be freely estimated and therefore offers a better reflection of reality. Additionally, latent modeling purges structural regression of the biasing effect of measurement error (Muthén, 2002), which also affects interaction effects, as these would be biased if the predictor variables contain measurement error (Busemeyer & Jones, 1983). In their article introducing moderated mediation analysis, Preacher et al. (2007) utilized manifest variables themselves but mentioned the possibility of applying a latent approach. To our knowledge, we are the first to employ this new methodological rigor. Further, when investigating stress processes that deal with the development of emotional exhaustion, it is important to consider relevant background variables, as these most likely show moderating effects (Byrne, 1991). This is even more important as the present studies aimed at identifying individual differences within stress development. Thus, in line with the suggestions of Byrne (1999), we considered important background variables as gender, years of experience, and school type in order to discuss assumptions of generalizability.

Method

Participants. Participants were teacher candidates working in German schools. In Germany, there are two phases of teacher

education. Phase 1 (4–5 years) takes place at university, where student teachers attend general courses on psychology, pedagogy, sociology, and so forth, and study two teaching subjects like mathematics and history. Phase 2 (1–2 years), the *referendariat*, is the practical training phase and was the focus of our studies. In this phase, teacher candidates are allocated to schools, where they first observe other teachers' instruction; then, after about 2–6 months, they gradually start to teach their first lessons independently (around 10 hr a week). At the same time, they attend courses in general principles and methods of teaching and in specific methods of teaching their subjects (6–8 hr per week).

Data of these teacher candidates in their *referendariat* were collected as part of the Broad Educational Knowledge and the Acquisition of Professional Competencies in Teacher Candidates Study (BilWiss Study; Terhart et al., 2012). Within the scope of the multiple-matrix design of the BilWiss Study, a random subsample received the scales that are relevant for the present studies. The matrix design was characterized by dividing the questionnaire into overlapping subsections that were randomly administered to subsamples (in our case, $n = 300$) of the overall sample. Through this we were able to shorten the length of each individual questionnaire but still ensure that each scale was answered by a sufficient sample size. However, this led to the effect that there are "missings" of random participants for each scale.

The subsample ($N = 1,227$)¹ consisted of 29.7% male and 70.3% female teacher candidates, with a mean age of 29.55 years ($SD = 4.47$). The average years of experience was 1.18 school terms ($SD = 0.577$, range 1–6 school terms). Nevertheless, the average time of prior internships that had been done in schools or environments similar to schools was 11.09 weeks ($SD = 4.84$). Among the sample, 23.7% taught at primary schools, 32.3% at vocational high school tracks (e.g., "Realschule," "Hauptschule," or "Gesamtschule"), and 44.0% at university high school tracks ("Gymnasium"). The teacher candidates were approached during course time, where they filled in the BilWiss questionnaire battery. Participating in the data collection was voluntary. Nevertheless, the participation rate was very high (>90%), indicating a representative sample of teacher candidates in the federal state in which the study was conducted.

Measures. Emotional exhaustion was measured with a short adapted version of the emotional exhaustion subscale of the German version (Enzmann & Kleiber, 1989) of the Maslach Burnout Inventory (MBI; Maslach et al., 1996). Items were measured on a 4-point Likert scale with sufficient Cronbach's alpha reliability (see Table 1).

Self-efficacy in classroom management was measured with an adapted German version of the Self-Efficacy in Classroom Management subscale of the Teachers' Sense of Efficacy Scale (TSES) developed by Tschannen-Moran and Woolfolk Hoy (2001), which has also been validated for teacher candidates (Tschannen-Moran & Woolfolk Hoy, 2001) and teachers across different cultural settings (Klassen et al., 2009). Additionally, this tool offers a subscale for assessing self-efficacy in classroom management in line with recommendations to assess self-efficacy domain specifically (Bandura, 1997; O'Mara et al., 2006). Items (e.g., "How

¹ Due to the randomization of the subsample, these values were very similar to the total sample of the BilWiss Study.

Table 1

Alpha Reliabilities, Descriptive Statistics, and Latent Intercorrelations of Variables (Study 1)

Variable	No. of items	Reliability	Latent mean	SD	1	2	3
1. Emotional exhaustion	4	.74	1.97	0.57	—		
2. Self-efficacy in classroom management	8	.88	4.25	0.62	-.31** (<i>SE</i> = .042)	—	
3. Classroom disturbances	3	.74	2.73	1.06	.26** (<i>SE</i> = .051)	-.33** (<i>SE</i> = .046)	—

Note. All reliabilities, means, standard deviations (*SD*), and correlations were estimated based on full-integrated maximum likelihood, which corrects for missing data. *SE* = standard error.

** Significant at $p < .001$.

well can you respond to defiant students?"") were measured on a 6-point Likert scale with a sufficient Cronbach's alpha reliability (see Table 1).

Classroom disturbances were measured by a scale developed by Baumert et al. (2008). Items (e.g., "At the beginning of the lesson it takes a long time until the students calm down and start to work") were measured on a 6-point Likert scale. Cronbach's alpha reliability was acceptable (see Table 1).

