



# A longitudinal study of teacher burnout and perceived self-efficacy in classroom management

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## Abstract

This study examined the direction and time-frame of relationships between perceived self-efficacy in classroom management and the three dimensions of burnout among 243 secondary school teachers. Structural equation modeling (SEM) analyses indicated that perceived self-efficacy had a longitudinal effect on depersonalization and a synchronous effect on personal accomplishment. However, the direction was reversed for the relationship between perceived self-efficacy and emotional exhaustion; the time frame was synchronous. It was concluded that perceived self-efficacy in classroom management must be taken into consideration when devising interventions both to prevent and to treat burnout among secondary school teachers. © 2000 Elsevier Science Ltd. All rights reserved.

*Keywords:* Burnout; Self-efficacy; Longitudinal studies; Secondary school teachers

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## 1. Introduction

Burnout is described as “a psychological syndrome of emotional exhaustion, depersonalization, and reduced personal accomplishment that can occur among individuals who work with other people in some capacity. Emotional exhaustion refers to feelings of being emotionally overextended and depleted of one’s emotional resources. Depersonalization refers to a negative, callous, or excessively detached response to other people, who are usually the recipients of one’s services or care” (Maslach,

1993, pp. 20, 21). Reduced personal accomplishment is described as “a person’s negative self-evaluation in relation to his or her job performance” (Schaufeli, Maslach & Marek, 1993, p. 17). The social relationships with the people in professionals’ care are the most obvious characteristic of occupations wherein burnout is an issue. A social psychological perspective which focuses on these relationships can be very useful in acquiring a closer understanding of burnout (Van Dieren-donck, Schaufeli & Sixma, 1994).

Burnout is a phenomenon of dramatic importance in education. The demands made on secondary school teachers consist to a substantial extent of emotionally charged relationships with students. In a study of over 5,000 American and Canadian teachers, 63% reported student discipline problems as the most stressful factors in their

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work environment (Kuzsman & Schnall, 1987). Relatedly, interaction research during classroom instruction reveals that student disruptive behavior has a positive effect on teacher burnout (Burke, Greenglass & Schwarzer, 1996; Friedman, 1995; Lamude, Scudder & Furno-Lamude, 1992; Byrne, 1991; Hock, 1988). For this reason it is advisable to pay attention to teacher–student relationships in studying teacher burnout.

Bandura's theory of perceived self-efficacy (Bandura, 1977, 1986, 1997) is a usable conceptual framework for studying the impact of emotionally charged relationships on burnout (Leiter, 1992; Cherniss, 1993; Brouwers & Tomic, 1998). Perceived self-efficacy refers to "beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments" (Bandura, 1997, p. 3). The power of this theory is that it integrates in one conceptual framework the origins or sources of efficacy beliefs, their structure and function, the processes through which they produce diverse effects, and the possibilities for change (Bandura, 1997).

Self-efficacy beliefs are the result of learning processes. Social relationships play an important role in these learning processes, which are based on four different sources of information (Bandura, 1997): (1) enactive mastery experiences that serve as direct indicators of capabilities, (2) vicarious experiences that alter efficacy beliefs by observing other people performing similar tasks, (3) verbal persuasion in which others can guide individuals to believe in their own capabilities, and (4) physiological arousal that indicates one's vulnerability to dysfunction.

Self-efficacy beliefs vary along three dimensions (Bandura, 1997; Maddux, 1995): (1) magnitude, which refers to the level a person believes him/herself capable of performing, (2) generality, which refers to the extent to which changes in self-efficacy beliefs extend to other behaviors and situations, and (3) strength, which refers to the resoluteness of people's convictions that he/she can perform a behavior in question.

Self-efficacy beliefs influence human functioning through four mediating processes (Bandura, 1997; Maddux, 1995): (1) they influence the goals people set for themselves and the strategies people envision for attaining these goals, (2) they influence

the motivation of people to persist in the face of obstacles, (3) they influence how people feel themselves when they attempt to reach their goals, and (4) they influence the situations people select in terms of their challenge.

Self-efficacy theory has inspired a tremendous body of research on the treatment of emotional and behavioral problems, such as anxiety and phobic dysfunctions, depression, eating disorders, and alcohol and drug abuse (Bandura, 1997). The theory has also applications in organizational, athletic, health-promoting, and educational settings. An example of an application in occupational psychology is a program which reduces absenteeism through development of self-regulatory efficacy (Frayne & Latham, 1987).

### *1.1. Teacher efficacy*

Teacher efficacy has been defined as "the extent to which the teacher believes he or she has the capacity to affect student performance" (Bergman, McLaughlin, Bass, Pauly & Zellman, 1977, p. 137), or as "teachers' belief or conviction that they can influence how well students learn, even those who may be difficult or unmotivated" (Guskey & Passaro, 1994, p. 4). In a review of empirical studies on teacher efficacy, Ross (1998) showed that teacher efficacy predicts a multitude of critically important variables. Examples include student achievement and motivation (Bergman et al., 1977; Moore & Esselman, 1992), student self-esteem and prosocial attitudes (Borton, 1991; Cheung & Cheng, 1997), school effectiveness (Hoy & Woolfolk, 1993), teachers' adoption of innovations (Fuchs, Fuchs & Bishop, 1992), the success of program implementation (Guskey, 1988), teachers' referral decisions for special education (Meijer & Foster, 1988; Soodak & Podell, 1993), teachers' professional commitment (Coladarci, 1992), teachers' classroom management strategies (Woolfolk, Rosoff & Hoy, 1990), teacher absenteeism (Imants & Van Zoelen, 1995), and teacher stress (Bliss & Finneran, 1991; Parkay, Greenwood, Olejnik & Proller, 1988). The concept of teacher efficacy is also studied in relation to teacher burnout, the topic of the present study. Besides such variables as internal rewards and support from principal and peers, Brissie,

Hoover-Dempsey and Bassler (1988), found that teacher efficacy predicts teachers' level of burnout. Teachers with a low sense of efficacy are also found to be the ones most likely to drop out of the teaching profession (Glickman & Tamashiro, 1982).

Tschannen-Moran, Woolfolk Hoy and Hoy (1998) proposed an integrated model which reflects the cyclical nature of teacher efficacy. Within this model, teachers' efficacy judgements are the result of the interaction between a personal appraisal of the relative importance of factors that make teaching difficult on the one hand and an assessment of self-perceptions of personal teaching capabilities on the other. To make these assessments, teachers draw information from four sources: enactive mastery experiences, vicarious experiences, verbal persuasion, and physiological arousal. The consequences of teacher efficacy—the goals teachers set for themselves, the effort they put into reaching these goals, and their persistence when facing difficulties—influence teachers' performance levels, which in turn serve as new sources of efficacy information. The cyclical nature of teacher efficacy implies that lower levels of efficacy lead to lower levels of effort and persistence, which lead to a deterioration in performance, which in turn lead to lower efficacy. In their study on teachers' self-efficacy in classroom management, Brouwers and Tomic (1998) found evidence to support such a cyclical model: high levels of student disruptive behavior lead to a low level of teachers' self-efficacy in classroom management, which lead to a higher level of teacher burnout, which in turn leads to a higher level of student disruptive behavior further reducing the level of teachers' self-efficacy.

