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Perceived Teacher Self-Efficacy as a Predictor of Job Stress and Burnout: Mediation Analyses

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Teacher self-efficacy is studied as a personal resource factor that may protect from the experience of job strain and, thus, make the escalation of burnout less likely. The article examines the relationships between self-efficacy, job stress, and burnout, focusing on mediation (self-efficacy → job stress → burnout). Moreover, it questions whether such a mediation, if found, would be dependent on the levels of other variables (moderated mediation). Study I, with two samples of teachers (N = 1,203), examined this putative mechanism cross-sectionally and found such an effect, in particular for younger teachers and those with low general self-efficacy. Study II, with 458 teachers, replicated the results longitudinally over a period of one year by employing structural equation models. In a cross-lagged panel design, low self-efficacy preceded burnout. Further research should study these mechanisms by interventions that aim at strengthening teacher self-efficacy as a protective resource factor.

L'auto-efficacité des enseignants est étudiée comme une ressource personnelle pouvant les protéger de l'expérience de la contrainte professionnelle et rendre l'escalade dans le burnout moins probable. Cet article examine les liens entre l'auto-efficacité, le stress au travail et le burnout, en se focalisant sur la médiation (auto-efficacité → stress au travail → burnout). En outre, il questionne la façon dont une telle médiation, si elle est avérée, pourrait être dépendante du niveau des autres variables (médiation modérée). La recherche 1 comprend deux échantillons d'enseignants (N = 1,203). Elle examine ce mécanisme croisé supposé et révèle un tel effet, en particulier pour les enseignants les plus jeunes et ceux ayant une auto-efficacité générale basse. L'étude 2 effectuée auprès de 458 enseignants confirme ces résultats, obtenus cette fois de façon longitudinale sur une période d'un an en employant des modèles à équation structurale. Ainsi, une auto-efficacité basse précède le burnout. Des recherches plus poussées pourraient étudier les mécanismes par lesquels des interventions renforcent ou non l'auto-efficacité des enseignants comme source de protection.

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INTRODUCTION

Why do some teachers succeed in being good teachers, in continuously enhancing students' achievements, and in setting and pursuing high goals for themselves, while others cannot meet expectations imposed on them and tend to collapse under the burden of everyday stress? One reason lies in a teacher's perceived self-efficacy as a job-specific disposition. Teacher engagement is positively associated with personal coping resources, whereas teacher burnout is indicated by a number of negative personality characteristics, including low levels of self-efficacy. Teacher burnout is seen as a result of job strain, that, given the demands of the profession, hits in particular those who lack the appropriate coping resources (Brief & Weiss, 2002; Guglielmi & Tatrow, 1998; Klusmann, Kunter, Trautwein, Lüdtke, & Baumert, 2008; Schwarzer & Greenglass, 1999; Vandenberghe & Huberman, 1999). The present article examines the relationships between self-efficacy, job stress, and burnout in two samples of teachers from Syria and Germany (N = 1,203) with a particular focus on putative mediation (self-efficacy $\rightarrow$ job stress $\rightarrow$ burnout). Moreover, it raises the question whether such a mediation, if found, would be dependent on the levels of other variables (moderated mediation).

PERCEIVED SELF-EFFICACY

The construct of self-efficacy represents one core aspect of social-cognitive theory (Bandura, 1997). In his unifying theory of behavior change, Bandura hypothesises that expectations of self-efficacy determine whether instrumental actions will be initiated, how much effort will be expended, and how long it will be sustained in the face of obstacles and failures. According to theory and research, self-efficacy makes a difference in how people think, feel, and act. In terms of feeling, a low sense of self-efficacy is associated with depression, anxiety, and helplessness. Persons with low self-efficacy also have low self-esteem, and they harbor pessimistic thoughts about their accomplishments and personal development. In terms of thinking, a strong sense of competence facilitates cognitive processes and performance in a variety of settings, including quality of decision-making and academic achievement.

Self-efficacy has an influence on preparing action because self-related cognitions are a major ingredient in the motivation process. Self-efficacy levels can enhance or impede motivation. People with high self-efficacy choose to perform more challenging tasks (Bandura, 1997; Schwarzer, 1992). They set themselves higher goals and stick to them. Actions are preshaped in thought, and people anticipate either optimistic or pessimistic scenarios in line with their level of self-efficacy. Once an action has been taken, highly self-efficacious people invest more effort and persist longer than those low

in self-efficacy. When setbacks occur, they recover more quickly and maintain commitment to their goals. High self-efficacy also allows people to select challenging settings, explore their environment, or create new ones. Some people harbor self-doubts and cannot motivate themselves. They see little point in even setting a goal if they believe they do not have what it takes to succeed.

The essential distinction between self-efficacy and similar constructs, such as self-esteem, self-concept, locus of control, and so on, lies in the following three aspects: (a) self-efficacy implies an internal attribution (I am the cause of the action), (b) it is prospective, referring to future behaviors, and (c) it is an operative construct, which means that this cognition is quite proximal to the critical behavior, thus being a good predictor of actual behavior.