Moderated mediation analysis. Analyzing the moderated mediation and testing the indirect conditional effect was based on the MODMED approach, using the MODMED code for Mplus (Version 6; Muthén & Muthén, 2010, Model 1) developed by Preacher et al. (2007). Advancing this approach, however, we estimated the moderated mediation model using latent variables and latent interactions, thus reducing the bias introduced by measurement error (Nagengast et al., 2011).

Emotional exhaustion was predicted by self-efficacy in classroom management but mediated by classroom disturbances, while simultaneously self-efficacy in classroom management moderated this mediation (see Figure 1). In Figure 2, this moderation is reflected by coefficient b_2 . Thus, in the present study, we hypothesized that the mediation process is conditional on the level of teachers' self-efficacy in classroom management. This can be derived from the following equations. A simple indirect effect can be quantified as $a_1 b_1$ (see Figure 2) and comes with following regression equations for the mediator (*M*) and the dependent variable (*Y*), where a_0 and b_0 reflect intercepts and r the residual (Preacher et al., 2007, p. 188).

$$M = a_0 + a_1 X + r \quad (1)$$

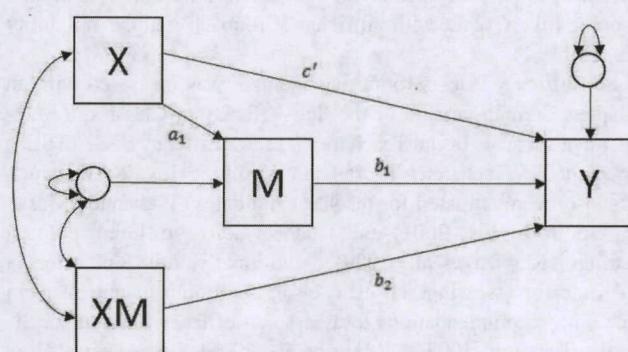


Figure 2. Moderated mediation Model 1 as proposed by Preacher et al. (2007; p. 194). X = predictor; M = mediator; XM = moderator; Y = dependent variable; a_1 , b_1 , b_2 , and c' = regression coefficients.

$$Y = b_0 + c' X + b_1 M + r \quad (2)$$

The conditional indirect effect (moderated mediation) of the present study, however, can be quantified by $f(\hat{\theta}|X) = \hat{a}_1(\hat{b}_1 + \hat{b}_2 X)$ and the regression Equations 3 and 4 (see Preacher et al., 2007, p. 196 for details).

$$M = a_0 + a_1 X + r \quad (3)$$

$$Y = b_0 + c' X + (b_1 + b_2 X)M + r \quad (4)$$

From these, it becomes clear how the levels of the predictor (*X*) influence the strength of the mediation. If the interaction of the predictor and mediator (*XM*) is close to zero, then b_2 is close to zero, and consequently the indirect effect will be close to $\hat{a}_1 \hat{b}_1$ as in simple mediation. Similarly if b_2 is close to zero in the regression equation of *Y*, Equation 4 is basically the same as Equation 2, which is the equation of *Y* in simple mediation (cf. Preacher et al., 2007).

In the present study, moderation of the indirect effect was explored at a range of values of self-efficacy ($\pm 2 SD$, $\pm 1 SD$, mean). Significance tests were conducted testing the hypothesis that the conditional indirect effect is zero at certain values of the moderator using the delta method. In order to investigate the consistency of the results, gender and years of experience were included as covariates. Likewise, for differences in school type, a group comparison was conducted with school type within a multigroup framework. For simplified interpretation of interaction effects (see Hayes, Glynn, & Huge, 2012), and to avoid nonessential multicollinearity (Cohen, Cohen, West, & Aiken, 2003) all variables were *z* standardized prior to the analysis (for details on the power discussion of moderated mediation models, please see the online supplemental materials).

The present studies are based on matrix design, and in such cases data are missing completely at random (MCAR) and were handled with full integrated maximum likelihood (FIML; Enders, 2010; Enders & Bandalos, 2001).

Goodness of fit. As model fit indices, the comparative fit index (CFI), Tucker-Lewis Index, and root-mean-square error of approximation (RMSEA) are reported in addition to the chi-square value. These measures of fit were included as the chi-square value is sample size dependent, where even small amounts of misfit can lead to significant chi-square values when sample sizes are moderate to large (Chen, 2007) and therefore can lead to misinterpretations. For the RMSEA, values $\leq .05$ are taken to reflect a good fit, values between .05 and .08 an adequate fit, and values between .08 and .10 a mediocre fit, whereas values $> .10$ are not acceptable (Browne & Cudeck, 1993). For TLI and CFI, values of .90 or

higher are considered satisfactory fit while values above .95 are considered excellent fit (Hu & Bentler, 1999; McDonald & Marsh, 1990). As the present study included a group comparison, model comparisons were led by the suggestions of Cheung and Rensvold (2001) and Chen (2007), stating that a change of -.010 or more in CFI or of .015 or more in RMSEA indicates noninvariance between a model in which parameters across the groups are free to take on unique values and a model in which they are constrained to be equal.