With respect to the meaning and measurement of the concept of teacher efficacy, two strands of research can be identified (Tschannen-Moran et al., 1998). The first is grounded in Rotter's social learning theory of internal versus external control (Rotter, 1966). Teachers who believe that they are competent to teach difficult or unmotivated students were considered to have internal control, whereas teachers who believe that the environment has more influence on student learning than their own teaching abilities were considered to have ex-

ternal control. The RAND organization, which first conducted research on teacher efficacy, developed two items to measure a teacher's locus of control (Armor et al., 1976). The statement that indicates that environmental factors overwhelm a teacher's power to influence student learning was labeled "general teaching efficacy". The other, labeled "personal teaching efficacy," indicates the importance of a teacher's abilities to overcome factors that could make learning difficult for students. In the course of time several other instruments were developed to measure teacher efficacy in the Rotter tradition, including Teacher Locus of Control (Rose & Medway, 1981), Responsibility for Student Achievement (Guskey, 1981), and the Webb Efficacy Scale (Ashton, Olejnik, Crocker & McAuliffe, 1982).

The second strand of research on teacher efficacy was grounded in Bandura's social cognitive theory and his construct of self-efficacy (Bandura, 1977). Several measures grew out of this tradition, including the Teacher Efficacy Scale (Gibson & Dembo, 1984), the Science Teaching Efficacy Belief Instrument (Riggs & Enochs, 1990), the Ashton Vignettes (Ashton, Buhr & Crocker, 1984), and the Teacher Self-Efficacy Scale (Bandura, 1990). Both Ashton and Webb (1986) and Gibson and Dembo (1984) suggested that the meaning of the two RAND items as well as that of the two dimensions of the Teacher Efficacy Scale—the most used measure to assess teacher efficacy—reflect the two expectancies of Bandura's social cognitive theory, self-efficacy and outcome expectancies. However, after performing factor analysis on an efficacy questionnaire adapted from Gibson and Dembo, Guskey and Passaro (1994) found no evidence in favor of this distinction, but instead a simpler internal versus external dichotomy. Within Guskey and Passaro's (1994) conceptualization, the internal dimension refers to the extent that teachers believe that they have personal influence, power, and impact on student learning whereas the external reflects teachers' perceptions of the influence, power, and impact of factors outside the classroom. Guskey (1998) stated that this internal/external distinction is not the same as that of locus of control measures because the two teacher efficacy factors are distinct and operate fairly independently.

In order to develop a measure which better reflects the domain of classroom management, Emmer and Hickman (1991) have added to the original Gibson and Dembo instrument a third scale which they derived from “current conceptualizations” of classroom management (Doyle, 1986). Factor analysis indicated that the classroom management efficacy subscale is distinct from the two other teacher efficacy subscales. Although critics, echoing Guskey and Passaro (1994), could state that this subscale reflects an internal attribution particular to the domain of classroom management rather than confidence in the teachers’ own abilities to handle student disruptive behavior, inspection of the item’s content reveals that most of the recommendations to create self-efficacy items were complied (Forsyth & Carey, 1998; Maibach & Murphy, 1995).

### *1.2. Burnout and teacher self-efficacy in classroom management*

An increasing number of researchers draw on self-efficacy theory in their research on burnout. Leiter (1992) stated that burnout is “a crisis in self-efficacy,” and Cherniss (1993) wrote about “the role of professional self-efficacy in the etiology and amelioration of burnout”. Van Yperen (1998), Leithwood, Menzies, Jantzi and Leithwood (1996), and Rabinowitz, Kushnir and Ribak (1996) use self-efficacy theory in empirical research on burnout. Self-efficacy theory has also been used by Chwalisz, Altmaier and Russell (1992) and by Brouwers and Tomic (1998) to study burnout in educational settings. The latter authors focused on teacher-perceived self-efficacy in classroom management, defined as teachers’ beliefs in their capabilities to organize and execute the courses of action required to maintain classroom order.

The ability to control students in a classroom is a critical factor in any educational setting. After all, if teachers do not react adequately to students when their behavior is disruptive, instructional time is lost for all students. In order to reach instructional goals it is necessary for teachers to deal adequately with disruptive behavior in classroom. It may therefore be assumed that teachers perceive

attaining a comfortable classroom environment as an invaluable outcome of their efforts.

People who doubt their abilities in a particular domain of activity are quick to consider such activities as threats, which they prefer to avoid (Bandura, 1997). Teachers who distrust their ability to maintain classroom order cannot avoid this key factor of the job. Day in, day out, they must continue to instruct students in order to reach educational goals. Teachers who have no confidence in their classroom management abilities are confronted by their incompetence every day, while at the same time understanding how important that competence is if they are to perform well and achieve the educational goals. Furthermore, they are likely to know that their colleagues routinely succeed in obtaining a comfortable classroom environment (Metz, 1978).

Teachers who (1) distrust their classroom management abilities under standard job conditions and (2) understand the importance of that competence, (3) cannot avoid the management tasks if they are to reach the educational goals, and (4) are informed that colleagues routinely obtain a comfortable learning environment, can easily suffer stress, exhaustion, and negative attitudes (Davies & Yates, 1982; Usaf & Kavanagh, 1990). Several studies demonstrate that doubts about self-efficacy can in themselves trigger the burnout process. Chwalisz, Altmaier and Russell (1992) found that teachers who score low in self-efficacy reported a higher degree of burnout than their counterparts who score high in self-efficacy. Greenglass and Burke (1988) conclude that doubts about self-efficacy contributed significantly to the development of burnout among male teachers. The more specific relationship between teachers’ perceived self-efficacy in classroom management and burnout has been investigated as well. Friedman and Farber (1992) found that teachers who considered themselves less competent in classroom management and discipline reported a higher level of burnout than their counterparts who have more confidence in their competence in this regard.

The present study examined the direction and time frame of the relationships between perceived self-efficacy in classroom management and the three dimensions of teacher burnout. The study

involved a sample of secondary school teachers who were surveyed at two points in time with a time lag of five months. The study attempts to respond the criticism of Guglielmi and Tatro (1998), who, after they had reviewed studies on teacher burnout, called for a methodological shift toward longitudinal designs. This study aimed to test the predictive value of self-efficacy theory for the problem of teacher burnout, in order to determine the role of this theory in devising interventions both to prevent and to treat burnout among secondary school teachers.

## 2. Method

### 2.1. Participants

Participants were teachers working in secondary schools in the province of Limburg in the Netherlands. Time 1 respondents ( $N = 558$ ) were those who participated during the first wave of data collection and who had completed the questionnaires. They represented 48% of 1156 teachers asked to participate. Time 2 respondents ( $N = 243$ ) were teachers from the Time 1 sample who participated again at Time 2 and who had also completed the questionnaires. The measurement points at Time 1 and 2 were October 1997 and March 1998, respectively, an interval of five months. Time 2 respondents consisted of 179 male (74%) and 64 female (26%) teachers. The average age was 46.29 yr ( $SD = 8.20$ ) with a range of 24–63 yr. The average teaching experience in years was 21.25 ( $SD = 8.92$ ) with a range of 1–39 yr. A comparison with all teachers working in secondary schools in the province of Limburg in 1997 (CFI, 1998) showed that the sample of the present study was representative in terms of sex ( $\chi^2 = 0.97, p = 0.33$ ), not in terms of age ( $t = 2.19, p = 0.01$ ).