Teacher Self-Efficacy

One domain where research on professional self-efficacy has been conducted is teaching in schools. Why do some teachers succeed in continuously enhancing students' achievements, in setting high goals for themselves, and pursuing these goals persistently, while others cannot meet expectations imposed on them and tend to collapse under the burden of daily stress? There are many reasons, one of which pertains to a teacher's perceived self-efficacy as a job-specific disposition (Burke, Greenglass, & Schwarzer, 1996; Caprara, Barbaranelli, Borgogni, & Steca, 2003; Schwarzer, Schmitz, & Tang, 2000; Tschannen-Moran, Woolfolk Hoy, & Hoy, 1998).

General Self-Efficacy

Self-efficacy is commonly understood to be domain-specific. That is, one can have more or less firm self-beliefs in different domains or particular situations of functioning. But there is also a general sense of self-efficacy that refers to global confidence in one's coping ability across a wide range of demanding or novel situations. General self-efficacy aims at a broad and stable sense of personal competence to deal effectively with a variety of stressful situations (Schwarzer, 1992). If self-efficacy is employed as a predictor of broad outcomes, such as quality of life, well-being, or overall adaptation and health, it is justified to use a correspondingly broad measure of general self-efficacy. An example for such an inventory is the General Self-Efficacy (GSE) scale (Schwarzer & Jerusalem, 1995).

TEACHER BURNOUT

Burnout can be described as a chronic state of exhaustion due to long-term interpersonal stress within human service professions. It pertains to feelings experienced by people whose jobs require repeated exposure to emotionally

charged social situations. Burnout has been defined as "a syndrome of Emotional Exhaustion, Depersonalization, and Reduced Accomplishment which is a special risk for individuals who work with other people in some capacity" (Leiter & Maslach, 1998, p. 347). *Emotional Exhaustion* is seen as the stress component. It refers to feelings of being emotionally overextended and depleted of one's emotional resources. Fatigue, debilitation, loss of energy, and wearing out are characteristics of this component. *Depersonalisation* is the "other-evaluation component". It is described as cynicism, irritability, loss of idealism, and negative or inappropriate attitudes toward recipients. It refers to a negative, callous, or excessively detached response to other people. *Reduced Personal Accomplishment* is the "self-evaluation component" and is equated with reduced professional efficacy, productivity or capability, low morale, and an inability to cope with job demands. It represents a decline in one's feelings of competence and achievement at work. Inadequate coping responses to the stressful encounters may lead to Emotional Exhaustion. In order to avoid becoming more and more exhausted, people withdraw from their clients and start focusing on their private life rather than on their job life. Distancing oneself from one's job can lead to reduced accomplishment on the job (Bakker, Hakanen, Demerouti, & Xanthopoulou, 2007; Maslach, Schaufeli, & Leiter, 2001; Schaufeli & Bakker, 2004) and may pose a risk for illness, such as cardiovascular disease (Melamed, Shirom, Toker, Berliner, & Shapira, 2006). There is ample evidence that teachers, in the course of their careers, experience a great deal of stress that may result in depressed mood, exhaustion, poor performance, or attitude and personality changes, which, in turn, may lead to illness and premature retirement (Bakker & Schaufeli, 2000; Vandenberghe & Huberman, 1999).

THE RELATIONSHIP BETWEEN TEACHER SELF-EFFICACY AND BURNOUT

We examine the relationships between self-efficacy, job stress, and burnout with a particular focus on putative mediation (self-efficacy $\rightarrow$ job stress $\rightarrow$ burnout). The construct of self-efficacy suggests a protective effect when coping with adversity. An optimistic belief in one's competence to deal with daily challenges enhances the motivation to engage in constructive ways of coping. Thus, self-efficacious teachers would perceive the objective demands of daily teaching as being less threatening than those teachers do who harbor self-doubts about their professional performance. Successful adaptation to stressful demands, in turn, would prevent the emergence of job burnout (Caprara et al., 2003; Schmitz & Schwarzer, 2002; Schwarzer & Greenglass, 1999; Skaalvik & Skaalvik, 2007). Although this theoretical assumption of mediation is generally accepted by most authors, one finds hardly any formal tests of mediation in the literature.

One prerequisite of such a mediation test is to rule out the possibility that burnout causes low self-efficacy. Although reciprocal relationships between these variables are to be expected (Bandura, 1997), the pathway from self-efficacy to burnout should be more substantial than the one from burnout to self-efficacy. Thus, in the absence of experimental data, at least a cross-lagged panel research design needs to be employed to obtain a rough estimate of the most likely direction of causality.