Results

Descriptives. Descriptive statistics, Cronbach's alpha reliabilities, and correlations between the latent variables are presented in Table 1. The reliability of all scales ranged from values of .74 to .87. In order to demonstrate the accuracy of the factors and the factor structure, we modeled all variables (emotional exhaustion, self-efficacy in classroom management, and classroom disturbances) in a first-order three-factor confirmatory factor analysis. Fit indices of that model indicated an acceptable fit, $\chi^2 = 379$, $df = 86$, $p < .001$, CFI = .93, TLI = .91, RMSEA = .05. Given the evidence in favor of the measurement structure, structural models based on our research questions were tested (see Table 1 for latent correlations).

Mediation. The first stage of our analysis was to set up a simple mediation model in which emotional exhaustion was regressed on self-efficacy in classroom management mediated by classroom disturbances.² The simple mediation model showed a satisfactory fit, $\chi^2 = 404$, $df = 87$, $p < .001$, CFI = .92, TLI = .90, RMSEA = .05. The results of the mediation analysis indicated that self-efficacy in classroom management predicted classroom disturbances with $\beta = -.362$ ($SE = 0.045$), $p < .001$, while in turn classroom disturbances predicted emotional exhaustion with $\beta = .305$ ($SE = 0.049$), $p < .001$. As hypothesized, a significant indirect effect of self-efficacy in classroom management on emotional exhaustion through classroom disturbances was observed: $\beta = -.110$ ($SE = 0.024$), $p < .001$. The results imply that higher self-efficacy in classroom management is related to fewer classroom disturbances, which are positively related to emotional exhaustion.

Moderated mediation. The analysis then moved to estimating the moderated mediation model, which formed the central question of the present research (see Figure 2). Emotional exhaustion was regressed on classroom disturbances, which in turn was regressed on self-efficacy in classroom management, while the slope of the former regression was predicted by self-efficacy in classroom management. The model showed a satisfactory fit with $\chi^2 = 429$, $df = 128$, $p < .001$, CFI = .93, TLI = .92, RMSEA = .04. The results of the mediation analysis indicated that self-efficacy in classroom management predicted classroom disturbances with $\beta = -.330$ ($SE = 0.046$), $p < .001$, while classroom disturbances in turn predicted emotional exhaustion with $\beta = .179$ ($SE = 0.055$), $p < .001$. Additionally, results revealed a significant moderation effect of $\beta = -.110$ ($SE = 0.055$), $p < .05$. Therefore, self-efficacy in classroom management seems to moderate the impact of classroom disturbances on emotional exhaustion.³ In order to test the proposed conditional indirect effect, we conducted significance tests, based on the hypothesis that the conditional indirect effect equals zero at certain levels of the moderator (mean,

$\pm 1 SD$, $\pm 2 SD$)—in this case, self-efficacy in classroom management. The results indicated that classroom disturbances mediated the effect of self-efficacy in classroom management on emotional exhaustion when self-efficacy was low ($-2 SD$, $-1 SD$) or at the mean but not when self-efficacy was high ($+1 SD$, $+2 SD$; Table 2). Results of the conditional indirect effect based on bias-corrected bootstrapping revealed identical results (Table 3). Thus, in line with findings by Schwarzer and Hallum (2008), the conditional indirect effect decreased with increasing level of self-efficacy in classroom management (see Figure 3).

Extended moderated mediation (Covariates and group comparisons). In the third stage of analysis, gender and years of experience were included in the moderated mediation model as covariates predicting emotional exhaustion. Model fit decreased very little after having added the covariates to $\chi^2 = 521$, $df = 158$, $p < .001$, CFI = .91, TLI = .90, RMSEA = .04. While there seems to be no significant effect of gender, years of teaching experience did have a positive significant path of $\beta = .182$ ($SE = .032$), $p < .001$, indicating that the more senior teacher candidates had higher emotional exhaustion. Despite these findings, path coefficients and correlations of the model including the covariates, compared with the model without covariates, were very similar. The moderation path increased slightly with $\beta = -.131$, $p < .05$. The conditional indirect effect showed the same pattern of significance (Table 2) for both models. Results of the conditional indirect effect based on bias-corrected bootstrapping revealed identical results (Table 3). Again, classroom disturbances mediated the effect of self-efficacy in classroom management on emotional exhaustion when self-efficacy was low ($-2 SD$, $-1 SD$) and at the mean but not when self-efficacy was high ($+1 SD$, $+2 SD$). As shown in Figure 3, the bootstrapped conditional indirect effect also decreased with rising levels of self-efficacy in classroom management.