Analysis revealed no significant differences between Time 1 and 2 participants on the measures, including sex ( $\chi^2 = 0.34, p = 0.558$ ), age ( $t = 1.27, p = 0.103$ ), years of teaching experience ( $t = 1.28, p = 0.100$ ), perceived self-efficacy ( $t = 0.71, p = 0.238$ ), emotional exhaustion ( $t = 0.18, p = 0.428$ ), depersonalization ( $t = 0.00, p = 0.500$ ), and personal accomplishment ( $t = 0.71, p = 0.240$ ).

### 2.2. Measures

The measures were used at Time 1 and 2.

#### 2.2.1. Burnout

Burnout was measured using the Dutch version of the Maslach Burnout Inventory for teachers (MBI-NL-Ed; Schaufeli & Van Horn, 1995; Schaufeli, Daamen & Van Mierlo, 1994; Maslach & Jackson, 1981). The questionnaire includes 20 items divided into three subscales: Emotional Exhaustion (EE; 8 items), Depersonalization (D; 5 items), and Personal Accomplishment (PA; 7 items). The items were measured on a 7-point Likert scale, ranging from “never” to “every day”. Scores on the scales are added separately. High scores on the scales EE and D, and low scores on the PA scale are indicative of burnout. Examples of items are: “I feel emotionally drained from my work” (EE), “I feel burned out from my work” (EE), “I’ve become more callous toward people since I took this job” (D), “I feel students blame me for some of their problems” (D), “I feel exhilarated after working closely with my recipients” (PA), and “I have accomplished many worthwhile things in this job” (PA). In a study among secondary school teachers ( $N = 916$ ), Schaufeli and Van Horn (1995) found Cronbach’s Alphas of 0.87, 0.71 and 0.78, respectively. The three-factor structure of the Dutch version of the Maslach Burnout Inventory for teachers is confirmed with confirmatory factor analysis (Schaufeli, Daamen & Van Mierlo, 1994).

#### 2.2.2. Perceived self-efficacy in classroom management

Perceived self-efficacy in classroom management was measured using the Self-efficacy scale for Classroom Management and Discipline designed by Emmer and Hickman (1991). The questionnaire includes 14 items measured on a 6-point Likert scale and has a strongly agree/strongly disagree response format. Examples of items are: “I can keep a few problem students from ruining an entire class” and “If a student in my class becomes disruptive and noisy, I feel assured that I know some techniques to redirect him quickly.” For this scale Emmer and Hickman (1991) found a reliability coefficient of 0.79 ( $N = 161$ ). The Emmer and

Hickman questionnaire was translated into Dutch. The translated items were discussed with eight secondary school teachers to check their comprehensibility in a different educational system. Based on their suggestions the translations of some items were adapted.

### 2.3. Procedure

The principals of 15 randomly selected schools in the province of Limburg in the Netherlands were asked to cooperate in the study and were mailed questionnaires at Time 1 and at 2 along with a request to hand out the questionnaires to every teacher in their school accompanied by a letter explaining the nature and general aim of the study. At both measurement times follow-up mailings were used to increase the return rate.

### 2.4. Analysis

A structural equation modeling (SEM) procedure with maximum likelihood estimation utilizing the AMOS 3.6 computer program was employed to determine the most likely direction and time-frame (five months longitudinal or synchronous) of the relationships between perceived self-efficacy and the three burnout dimensions. In testing longitudinal relationships, SEM procedures have several

advantages with respect to other analytical procedures such as the cross-lagged panel correlation technique and hierarchical regression analysis. The SEM procedure provides tests that allow for directional conclusions and can include reciprocal relationships between variables (Zapf, Dormann & Frese, 1996; Kessler & Greenberg, 1981).

The SEM procedure starts with the formulation of several plausible models specifying the relationships within a set of variables. As a model is being formulated in SEM, the parameters of the relationships between the variables, i.e. the regression coefficients, are specified as either fixed or free. Fixed parameters are usually set at constant values (e.g. zero) while free parameters are regarded as nonzero in the population from which the sample is selected. For example, in order to specify that variable *X* has no effect on variable *Y*, the parameter concerned must be fixed at zero. However, when it is assumed that variable *X* does have an effect on variable *Y*, the parameter concerned must be released to estimate.

Fig. 1 shows a model that consists of four variables: self-efficacy at Time 1 and 2 and a particular dimension of burnout at Time 1 and 2, e.g. depersonalization. To examine the relationships between the variables, a four-step procedure was followed (Lee & Ashforth, 1993). In step 1, the stability model was compared with the null model to reveal

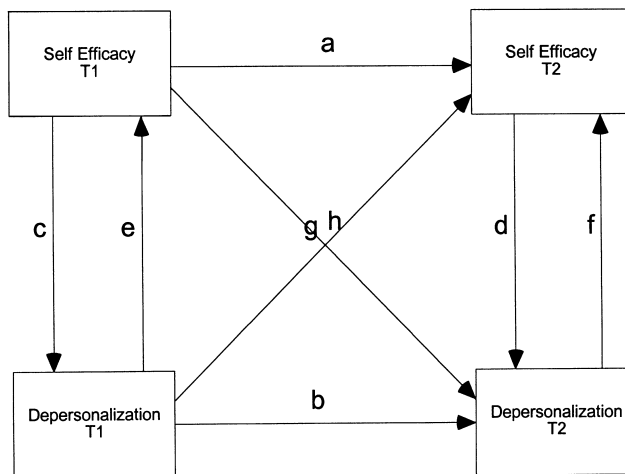


Fig. 1. Model for testing longitudinal relations between self-efficacy and the depersonalization dimension of burnout.

whether the stability paths were significant. A stability model consists of  $X_1-X_2$  and  $Y_1-Y_2$  relationships (stability paths) which reflect the amount of change in a single variable across time (Maruyama, 1998). In this model only the stability paths (arrows a and b in Fig. 1) are released, while the other paths (arrows c, d, e, f, g, and h) are fixed at zero. A null model represents the most restricted model, specifying that the variables are mutually independent (Bentler & Bonett, 1980). The variables at Time 1 were accepted to regress on themselves at Time 2, when the stability model fitted the data better than the null model.

In step 2, two synchronous models—named synchronous type 1 models—were compared with the stability model to reveal whether the synchronous paths were significant. In a synchronous type 1 model, the stability paths (arrows a and b) and the synchronous paths at Time 1 and 2 which go in the same direction are released (e.g., Time 1 perceived self-efficacy → Time 1 depersonalization [arrow c], and Time 2 perceived self-efficacy → Time 2 depersonalization [arrow d]) while the other synchronous paths as well as the lagged paths are fixed at zero (arrows e, f, g and h).