Moreover, the question arises whether such a mediation, if found, would be dependent on the levels of other variables. For example, it might be that such a mediation only occurs at particular levels of general self-efficacy (moderated mediation). Also, since burnout develops in relation to professional socialisation and critical career paths, the duration of professional experience (e.g. time on job) might be a moderating factor. As a proxy, one could examine age levels of teachers and identify a particular age bracket that might be prone to the above-mentioned mediation effect.

GENERAL RESEARCH QUESTIONS

The purpose of our study was to identify relationships between burnout, job stress, and personal resource factors. Although the study includes Syrian and German teachers, its focus is not on cross-cultural comparisons. Rather, it aims at identifying psychological mechanisms, making use of these samples of opportunity. In particular, the following research questions are examined.

1. The personal resource factors, namely teacher self-efficacy and general self-efficacy, are supposed to protect teachers from premature job burnout, as reflected by levels of Emotional Exhaustion, Depersonalisation, and Reduced Personal Accomplishment. Self-efficacy should be substantially and negatively related to the three burnout components and these should serve as external criteria for the validity of the burnout construct. Moreover, a related question is whether the pattern of associations is the same within the two samples of Syrian and German teachers, reflecting cross-cultural validity.
2. To examine further the direction of this hypothesis in contrast with the opposite direction, we will employ a cross-lagged panel design for which self-efficacy and burnout are studied over time. It is assumed that the prediction of burnout will be predominant over the prediction of self-efficacy, as theory and earlier research have suggested.
3. Job stress should be negatively related to self-efficacy and positively related to burnout. It should be a predictor of burnout, and at the same time it should be a dependent variable of self-efficacy. Thus, a mediation hypothesis is put forward that places job stress between the personal resource factors and the burnout consequences.

STUDY I

Aims

The purpose of the study was to explore the cross-sectional associations between teacher burnout and putative precursors, that is, self-efficacy and job stress. At the same time, job stress was considered a result of low personal coping resources. In addition to the mere associations among the variables, it will be examined whether there is a mediation effect (self-efficacy → job stress → burnout) to gain more insight into possible mechanisms of the development of burnout and of protective factors. The study is guided by the assumption that self-efficacy constitutes a resource factor and that job stress may operate as mediator between self-efficacy and burnout.

Method

Samples. A total of 1,203 teachers participated in a questionnaire study, 311 men and 892 women, from Syria and Germany. Syrian teachers were approached to participate in an anonymous questionnaire study on personality and work stress. Of the 690 invited persons, 88 per cent filled out the materials individually while the principal investigator was waiting. Thus, the Syrian sample consisted of 608 teachers (93 men and 515 women).

The German teachers were part of a nationwide school innovation project called "Self-Efficacious Schools" that included 10 schools in 10 German states. Of the 769 teachers invited to participate, 77 per cent were willing to fill out the questionnaires on school climate, attitudes, and work stress. Thus, the German sample comprised 595 teachers (218 men and 377 women).

Table 1 displays the age and gender distribution for both samples, indicating that the Syrians were younger than the Germans, and that they had a higher proportion of women.

Instruments. Teacher self-efficacy: In 1995, a scale was developed to measure teacher self-efficacy (Schwarzer, Schmitz, & Daytner, 1999) (see the Appendix for the English version). The first step was to identify different job skills within the teaching profession. Four major areas were: (a) job accomplishment, (b) skill development on the job, (c) social interaction with students, parents, and colleagues, and (d) coping with job stress. For each of these four domains, teachers may hold different self-efficacy expectations.

The second step involved the development of 27 items as part of a lengthy questionnaire that was administered to samples of approximately 300 German teachers. The aim was to extract a parsimonious instrument of 10 items for an economical assessment of efficacy beliefs within the four areas mentioned above. The primary focus during the reduction of the items was on

TABLE 1
Age and Sex Distribution in Both Samples (N = 1,203)

Age	*Men*	*Women*	*Total*
Syrians			
21–30 years	8	57	65
31–40 years	36	238	274
41–50 years	38	205	243
> 50 years	11	15	26
Total	93	515	608
Germans			
21–30 years	7	27	34
31–40 years	43	114	157
41–50 years	84	166	250
> 50 years	84	70	154
Total	218	377	595

optimising the validity of the instrument. Cronbach's alpha was found to be between .76 and .82, retest reliability was .76 (n = 193), for the period of one year. Indicators of validity could be obtained by means of correlations with other teacher characteristics at two points in time. High negative relations with job strain and with job burnout were found. Moreover, the extra time teachers voluntarily spent with their students was strongly associated with their teacher self-efficacy (Schmitz & Schwarzer, 2002; Schwarzer et al., 2000). In the present study, Cronbach's alpha was .80 for the Syrian, and .81 for the German sample.