Additionally, two group comparisons were conducted with school type as a grouping variable. The first group consisted of teacher candidates working at primary schools, the second of teacher candidates working in vocational high school tracks, and the third of those working in university high school tracks. In order to allow adequate group comparisons, we dropped the model constraints for estimating the conditional indirect effects. In the first model, factor loadings and intercepts were held invariant while the second model additionally held structural model components invariant. When factor loadings and intercepts were held invariant across groups, the model fit was satisfactory with $\chi^2 = 886$, $df = 450$, $p < .001$, CFI = .90, TLI = .90, RMSEA = .05. Additionally, constraining the components of the structural model (i.e., the regression paths) yielded a very similar fit, with $\chi^2 = 855$, $df = 440$, $p < .001$, CFI = .90, TLI = .90, RMSEA = .05. Very small changes in fit indices ($\Delta CFI = 0.005$, $\Delta TLI = 0.003$, $\Delta RMSEA = 0.001$) indicated good support for the model with regard to the cutoff values for evaluating invariance (Chen, 2007;

² Please see the online supplemental material for results of an alternative mediation model in which classroom disturbances predicts emotional exhaustion via self-efficacy in classroom management.

³ Using the latent moderated structural equations (LMS) approach (Klein & Moosbrugger, 2000) the moderator was nearly significant with $\beta = -.149$, $p = .073$. However, the LMS approach does not allow for bootstrapping or group comparisons.

Table 2
Conditional Indirect Effects of Self-Efficacy in Classroom Management on Emotional Exhaustion via Classroom Disturbances

Model/level of self-efficacy	Indirect effects	SE	p
Model 1			
-2 SD	-.118	.040	.004
-1 SD	-.088	.027	.001
Mean	-.057	.020	.003
1 SD	-.026	.025	.286
2 SD	.004	.037	.908
Model 2			
-2 SD	-.124	.042	.003
-1 SD	-.085	.027	.002
Mean	-.046	.019	.015
1 SD	-.007	.026	.788
2 SD	.032	.040	.425
Model 3			
-2 SD	-.570	.11	.025
-1 SD	-.337	.075	.018
Mean	-.105	.046	.029
1 SD	-.127	.032	.217
2 SD	.360	.048	.092

Note. Model 1 = moderated mediation model without covariates (Study 1); Model 2 = moderated mediation model including gender and years of experience as covariates (Study 1); Model 3 = manifest sequential model (Study 2). SE = standard error.

Cheung & Rensvold, 2001). Thus, group comparisons revealed that invariance of factor loadings and invariance of structural components were both met. This suggests that the findings generalize across teachers of different school types.

Table 3
Conditional Indirect Effects of Self-Efficacy in Classroom Management on Emotional Exhaustion via Classroom Disturbances Based on Bias-Corrected Bootstrapping Technique

Model/level of self-efficacy	Indirect effects	SE	p	95% CI
Model 1				
-2 SD	-.118	.046	.010	[-0.24, -0.04]
-1 SD	-.088	.030	.004	[-0.16, -0.04]
Mean	-.057	.022	.010	[-0.12, -0.02]
1 SD	-.026	.029	.366	[-0.09, 0.03]
2 SD	.004	.045	.924	[-0.08, 0.10]
Model 2				
-2 SD	-.124	.055	.023	[-0.28, -0.04]
-1 SD	-.085	.033	.009	[-0.17, -0.03]
Mean	-.046	.019	.018	[-0.09, -0.02]
1 SD	-.007	.031	.823	[-0.06, 0.07]
2 SD	.032	.052	.538	[-0.05, 0.18]
Model 3				
-2 SD	-.570	.293	.05	[-1.24, -0.07]
-1 SD	-.337	.159	.03	[-0.70, -0.06]
Mean	-.105	.065	.10	[-0.30, -0.02]
1 SD	.127	.150	.39	[-0.13, 0.47]
2 SD	.360	.283	.20	[-0.10, 1.03]

Note. Model 1 = moderated mediation model without covariates (Study 1); Model 2 = moderated mediation model including gender and years of experience as covariates (Study 1); Model 3 = manifest sequential model (Study 2). SE = standard error; CI = confidence interval.

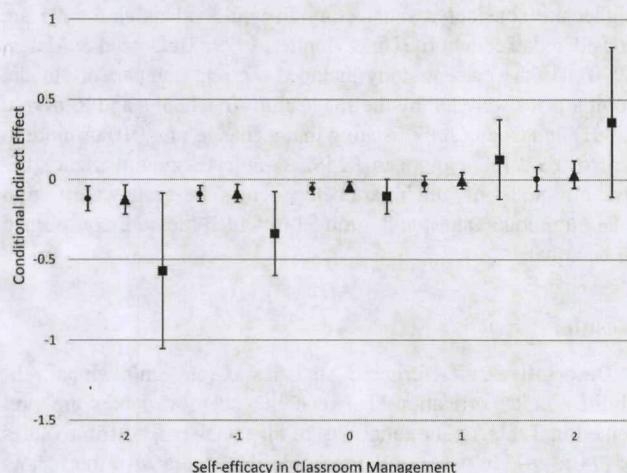


Figure 3. Conditional indirect effect of self-efficacy in classroom management on emotional exhaustion through classroom disturbances based on the bias-corrected bootstrap technique for the (Study 1) model excluding covariates (marked by a bullet), the (Study 1) model including gender and years of experience as covariates (marked by a triangle), and the (Study 2) sequential validation model (marked by a square); all with confidence intervals.