In step 3, two synchronous models with equality constraints—named synchronous type 2 models—were compared with the best-fitting synchronous type 1 model to reveal whether the synchronous paths met the stationarity assumption (James, Mulaik & Brett, 1982). In a synchronous type 2 model the stability paths are released (arrows a and b) and the synchronous paths at Time 1 and 2 which go in the same direction are constrained to be equal (e.g., Time 1 perceived self-efficacy → Time 1 depersonalization [arrow c] was set equal to Time 2 perceived self-efficacy → Time 2 depersonalization [arrow d]); the other synchronous paths as well as the lagged paths are fixed at zero (arrows e, f, g, and h).

In step 4, two longitudinal models were compared with the synchronous type 2 models to reveal whether the lagged paths were significant. Then the best-fitting longitudinal model was compared with the best-fitting synchronous model, to reveal which model fit the data best. In a longitudinal model, the stability paths (arrows a and b) and one of the lagged paths are released (e.g., Time 1 perceived

self-efficacy → Time 2 depersonalization [arrow g]), while the synchronous paths at Time 1 and 2 which go in the same direction as the released lagged path are constrained to be equal (e.g., Time 1 perceived self-efficacy → Time 1 depersonalization [arrow c] was set equal to Time 2 perceived self-efficacy → Time 2 depersonalization [arrow d]); the other lagged path and the other synchronous paths are fixed at zero (arrows e, f and h).

After models are formulated in SEM, the extent to which each model fits the data is estimated using the chi-square statistic. The chi-square statistic is used to compare the observed covariances, i.e. the covariances calculated from the data matrix, with the implied covariances, i.e. the covariances implied by the model. An arbitrary set of initial values which are possible within the boundaries of the model serve as a starting point for the implied covariances. Because the initial values are arbitrary, the fit is likely to be poor. One or more of the initial values are therefore changed to improve the fit, and the process is repeated with this new set of trial values. This cycle is repeated again and again until the optimum solution is found (Loehlin, 1998). The implied covariances of the optimum solution are then compared with the observed covariances using the chi-square statistic. If the chi-square statistic is small compared to the degrees of freedom, the model provides a plausible representation of the relationships between the variables in the population (Bentler & Bonett, 1980).

Chi-square difference tests were used to compare the relative fit of the models. The chi-square statistic for these tests is simply the difference between the separate chi-square statistics of the compared models, while the number of degrees of freedom (df) is simply the difference between their dfs (Loehlin, 1998). The model that performs better than the comparison models—as reflected in the chi-square difference tests—shows to have a significantly smaller difference between its implied covariances and the observed covariances than the comparison models.

Besides the chi-square statistic, the Adjusted Goodness of Fit Index (AGFI), the Tucker–Lewis Index (TLI), and the Comparative Fit Index (CFI) were used to examine the models fit. TLI and CFI are said to be relatively robust to sample size bias

and to take model simplicity and chi-square values into consideration (McDonald & Marsh, 1990; Bentler, 1990). The indexes were used to compare the models of step 1–4. In step 1 the null model served as baseline, whereas in steps 2–4 the stability model served as baseline. If TLI and CFI exceed 0.90, the fit of a model can be considered as acceptable (Bentler & Bonett, 1980). The model which performed significantly better than the comparison model—as reflected in the chi-difference tests—and which produced the largest value on TLI and CFI, was considered to fit the data best.

### 3. Results

Table 1 presents means, standard deviations, internal consistency measures (i.e., Cronbach’s Alpha), and intercorrelations of variables. The reliability of the scales at both measurement times was 0.71 or higher, which is adequate according to the criterion suggested by Nunnally (1978).

Table 2 presents the fit of the models to examine the synchronous and longitudinal relationships between perceived self-efficacy and the three burnout dimensions. For the relationship between emotional exhaustion and perceived self-efficacy, the step 1 results indicated that the stability model was significantly superior to the null model, as reflected in the chi-square difference test ( $\Delta\chi^2_{(2)} = 499.40$ ,

$p < 0.01$ ), and the values on AGFI (0.70 and 0.15, respectively). So, emotional exhaustion and perceived self-efficacy at Time 1 could be accepted to regress on themselves at Time 2. The step 2 results indicated that the synchronous type 1 models were significantly superior to the stability model, as reflected in the chi-square difference tests ( $\Delta\chi^2_{(2)} = 73.70, p < 0.01$  and  $\Delta\chi^2_{(2)} = 63.22, p < 0.01$ ). However, the synchronous type 1 model with the released paths of emotional exhaustion to perceived self-efficacy fitted the data better than the other synchronous type 1 model, as reflected in the values on the fit indexes (e.g., TLI is 1.00 and 0.72, respectively). The step 3 results indicated that the synchronous type 2 models were significantly inferior to the best-fitting synchronous type 1 model, as reflected in the chi-square difference tests ( $\Delta\chi^2_{(1)} = 12.67, p < 0.01$  and  $\Delta\chi^2_{(1)} = 32.62, p < 0.01$ ). The step 4 results indicated that only the longitudinal model with the released lagged path of emotional exhaustion to perceived self-efficacy was significantly superior to the best-fitting synchronous type 2 model, as reflected in the chi-square difference test ( $\Delta\chi^2_{(1)} = 6.94, p < 0.01$ ). However, the synchronous type 1 model with the released synchronous paths of emotional exhaustion to perceived self-efficacy fitted the data better than the best-fitting longitudinal model, as reflected in the values on the fit indexes (e.g., TLI is 1.00 and 0.86, respectively). So, the results indicated that the

Table 1  
Means, standard deviations, internal consistency measures (i.e., Cronbach’s Alpha’s), and intercorrelations of variables ( $N = 243$ )

Variable	Scale			Intercorrelations							
	M	SD	$\alpha$	1	2	3	4	5	6	7	8
Time 1											
1. Perceived self-efficacy	50.31	8.46	0.89	—							
2. Emotional exhaustion	16.30	9.43	0.91	–0.45	—						
3. Depersonalization	5.71	4.18	0.72	–0.43	0.61	—					
4. Personal accomplishment	27.01	6.64	0.86	0.60	–0.45	0.50	—				
Time 2											
5. Perceived self-efficacy	50.09	8.37	0.90	0.76	–0.46	–0.37	0.56	—			
6. Emotional exhaustion	16.83	9.51	0.92	–0.41	0.84	0.55	–0.41	–0.47	—		
7. Depersonalization	6.50	4.13	0.71	–0.36	0.58	0.69	–0.52	–0.45	–0.61	—	
8. Personal accomplishment	27.29	6.48	0.86	0.59	–0.53	–0.51	0.75	–0.69	–0.53	–0.63	—



Table 2  
Chi-squares, chi-square differences, and fit indexes of the models ( $N = 243$ )