General self-efficacy: Participants completed the GSE scale by Schwarzer and Jerusalem (1995). Responses to the 10 items range from *strongly disagree* (1) to *strongly agree* (4); for example, "I can always manage to solve difficult problems if I try hard enough". The high validity and reliability of the scale has been demonstrated in many studies across various research contexts and ethnically diverse populations (e.g. Luszczynska, Scholz, & Schwarzer, 2005). In this sample, the internal consistency was Cronbach's alpha = .86 for the Germans and .87 for the Syrians.

Job stress: To assess perceived job strain of teachers, a 15-item inventory was used (Enzmann & Kleiber, 1989) that addresses a broad range of uncomfortable subjective experiences at the workplace. Examples are: "I feel stressed by being responsible for others", and "In my profession, one always feels overburdened". Responses are on a 5-point scale ranging from *not at all* to *definitely yes*. Cronbach's alpha was .87 in the German and .85 in the Syrian samples.

Burnout: To assess the three burnout dimensions, the Maslach Burnout Inventory (MBI; Maslach, Jackson, & Leiter, 1996) was administered. The

leading symptom of the burnout syndrome, Emotional Exhaustion, was assessed with nine items, such as "I feel emotionally drained from my work". The internal consistency of the scale was $\alpha = .88$ in the German and .83 in the Syrian sample. The subscale Depersonalisation consists of five items, such as "I feel I treat some students as if they were impersonal objects". Cronbach's alpha was found to be .69 for the German and .71 for the Syrian sample. The third dimension, Reduced Personal Accomplishment, was assessed with eight items, such as "I have not attained important goals with my work". Cronbach's alpha was .82 for German teachers and .78 for Syrian teachers.

All measures were translated by the second author into Arabic and back-translated by experts, until a satisfactory adaptation was found.

Analysis. Analyses of variance and product-moment correlations were computed. Mediation was tested by evaluating the indirect effect in terms of Sobel *Z*. Moderated mediation was examined with an SPSS macro provided by Preacher, Rucker, and Hayes (2007). Missing data were imputed using the Expectation Maximisation (EM) algorithm in SPSS (Enders, 2001).

Results

Mean differences between the two nations, gender, and age groups are examined in the following section. In addition, correlational findings are reported.

Mean Differences: Syrians and Germans Differ in Resources and Burnout. The three burnout variables (Emotional Exhaustion, Depersonalisation, and Reduced Personal Accomplishment) as well as the two self-efficacy variables and job stress were subject to three-factorial analyses of variance, with nation, gender, and age as factors. A main effect for nation was found for all variables except Depersonalisation. A gender effect was due to Depersonalisation only. Men had higher scores than women, $p < .01$, which is in line with the literature (Maslach et al., 1996). There was an age effect for lack of accomplishment, $p < .05$. The youngest group of teachers felt slightly less successful than the other groups. The means and standard deviations for all six variables within each country are displayed in Table 2, along with the inference statistics for the factor nation.

Correlations: Evidence for Validity. In the MBI manual, the following intercorrelations between the three burnout dimensions are reported (Maslach et al., 1996, p. 44): Emotional Exhaustion correlates .52 with Depersonalisation and .22 with Reduced Personal Accomplishment, and Depersonalisation correlates .26 with Reduced Personal Accomplishment.

TABLE 2
Means (*M*) and Standard Deviations (*SD*) in Syrians and Germans

Nationality		*Teacher self-efficacy*	*General self-efficacy*	*Job stress*	*Emotional exhaustion*	*Depersonalisation*	*Reduced accomplishment*
German	*M*	2.86	2.92	2.19	1.91	1.55	1.90
	SD	.40	.41	.57	.53	.47	.38
Syrian	*M*	3.32	3.27	2.11	2.17	1.56	1.48
	SD	.39	.33	.47	.45	.36	.31
Total	*M*	3.09	3.09	2.15	2.04	1.55	1.69
	SD	.45	.41	.52	.51	.42	.41
	F (1, 1201)	416.8	277.8	6.1	82.4	0.3	433.8
	p	< .01	< .01	< .05	< .01	.57	< .01
	η^2	.26	.19	.01	.06	0	.26

To determine indicators of validity for the German and Syrian adaptations, the corresponding relationships in these samples were studied. Table 3 displays the relationships, with the Syrian sample above and the German sample below the diagonal.

The Syrian sample replicates the US-American pattern well, with correlations of .53, .19, and .27, all ps < .01. In contrast, the German sample does not replicate well, with correlations of .57, .57, and .61, all ps < .01. The associations are higher than in the normative sample, which renders the three dimensions as being less distinct from each other. This, however, is much more in line with the assumption of a "burnout syndrome". In other words, the burnout correlation patterns differ between Syrians and Germans, making nationality a moderator.

A different question is how the three burnout variables are associated with job stress and perceived self-efficacy (see Table 3). Emotional Exhaustion, Depersonalisation, and Reduced Personal Accomplishment are related significantly to the three other variables in the expected direction, all ps > .01. Self-efficacious teachers suffer less from burnout than their less confident counterparts. These correlations corroborate the criterion-related validity of the burnout construct, although to a different degree in the two samples.