Study 2

Aim

Study 2 complements the first study by testing the moderated mediation model with a random longitudinal subsample of Study 1, in which self-efficacy in classroom management was measured at Time Wave 1 and classroom disturbances and emotional exhaustion approximately 1 year later at Time Wave 2.⁴ This sequential design, comparing two times waves that are separated by approximately 1 year, enabled us to provide further evidence of prior self-efficacy in classroom management predicting later classroom behavior (as reflected by classroom disturbances); however, it is not a fully longitudinal model, meaning it was not possible to test temporal precedence (Mitchell & Maxwell, 2013). The subsample of Study 1 surveyed longitudinally in Study 2 was comparably small. To achieve a convenient sample size, we employed FIML. However, as coverage rates were very low, the sample lacked power for latent-based analyses of interactions. In Study 2, we therefore applied a manifest approach of data analysis for the moderated mediation model (for details on the power discussion of moderated mediation models, please see the online supplemental materials).

Method

Participants. Participants were a random subsample of the Study 1 sample surveyed a second time 1 year later. Based on the matrix design, which surveyed a random subsample of teacher candidates receiving the relevant scales at Time Wave 1 (see Study 1) and a random subsample of this sample being included longi-

⁴ Self-efficacy in classroom management at a later time wave was not yet available at the time analyses were conducted.

tudinally in Study 2, as well as FIML treatment of "missings," data were available for 966 participants, with coverage rates of from .05 to .679.⁵ Thus, despite the convenient sample size due to FIML, coverage rates were in part rather low. Therefore, the sample still lacked power for latent-based analyses of interactions. The subsample consisted of 29.1% male and 69.1% female teacher candidates, with a mean age of 29.86 years ($SD = 3.85$) at Time Wave 1. Nevertheless, the average time of internships that had been spent prior to the referendariat in schools or environments similar to schools was 11.37 weeks ($SD = 4.07$). Of the sample, 36.4% of the sample taught at primary schools, 30.9% at vocational high school tracks (e.g., "Realschule," "Hauptschule," or "Gesamtschule"), and 32.7% at university high school tracks ("Gymnasium"). Study 2 applied the same measures as Study 1. The only changes apply to the Classroom Disturbances scale, which was measured on a 4-point Likert scale at Time Wave 2. Cronbach's alpha reliability was acceptable for all scales (see Table 4).

Moderated mediation analysis. Analyzing the moderated mediation and testing the indirect conditional effect was based on the MODMED approach, using the MODMED code for Mplus (Version 6: Model 1) developed by Preacher et al. (2007). However, due to the (compared with Study 1) smaller sample size, the model was applied on the manifest level. To reveal further evidence for our assumed stress process, in which self-efficacy in classroom management predicts emotional exhaustion via classroom disruptions, we measured self-efficacy in classroom management at the first time wave, whereas classroom disturbances and emotional exhaustion were measured at the second time wave. Thus, emotional exhaustion at Time Wave 2 was predicted by self-efficacy in classroom management at Time Wave 1 but mediated by classroom disturbances of Time Wave 2, while simultaneously self-efficacy in classroom management at Time Wave 1 moderated this mediation (see Model 1; Preacher et al., 2007). As in Study 1, moderation of the indirect effect was explored at a range of values of self-efficacy ($\pm 2 SD$, $\pm 1 SD$, mean) with significance tests. Again all variables were z standardized (see Aiken & West, 1991), and missing data were handled by FIML.

Results

Descriptives. Descriptive statistics, Cronbach's alpha reliabilities, and correlations between the variables are presented in Table 4. The reliability of all scales ranged from values of .75 to .88. Compared with the values of Time Wave 1, emotional exhaustion increased from $M = 1.97$ to $M = 2.36$. Further, as the scaling changed, classroom disruptions seemed to also have increased from $M = 2.73$ on a 6-point Likert scale ($2.73/6 = .455$) to $M = 2.06$ on a 4-point Likert scale ($2.06/4 = .515$).

Sequential model. In order to confirm the cross-sectional results, we tested a sequential moderated mediation model. Due to the smaller sample size than Study 1, this analysis was based on manifest variables. The results of the mediation analysis indicated that self-efficacy in classroom management, measured at Time Wave 1, predicted later classroom disturbances (Time Wave 2) with $\beta = -.414$ ($SE = .127$), $p < .05$, while classroom disturbances in turn predicted emotional exhaustion (also Time Wave 2) with $\beta = .237$ ($SE = .082$), $p < .05$. Additionally, results revealed a significant moderation effect of $\beta = -.335$ ($SE = .132$), $p < .001$. Thus, self-efficacy in classroom management also seems to

moderate the impact of later classroom disturbances on emotional exhaustion. As in the cross-sectional model of Study 1, significance tests were conducted, based on the hypothesis that the conditional indirect effect equals zero at certain levels of the moderator (mean, $\pm 1 SD$, $\pm 2 SD$)—in this case, self-efficacy in classroom management. The results indicated that classroom disturbances (Time Wave 2) mediated the effect of self-efficacy in classroom management at Time Wave 1 on emotional exhaustion at Time Wave 2 when self-efficacy was at the mean or lower ($-2 SD$, $-1 SD$), but not when self-efficacy was high ($+1 SD$, $+2 SD$; Table 3). Results of the conditional indirect effect based on bias-corrected bootstrapping revealed identical results (Table 4). Thus, the findings of Study 2's sequential model are in line with the cross-sectional findings of Study 1; the conditional indirect effect decreased with increasing level of self-efficacy in classroom management (see Figure 3).