	$\chi^2$	$df$	$\Delta\chi^2$	$p$	AGFI	TLI	CFI
Emotional exhaustion (EE)↔Perceived self-efficacy (PSE)							
Null model	574.47	6			0.15		
Stability model	75.07	4	499.40	0.000	0.70	0.81	0.88
Synchronous type 1 models:							
EE → PSE	1.37	2	73.70	0.000	0.99	1.00	1.00
PSE → EE	11.85	2	63.22	0.000	0.88	0.72	0.86
Synchronous type 2 models:							
EE → PSE	14.04	3	61.03	0.000	0.91	0.79	0.84
PSE → EE	33.99	3	44.08	0.000	0.80	0.42	0.56
Longitudinal models:							
EE → PSE	7.10	2	67.97	0.000	0.93	0.86	0.93
PSE → EE	22.10	2	52.97	0.000	0.79	0.43	0.72
Depersonalization (DP)↔ Perceived self-efficacy (PSE)							
Null Model	440.08	6			0.23		
Stability Model	76.88	4	363.20	0.000	0.69	0.75	0.83
Synchronous type 1 models:							
DP → PSE	7.04	2	69.84	0.000	0.93	0.86	0.93
PSE → DP	7.01	2	69.87	0.000	0.93	0.86	0.93
Synchronous type 2 models:							
DP → PSE	16.85	3	60.03	0.000	0.90	0.75	0.81
PSE → DP	14.32	3	62.56	0.000	0.91	0.79	0.84
Longitudinal models:							
DP → PSE	6.46	2	70.42	0.000	0.94	0.88	0.94
PSE → DP	2.71	2	74.17	0.000	0.97	0.98	0.99
Personal accomplishment (pa)↔ Perceived self-efficacy (PSE)							
Null Model	597.55	6			0.05		
Stability Model	187.80	4	409.75	0.000	0.44	0.53	0.69
Synchronous type 1 models:							
PA → PSE	21.59	2	166.21	0.000	0.79	0.79	0.89
PSE → PA	10.64	2	177.16	0.000	0.89	0.91	0.95
Synchronous type 2 models:							
PA → PSE	31.98	3	155.82	0.000	0.81	0.79	0.84
PSE → PA	20.49	3	167.31	0.000	0.87	0.87	0.90
Longitudinal models:							
PA → PSE	20.90	2	166.90	0.000	0.80	0.79	0.90
PSE → PA	13.61	2	174.19	0.000	0.87	0.87	0.94

synchronous type 1 model with the released synchronous paths of emotional exhaustion to perceived self-efficacy fitted the data best.

For the relationship between depersonalization and perceived self-efficacy, the step 1 results indicated that the stability model was significantly superior to the null model, as reflected in the chi-square difference test ( $\Delta\chi^2_{(2)} = 363.20$ ,  $p < 0.01$ ), and the values on AGFI (0.69 and 0.23, respectively). So, depersonalization at Time 1 could be accepted to regress on itself at Time 2. The step 2 results indicated that the synchronous type 1 models were

significantly superior to the stability model, as reflected in the chi-square difference tests ( $\Delta\chi^2_{(2)} = 69.84$ ,  $p < 0.01$  and  $\Delta\chi^2_{(2)} = 69.87$ ,  $p < 0.01$ ). The values on the fit indexes indicated that the fit of both synchronous models was about equal (e.g., TLI is 0.86 and 0.86). The step 3 results indicated that the synchronous type 2 models were significantly inferior to the best fitting synchronous type 1 model, as reflected in the chi-square difference tests ( $\Delta\chi^2_{(1)} = 9.84$ ,  $p < 0.01$  and  $\Delta\chi^2_{(1)} = 7.31$ ,  $p < 0.01$ ). The step 4 results indicated that the longitudinal models were significantly superior to the

best fitting synchronous type 2 model, as reflected in the chi-square difference test ( $\Delta\chi^2_{(1)} = 7.86$ ,  $p < 0.01$  and  $\Delta\chi^2_{(1)} = 11.60$ ,  $p < 0.01$ ). However, the longitudinal model with the released lagged path of perceived self-efficacy to depersonalization fitted the data better than the other longitudinal model as well as the synchronous type 1 models, as reflected in the values on the fit indexes (e.g., TLI is 0.98, 0.88, 0.86, and 0.86, respectively). So, the results indicated that the longitudinal model with the released lagged path of perceived self-efficacy to depersonalization fitted the data best.

For the relationship between personal accomplishment and perceived self-efficacy, the step 1 results indicated that the stability model was significantly superior to the null model, as reflected in the chi-square difference test ( $\Delta\chi^2_{(2)} = 409.75$ ,  $p < 0.01$ ), and the values on AGFI (0.44 and 0.05, respectively). So, personal accomplishment at Time 1 could be accepted to regress on itself at Time 2. The step 2 results indicated that the synchronous type 1 models were significantly superior to the stability model, as reflected in the chi-square difference tests ( $\Delta\chi^2_{(2)} = 166.21$ ,  $p < 0.01$  and  $\Delta\chi^2_{(2)} = 177.16$ ,  $p < 0.01$ ). However, the synchronous type 1 model with the released paths of perceived self-efficacy to personal accomplishment fitted the data better than the other synchronous type 1 model, as reflected in the values on the fit indexes (e.g., TLI is 0.91 and 0.79, respectively). The step 3 results indicated that the synchronous type 2 models were significantly inferior to the best-fitting synchronous type 1 model, as reflected in the chi-square difference tests ( $\Delta\chi^2_{(1)} = 21.34$ ,  $p < 0.01$  and  $\Delta\chi^2_{(1)} = 9.85$ ,  $p < 0.01$ ). The step 4 results indicated that only the longitudinal model with the released lagged path of perceived self-efficacy to personal accomplishment was significantly superior to the best-fitting synchronous type 2 model, as reflected in the chi-square difference test ( $\Delta\chi^2_{(1)} = 6.88$ ,  $p < 0.01$ ). However, the synchronous type 1 model with the released synchronous paths of perceived self-efficacy to personal accomplishment fitted the data better than the best-fitted longitudinal model, as reflected in the values on the fit indexes (e.g., TLI is 0.91 and 0.87, respectively). So, the results indicated that the synchronous type 1 model with the released synchronous paths of

perceived self-efficacy to personal accomplishment fitted the data best.

#### 4. Discussion

The present study examined the direction and time-frame of relationships between perceived self-efficacy in classroom management and the three dimensions of teacher burnout. The results show that the direction and time-frame (five months longitudinal or synchronous) of relationships between the variables were different for the three burnout dimensions.

The direction of the relationship between emotional exhaustion and perceived self-efficacy in classroom management showed an effect of the former on the latter, while the time frame was synchronous. The direction of the relationships between the variables does not necessarily contradict the findings of Brouwers and Tomic (1998). In their study of student disruptive behavior, perceived self-efficacy in classroom management and teacher burnout, they initially assumed that perceived self-efficacy has an effect on emotional exhaustion. However, SEM analysis procedure indicates that emotional exhaustion and depersonalization underlie a construct named the core of burnout. Although their analysis showed that perceived self-efficacy has an effect on the core of burnout and, by that on emotional exhaustion, a substantial part of this effect can be attributed to depersonalization, the other underlying factor. It so happens that the present study showed that the direction of the relationship between depersonalization and perceived self-efficacy is the reverse of the direction of the relationship between emotional exhaustion and perceived self-efficacy (Fig. 2).