Mediation: Job Stress Mediates between Self-Efficacy and Burnout. The basic assumption was that self-efficacy constitutes a personal resource factor that protects against the experience of job stress and, thus, would make burnout less likely. To examine this assumption, mediation analyses were performed. Teacher self-efficacy was specified as the independent variable, job stress as the mediator, and the three burnout components served separately as the dependent variables. In the German sample, for Emotional Exhaustion, the expected mediation effect emerged with an indirect effect of –.51, Sobel $Z = 12.7$, $p < .01$. The value of –.51 reflects the difference between the previous direct effect of self-efficacy on exhaustion (–.64) and the remaining direct effect (–.13), after introducing the mediator into the model.

For Depersonalisation, the indirect effect was –.23, Sobel $Z = 8.52$, $p < .01$, and for lack of accomplishment, the indirect effect was –.16, Sobel $Z = 8.98$, $p < .01$.

In the Syrian sample, for Emotional Exhaustion, the expected mediation effect emerged with an indirect effect of –.18, Sobel $Z = 6.5$, $p < .01$. The direct effect of self-efficacy on Exhaustion became insignificant after introducing the mediator, which reflects a full mediation. For Depersonalisation, the indirect effect was –.11, Sobel $Z = 5.81$, $p < .01$, and for Lack of Accomplishment, the indirect effect was –.04, Sobel $Z = 4.73$, $p < .01$.

Although all indirect effects were highly significant (also due to sample size), the most substantial mediation effect was the one for Emotional Exhaustion within the German sample.

TABLE 3
Intercorrelations of Variables in German (n = 595, Lower Triangle) and Syrian (n = 608, Upper Triangle) Teachers

	Teacher self-efficacy	*General self-efficacy*	*Job stress*	*Emotional exhaustion*	*Depersonalisation*	*Reduced accomplishment*
Teacher self-efficacy	1	.72	−.25	−.17	−.24	−.66
General self-efficacy	.71	1	−.43	−.27	−.21	−.80
Job stress	−.52	−.51	1	.63	.53	.37
Emotional exhaustion	−.48	−.46	.79	1	.53	.19
Depersonalisation	−.56	−.44	.57	.57	1	.27
Reduced accomplishment	−.75	−.69	.63	.58	.62	1

Moderated Mediation: Translation of Teacher Self-Efficacy into Job Stress Experience. To qualify these findings further, the question was raised whether there were moderating conditions that might affect the mediating relationships. General self-efficacy was examined as a putative moderator. For the entire sample (N = 1,203), a moderated mediation effect emerged as reflected by an interaction between general and teacher self-efficacy, t = 3.21, $p < .01$ (Model 2 according to Preacher et al., 2007). Further inspection revealed that the mediation effect found previously (teacher self-efficacy → job stress → emotional exhaustion) occurred at lower levels of general self-efficacy. At one standard deviation below the mean (general self-efficacy score of 2.68), there was a significant mediation effect, Z = 2.51, p = .01, whereas at the mean (3.09) and at one standard deviation above the mean (3.51) no such effect was documented. The same was found for Depersonalisation and Lack of Accomplishment as dependent variables.

In other words, teachers with low general self-efficacy might be more vulnerable for a chain of events, that is, the translation of their low teacher self-efficacy into job stress experience (and subsequent burnout).

Discussion

The mean differences between Syrian and German teachers may be due to a number of reasons. First, Syrian teachers could actually be more self-efficacious and at the same time more burned out than the Germans. However, such a discrepant pattern is unlikely. Therefore, it appears more likely that either the samples were not comparable, or the language adaptations of the scales to German and Arabic were not satisfactory. The latter point also refers to cultural differences in wording and interpretation. The GSE scale has been adapted to 30 languages, and the construct has been found to be universal in a series of studies (e.g. see Luszczynska et al., 2005). The somewhat higher scores for the Syrian teachers might point to a selection effect in this particular sample.

Our study did not focus on cultural comparisons because these were not representative national samples. Instead, the purpose was to gain insight into possible mechanisms of the development of burnout and protective factors, based upon previous studies (e.g. Burke et al., 1996; Schmitz & Schwarzer, 2002; Schwarzer et al., 2000). The mediation analysis confirmed the assumptions that self-efficacy constitutes a resource factor, and that job stress may operate as mediator between self-efficacy and burnout. The mediation effect (teacher self-efficacy → job stress → emotional exhaustion), found in particular in German teachers, needs further examination in longitudinal or intervention studies. Therefore, additional longitudinal data were analysed that were collected in the context of the German study.