Discussion

In these studies, we tested and found support for a moderated mediation model. This model addresses the question of how the overall process of self-efficacy in classroom management indirectly predicts emotional exhaustion via classroom disturbances may differ across teachers, depending on their level of self-efficacy in classroom management. The hypothesized model provided good fit to the data in both studies. Conditional indirect effects were statistically significant at classroom management self-efficacy levels of mean and below, indicating that the mediation was stronger at lower levels of self-efficacy in classroom management, in line with assumptions of Schwarzer and Hallum (2008). Study 1 was based on a large sample size with high power allowing for latent modeling. Adding gender and years of experience as covariates did not have a significant impact on the conditional indirect effect; significant indirect effects were observed at the mean and below as well. Nevertheless, years of experience had a significant effect on emotional exhaustion, showing a positive linear effect, in line with findings of Klusmann, Kunter, Voss, and Baumert (2012) with similar participants. Additionally, multiple group comparisons revealed no significant differences of model fit for different school types. These group comparisons were particularly important, as German school types differ in type of students taught, which can moderate the development of burnout (Byrne, 1994, 1999).

In Study 2, a random longitudinal subsample of Study 1 was employed in order to provide further evidence that prior self-efficacy in classroom management predicts later classroom disturbances. However, this sequential design is not fully longitudinal so that causal interpretations are not justified (Mitchell & Maxwell, 2013). Despite this limitation, Study 2 provided further evidence for our suggested stress process by revealing similar results as Study 1. Taken together, the complementary results of both studies are consistent with our hypothesis of the assumed moderated mediation.

Descriptives. The descriptive statistics reveal interesting results. At Time Wave 1, self-efficacy in classroom management

⁵ Due to the matrix design, missing was completely at random (MCAR), and analysis based on listwise deletion revealed very similar results providing further evidence for our model.

Table 4

Alpha Reliabilities, Descriptive Statistics, and Intercorrelations of Variables of Longitudinal Data (Study 2)

Variable	No. of items	Reliability	M	SD	1	2	3
1. Emotional exhaustion-Time 2	4	.77	2.36	0.73	—		
2. Self-efficacy in classroom management-Time 1	8	.88	4.29	0.55	-.18 (<i>SE</i> = .136)	—	
3. Classroom disturbances-Time 2	3	.75	2.06	0.63	.27** (<i>SE</i> = .050)	-.40** (<i>SE</i> = .130)	—

Note. All reliabilities, means (*M*), standard deviations (*SD*), and correlations were estimated based on manifest variables. *SE* = standard error.

** Significant at $p < .001$.

was high, while classroom disturbances and emotional exhaustion were low (see Table 1). Based on the sample characteristics and the details of the German teacher education program (both described in the Method section of Study 1), it can be concluded that so far the majority of participating teacher candidates had just begun and had their first lessons within the referendariat and in internships, but very likely a large number of participants were supervised by a mentor or experienced teacher. Therefore, they were able to gain a certain level of self-efficacy in classroom management within a rather protected (disturbance-free) environment (Woolfolk Hoy & Burke-Spero, 2005). In line with Friedman's (2000) expectations, emotional exhaustion as well as classroom disruptions turned out to have increased at the second time wave (see Table 4; see also, e.g., Klassen & Chui, 2010, 2011; Veenman, 1984). At this point in time, the majority of the present studies' teacher candidates faced their lessons on their own and thus perceived more disturbances and consequently higher levels of emotional exhaustion (see also Klusmann et al., 2012).

The role of self-efficacy in classroom management. According to the results of the moderated mediation analyses, self-efficacy in classroom management seems to play a more complex role in the stress process than has been assumed so far. In the literature, empirical evidence has been found for both self-efficacy roles: (a) self-efficacy as a predictor of strain via stress (Betoret, 2009; Schwarzer & Hallum, 2008) and (b) self-efficacy as a moderator of the stress and strain relationship (buffering effect; Hakanen et al., 2006; Jex & Bliese, 1999; Schwarzer & Hallum, 2008). The major theoretical contribution of the present studies, however, is that we found (c) self-efficacy in classroom management acting in both roles. Thus, the interpretations of the mediation and moderation, which are discussed in the following section, have to be taken into account simultaneously. Therefore, we briefly first discuss results based on simple mediation, then on simple moderation, but focus on the combination of both, that is, the moderated mediation.