An explanation of the effect of emotional exhaustion on perceived self-efficacy can be found in two sources of self-efficacy beliefs, including enactive mastery experiences and physiological and affective states (Bandura, 1986,1997). First, the number of enactive mastery experiences which serve as direct indicators of capabilities, will most likely decrease as a consequence of emotional exhaustion. The more emotionally exhausted teachers are, the poorer their performances will generally be.

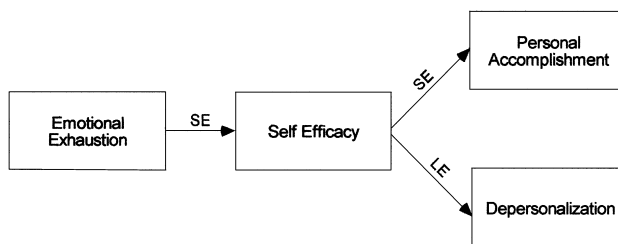


Fig. 2. Relationships between self-efficacy in classroom management and the three dimensions of burnout (SE above the arrows indicates synchronous effects, LE indicates a longitudinal effect).

Since teachers form their self-efficacy beliefs on the basis of evaluations of their performances (including their evaluation of their attempts to manage student disruptive behavior, Brouwers & Tomic, 1998), their perceived self-efficacy in classroom management will likely decrease as a consequence of diminished performances. Second, emotional exhaustion is a long-term stress reaction (Maslach & Leiter, 1997). Aversive physiological and affective arousal merged with job stress can serve as an indicator of low capability, which influences perceived self-efficacy negatively (Bandura, 1997).

The direction of the relationship between depersonalization and perceived self-efficacy in classroom management showed an effect of the latter on the former, while the time-frame was longitudinal. Brouwers and Tomic (1998) showed in a cross-sectional study an effect of perceived self-efficacy on the core of burnout of which depersonalization was one of the underlying factors.

Depersonalization refers to a cynical, cold, and distant attitude towards work and the people on the job, i.e. students (Maslach & Leiter, 1997). A possible explanation of the effect found is that teachers who doubt their ability to manage disruptive students can blame students for their doubts (Brouwers & Tomic, 1998). As a consequence, sooner or later they develop a negative attitude toward students.

The direction of the relationship between personal accomplishment and perceived self-efficacy in classroom management showed an effect of the latter on the former, while the time-frame was synchronous. The direction of the relationships between the variables is in accordance with the findings of Brouwers and Tomic (1998). They found

an effect of perceived self-efficacy on personal accomplishment as well, mediated by the core of burnout, i.e. emotional exhaustion and depersonalization.

Personal accomplishment and perceived self-efficacy are sometimes mistakenly viewed as essentially the same phenomenon measured at different levels of generality. In point of fact, they represent different phenomena. Perceived self-efficacy is a judgment of one's ability to organize and execute given types of performances, whereas personal accomplishment refers to a judgment of the consequences of such performances (Bandura, 1997).

The effect found of perceived self-efficacy on personal accomplishment is easy to explain. When teachers have little confidence in their ability to maintain classroom order, they will likely give up easily in the face of continuous disruptive student behavior. As a consequence they feel themselves ineffective in their attempts to maintain classroom order. It is reasonable to assume that these feelings of ineffectiveness will quickly arise after a decline in perceived self-efficacy. It so happens that teachers who doubt their ability to maintain classroom order also do less to solve the order problem.

This study has a few suggestions with respect to devising interventions. First, the longitudinal effect found on depersonalization and the synchronous effect on personal accomplishment suggest that it is important to take perceived self-efficacy in classroom management into consideration when devising interventions to prevent and to treat teacher burnout. Maddux and Lewis (1995) discussed strategies for enhancing self-efficacy and gave several recommendations to devisers of self-efficacy directed interventions.

The four sources of efficacy beliefs are enactive mastery experiences, vicarious experiences, verbal persuasion, and affective states (Bandura, 1997). As enactive mastery experiences have the greatest influence on self-efficacy, in enhancing teacher's self-efficacy in the domain of classroom management it is essential to induce experiences of success. To achieve this, the first step in a training program must be aimed at giving teachers the necessary skills to cope with disruptive student behavior. Practical problems would allow experienced teachers to tell how they handle such situations. In addition, they could watch a video showing teachers who handled student disruptive behavior successfully (vicarious experience). After the teachers were taught the necessary know-how to handle disruptive students, they could perform the new skills in a laboratory classroom in order to experience their mastery at handling disruptive behavior. Video-recordings would chart their successes and failures and allow experienced teachers to give feedback (verbal persuasion). After the teachers had experienced a kind of mastery at handling disruptive behavior in the laboratory classroom and after experienced teachers had persuaded them of their efficacy, they might be able to handle their own classrooms with more confidence in their abilities to manage disruptive behavior.

Second, emotional exhaustion may not be influenced directly by interventions which are intended to increase perceived self-efficacy in classroom management. So, it is desirable that interventions which take aim at treating all three dimensions of the burnout syndrome are focused not only on increasing self-efficacy in classroom management, but also on other determinants of teacher burnout. Longitudinal studies of teacher burnout have revealed that social support and disruptive students were precursors of burnout as well (Burke & Greenglass, 1995; Burke, Greenglass & Schwarzer, 1996).

This study has a few limitations. First, no previous research was available with which to estimate the time lag at which perceived self-efficacy and burnout influence each other, nor was it possible to deduce the time lag from theory. So, the time lag between the measurement points was arbitrarily specified at five months. Clearly, it is desirable to

identify the appropriate temporal lags for the development of burnout and perceived self-efficacy in future longitudinal studies (Gollob & Reichardt, 1987; McGrath & Kelly, 1986).

Second, the variables were measured at only two points in time. As all changes took place in the same time frame, the longitudinal effect found of perceived self-efficacy on depersonalization can only be considered as tentative.

Third, the number of teachers who participated at both measurement times was low in comparison with the total number of teachers who were asked to participate in the first instance. Although this problem is a common one in longitudinal studies, it makes it difficult to draw firm conclusions from the results. However, in the present study this problem was tackled to some extent by analyzing the differences between Time 1 and 2 participants on all measured variables. Since no significant differences were found, it was assumed that the refusal of teachers to participate at Time 2 was not selective.

It was concluded that in educational settings perceived self-efficacy in classroom management has a longitudinal effect on the depersonalization dimension of burnout and a synchronous effect on the personal accomplishment dimension. So, it is important to take perceived self-efficacy in classroom management into consideration when devising interventions to prevent and to treat burnout among secondary school teachers.

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## References

- Armor, D., Conroy-Oseguera, P., Cox, M., King, N., McDonnell, L., Pascal, A., Pauly, E., & Zellman, G. (1976). *Analysis of the school preferred reading programs in selected Los Angeles minority schools*. Santa Monica, CA: RAND. (ERIC Document Reproduction Service No. 130 243).