STUDY II

Aims

Study I suffered from the shortcoming of being cross-sectional, making predictions speculative. Study II overcomes this problem by providing longitudinal data. Although no causal inferences can be made from nonexperimental data, the situation becomes less speculative. By employing cross-lagged panel analyses one has a better chance of avoiding the wrong conclusions about causes and effects. Study II aims at predicting burnout on the basis of perceived self-efficacy measured one year before. Moreover, the question is raised whether job stress may mediate this prediction. It will be examined whether the mediation effect (self-efficacy → job stress → burnout) found in Study I can be replicated longitudinally to gain insight into possible mechanisms of the development of burnout and of protective factors.

Method

Sample. The 595 German teachers who took part in Study I were approached again one year later for another data collection. They had taken part in a nationwide school innovation project called "Self-Efficacious Schools" that included 10 schools in 10 German states. Of those, 77 per cent were willing to respond to another questionnaire. Thus, a total of 458 teachers participated in a longitudinal questionnaire study, 181 men and 277 women. They reported age group membership instead of actual age because they did not want to disclose their actual age to protect their anonymity. There were 100 teachers in the youngest group, below the age of 41 years (32 men, 68 women), 284 teachers in the middle group between the ages of 41 and 50 years (109 men, 175 women), and 74 teachers in the oldest group above 50 years (40 men, 34 women). The same instruments as in Study I were employed.

Analysis. Structural equation modeling with AMOS 6 (Arbuckle, 2005) was used to predict burnout by personal resources and to examine the putative mediating role of job stress. Multiple indicators were specified for each construct. The burnout construct was specified by Emotional Exhaustion and Depersonalisation. Reduced Personal Accomplishment was omitted because of construct overlap with the self-efficacy measures. To identify the precursor status of self-efficacy, its putative predominance over burnout was examined with a cross-lagged panel design. To consider age group differences, multi-group analyses were performed. Missing data were imputed using the Expectation Maximisation (EM) algorithm in SPSS (Enders, 2001).

Results

The first research question deals with the prediction of burnout by perceived self-efficacy measured one year before. At the same time, a reversal of the expected direction of relationships is explored. Burnout could be a predictor of self-efficacy, or both variables could influence each other reciprocally. To shed light on this issue, a cross-lagged panel design was chosen where both variables are specified as predictors and outcomes as well. A structural equation model was specified with multiple indicators on each side. At Time 1, teacher and general self-efficacy were chosen as indicators of self-efficacy, reflecting the coping resources of teachers. At Time 2, the same constructs, measured one year later, served as indicators. To reflect the burnout construct, two of the MBI subscales, Emotional Exhaustion and Depersonalisation, were chosen. Each of the two subscales was specified as an indicator at Time 1 and at Time 2. The third subscale, Lack of Accomplishment, was not considered because it was too closely associated to self-efficacy and in order to avoid construct overlap, in line with previous work (Schmitz & Schwarzer, 2002). Autocorrelated residuals were set free to covary.

The model fit the data moderately, $\chi^2 = 61.43$, df = 10, $p < .01$, $\chi^2/df = 6.1$, GFI = .97, NFI = .98, TLI = .95, RMSEA = .11. The standardised solution is depicted in Figure 1. The factor loadings (lambdas) were very high, indicating a good measurement model. The retest reliability of the self-efficacy construct was higher (.90) than that of the burnout construct (.64). Most important, the path from earlier self-efficacy to later burnout (.26) was superior to the opposite path, leading from earlier burnout to later self-efficacy (.00), which confirms the resource hypothesis that was suggested by earlier research (Schmitz & Schwarzer, 2002).

After the putative direction of influence had been confirmed, the question was whether job stress would operate as a mediator between earlier self-efficacy and later burnout. Theory suggests that resourceful individuals with high self-efficacy would experience less job stress, which in turn would prevent them from burnout. Another structural equation model was specified, with job stress placed between self-efficacy and burnout. Job stress was jointly indicated by corresponding variables at Time 1 and Time 2, thus avoiding an exclusive temporal attachment to one of the two time points.

First analyses did not achieve a satisfactory fit between model and data. Considering age groups, however, yielded a better fit. Within the youngest age group (up to 40 years), the model achieved a very good fit, $\chi^2 = 7.3$, df = 6, $p = .29$, $\chi^2/df = 1.22$, GFI = .98, NFI = .98, TLI = .99, RMSEA = .05.

To elucidate possible age group effects, a constrained three-group model was specified that compared the three age groups and imposed various constraints upon the data. The measurement weights model, that constrained all measures to be of equal weight, achieved a moderate fit, $\chi^2 = 120.8$, df =