Mediation. The results of the present studies can be interpreted as follows: Teacher candidates who feel better able to manage classroom disturbances also report fewer disturbances. In line with the assumptions of self-worth theory (e.g., Parker et al., 2012), low self-efficacy in classroom management may lead to a higher vulnerability (and poorer quality of coping) to the negative effects of classroom disturbances, due to feelings of inability, compounding the negative effect of the actual number of disruptions. Nevertheless, it may also mean that, for individuals with low self-efficacy in classroom management, more disturbances actually occur in their lessons, due to their inability to utilize adequate classroom management skills to prevent them (Bandura, 1977). In turn, more (perceived) classroom incidents are related to higher

perceptions of emotional exhaustion (e.g., Friedman, 2006). Individuals with higher self-efficacy in classroom management, on the other hand, may experience classroom disturbances as less salient, due to their higher self-belief, and they may be able to effectively handle disturbances with greater ease, therefore perceiving them as less stressful.

Moderation. In line with theoretical assumptions of the JD-R model (Bakker & Demerouti, 2007; Bakker et al., 2003) and COR theory (Hobfoll, 2001), we also found the prediction of emotional exhaustion by classroom disturbances to be weaker for teacher candidates with higher self-efficacy in classroom management, demonstrating the buffering effect of personal resources on the stressor-strain relationship (Bakker et al., 2005).

Moderated mediation. Combining these effects leads to the conditional indirect effect (moderated mediation) which reflects the dependency of the whole mediation on the levels of self-efficacy in classroom management. Based on our results, one possible interpretation suggests that for teacher candidates with low self-efficacy, their lower levels of self-belief would have a strong influence on classroom disturbances and thus on their feelings of stress. This is in line with COR, which states that individuals with fewer resources are more vulnerable to resource loss (Hobfoll, 2001; Hobfoll & Shirom, 1993). However, we stress that this research did not test this interpretation, and thus further research is needed. For high self-efficacy individuals, this process was not significant at all.

Hence, our results indicate that in this suggested stress process, self-efficacy in classroom management acts as a resource directly diminishing stress and therefore indirectly lowering levels of emotional exhaustion, but only so far as a certain degree of self-efficacy in classroom management is given. This would mean that after reaching a certain level of self-efficacy, the benefit of self-efficacy in this particular stress process, in which self-efficacy indirectly affects emotional exhaustion via the stressor classroom disturbances, disappears—very similar to the economic principle of “diminishing marginal returns.” Thus, gaining self-efficacy is more important for individuals with low self-efficacy than for individuals who already have a certain level of self-efficacy. These findings are in line with principles of COR (Hobfoll, 2001), which imply that resource gains are particularly important in case of resource loss. Another explanation is based on the domain-specific construct of self-efficacy in classroom management predicting classroom disturbances (Bandura, 1997; O’Mara et al., 2006). As highly efficacious teachers experience almost no classroom disturbances, the link between disturbances and emotional exhaustion is essentially zero. Thus, for this group, there is no indirect effect. Emotional exhaustion, on the other hand, is a domain-general construct (Maslach et al., 1996), and thus, while classroom distur-

bances has been shown in research to be the dominate predictor of emotional exhaustion (e.g., Friedman, 2006; Jones, 2006), it is by no means the only one (Borg & Riding, 1991). Thus, the emotional exhaustion experienced by highly efficacious individuals likely results from other sources (e.g., poor colleague relations; Borg & Riding, 1991).

Applied implications. Based on our proposed mediation process, there seem to be two possibilities in order to diminish emotional exhaustion. First, one could target self-efficacy in classroom management to affect emotional exhaustion indirectly. Second, one could target classroom disruptions to directly affect emotional exhaustion. This could be realized by fostering knowledge about and the ability to use classroom management strategies adequately. There has been extensive research on the positive effects of employing classroom management strategies on student behaviors and, most important, student discipline (for an overview, see Emmer & Stough, 2001). Additionally, results of a study by Voss, Kunter, and Baumert (2011) revealed that students of teacher candidates with high pedagogical/psychological knowledge (including knowledge of classroom management) reported fewer classroom disruptions. Such knowledge can be imparted to candidate teachers during their studies (Terhart et al., 2012). Furthermore, the importance of knowledge of classroom management is stressed by the recent findings of a longitudinal study showing that knowledge of classroom management explained individual differences in emotional exhaustion, as teacher candidates with high knowledge reported less of an increase of emotional exhaustion (Klusmann et al., 2012).