- Ashton, P. T., Olejnik, S., Crocker, L., & McAuliffe, M. (1982). *Measurement problems in the study of teachers' sense of efficacy*. Paper presented at the Annual Meeting of the American Educational Research Association, New York.
- Ashton, P., Buhr, D., & Crocker, L. (1984). Teachers' sense of efficacy: A self- or norm-referenced construct. *Florida Journal of Educational Research*, 26(1), 29–41.
- Ashton, P. T., & Webb, R. B. (1986). *Making a difference: Teachers' sense of efficacy and student achievement*. New York: Longman.
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, 84, 191–215.
- Bandura, A. (1986). *Social foundations of thought and action*. New York: Prentice-Hall.
- Bandura, A. (1990). *Multidimensional scales of perceived academic efficacy*. Stanford, CA: Stanford University.
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. USA: Prentice-Hall.
- Bentler, P. M., & Bonett, D. G. (1980). Significance tests and goodness of fit in the analysis of covariance structures. *Psychological Bulletin*, 88, 588–606.
- Bentler, P. M. (1990). Comparative Fit Indexes in structural models. *Psychological Bulletin*, 107(2), 238–246.
- Bergman, P., McLaughlin, M., Bass, M., Pauly, E., & Zellman, G. (1977). *Federal programs supporting educational change: Vol. VII. Factors affecting implementation and continuation*. Santa Monica, CA: RAND. (ERIC Document Reproduction Service No. 140 432)
- Bliss, J., & Finneran, R. (1991). *Effects of school climate and teacher efficacy on teacher stress*. Paper presented at the annual meeting of the American Educational Research Association, Chicago.
- Borton, W. M. (1991). *Empowering teachers and students in a restructuring school: A teacher efficacy interaction model and the effect on reading outcomes*. Paper presented at the annual meeting of the American Educational Research Association (ERIC Document Reproduction Service No. 335 341), Chicago.
- Brissie, J. S., Hoover-Dempsey, K. V., & Bassler, O. C. (1988). Individual, situational contributors to teacher burnout. *Journal of Educational Research*, 82(2), 106–112.
- Brouwers, A., & Tomic, W. (1998, July). *Student disruptive behaviour, perceived self-efficacy in classroom management and teacher burnout*. Paper presented at the ninth European Conference on Personality, University of Surrey.
- Burke, R. J., & Greenglass, E. (1995). A longitudinal study of psychological burnout in teachers. *Human Relations*, 48, 187–202.
- Burke, R. J., Greenglass, E. R., & Schwarzer, R. (1996). Predicting teacher burnout over time: Effects of work stress, social support, and self-doubts on burnout and its consequences. *Anxiety, Stress, and Coping: An International Journal*, 9(3), 1–15.
- Byrne, B. M. (1991). Burnout: Investigating the impact of background variables for elementary, intermediate, secondary, and university educators. *Teaching and Teacher Education*, 7(2), 197–209.
- CFI (1998). Agentschap van het Ministerie van Onderwijs, Cultuur en Wetenschappen. Zoetermeer (Persoonlijk verstrekte gegevens). [Branch of the Department of Education, Culture and Science, personal information]
- Cheung, W. M., & Cheng, Y. C. (1997, April). *A multi-level analysis of teachers' self-belief and behavior, and student' educational outcomes*. Paper presented at the annual meeting of the American Educational Research Association, Chicago.
- Cherniss, C. (1993). Role of professional self-efficacy in the etiology and amelioration of burnout. In W. B. Schaufeli, C. Maslach, & T. Marek, *Professional burnout: Recent developments in theory and research* (pp. 135–149). Taylor and Francis: Washington, DC.
- Chwalisz, K., Altmaier, E. M., & Russell, D. W. (1992). Causal attributions, self-efficacy cognitions, and coping with stress. *Journal of Social and Clinical Psychology*, 11(4), 377–400.
- Coladarci, T. (1992). Teachers' sense of efficacy and commitment to teaching. *Journal of Experimental Education*, 60, 323–337.
- Davies, F. W., & Yates, B. T. (1982). Self-efficacy expectancies versus outcome expectancies as determinants of performance deficits and depressive affect. *Cognitive Therapy and Research*, 6, 23–35.
- Doyle, W. (1986). Classroom organization and management. In M. Wittrock, *Handbook of research on teaching*. (3rd ed.) (pp. 392–431). New York: Macmillan.
- Emmer, E. T., & Hickman, J. (1991). Teacher efficacy in classroom management and discipline. *Educational and Psychological Measurement*, 51, 755–765.
- Forsyth, A. D., & Carey, M. P. (1998). Measuring self-efficacy in the context of HIV risk reduction: Research challenges and recommendations. *Health Psychology*, 17(6), 559–568.
- Friedman, I. A., & Farber, B. A. (1992). Professional self-concept as a predictor of teacher burnout. *Journal of Educational Research*, 86(1), 28–35.
- Frayne, C. A., & Latham, G. P. (1987). Application of social learning theory to employee self-management of attendance. *Journal of Applied Psychology*, 72, 387–392.
- Friedman, I. A. (1995). Student behavior patterns contributing to teacher burnout. *Journal of Educational Research*, 88(5), 281–289.
- Fuchs, L. S., Fuchs, D., & Bishop, N. (1992). Instructional adaptation for students at risk. *Journal of Educational Research*, 86, 70–84.
- Gibson, S., & Dembo, M. (1984). Teacher Efficacy: A construct validation. *Journal of Educational Psychology*, 76(4), 569–582.
- Glickman, C. D., & Tamashiro, R. T. (1982). A comparison of first-year, fifth-year, and former teachers on efficacy, ego-development, and problem-solving. *Psychology in the Schools*, 19, 558–562.
- Gollob, H. F., & Reichardt, C. S. (1987). Taking account of time lags in causal models. *Child Development*, 58, 80–92.
- Greenglass, E. R., & Burke, R. J. (1988). Work and family precursors of burnout in teachers: Sex differences. *Sex Roles*, 18(3/4), 215–229.
- Guglielmi, R. S., & Tatrow, K. (1998). Occupational stress, burnout, and health in teachers: A methodological and theoretical analysis. *Review of Educational Research*, 68(1), 61–99.