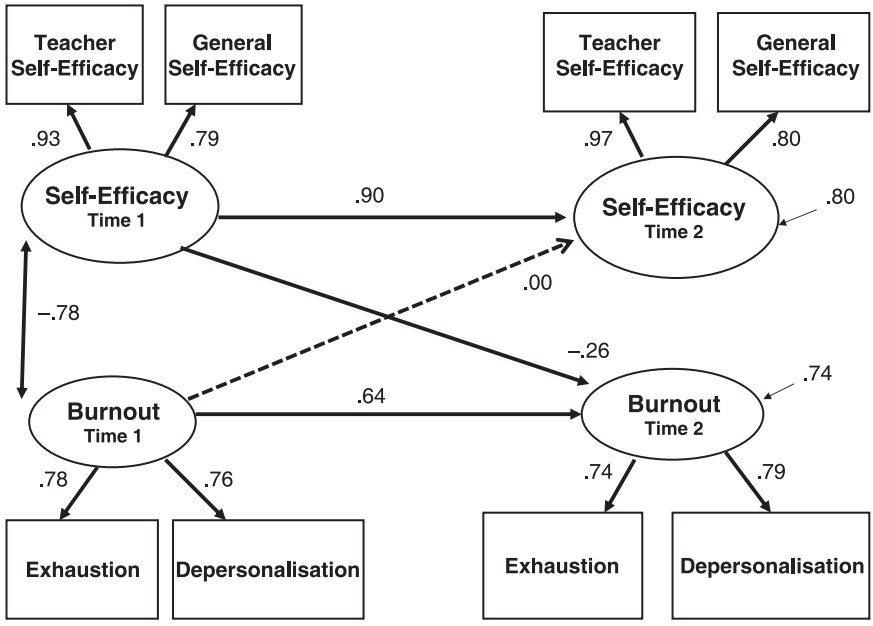

FIGURE 1. Cross-lagged panel design for self-efficacy and burnout with a one-year time span (autocorrelated residuals omitted from figure).

24, $p < .01$, $\chi^2/df = 5.03$, GFI = .94, NFI = .94, TLI = .91, RMSEA = .09. The most constrained model (measurement residuals model) also achieved a moderate fit, $\chi^2 = 191.88$, df = 48, $p < .01$, $\chi^2/df = 4.0$, GFI = .88, NFI = .91, TLI = .93, RMSEA = .08.

Figure 2 provides the standardised solution for each age group. Although the coefficients differ slightly between age groups, the basic message remains the same, namely that the effect of self-efficacy on burnout is mediated by job stress. Self-efficacy appears to be a protective resource against job stress, whereas job stress translates directly into burnout. Of the job stress variance, 57 per cent was accounted for by self-efficacy. Of the burnout variance, 84 per cent was explained by all predictors.

Moderated Mediation. The moderated mediation effect that was based on latent variables was confirmed by using manifest variables with the SPSS macro for moderated mediation by Preacher et al. (2007). For this analysis, the two Time 1 self-efficacy measures were summed, the two Time 2 burnout measures were summed, and the two job strain measures (Times 1 and 2) were also summed to gain three variables to be tested for mediation. An interaction between age groups and self-efficacy was found (Model 2 in

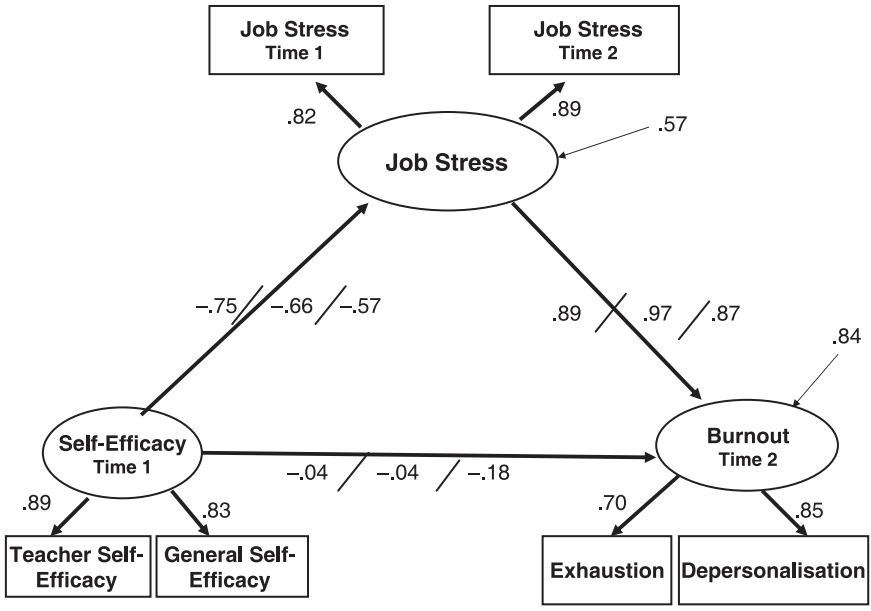

FIGURE 2. Job stress as a mediator between self-efficacy and burnout: A structural equation model with standardised coefficients.

Preacher et al., 2007). After introducing job stress into the prediction of burnout by self-efficacy, the effect of self-efficacy became nonsignificant. Conditional indirect effects of self-efficacy via job stress on burnout were significant at all age groups, with a trend to be stronger for younger teachers.