On the other hand, the moderation process suggests that emotional exhaustion is predicted by classroom disruptions, depending on the level of self-efficacy in classroom management. Thus, the effectiveness of trying to reduce emotional exhaustion through targeting classroom disruptions or self-efficacy in classroom management depends on the individual level of self-efficacy in classroom management. This would imply that preservice teacher education or training programs need to be more closely matched to teacher candidates' needs to ensure a well balanced return on investment. Interventions targeting the components of the stress process therefore need to take these into account (Dewe, 2004). In respect to the present research, self-efficacy in classroom management would not just be the target of an intervention to reduce emotional exhaustion but would also be a moderator of its effectiveness, as only participants with low self-efficacy would profit. The results of our studies indicate that the proposed stress process is stronger for those teacher candidates with low self-efficacy in classroom management. Therefore, training that targets elements of the stress process should be more effective for those with low self-efficacy in classroom management. On the other hand, research on training effectiveness has shown that high levels of self-efficacy generally increase training efficacy and transfer of training effects (e.g., Gist, Stevens, & Bavetta, 1991). Indeed, VandeWalle (2001) has previously noted a similar paradox in terms of workplace motivation: Often, among those who need intervention the most are those for whom such interventions are most difficult to implement effectively. It would be interesting to explore these contradictory findings and to compare underlying processes in future research.

Strengths, limitations and directions for further research. A major strength of the present Study 1 is that we were the first to

be able to successfully extend prior attempts to model a moderated mediation by applying latent variables, including latent interaction, thus overcoming the disadvantages of modeling on a manifest base (Nagengast et al., 2011). The application of these methods was made feasible by the availability of a large, representative sample of teacher candidates. Therefore, the common problems of typical stress research that depends on convenience samples and on the occurrence of the healthy worker effect can be avoided (Zapf, Dormann, & Frese, 1996).

However, the studies have some limitations that need to be considered. As mentioned earlier, it was not possible to set up a fully longitudinal moderated mediation model (Mitchell & Maxwell, 2013). The model applied in Study 2 is rather sequential and, thus, does not allow for any causal interpretations. It would be important to test our proposed moderated mediation model with fully longitudinal data enabling either autoregressive modeling (including cross and lagged paths), latent growth modeling, latent difference modeling, or a combination of these (MacKinnon, Fairchild, & Fritz, 2007) to further disentangle relationships among self-efficacy in classroom management, classroom disturbances, and emotional exhaustion.

Further, in stress research particularly, authors have discussed the limitations of relying on self-report data (Dewe & Trenberth, 2004; Lazarus, 2000; Schmitt, 1994). Nevertheless, self-report offers anonymity and privacy in a research context. This is likely to be important in research on teacher candidates' well-being and performance-related variables, as they are subject to a constant evaluation process until receiving their teacher's license. Further, there is some indication that the particular self-report scale on classroom disturbances used in the present studies provides a valuable estimation of real classroom processes, as is shown by a validation study in which teacher and student ratings were compared (Kunter & Baumert, 2006). Kunter and Baumert (2006) showed considerable agreement on the aspects of classroom management (including classroom disturbances) of students and teacher candidates, while other classroom-related variables (e.g., cognitive activation displayed big differences). Therefore, there does not seem to be a large bias in teacher candidates' rating of classroom disturbances and rather a sufficient amount of congruency with student' ratings. While this suggests that self-report research is appropriate, there is still a need to expand research to include other methods (Dewe & Trenberth, 2004). For example, in future research, classroom disruptions could be assessed through simple objective measures like student or observer ratings, rather than teacher self-perceptions (Klusmann, Kunter, Trautwein, & Baumert, 2006). Further, other constructs such as other stressors or strain-related variables (e.g., lack of pedagogical knowledge, cortisol levels) or indicators of positive well-being (e.g., engagement), could be introduced into the model. This is important to identify other variables that are crucial for the proposed stress process, as our first study revealed relatively small effects. Further, other variables could explain high emotional exhaustion perceived by teachers with high self-efficacy. Thus, it is necessary to explore further the specific model considered here within a broader framework of other variables associated with emotional exhaustion. It would also be interesting to focus not only on the negative consequences of stressors but to investigate the prediction of positive outcomes (e.g., motivation, job satisfaction, commitment, and so forth).

Last but not least, future research should investigate how the proposed model interacts with different cultural backgrounds (as the present studies were conducted with a specific group of German teacher candidates) and also its application to in-service teachers, perhaps in respect of varying levels of experience.

Conclusion. The present research aimed to further explore the relationship of three important variables within the stress development process: self-efficacy in classroom management, classroom disturbances, and emotional exhaustion. Furthermore, in this research, we applied the new methodological approach of latent modeling and latent interaction to moderated mediation analysis. Taken together, the findings of the present studies hold substantive and methodological implications for those exploring issues relevant to well-being in teachers and applied implications for those who are responsible for teacher candidates' well-being in the workplace.

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Call for Submissions: Psychological Science in MedEdPORTAL Publications

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- Memory
- Perception
- Psychophysiology
- Psychoneuroimmunology
- Interpersonal relationships
- Behavior change
- Motivation
- Decision making
- Leadership
- Unconscious bias
- Group dynamics and team functioning
- Violence
- Psychometrics
- Stress and coping
- Treatment adherence
- Grief
- Behavioral health risk factors
- Obesity and weight management
- Smoking cessation
- Mental and behavioral disorders
- Health belief models
- Dental anxiety
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- Provider–patient communication

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