- Guskey, T. R. (1981). Measurement of responsibility teachers assume for academic successes and failures in the classroom. *Journal of Teacher Education*, 32, 44–51.
- Guskey, T. R. (1988). Teacher efficacy, self-concept, and attitudes toward the implementation of instructional innovation. *Teaching and Teacher Education*, 4, 63–69.
- Guskey, T. R., & Passaro, P. D. (1994). Teacher efficacy: A study of construct dimensions. *American Educational Research Journal*, 31, 627–643.
- Guskey, T. R. (1998, April). *Teacher efficacy measurement and change*. Paper presented at the Annual Meeting of the American Educational Research Association, San Diego, CA. (ERIC Document Reproduction Service No. 422 396).
- Hock, R. R. (1988). Professional burnout among public school teachers. *Public Personnel Management*, 17(2), 167–189.
- Hoy, W. K., & Woolfolk, A. E. (1993). Teachers' sense of efficacy and the organizational health of schools. *The Elementary School Journal*, 93, 356–372.
- Imants, J., & Van Zoelen, A. (1995). Teachers' sickness absence in primary schools, school climate and teachers' sense of efficacy. *School Organization*, 15(1), 77–86.
- James, L. R., Mulaik, S. A., & Brett, J. M. (1982). *Causal analysis: Assumptions, models, and data*. Beverly Hills, CA: Sage.
- Kessler, R. C., & Greenberg, D. F. (1981). *Linear panel analysis: Models of quantitative change*. New York: Academic Press.
- Kuzman, F. L., & Schnall, H. (1987). Managing teachers' stress: Improving discipline. *The Canadian School Executive*, 6, 3–10.
- Lamude, K. G., Scudder, J., & Furno-Lamude, D. (1992). The relationship of student resistance strategies in the classroom to teacher burnout and teacher type-A behavior. *Journal of Social Behavior and Personality*, 7(4), 597–610.
- Lee, R. T., & Ashforth, B. E. (1993). A longitudinal study of burnout among supervisors and managers: Comparisons between the Leiter (1988) and Golembiewski et al. (1986) models. *Organizational Behavior and Human Decision Processes*, 54, 369–398.
- Leiter, M. P. (1992). Burn-out as a crisis in self-efficacy: Conceptual and practical implications. *Work and Stress*, 6(2), 107–115.
- Leithwood, K., Menzies, T., Jantzi, D., & Leithwood, J. (1996). School restructuring, transformational leadership and the amelioration of teacher burnout. *Anxiety, Stress, and Coping*, 9, 199–215.
- Loehlin, J. C. (1998). *Latent variable models: An introduction to factor, path, and structural analysis*. London: Lawrence Erlbaum Associates.
- Maddux, J. E. (1995). Self-efficacy theory: An introduction. In J. E. Maddux, *Self-efficacy, adaptation, and adjustment: Theory, research, and application* (pp. 3–33). Plenum: New York.
- Maddux, J. E., & Lewis, J. (1995). Self-efficacy and adjustment: Basic principles and issues. In J. E. Maddux, *Self-efficacy, adaptation, and adjustment: Theory, research, and application* (pp. 37–68). Plenum: New York.
- Maibach, E., & Murphy, D. A. (1995). Self-efficacy in health promotion research and practice: Conceptualization and measurement. *Health Education Research: Theory and Practice*, 10(1), 37–50.
- Maruyama, G. M. (1998). *Basics of structural equation modeling*. Thousand Oaks: Sage.
- Maslach, C. (1993). Burnout: A multidimensional perspective. In W. B. Schaufeli, C. Maslach, & T. Marek, *Professional burnout: Recent developments in theory and research* (pp. 19–32). Taylor and Francis: Washington, DC.
- Maslach, C., & Jackson, S. E. (1981). The measurement of experienced burnout. *Journal of Occupational Behaviour*, 2, 99–113.
- Maslach, C., and Leiter, M. P. (1997). *The truth about burnout: How organizations cause personal stress and what to do about it*. San Francisco: Jossey-Bass.
- McDonald, R. P., & Marsh, H. W. (1990). Choosing a multivariate model: Noncentrality and goodness of fit. *Psychological Bulletin*, 107(2), 247–255.
- McGrath, J. E., & Kelly, J. R. (1986). *Time and human interaction: Toward a social psychology of time*. New York: Guilford Press.
- Meijer, C. J. W., & Foster, S. F. (1988). The effect of teacher self-efficacy on referral change. *Journal of Special Education*, 22, 378–385.
- Metz, M. H. (1978). *Classrooms and corridors. The crisis of authority in desegregated secondary schools*. Berkeley, CA: University of California Press.
- Moore, W., & Esselman, M. (1992). *Teacher efficacy, power, school climate and achievement: A desegregating district's experience*. Paper presented at the Annual Meeting of the American Educational Research Association, San Francisco.
- Nunnally, N. C. (1978). *Psychometric theory*. New York: McGraw-Hill Inc.
- Parkay, F. W., Greenwood, G., Olejnik, S., & Proller, N. (1988). A study of the relationship among teacher efficacy, locus of control, and stress. *Journal of Research and Development in Education*, 21(4), 13–22.
- Rabinowitz, S., Kushnir, T., & Ribak, J. (1996). Preventing Burnout: Increasing professional self efficacy in primary care nurses in a balint group. *American Association of Occupational Health Nurses Journal*, 44(1), 28–32.
- Riggs, I., & Enochs, L. (1990). Toward the development of an elementary teacher's science teaching efficacy belief instrument. *Science Education*, 74(625–638).
- Rose, J. S., & Medway, F. J. (1981). Measurement of teachers' beliefs in their control over student outcome. *Journal of Educational Research*, 74, 185–190.
- Ross, J. A. (1998). Antecedents and consequences of teacher efficacy. In J. Brophy, *Advances in research on teaching*, vol. 7 (pp. 49–74). Greenwich, CT: JAI Press.
- Rotter, J. B. (1966). Generalized expectancies for internal versus external control of reinforcement. *Psychological Monographs*, 80, 1–28.
- Schaufeli, W. B., Maslach, C., & Marek, T. (1993). *Professional burnout: Recent developments in theory and research*. Taylor and Francis: Washington, DC.
- Schaufeli, W. B., Daamen, J., & Van Mierlo, H. (1994). Burnout among Dutch teachers: An MBI-validity study. *Educational and Psychological Measurement*, 54(3), 803–812.

- Schaufeli, W. B., and Van Horn, J. E. (1995). *Maslach Burnout Inventory voor leraren (MBI-NL-Le). Voorlopige handleiding*. [Maslach Burnout Inventory for teachers. Preliminary guide]. University of Utrecht: PAGO.
- Soodak, L., & Podell, D. (1993). Teacher efficacy and student problem as factors in special education referral. *Journal of Special Education, 27*, 66–81.
- Tschannen-Moran, M., Woolfolk-Hoy, A., & Hoy, W. K. (1998). Teacher efficacy: Its meaning and measure. *Review of Educational Research, 68*(2), 202–248.
- Usaf, S. O., & Kavanagh, D. J. (1990). Mechanisms of improvement in treatment for depression : Test of a self-efficacy and performance model. *Journal of Cognitive Psychotherapy: An International Quarterly, 4*(1), 51–70.
- Van Dierendonck, D., Schaufeli, W. B., & Sixma, H. (1994). Burnout among general practitioners: a perspective from equity theory. *Journal of Social and Clinical Psychology, 13*, 86–100.
- Van Yperen, N. W. (1998). Informational support, equity and burnout: The moderating effect of self-efficacy. *Journal of Occupational and Organizational Psychology, 71*, 29–33.
- Woolfolk, A. E., Rosoff, B., & Hoy, W. K. (1990). Teachers' sense of efficacy and their beliefs about managing students. *Teaching and Teacher Education, 6*, 137–148.
- Zapf, D., Dormann, C., & Frese, M. (1996). Longitudinal studies in organizational stress research: A review of the literature with reference to methodological issues. *Journal of Occupational Health Psychology, 1*(2), 145–169.