Discussion

The cross-lagged panel analysis has succeeded in confirming the direction of effects hypothesis. The path from earlier self-efficacy to later burnout (.26) was higher than the one from earlier burnout to later self-efficacy (.00). Although these are nonexperimental data, this finding seems to be trustworthy because it is in line with theory and previous research.

Based on this resource effect on burnout, we have tested the putative mediating role of job stress and have confirmed the relationship that had emerged in Study I. The latent self-efficacy factor predicted job stress, which, in turn, predicted burnout. Moreover, this effect was moderated by age. Mediation was documented for teachers below the age of 40, and less so for those who were older.

GENERAL DISCUSSION

Most of the research on teacher burnout has been done in North America. The present two studies from Syria and Germany with 1,203 teachers provide additional information on this topic from an international perspective, building on earlier cross-cultural research that we had carried out with teachers in Canada (Burke et al., 1996) and Hong Kong (Schwarzer et al., 2000). Part of the present studies are the cross-cultural validation of the teacher self-efficacy scale and also the other measures involved. Evidence emerged that the psychometric properties are satisfactory, and validation information is accumulating. However, there were also differences between Syrian and German teachers that could not be explained with certainty. Samples were not representative for the nations or cultures, and, therefore, no conclusions could be drawn whether mean level differences or those between correlation patterns were due to cultural characteristics, scale adaptation, data collection problems, self-selection of participants, or other causes.

A central research question addressed the prediction of burnout by self-efficacy as opposed to the prediction of self-efficacy by burnout. The cross-lagged panel analysis has added further evidence for this theory. The studies have also been conducted with the assumption that self-efficacy constitutes a resource factor, and that job stress may operate as mediator between self-efficacy and burnout. The main progress of the present studies lies in the analysis of the assumed mediation effect (self-efficacy $\rightarrow$ job stress $\rightarrow$ burnout), employing advanced methodology. Mediation was found cross-sectionally, in particular among German teachers, and, therefore, was further examined in the longitudinal data (Study II) that included only Germans.

Another innovative approach included the moderated mediation analysis. The model chosen for this task addressed the possible interaction between a fourth variable (general self-efficacy, age groups) that, to some degree, could account for the mediation effects found before. Mediation, thus, takes place only at particular levels of this variable. Cross-sectionally, it was found that the hypothesised mediation (teacher self-efficacy $\rightarrow$ job stress $\rightarrow$ burnout) was moderated by general self-efficacy. Longitudinally, it was found that age moderated this relationship. This emerged at the level of latent variables within a structural equation approach as well as in a different analysis using a formal test of moderated mediation in manifest variables (Preacher et al., 2007).

Some limitations need to be addressed. All data are self-reported, and further studies would ideally include data from the school context to improve validity of the constructs involved. Also, experience at the workplace and data on coping with professional demands would be valuable. Research

has found a number of other antecedents of burnout, for instance role ambiguity, work overload, disruptive students, amount of red-tape, sense of social isolation, lack of control, and lack of purposefulness (Burke et al., 1996). Future work should also address the positive pole of burnout, which has been called teacher engagement (Klusmann et al., 2008). One particular weakness of the present constructs seems to be the job stress variable. Its very close association with emotional exhaustion raises doubt about the construct validity of the job stress measure chosen here. A similar problem exists for the third burnout component, Reduced Personal Accomplishment. This component overlaps theoretically and empirically with the personal resource factor, perceived self-efficacy. Therefore, we have omitted this component from some of the analyses.

In sum, the present findings help elucidate the possible mechanisms that protect teachers from experiencing burnout and that translate a lack of personal resourcefulness into the experience of job strain, which, in turn, makes teachers vulnerable for burnout. Strengthening teachers' optimistic self-beliefs along with improved teaching skills should be a preventive measure to avoid this downward spiral.

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APPENDIX

English version of the Teacher Self-Efficacy Scale (Schwarzer, Schmitz, & Daytner, 1999) (see http://www.ralfschwarzer.de/).

1. I am convinced that I am able to teach successfully all relevant subject content to even the most difficult students.
2. I know that I can maintain a positive relationship with parents, even when tensions arise.
3. When I try really hard, I am able to reach even the most difficult students.
4. I am convinced that, as time goes by, I will continue to become more and more capable of helping to address my students' needs.
5. Even if I am disrupted while teaching, I am confident that I can maintain my composure and continue to teach well.
6. I am confident in my ability to be responsive to my students' needs, even if I am having a bad day.
7. If I try hard enough, I know that I can exert a positive influence on both the personal and academic development of my students.
8. I am convinced that I can develop creative ways to cope with system constraints (such as budget cuts and other administrative problems) and continue to teach well.
9. I know that I can motivate my students to participate in innovative projects.
10. I know that I can carry out innovative projects, even when I am opposed by skeptical colleagues.

Response format:
(1) *not at all true*, (2) *barely true*, (3) *moderately true*, (4) *exactly true*